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SAMENA TRENDS

FOR SAMENA TELECOMMUNICATIONS COUNCIL'S MEMBERS

BUILDING DIGITAL ECONOMIES

Featured

Review of International ITU Radio Regulations during the WRC-19

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THIS MONTH

EXPECTATIONS FROM THE WORLD RADIOCOMMUNICATION CONFERENCE 2019

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SUSTAINABILITY REPORT 2018

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VOLUME 10, JUNE, 2019

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Expectations from the World Radiocommunication Conference 2019

Starting October 28 this year in Egypt, the global Radio Regulations, through the World Radiocommunication Conference 2019 (WRC-19), will undergo review and, as necessary, revision to attend to the rising radio-frequency needs of the Telecommunications Industry. Among the most important areas of discussion at WRC-19, is the use of spectrum for mobile broadband, including for next-generation mobile broadband technology, 5G. Decisions taken at the conference on this and other matters could affect millions of users in the SA-ME-NA region, SAMENA Council's Member Operators, as well as other operators and technology business in the region.

The scale of what may transpire during WRC-19, not to mention the Conference itself, is large and challenging. For Telecom Operators, the most significant items of interest are the C band and UHF below 700 MHz. Based on discussions with Telecom Operators and experience as well as observation of what can be achieved at this stage, SAMENA Council, as a unified voice of the Industry in the SA-ME-NA region, is focusing its efforts on bands that will be of commercial value to Operator Members and important in the short-to-medium term.

The agenda of WRC-19 contains over 30 agenda items and issues covering many frequency bands and radio services and includes "standing" agenda items which address general regulatory and procedural matters. Some items are very specific and tightly defined while others cover a wide range of issues. All of them have the potential to create new opportunities for the use of the radio spectrum and may therefore present potential threat to existing users. In total, the agenda of WRC-19 consists of 17 spectrum proposals and a variety of administrative matters. The 17 proposals deal with bands ranging in frequency from proposed use of 50–54 MHz (6 m) for amateur radio in ITU Region I (Europe, Africa, the Middle East west of the Persian Gulf including Iraq, the former Soviet Union, and Mongolia) up to the proposed use worldwide of some parts of 275-450 GHz for terrestrial communications.

There are two main types of WRC spectrum related decisions: First, those which support services which are inherently international (for example, satellite, maritime and aeronautical), where the nature of the service means that a consistent approach is required across national boundaries. And, second, those where there is more scope for decisions to be taken at a national level. However, even in these cases there may be significant advantages in aligning with international frameworks. These include international harmonization to support economies of scale and the need to prevent harmful cross-border interference. The second is of particular importance and relevance with regard to 5G aspirations around the globe.

Since WRC-15, there has been a strong interest in using spectrum bands for 5G in higher frequency ranges than are currently used for mobile, i.e., above 24 GHz. The initial version of the agenda for WRC-19 was drafted and provisionally agreed at WRC-12. However, the majority of agenda items and their detailed scope were subsequently agreed at WRC-15.

Some of SAMENA Council's member companies (i.e., the satellite operators) have a good understanding of the ITU-R processes and WRC's. This is because satellite operators rely on the ITU-R process of filing satellite orbital slots with the ITU Master Frequency Registry in order to offer an international satellite service. There have been some efforts by SAMENA Council to help improve understanding of WRC-19 related issues between Satellite and Telecom Operators, and we continue to believe and hope that collaboration and understanding would be achieved in the future to realize desired, mutual benefit from imminent global spectrum allocation paradigm shifts.

Bocar A. BA
Chief Executive Officer &
Board Member
SAMENA Telecommunications
Council

What happens during the WRC-19 will have a direct impact on the speed of development and availability of 5G in the MEA region, and the SA-ME-NA region at large. This is so, because 5G can't be used to its fullest potential without wide deployment of 5G hardware and related equipment, both of which require spectrum and economies of scale. This requires an unprecedented scale of collaboration and understanding among local and national regulators and private-sector stakeholders, and there is also a need to become ambitious enough to implement multi-stakeholder engagement models across the spectrum front as well.

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SAMENA Council's Perspective on the WRC-19

World Radiocommunication Conference 2019: An Opportunity to Revisit Our Digital Development Priorities and Readiness

Bocar A. BA
Chief Executive Officer & Board Member
SAMENA Telecommunications Council

> *Decisions taken during the upcoming global WRC-19 Conference will set the direction for the use of spectrum throughout the world for the next several years; a time period during which the Industry is working tirelessly to develop 5G. It is, therefore, important that the voice of Operators be heard through SAMENA Council, which is an ITU-D Sector Member.*

Decisions taken during the upcoming global WRC-19 Conference will set the direction for the use of spectrum throughout the world for the next several years; a time period during which the Industry is working tirelessly to develop 5G. It is, therefore, important that the voice of Operators be heard through SAMENA Council, which is an ITU-D Sector Member.

The most important and presently relevant issue for Telecom Operators on the WRC-19 agenda is the 5G cellular topic in Agenda Item 1.13, which states:

"To consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238 (WRC-15)"

For SAMENA Council, which represents Telecom Operators and exercises its role in serving regional Regulatory Authorities as a sector-development partner, the core issue of the identification of spectrum to provide commercially viable options for the next-generation of mobile technologies, commonly referred to as 5G, is of immense relevance to the SA-ME-NA region's digital development efforts and national economic transformation goals, defined in various national ICT visions that the Council fully supports.

> *Under such a complex situation, Regulators in the region have expressed the need for SAMENA Council to assist in addressing the cross-border spectrum interference issues, which could compromise 5G development and its proliferation.*

The bands under prospective consideration at the WRC-19 for 5G have a variety of complex sharing issues with both allocations to the same-band as well as to adjacent-band users. Several inter-service interference frequency pairs have also been investigated by the ITU-R, and it is observed that, at the millimeter-wave frequencies, national differences in spectrum use are much easier to resolve without interference than in the VHF and UHF bands. However, such differences have a potential impact on the economies of scale in equipment development and production and interoperability issues when users travel to a country with different band plans. Thus, while a long list of bands is under discussion, it is yet to be confirmed if all are, in fact, commercially viable or attractive at all.

ITU Spectrum Regions

> *SAMENA Council hopes that close communication of priorities among the Regional Administrations as well as the Private Sector may lead us to a win-win situation for all.*

Under such a complex situation, Regulators in the region have expressed the need for SAMENA Council to assist in addressing the cross-border spectrum interference issues, which could compromise 5G development and its proliferation in markets, such as Saudi Arabia. Considering also that, as in other 5G-prime regions, Telecom Operators in the SA-ME-NA need and want access to commercially attractive bands for mobile broadband and 5G both in the short and medium terms, SAMENA Council hopes that close communication of priorities among the Regional Administrations as well as the Private Sector may lead us to a win-win situation for all.

The fulfillment of grand sustainable development goals and our collective readiness to tackle the world's prevailing issues, which can be addressed effectively through the ICTs, merit that the post WRC-19 spectrum situation around the globe should be much better than how it is prior to the Conference. We may realize that WRC-19 presents itself as a much-needed opportunity to bridge the rising digital divides across the three ITU spectrum Regions.

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Arab Spectrum Management Group's Perspectives on the WRC-19

Tariq Al Awadhi
Executive Director Spectrum Affairs
Telecommunications Regulatory Authority (TRA), UAE

TRA هيئة تنظيم الاتصالات
TELECOMMUNICATIONS REGULATORY AUTHORITY

> *WRC-19 will be one of the most important ICT events held in the Arab region. It is coming in a transformational era where countries are considering and launching different future digital development plans to foster and benefit from the fourth industrial revolution.*

Q. What is the significance of WRC-19 to the Arab Region's future digital development plans?

A. WRC-19 will be one of the most important ICT events held in the Arab region. It is coming in a transformational era where countries are considering and launching different future digital development plans to foster and benefit from the fourth industrial revolution.

WRC-19willmakeimportantinternationaldecisions and possible changes to Radio Regulations covering different radiocommunications services and applications such as IMT & RLAN in Mobile Service, ESIMs in Fixed Satellite Service, and VDES in Maritime Service.

Q. What relevant preparatory milestones has the Arab Region been able to achieve since WRC-15?

A. Arab Spectrum Management Group has succArab Spectrum Management Group (ASMG) has successfully held four meetings since the end of WRC-15 and throughout the course of preparations for WRC-19. It is important to highlight that while ASMG's main focus has been on preparing for the WRC, ASMG has also taken advantage of its meetings to share various experiences of Administrations and proposals towards harmonizing the use of frequency bands for some services and applications. ASMG has also provided some technical studies pertaining to various challenges associated with un-harmonized utilization of specific frequency bands.

Positions on WRC-19 agenda items are taken based on the interests of the ASMG Administrations. Generally, these positions take into consideration the same basic principles that are followed by all regional groups: to have the most efficient use of spectrum; to accommodate new developments and new technologies in the industry; and to protect the existing services.

Q. What outcomes are anticipated by the regional Regulators and the Private sector?

A. Currently, all ASMG Administrations (regional regulators) are looking at all WRC-19 agenda items and issues to be discussed in the conference. All topics are important, and ASMG Administrations have their views on all the agenda items and issues. However, in terms of priorities, we could indicate that outcomes of Agenda Item 1.13, which specifically refers to the identification of frequency bands for 5G applications (or what is called IMT2020) is of great importance for many ASMG Sdministrations. This Agenda Item has direct implications for the Arab region's future digital development plans, in which 5G has been deemed to be an important transformational force.

> *Currently, all ASMG Administrations (regional regulators) are looking at all WRC-19 agenda items and issues to be discussed in the conference. All topics are important, and ASMG Administrations have their views on all the agenda items and issues.*

The Private sector, specifically Operators, is aligned with the regulators' views on various proposals and considerations, and is mainly looking into the new deployments of IMT, ESIM, etc., and also wishes to ensure the protection of and return on investment on their existing operating systems and infrastructure.

ASMG has taken into account the important participation by all industry stakeholders, and this will increase the possibility of achieving unified decisions on harmonized bands in Region 1.

Q. In the wake of WRC-19, what due considerations for future ICT development efforts are merited as the world moves toward digital economy?

A. ASMG is fully aligned with the main aim of revising relevant RR articles, which are essential to keep this global as well as regional harmonization. Besides the works undertaken by ITU-R Study Groups to promote the frequency-wide harmonization which helps in facilitating future ICT development and digital economy, the Arab region has made direct contributions and is fully attentive to future ICT development needs, globally. There are number of agenda items which together will shape the future of a digital lifestyle and digital economy around the world.

The WRC will address in addition to 5G the intelligent transportation system frequency ranges, future of railway communications, HAPS, RLAN, among others.

Global spectrum harmonization is thus essential for achieving economies of scale, roaming, and ensuring interoperability. The WRC decisions should bring regulatory stability to the standards, equipment manufacturing and deployment of new networks.

Q. How do you see the post WRC-19 situation within the industry, and what can be anticipated for WRC-23?

A. All regional groups have started discussions on WRC-23's priorities of agenda items and studies which are not only limited to IMT possible studies, but to other radiocommunications services such as Fixed-Satellite Services, etc.

ASMG has already initiated discussions on future agenda items related to ESIMS in Q and V bands and also IMT, in particular the sub-700 MHz Band as well as the primary Mobile Allocation in the 3300-3800 MHz range with some reservation from a few Arab Administrations on the 3300-3400 MHz band.

> *Global spectrum harmonization is thus essential for achieving economies of scale, roaming, and ensuring interoperability. The WRC decisions should bring regulatory stability to the standards, equipment manufacturing and deployment of new networks.*

At its final meeting, to be held at the end of July 2019, ASMG will make its final decisions on the future WRC-23 agenda items to be supported.

It is important to note that there is always a room for improvement on ITU processes to foster the process and to pace up with rapid industry developments and technology trends. ASMG acknowledges and supports the ITU's consensus-driven processes, including the WRCs, and fully supports contributions driven by Member States and ITU Sector Members. This process has shown over the time its efficiency to obtain consensus across Member States, despite varying interests, priorities, and needs. However, the pace of new developments, which are imminent in terms of technologies, innovations, and societal trends, will require some improvements to be made to future WRC processes, especially within the scope of WRC-23 preparations.

African Perspective on the WRC-19

WRC-19 presents a critical opportunity for African countries to work with like-minded countries to finalize identification of spectrum that will enhance the delivery of services across various industries, but especially wireless broadband, to rural and remote un-served and underserved areas where wireline facilities are not feasible.

Q. What is the significance of WRC-19 to Africa's Digital Development Plans?

A. WRC-19 will discuss use of spectrum for various services including next generation of mobile networks or 5G and the following:

- Sharing between non-geostationary and geostationary satellites;
- Additional spectrum allocation to amateur radio services;
- Modernisation of Global Maritime Distress and Safety System (GMDSS);
- Introduction of a Global Aeronautical Distress and Safety System (GADSS);
- Potential global or regional harmonisation of spectrum for the development of Intelligent Transport Systems (ITS);
- Identification of additional spectrum for High Altitude Platform Stations (HAPS);
- Technical and operational aspects of narrowband and broadband machine-type (i.e. IoT, "Internet of Things") communication infrastructures;
- Possible extension of Local Wireless Broadband or RLANs; and
- Satellite coordination & recording procedures and processes; among others.

Decisions taken at the conference on these and other matters have the potential to affect millions of African consumers and businesses.

Daniel Obam
Communications Secretary
National Communications Secretariat, Kenya

The African continent is suffering from low mobile broadband connectivity with less than 30% of Africans having access to broadband. The majority of Africans access the Internet mostly via mobile phones. Internet access anywhere and at any time is pivotal to the successful growth of a knowledge economy. African governments will continue to invest in infrastructure for universal, always-on, high speed, wireless data connectivity for every citizen. Nonetheless, ICTs and broadband access are expected to play significant role in enhancing Africa's competitiveness in the implementation of the African Continental Free Trade Area (AfCFTA). Therefore, African governments are looking at making broadband accessible and affordable to enable citizens to utilize digital technologies to access public services and transact business effortlessly on online platforms.

> *One of the agenda items to be discussed at WRC-19 concerns identification and the future availability of spectrum for the next generation of mobile broadband, commonly referred to as 5G.*

As postulated by the World Economic Forum, the digital and wireless transformation of Africa's economies will be powered by 5G networks, which have the potential to drive economic growth in the region like no previous generation of mobile technology. One of the agenda items to be discussed at WRC-19 concerns identification and the future availability of spectrum for the next generation of mobile broadband, commonly referred to as 5G.

WRC-19 presents a critical opportunity for African countries to work with like-minded countries to finalize identification of spectrum that will enhance the delivery of services across various industries, but especially wireless broadband, to rural and remote un-served and underserved areas where wireline facilities are not feasible.

Q. What relevant preparatory milestones has Kenya contributed to in this regard?

A. Kenya's preparatory process for WRC-19 began in early 2016 when members of the National Preparatory Committee (NPC) who had attended WRC-15 held a one-day workshop to brief other stakeholders on the outcomes of WRC-15. Thereafter, the National Preparatory Committiee for WRC-19 was constituted. The main objective of the NPC was to prepare the country position for the WRC-19, taking into consideration the results of ITU studies, current national spectrum use and priorities. The membership of the NPC was drawn from organisations that utilize the radio frequency spectrum resource. The Communications Authority of Kenya (CA), by virtue of its mandate as the country's radio frequency management agency, plays a pivotal role in the preparations of the WRC-19 by providing the chairmanship and secretariat for the NPC as well as logistical support for all the preparatory activities.

The NPC holds its meetings before major international preparatory meetings such as EACO Preparatory Meetings, ATU Preparatory Meetings, CPM and Inter-Regional Workshops while the associated subcommittees hold several meetings depending on the volume of allocated work in order to deliberate on the WRC-2019 agenda items in an effort to come up with final positions.

Kenya hosted and chaired the first ATU Preparatory meeting for WRC-19. We have also attended all the EACO and ATU preparatory meetings and contributed the rapporteur for Chapter 6 of the CPM Report.

Q. In the wake of WRC-19, what due considerations for future ICT development efforts are merited?

A. 5G technology is expected to increase opportunities for developments brought about by technologies such as Internet of Things (IoT), Machine-to-Machine (M2M) communications, Virtual Reality, Artificial Intelligence and mission critical communication. It is also expected to enhance overall capacity, speed and latency of the mobile networks and drive industrial and societal transformation and economic growth globally.

> *5G technology is expected to increase opportunities for developments brought about by technologies such as Internet of Things (IoT), Machine-to-Machine (M2M) communications, Virtual Reality, Artificial Intelligence and mission critical communication.*

The WRC process has helped create economies of scale and make mobile services more affordable and as a result penetration of telephony in Africa has increased significantly.

The decisions at WRC-19 hold the promise for next-generation networks which will connect the remaining billions of unserved and under-served populations in Africa, with even higher capacity, higher speed services globally, opening up a world of opportunities to African and other people in the world.

Q. What milestones has the Republic of Kenya achieved in national digital transformation? (reference to the Kenya Blue Print)

A. Kenya has achieved much in the digital transformation of its economy; although a lot more work remains to be accomplished. In the SMART Africa Alliance (whose aim is to use ICT to drive the achievement of Africa as a Single Digital Market), Kenya has the responsibility to promote the Digital Economy Pillar. During the Transform Africa Summit held in Kigali, Rwanda in May 2019, Kenya decided to review the factors that are driving the digital transformation of its economy.

The review resulted in the development, through a collaborative effort between the government, it's agencies and the private sector, of the Kenya Digital Economy Blueprint for Africa which outlines the factors that are behind the digital transformation of the economy.

> *The Kenya Vision 2030 aims to create "a globally competitive and prosperous country with a high quality of life by 2030". It also aims to transform Kenya into "a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment". The Vision identifies ICT as a key enabler in the achievement of economic pillars and a critical factor in driving the economic, social and political development in our country.*

Kenya's national development priorities are enshrined in the Kenya Vision 2030 and the Big Four Agenda. The Kenya Vision 2030 aims to create "a globally competitive and prosperous country with a high quality of life by 2030". It also aims to transform Kenya into "a newly-industrializing, middle income country providing a high quality of life to all its citizens in a clean and secure environment". The Vision identifies ICT as a key enabler in the achievement of economic pillars and a critical factor in driving the economic, social and political development in our country.

On the other hand, the Big Four Agenda is an accelerated five-year development plan designed to fast-track the realisation of the Vision 2030 and focuses on four pillars, namely Food and Nutritional Security, Universal Healthcare, Manufacturing, and Affordable Housing. The Big Four agenda can be directly related to the Sustainable Development Goals (SDGs) No. 2(End hunger, achieve food security and improved nutrition and promote sustainable agriculture), 3(Ensure healthy lives and promote well-being for all at all ages), 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) and 11 (Make cities and human settlements inclusive, safe, resilient and sustainable)

The Blueprint defines the Digital Economy as "the entirety of sectors that operate using digitally-enabled communications and networks leveraging internet, mobile and other technologies", and identifies pillars that are driving the digital transformation of the economy.

Kenya sees the Digital economy as opportunity to leapfrog and grow its economy, and transit to a Knowledge based economy. It expects to reap benefits in economic growth (GDP growth, sustainable development , job creation, reduced poverty, and innovative homegrown solutions), socio-economic development (enhanced quality of life and basic needs leading to citizen satisfaction), and in improved governance(transparency and accountability, greater efficiency for better public service delivery and increased public participation in decision making).

Five pillars have been identified as the foundations to guide the collective way forward in the Kenya's digital economy:

- **Digital Government** - The presence and use of digital services and platforms to enable public service delivery
- **Digital Business** - Development of a robust marketplace for digital trade, digital financial services and digital content. As the home for MPESA, Kenya is recognised globally as one of the world leaders in driving financial inclusion through the use of digital finance solutions.
- **Infrastructure** - The availability of affordable, accessible resilient and reliable infrastructure
- **Innovation-Driven Entrepreneurship** - The presence of an ecosystem that supports homegrown firms to generate world class products and services which help to widen and deepen digital economic transformation.
- **Digital Skills and Values** - The development of a digitally skilled workforce that is grounded on sound ethical practices and sociocultural values

Q. In your role, how do you foresee the post WRC-19 international efforts on ICT development?

A. Post WRC-19, countries will have to promote policies that promote development of ICTs as an important tool for innovation processes, digital transformation and economic growth. The traditional regulatory architecture will be ill-suited for the ICT sector in a converged environment where 5G is deployed. Due to the expected rapid changes in technology and how it rapidly disrupts systems, any regulation must be backed by proper data and research with high level principles being applied as regulatory tools instead of prescriptive rules as has been done previously. The policy areas of focus could be:

- Broadband deployment: available high-speed broadband viewed as a driver of innovation, efficient public service delivery, growth and jobs in ICT industry and beyond.;
- Encouragement of technology diffusion to businesses for smart applications which are both more efficient and environmentally friendly;
- The security of information systems and networks;
- Electronic settlement/payment;
- Availability of relevant and appropriate Digital content.
- Introduction of pro-investment ICT policies which should be applied progressively to drive innovation, growth and to protect consumers and must take cognizance of the convergence and emergence of new technologies.

Q. In what significant ways is Africa region fulfilling its obligations and commitment to the international sustainable development goals?

A. Africa is doing this in several ways some of which are enumerated below:

African Continental Free Trade Area (AfCFTA) Agreement
The is reported to be world's largest free trade zone — a 55-nation bloc worth $3.4 trillion. The AfCFTA agreement was signed in Kigali Rwanda on 21 March 2018 and by July 2019, 54 African States had signed up. Kenya and Ghana were among the first countries to ratify the Agreement and the ratification requirement was reached in good time and the agreement was launched on 8 July 2019 in Niamey Niger by African leaders.

The trade pact aims to create a single African continental market for goods and services and boost cross-border trade by reducing or eliminating duties and red tape with free movement of business, persons and investments. This is expected to expand intra-Africa trade, expedite the continental integration process and enhance competitiveness at the industry and enterprise level. All these will contribute towards the African Region fulfilling its obligations and commitment to the international sustainable development goals as well as making the economies of African countries become stronger and much bigger and the mutual benefits of trade elevating Africa's economic development status.

SMART Africa Alliance
SMART Africa Alliance is group of countries with a vision to Transform Africa into a single digital market and whose Heads of State and Government have made a bold and innovative commitment to accelerate sustainable socio-economic development on the continent, ushering Africa into a knowledge economy through affordable access to Broadband and usage of ICTs.

Policy and Regulation Initiative for Digital Africa (PRIDA)
The African Union Commission (AUC) in line with its role and strategic mandate in developing continental strategies and related norms initiated several studies on harmonization of policies, regulatory frameworks and strategies conducive to development of regional and continental ICT networks and services. Affordable and accessible ICT services have the potential to help create competitive markets, drive social and inclusive growth and deliver more equitable development.

PRIDA has the objective of fostering universally accessible and affordable broadband across Africa, in order to unlock future benefits of internet-based services. Specifically it aims to create a more harmonised and enabling legal and regulatory framework for the use of ICT for social and economic development, with an emphasis on boosting the spectrum market across Africa. The project which is funded in collaboration with European Commission has the strategic priority areas of mobilising investments for African structural sustainable transformation. The main activities of the project are based on three pillars:

- Efficient and harmonised spectrum utilisation;
- Harmonisation of measurable ICT/ Telecommunications policy, legal and regulatory frameworks; and
- African decision makers' active participation in the global internet governance debate.

SMART Africa Alliance is group of countries with a vision to Transform Africa into a single digital market and whose Heads of State and Government have made a bold and innovative commitment to accelerate sustainable socio-economic development on the continent, ushering Africa into a knowledge economy through affordable access to Broadband and usage of ICTs.

Telecom Operator Perspective on the WRC-19

Karim Lesina
Senior Vice President International
External and Regulatory Affairs
AT&T

> *WRC-19 is important domestically in the U.S. as it will directly impact the ability and utility of mmWave bands in the deployment of terrestrial 5G. Globally it will impact the business from economies of scale and international roaming perspective.*

Q. How well is the WRC-19 agenda understood by Operators in the North American market, and what is the significance of WRC-19 to your business aspirations around the globe?

A. Major operators in the U.S. have a good understanding of many of the WRC-19 agenda items ("AI"), in particular AI 1.13 - the identification of spectrum for IMT-2020 to which most of their focus has been. Smaller operators are likely relying on industry associations such as CTIA and GSMA for information and updates.

There has been less focus on the other WRC-19 agenda items. However, to the extent that an AI is addressing the same spectrum as is included in AI 1.13, such as AI 1.13 HAPS or AI 1.6 NGSO, operators have been involved to ensure that terrestrial services are not negatively impacted in the band or a bad precedent is set for this or future WRCs.

WRC-19 is important domestically in the U.S. as it will directly impact the ability and utility of mmWave bands in the deployment of terrestrial 5G. Globally it will impact the business from economies of scale and international roaming perspective. In addition, to the extent that there is harmonization of spectrum bands internationally, this provides opportunities to serve multi-national businesses with less complex devices.

Q. Spectrum challenges for the Industry are immense. How prepared is the private sector as a whole to address these challenges?

A. 5G will provide (1) much greater speeds, (2) much lower latency, and (3) massive IoT connections. Operators on their own using existing terrestrial allocations and licenses will be challenged to deploy 5G along with supporting legacy technology as customers migrate to 5G. As such, the industry will be hard pressed to address the challenges of increased consumer demand and new services. Additional low-band, mid-band, and high-band (mmWave) spectrum needs to be identified and then allocated to operators by countries in order to be prepared to meet the challenges. Those countries who fail to do so will fall behind, losing opportunities.

Q. What is on your wish list for WRC-19 and WRC-23?

A. For WRC-19, it is the following:
Agenda Item 1.13 (top on the wish list):

- Identification of the 26 GHz band (24.25-27.5 GHz) for IMT-2020 with minimal necessary constraints (condition A2a). Any constraint on OOBE in this band must be based on realistic and non-flawed studies protecting passive EESS services in 23.6-24.0 GHz. Many of the studies that went into Task Group 5/1 were flawed and analyzed a sensor that didn't exist. We support the current U.S. position on the protection of passive services at -20 dBW/200MHz. Sharing studies of other services such as FSS and ISS showed large positive margins and no conditions are necessary here.
- Identification of the 40 GHz band (37-43.5 GHz) for IMT-2020 with no conditions (Method C2, Alternative 2; method D2, alternative 2; method E2, alternative 2). Because different Administrations are looking at various blocks of spectrum within this range for IMT-2020 (for example the U.S. has identified 37-40 GHz for IMT-2020 which the EU has identified 40-42.5 GHz), it is important that the entire tuning range be identified which will offers Administrations flexibility and maximizes economies of scale while providing for international roaming.

We view the industry post WRC-19 as vibrant and competitive and moving quickly to 5G.

This allows each government to choose which range is best in their respective country given their local circumstances and still allow others, such as satellite access to portions of the band. In addition, studies show existing unwanted emission limits in 3GPP are sufficient to protect other services, including passive EESS which is already shared with active services, and no technical conditions to protect other services are required.

AI 9.1.1 – Sharing between IMT and MSS in 1885-2025 and 2110-2200
Support No Change to the regulatory conditions currently in force. ITU-R studies being conducted in response to this issue have identified several technical and operational measures to address compatibility of the terrestrial and satellite components of IMT in adjacent countries. Necessity of these measures depends on cross-border situations, and these measures may not be universally applicable to all possible cross-border cases. Administrations should have the flexibility to adopt a variety of such measures, based on actual system characteristics and confidential information, during the bilateral coordination processes, and this flexibility should be maintained. A change to the Radio Regulations would limit the present flexibility for deployments by individual countries.

AI 1.14 HAPS
Some of the bands under consideration as part of AI 1.14 are not going to be used by IMT/5G systems (e.g. 21.4-22 GHz and 31-31.3 GHz), while other bands under consideration for AI 1.14 are also being considered for IMT or 5G use. Any use of HAPS, if designated for use in the IMT candidate bands under WRC-19 AI 1.13, or bands used by mobile 5G networks, should not impact IMT identification or in any way limit the potential of mobile 5G networks or fixed systems. There must not be any constraints on IMT or mobile 5G networks in the Radio Regulations related to sharing with HAPS and HAPS should not cause interference to or claim protection from IMT. This is of particular importance given the priority of the 26 and 40 GHz bands for IMT as well as mobile 5G in 28 GHz. In that sense, it is necessary to establish technical and regulatory provisions for HAPS to be able to not interfere with IMT. Given that the draft CPM text does not include the appropriate PFD limit, it is important to ensure that any WRC action to enable HAPS use in any bands used by IMT or mobile 5G systems adopts appropriate pdf limits.

For WRC-23, it is the following:
For WRC-23, our wish list includes the identification for study of additional spectrum bands below 24 GHz for IMT and to prevent the encroachment of other services in the bands identified in WRC-19 by other services such as ESIMs and HAPs. For instance, there are proposals to study NGSO to GSO links in various bands including 3700-4200 MHz and in

5925-6425 MHz. Both of these bands are currently subject of a U.S. proceeding - neither for NGSO to GSO links and worldwide are being considered for terrestrial service.

- Many suggested agenda items are proposing to cover ALL the 5G bands; a number of these proposals target key bands in AI 1.13 particularly the 37 GHz, 39 GHz and 47 GHz bands.
- Also, it should be noted that some of these agenda items are proposing many 5G bands without any consideration of relative market demand. For example, ESIMs already have access to 4.55 GHz of spectrum with an additional 4 GHz under study as part of WRC-19 agenda item 1.5; an additional 12.5 GHz of spectrum would be under consideration in the future agenda item proposals for ESIM use without having ever establishing any spectrum needs for ESIMs

Q. How do you view the Industry post WRC-19?

A. We view the industry post WRC-19 as vibrant and competitive and moving quickly to 5G.

ITU's Views on the WRC-19

Mario Maniewicz
Director, Radiocommunication Bureau
ITU

The 2019 World Radiocommunications Conference (WRC-19), which will take place in Sharm El-Sheikh from 28 October to 22 November, will have profound impact not only on the advancement of radiocommunications, but also on the achievement of the UN Sustainable Development Goals.

Q. What significant role have the World Radiocommuncation Conferences played in telecommunications development around the world?

A. The World Radiocommunication Conferences (WRCs) review and revise the Radio Regulations, the international treaty that governs the international use of radio spectrum and the geostationary-satellite and other satellite orbits

These Regulations have played a key role in the development of applications and services using the radio spectrum, including terrestrial and satellite communications, which have evolved from telegraphs to fixed and mobile, maritime and aeronautical communications; the introduction and subsequent transition from analogue to digital broadcasting; providing signals used for positioning, navigation and timing; expanding our knowledge of the universe and our planet via support for radio astronomy, space exploration and earth observation, including weather forecasting and measuring climate change; supporting safety of life, including maritime and aeronautical distress communications; global flight tracking and on and on...

The WRCs work towards ensuring all countries have equitable access to spectrum and orbits, and the limited natural resources are used rationally, efficiently and economically. Operation of stations in accordance to the Radio Regulations enables the provision of services that are free of harmful interference, and support achieving the goals of equipment interoperability, roaming, and economies of scale.

For more than 110 years the WRCs have supported technological and social development for the benefit of all.

> *The WRCs work towards ensuring all countries have equitable access to spectrum and orbits, and the limited natural resources are used rationally, efficiently and economically.*

Q. What significant milestones are expected to be achieved during WRC-19?

A. The 2019 World Radiocommunications Conference (WRC-19), which will take place in Sharm El-Sheikh from 28 October to 22 November, will have profound impact not only on the advancement of radiocommunications, but also on the achievement of the UN Sustainable Development Goals.

The agenda for WRC-19 covers a series of issues related to the use of radio-frequency spectrum and satellite orbits. It includes items that will have an impact on the future broadband and on the digital society, such as 5G (IMT-2020 in ITU terminology), High Altitude Platforms (HAPS), radio local area networks (RLANs); and also terrestrial wireless applications such as aeronautical and maritime communications, intelligent transport systems (ITS), Railway wireless technologies; and Satellite systems such as non-geostationary satellite orbits (non-GSO) FSS, and Earth stations in motion (ESIM).

Q. Spectrum challenges for the Industry are immense. How is the ITU prepared to help address these challenges through new approaches?

A. The preparation for WRCs is a four-year process in which the ITU Member States, ITU-R Sector Members, Associates and Academia participate and which is coordinated through national, regional, and inter-regional preparatory processes. The most important aspects of the preparatory work for WRCs are the technical and regulatory studies carried out within the ITU-R Study Groups. These studies provide the technical basis for the decisions made by the WRCs. Underpinned by the technical work performed by the ITU-R Study Groups, the WRC is able to be a reliable and stable process that aims at building consensus. The ITU provides the platform for representatives of governments and regulators and other stakeholders to come together and discuss the relevant parts of the Radio Regulations and commit to the modifications to the international treaty.
The ITU-R Study Groups address the spectrum challenges by conducting sharing and compatibility studies between incumbent and possible future users of radio frequencies. These studies take into account the requirements of the services and the technical characteristics of all systems involved to determine what is technically and/or economically possible.

Q. In what ways could we see a different digital communications industry after WRC-19?

A. During the last years we have witnessed the flourishing of new applications and web-based services. Social media and search engines have changed considerably the digital communications industry. And areas such as digital advertising, content creation and content strategy are strongly based on data, or more specifically on data collection, storage and analysis.
The evolution of data solutions have only been possible due to the development of wireless communications. Mobile infrastructure has been used to increase broadband connectivity and provide seamless experience to end users.

WRC-19 will consider technologies (see answer to Q.2) to further expand broadband wireless communications. This will enable sharing of any type of content anytime, anywhere through any device. Devices will collect and share real time data. Users will generate more content and share this content without being limited by time and location. The availability of huge amounts of live data represents a change in paradigm to the digital communications industry.

> *The ITU provides the platform for representatives of governments and regulators and other stakeholders to come together and discuss the relevant parts of the Radio Regulations and commit to the modifications to the international treaty.*

Q. Is there any visibility on what may come under focus during WRC-23?

A. The preliminary agenda for the World Radiocommunication Conference of 2023 (WRC-23) is contained in the Resolution 810 (WRC-15) and includes Global Maritime Distress and Safety System (GMDSS), Earth exploration-satellite (active) service for space-borne radar sounders, space weather sensors, fixed-satellite service, and services within the frequency band 470-960 MHz in Region 1. Further agenda items for WRC-23 are expected to be proposed by the Regional groups and by Administrations to WRC-19. In addition, as an outcome of WRC-19 discussions, new items may also be proposed to the agenda of WRC-23.

The collection of Agenda Items agreed upon will then be considered and approved by Council.

The WRC-19 Issues of Importance to MEA Telecom Operators

Operators' Perspectives on WRC-19 in the MEA Region

Roberto Ercole
Director Public Policy & Regulatory Affairs
SAMENA Telecommunications Council

From the operators' perspective, the main WRC concern is IMT (5G) spectrum above 20 GHz. More important than what is on the agenda it what is not on the agenda. The main band for 5G capacity is going to be the C Band (3.4-3.8 GHz). However, 3.6-3.8 GHz is not recognised in EMEA for mobile services or IMT in the ITU regulations. This means that it must protect existing and future satellite services in 3.6 – 3.8 GHz. Satellite uses the band to provide broadband connections in rural areas as well as TV distribution. Unfortunately, the exclusion zone required could be of the order of tens of kilometres and perhaps, in some circumstance, up to 200 km (or more). This could be a major issue for some countries if their neighbours have widespread satellite deployment in 3.6 to 3.8 GHz. There are suggestions that WRC-19 could agree to look at this issue in the subsequent world radiocommunication conference (WRC-23).

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Another major issue for operators will be the availability of so called "mm-wave bands". These are the bands above 24 GHz, and will be used for very high capacity services. C band will allow operators to have around 100 MHz of contiguous spectrum. This is substantially more than in existing bands where 20 or 30 MHz is more typical. Mm-wave will allow operators to have 1 GHz (1000 MHz) of contiguous spectrum each to allow much higher data rates for new applications such as virtual reality. The band that most regulators have agreed upon in this region (and beyond) is 24.25 to 27.5 GHz (AKA 26 GHz).

> *Another major issue for operators will be the availability of so called "mm-wave bands". These are the bands above 24 GHz, and will be used for very high capacity services. C band will allow operators to have around 100 MHz of contiguous spectrum.*

However, an interference issue has emerged with passive satellite services at around 24 GHz. This passive service (used by European Space Agency) does not transmit but receives only. ESA uses the satellites to measure the temperature of the earth to monitor global warming globally. Unfortunately, the CEPT believes that the 5G signal strength that is allowed to "spill-over" into the ESA band should be around 1000 times less than the figure Africa and MENA have suggested. The upshot could be that IMT/5G will not be able to use bands below 26.5 GHz for mobile devices to meet such stringent limits. This would mean that in a market with three mobile opcos, each would only have access to 300 MHz instead of 1000 MHz. This might significantly limit the attractiveness of mm-wave bands. These mm-wave bands are seen as important for the longer term development of 5G.

Issues of importance to African Telecom Operators

An issue that seems to have a lot of traction with African regulators is to widen broadband coverage beyond major urban areas. It is likely that this drive will have an impact on African MNO's one way or another. ATU seems to have high priority on agenda item 1.14 and High-Altitude Platforms (HAPS). The idea is to have balloons or aircraft at 20 – 50 km above the earth's surface that can be used to provide backhaul for mobile or local WiFi in very remote areas that can't be easily connected by fibre. There might be an opportunity here to help ensure that what comes out of this agenda item allows the MNO's in Africa to most effectively benefit from this. It is currently pushed by Facebook and others, but to their advantage. We have yet to know specific details of whether MNOs in Africa have much involvement in this so far or not.

The other issue that could be important is WRC-19 AI 10 – which is setting the AI's for WRC-23. As regards WRC-23, which is already being talked about heading into WRC-19, there are two potential agenda items for WRC-23 that could be of interest to Operators:

1. IMT/Mobile in 3.6 to 3.8 GHz – which I believe ASMG wants to promote.
2. A review of the TV bands (470 to 960 MHz) – with a view to having more mobile spectrum for 5G. These bands would be very useful for offering higher data rates in rural areas. They could do so more cost effectively and having larger blocks of spectrum makes the engineering easier. Again, ASMG wants to do this.

> *An issue that seems to have a lot of traction with African regulators is to widen broadband coverage beyond major urban areas. It is likely that this drive will have an impact on African MNO's one way or another.*

Both these issues for 2023 are likely to face a lot of push back in Africa, so it might be something that SAMENA Council may delve into.

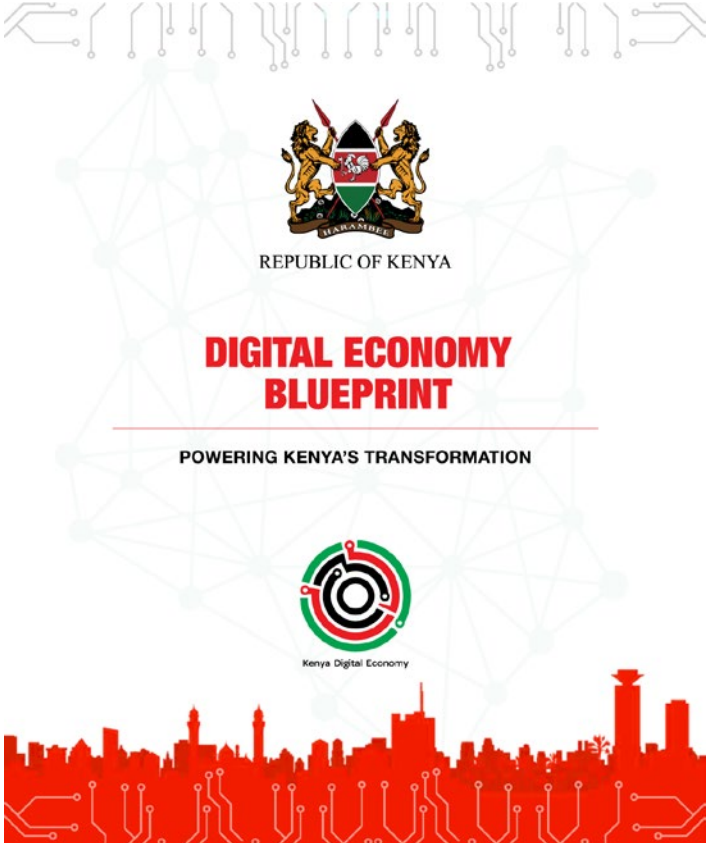
ARTICLE

Defining a Transformational Path to Digital Economy

Kenya as a Living Example

In this growing digital world of ours, new technologies and services are emerging over the horizon. As digital technologies become the cornerstone of human and societal activities, nations are learning to adapt. Kenya is one such country, which has embarked on its digital transformation journey, to ensure that the digital economy benefits become its future reality, benefiting the whole of the African continent.

Digital Economy policies and the underlying frameworks have become commonplace within Nation States that seek to transform their overall economic outlook. Their main focus then becomes identification of digital ecosystem enablers that are necessary to transform a country. This practice has been adopted by organisations like International Bank for Reconstruction and Development (the World Bank), which has identified five digital pillars: digital infrastructure, digital skills, digital financial services, digital platforms and digital entrepreneurship.



> *Kenya is one such country, which has embarked on its digital transformation journey, to ensure that the digital economy benefits become its future reality, benefiting the whole of the African continent.*

Kenya is one of the world leaders in driving financial inclusion through the use of digital finance solutions such as M-PESA, Mula, PesaLink and Pesapal. The adoption of such innovations is facilitating transactions and spurring trade for corporations, small and medium enterprises (SME's) and individuals. This in turn translates to improved and efficient business environment, increased accessibility, connectedness and better standards of living.

The Kenya Government has adopted technology that is leading to faster and efficient services to the people.

Kenya however, has much more to offer and gain from the digital economy. To harness these benefits, we have to build ecosystems that facilitate digital transactions nationally, regionally and globally. Towards this end, Kenya has developed its very own Digital Economy Blueprint, which serves as one of Kenya's contributions in championing the growth of an african-wide digital economy for all of Smart Africa Alliance members. It is our hope and wish that all the member states shall peruse this Blueprint and find value in adapting it within their own ecosystems to realize the potential of digital transformation that will leapfrog our economies to prosperous heights. Kenya's Digital Economy Blueprint defines the digital economy as "the entirety of sectors that operate using digitally-enabled communications

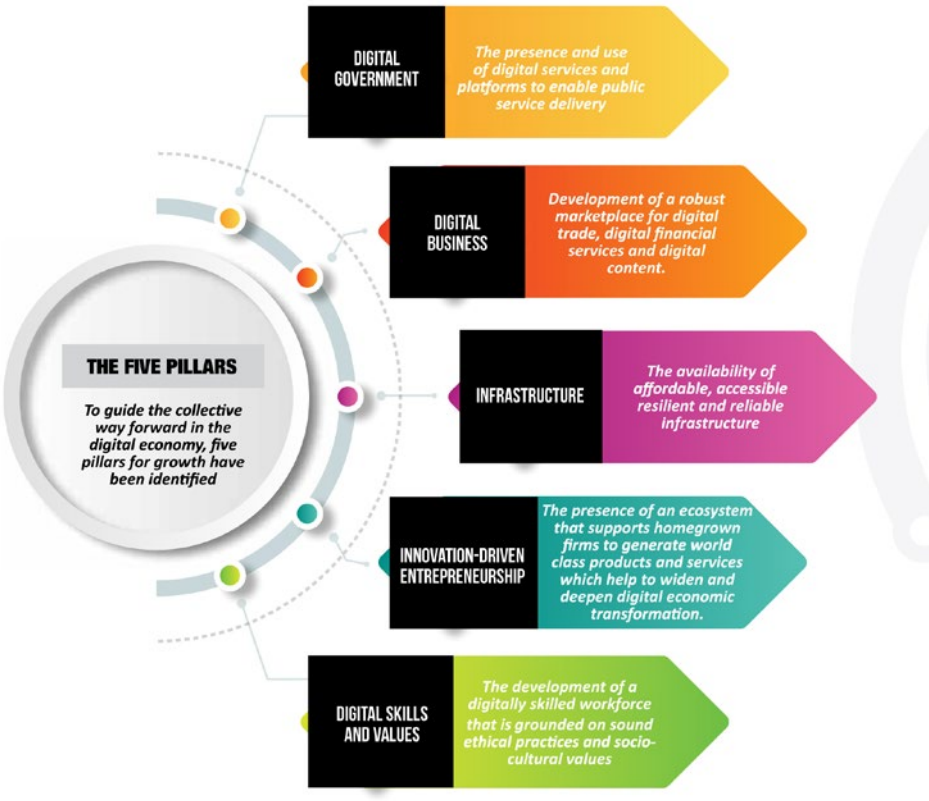
and networks leveraging internet, mobile and other technologies" irrespective of industry.

For Kenya, a Digital Economy will therefore be premised on ubiquitous provision of universal broadband access that will drive digitally enabled services for a digital people and economy. Universal access initiatives have provided enabling infrastructure and frameworks to connect every Kenyan and every Government or public facility such as hospitals, schools, police stations and prisons.

Kenya's Role in Digital Economy of Africa would be to serve as test bed for new ideas enabling multi-sided platforms in emerging digital economy contexts.

To this effect, Kenya recognizes that its, or of any emerging economy's, digitla blueprint must adopt an ICT-centric innovation strategy whose main aim should be to recommend programmes and policies supporting digital markets, infrastructure, digital platforms, digital entrepreneurship, digital skills and values, and identify flagship projects to help unleash the potential of ICT-centric innovation ecosystem.

> *Kenya has developed its very own Digital Economy Blueprint, which serves as one of Kenya's contributions in championing the growth of an african-wide digital economy for all of Smart Africa Alliance members.*



For the digital market pillar, the Kenya digital blueprint highlights the development of a robust marketplace for digital trade, digital financial services and digital content.

For the infrastructure pillar, the availability of affordable, accessible, resilient and reliable infrastructure has been identified as a critical factor for the digital economy. For the digital platforms pillar, the blueprint highlights the presence and use of digital services and platforms to enable digital exchange.

For innovation and entrepreneurship pillar, the presence of an ecosystem that supports homegrown firms to generate world class products and services which help to widen and deepen digital economic transformation.

For the digital skills and values, the development of a digitally skilled workforce that is grounded on sound ethical practices and socio-cultural values.


HUAWEI
Bring digital to every person,
home and organization for
a fully connected, intelligent world

Huawei Speaks to SAMENA Council

Charles Yang
President
Huawei Middle East

HUAWEI

> *5G is growing much faster than expected. All factors that 5G needs are ready now. We already had 5G chipsets in 2018. In 2019, vendors like Huawei, Samsung have announced 5G smartphones. As for spectrum, most countries in the region have been prepared for 5G, like UAE, Saudi Arabia, and Kuwait.*

Q. How does early deployment of 5G technologies help states and companies in the region in their digital transformation plans?

A. In the ME region, regulators took a good position to push 5G in an open way. We continue to collaborate with governments and customers to push 5G in the ME region, which will very soon be in a top position globally with regards to 5G.

5G is growing much faster than expected. All factors that 5G needs are ready now. We already had 5G chipsets in 2018. In 2019, vendors like Huawei, Samsung have announced 5G smartphones. As for spectrum, most countries in the region have been prepared for 5G, like UAE, Saudi Arabia, and Kuwait. Moreover, through close cooperation between governments entities, operators, vendors and vertical partners, Middle East countries are in the first wave of 5G commercial launches, standing at the global forefront. Many operators have already deployed or announced their plans to deploy large-scale networks.

Large-scale rollout have been started since 2018. I'm proud to say that our GCC countries are in the 1st wave of 5G rollout. By estimation, we will have 1M 5G sites globally in 2019 and 5G is obviously accelerating. We think it will only take 3 years to achieve 500M users for 5G, which took 6 years for 4G and 9 years for 3G.

The region's economic value will definitely be bolstered by the roll-out of 5G broadband, enabling more people, things and devices to be connected than ever before. 5G will facilitate the kind of real-time data sharing and analysis and will generate unprecedented productivity in government, society, enterprises, and even on an individual level.

Just like the transformation brought by electricity to society over one hundred years ago, 5G will bring a revolutionary change to the future of society. As a crucial digital service enabler, 5G can offer ultra-high-speed and ultra-low-latency, delivering huge amounts of data collected from our connected world. With this intelligent connectivity, it will be much easier to handle thousands of devices simultaneously.

The ME governments looks at 5G as a real enabler of economies and societies. ME governments looks at 5G as a real enabler of their digital transformation journeys. This is true because 5G is powerful technology that will change the future of all industries and sectors.

> *5G is an end-to-end system and Huawei's strength is not only in wireless but in all aspects of 5G, from devices, to network, and to ecosystems. We are keen to support the Middle East region to be in the first wave globally in 5G technology.*

Q. What are the major milestones Huawei has been able to achieve in 5G technologies on the international scene?

A. 5G is an end-to-end system and Huawei's strength is not only in wireless but in all aspects of 5G, from devices, to network, and to ecosystems. We are keen to support the Middle East region to be in the first wave globally in 5G technology.

Huawei started to develop its own 5G technology as early as in 2009. In 2013, Huawei hired more than 300 top experts from wireless industry around the world and announced that they put $600 million investment in 5G research. In 2016, Huawei set up a 5G product line for 5G products. Today, thousands of employees are engaged in 5G product development. Following this, in 2017 and 2018 Huawei invested almost US$1.4 billion into 5G product development.

In 2018, Huawei announced the world's most powerful 5G chipset. In 2019, Huawei announced the world's 1st foldable 5G smartphone - Mate X. Regarding 5G networks, Huawei's wireless technology has ranked no.1 in all the top performance tests. Just this summer, Huawei won the "Best 5G Core Network Technology" award at the 5G World Summit 2019.

The root reason of Huawei's leadership in 5G is our insistent and heavy investment on 5G for past 10 years. We have achieved a lot of breakthrough in innovations. For example, most of the key chipsets in equipment and devices are self-designed. Regarding ecosystems, Huawei has built Xlab in order to jointly innovate 5G use cases with our customers and partners. We have brought 283 global industry partners and 57 regional partners into Xlab. Based on that we are jointly working with Etisalat, STC, and others in order to innovate the most suitable and profitable use cases in the Middle East today. The company also collaborates with carriers and industry partners to continuously develop 5G applications in vertical industries, enable a thriving industry ecosystem, and make full preparations for the mature commercial use of 5G.

Moreover, network security is Huawei's highest priority and it overarches everything. Huawei has served 3 billion users with 1,500 networks over 170 countries for the past 30 years, and Huawei has maintained a very solid record that we have never had a serious network security incident.

Huawei has also developed 11 5G R&D centers all around the world and utilizes more than 5,700 5G R&D experts and engineers to advance the future of the 5G revolution.

Moving forward, our carrier business will seize the first wave of business opportunities for 5G in ME Region. We will work hard to leverage our end-to-end strengths to achieve strategic leadership and enhance trust. As always, we need to strive to create greater value for our customers. We need to use innovative business solutions to help them increase profitability.

> *By June 2019, Huawei had won 50 5G commercial contracts and shipped 150,000+ base stations globally, and has launched a series of cross-industry collaboration based on network slicing and MEC in smart grid, VR/AR, IoV, remote surgery, smart manufacturing, and other fields, greatly promoting 5G ecosystem prosperity.*

Q. In terms of presence, in how many international markets is Huawei 5G technology present today? How many commercial contracts has it signed in this regard and how many 5G towers and/or stations has been deployed and/or built and shipped by Huawei so far? (both internationally, regionally and locally, if possible)

A. By June 2019, Huawei had won 50 5G commercial contracts and shipped 150,000+ base stations globally, and has launched a series of cross-industry collaboration based on network slicing and MEC in smart grid, VR/AR, IoV, remote surgery, smart manufacturing, and other fields, greatly promoting 5G ecosystem prosperity.

In February last year, it made the world's first 5G call and launched the first 5G terminal device. We are well prepared for this region 5G commercial use and large scale deployments, and emerging as a top player in the race for setting up the super-fast 5G telecommunications system in ME Region and globally.

We currently operate in more than 170 countries and regions, serving more than 3 billion people around the world. We are optimistic about the 5G prospects in ME Region and keen to collaborate with all public and private sectors partners to

create the right ICT and 5G ecosystem, starting from the Talent Ecosystem which is a key objective in this region countries national plans and visions.

Our latest 5G announcements includes Spain which became one of the first European countries to roll out a 5G network as Vodafone Spain commercially launched the service in 15 cities, including Madrid and Barcelona, in cooperation with Huawei. Huawei has also recently signed a deal with Russian telecoms company MTS to develop a 5G network in the country over the next year.

> *Today in 5G, Huawei is ahead of its competitors by between 12 and 18 months. Maybe that level of advancement is seen as a threat by some. But for most customers, it is seen as a virtue. We are immensely grateful for the support Huawei has received from its global suppliers.*

Q. In your opinion, how should countries in the Middle East and EM view the current race between China and the US to win the 5G new "space race" – so to speak?

A. Let me start my answer with saying that here in the ME region the situation is different from the global one. Thanks to the open-mindedness of our customers, especially our strategic customers, the telecom operators.

The decision made by the US government has seriously disrupted the continuity and security of the global supply chain, as well as the international trade order and all related rules. This is a clear abuse of executive and law enforcement powers.

Today in 5G, Huawei is ahead of its competitors by between 12 and 18 months. Maybe that level of advancement is seen as a threat by some. But for most customers, it is seen as a virtue. We are immensely grateful for the support Huawei has received from its global suppliers. Moving forward, we will continue working with these suppliers to promote the healthy development of our industry, maintain order in the market, and protect consumer interests.

Most countries in the world have a lot of experience of working with Huawei and our technology and those customers and governments remain very supportive of us.

Q. Do you agree that 5G has spurred a "technological war" between China and the US? Please explain. Do you think that 5G lies at the core of the current trade conflict between the US and China? Please explain.

A. I think both China and the United States are of large scale. And while those powers clash, we do not carry that big a weight.

5G is not politics. It's not like politicians can draw a line to create two versions. We think 5G has passed a set of unified standards. If there's no interconnectivity for 5G technologies, the costs will be much higher.

Q. Are the US and some of the western countries' concerns about the security of Huawei 5G technologies justified? Please explain.

A. Cyber Security is Huawei's highest priority and it overarches everything. Huawei has served 3 Billion users with 1,500 networks over 170 countries for the past 30 years, and Huawei has maintained a very solid record that we have never had a serious network security incident.

We reject the US government's claims as groundless, meritless and without fact. In over 30 years of business, supporting more than a third of the world's population today, Huawei has never compromised anyone's security, nor would we. We have grown into a $100 billion plus business only because our customers and governments around the world trust Huawei.

We have never been asked by the Chinese government or any other government, to do anything that would weaken the

> *Cyber Security is Huawei's highest priority and it overarches everything. Huawei has served 3 Billion users with 1,500 networks over 170 countries for the past 30 years, and Huawei has maintained a very solid record that we have never had a serious network security incident.*

security of a product. Only about 30% of the components in Huawei products are actually made by the company - the rest of the components are obtained from a global supply chain that Huawei closely monitors in order to prevent security breaches.

5G brings benefits to people and offers us information channels and pipes. These channels and pipes are controlled by operators and governments. We provide equipment only, similar to water pipes and taps. They won't be a big threat to security. We believe that our customers in the ME region makes their own assessment and decisions. We believe that before any country say Huawei poses a threat or not, they should first assess Huawei's history, value and contributions to society.

First, we provide services to three billion people in 170 countries and regions, and we have contributed greatly to bridging the digital divide, like giving poor countries access to information and education opportunities. China is ahead of many countries in terms of network development, and China is now seeing a decline in poverty. This is because people have access to new information, new technologies, new jobs, and new sales techniques. We bring benefits to humanity; we are not a threat to society, and would never cause it harm.

Second, we have more than 80,000 patents. These are our contribution to the foundation of the digital society. More than 11,500 of these core patents were granted

by the US government, giving us legitimate rights. We are a big contributor to the US's information development, not a threat.

For the US allies in Europe, I can drive some examples. Germany. Chancellor Angela Merkel recently said: "There are two things I don't believe in. First, to discuss these very sensitive security questions publicly, and second, to exclude a company simply because it's from a certain country."

Robert Hannigan, former head of GCHQ, the U.K. signals intelligence agency, wrote in the Financial Times that NCSC had "never found evidence of malicious Chinese state cyber activity through Huawei" and that any "assertions that any Chinese technology in any part of a 5G network represents an unacceptable risk are nonsense."

Thea Lee, president of the Economic Policy Institute recently said: "Trump is burning bridges with a lot of trading partners". Craig Allen, president of the U.S.-China Business Council recently described Trump's restrictions on Chinese telecom giant Huawei are comparable to "murder,". Also People are increasingly aware of our advanced products and are more willing to accept us. Let the facts speak for themselves.

Q. Do you have any figures to elaborate how much 5G technology is expected to add to the UAE and or the MENA region's economies by a certain date?

A. The likely contribution of 5G to an economy has been the subject of many studies. Most agree that, to derive the maximum benefits, a country or a region will need to have a high existing level of mobile penetration, and a clear roadmap for deploying digital platforms. With one of the highest rates of mobile adoption in the world, the GCC region appears well positioned to benefit significantly from 5G. According to the GSMA, in the Middle East and North Africa (MENA) region, mobile technologies and services generated around 4.2% of GDP in 2016, equating to $165 billion of economic value. In the period to 2020 the GSMA expects this to increase to almost $200 billion (4.3% of GDP).

Huawei advocates openness, collaboration, and shared success. Through joint innovation with our customers and partners, we are expanding the value of ICT to develop a more robust and symbiotic industry ecosystem. Huawei is an active member of more than 400 standards organizations, industry alliances, and open source communities, where we work with our peers to develop mainstream standards and lay the foundation for shared success. Together, we are driving the industry forward.

In the GCC region, a study we conducted with Analysys Mason estimates that 5G will provide a cumulative new revenue opportunity over ten years totaling $273 billion, with about 50% of this addressable by mobile operators (MNOs) and the rest by other ICT players.

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Through continuous innovation in ICT infrastructure and smart devices, we are making technology simpler, more convenient, and more affordable, giving more people access to the benefits of digital technology. Our ultimate goal is to improve people's quality of life and promote socioeconomic development.

MEMBERS NEWS

STC Launches 5G Home Broadband Service in Saudi Arabia

Saudi Telecom Company (STC) has announced the official launch of 5G home broadband services in a number of cities in the Kingdom. Nasser Bin Sulaiman Al-Nasser, CEO of STC Group, said: 'The commercial launch of the service in Saudi Arabia coincides with the commercial launch of 5G service by Viva Kuwait, a subsidiary of STC, as the first 5G operator in Kuwait. Viva Bahrain, another subsidiary of STC, will launch commercial service of 5G in Bahrain in the near future.' Potential users need to acquire a home router in order to benefit from the service.

Batelco First to Launch Commercial 5G Network in the Kingdom of Bahrain

Batelco, the Kingdom's leading digital solutions provider is proud to be the first to announce the commercial launch of 5G in the Kingdom of Bahrain. In reaching this technological milestone, Batelco is the first in Bahrain and among the first in the region to deliver commercial 5G network services for its customers. Batelco is very proud to launch this technology in the Kingdom's market due to the importance of 5G technology in enabling the digital economy and enhancing the telecom sector. Batelco's development of 5G, has been carried out in collaboration with key partners with strong commitment from all concerned to ensure the successful delivery of the commercial launch. The service will be available in key locations and gradually rolled out in more areas throughout the Kingdom depending on customer demand and requirements. The communication landscape is changing rapidly requiring the latest in digital technology that can meet the current and future requirements of residential customers and the enterprise sector. Batelco is always keen to be the first in delivering the latest services for its customers in the local market in line with the latest developments in digital technology. Batelco CEO Mikkel Vinter said that Batelco is very happy to launch 5G in the Kingdom of Bahrain and very proud to be first to provide the service. "Delivering the latest in digital technology to our customers is our top priority and a crucial part of our corporate digital strategy." "Batelco is committed to supporting the telecom sector in line with the Kingdom's vision for the digital economy as well as working on unleashing the great potential of 5G technology which impacts all aspects of life and which in turn will elevate the definition of telecommunications in our community," he added.

Batelco and Tata Communications Collaborate For Network Connectivity in Middle East

Batelco, Bahrain's leading digital communications solutions provider is announcing an extension of its partnership with Tata Communications, a leading global digital infrastructure provider, to offer flexible and reliable data connectivity with expanded global reach; to service providers, mobile network operators (MNO) and ISPs in the Middle East. This new collaboration brings together Tata Communications' global Tier-1 IP network and its new partnership IP node with Batelco in Global Zone – the Carrier Neutral Tier-3 certified data center in Bahrain, and the recently launched protected terrestrial cable system of the Batelco Gulf Network (BGN). The combination of these networks and infrastructures will offer service providers highly resilient network connectivity with increased reach in the Middle East and globally. Adel Al-Daylami, Batelco Chief Global Business Officer, said, "By harnessing each other's assets, we look to bring Middle East service providers, MNOs and ISPs the best of both worlds – the global reach of Tata Communications' Tier 1 IP network and our regional reach over our protected BGN. As businesses' use of data and cloud-based applications continues to grow, this highly resilient offering will help service providers and their customers ensure the reliability of their operations." Vaneet Mehta, Tata Communications Region Head – Middle East, Central Asia & Africa, said: "Through our partnership to-date, we've extended the reach of our respective data center, cloud and connectivity capabilities. Our new collaboration with Batelco strengthens this relationship further. It helps service providers, MNOs and ISPs in the Gulf future-proof their capabilities and address their customers' growing data connectivity including Tier 1 IP network requirements."

du Inks JV Deal with Bahrain's Batelco

Emirates Integrated Telecommunications Company, du, said it formed a joint venture with Bahrain Telecommunications Company (Batelco) to set up a regional infrastructure platform. The technology platform, equally owned by du and Batelco, will be capable of delivering connectivity and data center services across the region, du said in a statement to the Dubai Financial Market, where its shares trade. Through the platform, du and Batelco, will be in a position to "serve their customers more comprehensively and efficiently", it said without saying how much the companies are investing in the venture or where it will be based. du's capital expenditure on technology will surge as much as 25 per cent to Dh1.5 billion this year as the telecoms operator aims to support 5G connectivity in the UAE, which has more than 100 per cent mobile phone penetration. "Next year's allocation will certainly be higher," Saleem Al Balooshi, chief infrastructure officer of du told The National, earlier this month. The new 5G network requires more computing power, analytics, memory and cloud infrastructure, which demands greater investment in data centers, Mr. Balooshi said. du, which operates 10 data centers in the UAE, plans to open three more in the next two years. The operator has 120 5G towers in the UAE and is set to add 580 more by the end of the year.

du Launches 5G-Enabled Mobile Devices

du, part of Emirates Integrated Telecommunications Company (EITC), has become the first telco to launch 5G mobile devices in the Middle East. Fahad Al Hassawi, Deputy CEO – Telco Services, EITC, said: "The 5G reality is here, which is why we are thrilled to be able to bring this revolutionary technology to more customers across the UAE. As the 5G journey gathers momentum, we are excited to be inspiring customers to achieve new possibilities as advanced connectivity becomes available in more places. "As a foremost technology leader tasked with enabling digital transformation, we are committed to accelerating 5G adoption by providing advanced devices to consumers. The transformative potential of 5G will have a large social and economic impact on the country, and we are proud to be leading the evolution towards a faster, more connected future," he said. Du was the first to launch 5G demonstrations in the UAE through its experiential 5G showcases and suhoors throughout the month of Ramadan. By pre-registering and taking part in the demonstrations, customers became the first to experience the 5G network on ZTE's Axon Pro 10. The device was used to show consumers how they can unlock the full potential of the 5G network upgrade. These experiential events fueled anticipation for 5G, with customers having the opportunity to register their interests in acquiring 5G devices. As a result of this, the first preregistered du customers received their Axon Pro 10 device as a gift from the company. Du has started selling the 5G-enabled ZTE Axon Pro 10 handset, with the company's portfolio of 5G devices expected to expand further over the coming weeks. As du is in the process of adding new 5G sites, the company will not be charging customers any extra for the 5G service. This means they can use their 5G devices while enjoying new and existing benefits of their existing plans, the operator said.

du Launches 5G Service in UAE

UAE telecom services provider du has announced it is giving away free phones to some customers as it brings in the much-anticipated 5G to UAE devices. The company turned on the 5G connectivity, which promises to offer much faster internet connections, on Saturday and can now be accessed through the Axon Pro10 handset. Du rolled out the service in collaboration with ZTE shortly after Etisalat made a similar launch. UAE consumers will see more 5G-capable devices over the next few weeks, with du promising to bring in Huawei Mate x5G and ZTE Route. The company had earlier introduced the fifth generation cellular network technology in the UAE by hosting live 5G consumer experiences across its retail outlets and suhoor gatherings last month. As part of the rollout, du said it is giving away the first batch of 5G-enabled smartphones for free to some of its customers who had pre-registered for the service. "We're proud to have been the first to provide a live experience of the 5G network in the UAE at the fastest speed of 1.26 Gbps and first to provide pre-registration," the telecom firm said. "Today we're pleased to give the first batch of Axon Pro 10 phones for free to our pre-registered customers."

Etisalat Introduces 'Roam Like Home' For Freedom Postpaid Customers

Etisalat has announced the launch of 'Roam Like Home' (RLH) services that enable Freedom postpaid customers to continue enjoying local allowances while travelling outside the country. With Etisalat's new roaming options, customers can enjoy a seamless roaming experience. Freedom postpaid customers can choose from Data only at AED100, Voice only at AED200, and Voice & Data at AED250, all valid for seven days. All RLH models are charged upon subscription, with validity starting from the first eligible usage, so customers who purchase now can use them anytime while roaming with any of Etisalat's preferred roaming partners covering more than 120 countries including while inflight. These do not renew automatically so customers will need to re-purchase upon expiry. There are six Freedom postpaid plans starting from AED100 all the way up to AED1,000. To avail any of the 'Roam Like Home' service, Freedom postpaid customers with active roaming service can subscribe through My Etisalat UAE app, by dialing *177#, by SMS, or call the customer care center or visit the nearest Etisalat business center. Fair usage policies apply to ensure superior service levels to customers with normal usage behavior. For more information about the roaming products and services, visit www.etisalat.ae/roaming.

Omantel Appoints New Chairman

Oman Telecommunications Company (Omantel), has appointed Abdulsalam Mohammed Al Murshidi as the chairman of the board of the company, taking over from Sultan bin Hamdoon Al Harthi, the statement said. Al Murshidi serves as the executive president of the State General Reserve Fund (SGRF), the largest Sovereign Wealth Fund of the Sultanate of Oman. As part of his duties in SGRF, Al Murshidi serves on the board of few subsidiaries such as the Oman National Investment Development Company (TANMIA), UzOmanKapital LLC and Oman Brunei Investment Company (OBIC). He has previously held other positions and founded various industrial, commercial and investment companies in the region.

Omantel Acquires 40% Stake in Renna Mobile

Omantel has announced that it has acquired a 40 per cent stake in Majan Telecommunication LLC (Renna Mobile), one of the first mobile virtual network operators (MVNO) in Oman. Omantel has signed a definitive share purchase agreement with Integrated Telecommunications Oman (TeO) whereby Omantel purchased 40 per cent shares in Renna Mobile. In a disclosure to the Muscat Securities Market, Omantel clarified that the total consideration of the transaction is RO5mn. Last year, the sultanate's Telecommunications Regulatory Authority (TRA) had proposed permitting a higher percentage of holding in MVNO businesses by the host operator. 'The transaction is underpinned by a vision of both the parties to chart a course of robust growth for both entities who have a long history of mutually beneficial growth and collaboration which has introduced innovative and appealing products and services to all segments of the Omani society', Omantel said in its market disclosure. The company added that this transaction is expected to take Omantel and Renna Mobile's collaboration to new heights and long term value creation to their shareholders and subscribers. Renna Mobile was established in 2007 and is considered one of the first mobile services resellers licensed in the sultanate and currently enjoys the highest market share among MVNOs. TeO had acquired 100 per cent shares of Renna Mobile in 2016. TeO is Oman's first private Class I international gateway operator, a mobile virtual network operator and an over-the-top (OTT) service provider. As per the TRA's latest statistics, the total number of prepaid mobile subscribers in Oman stood at 5,864,742 as of April 2019, of which mobile resellers or MVNOs account for 745,439 subscribers.

Omantel, OBC Sign Pacts with Eight SMEs

On the initiative of the Telecommunications Regulatory Authority (TRA) to support small and medium enterprises (SMEs) and create job opportunities in the telecom sector, Omantel and Oman Broadband Company (OBC) have signed contracts with eight Omani SMEs specializing in the Last-Mile Connectivity (LMC) works. The signing of the contracts was the result of completion of training of 22 SME employees on operators' systems and outsourcing 15 trial requests to each SME to connect broadband services to customers. This was performed under the supervision of operators' employees in order to check the performance of the SMEs and ensure they are capable of handling the LMC services. The owners of these SMEs were verified to be available full-time to work and manage their businesses and are committed to provide job opportunities to Omanis to ensure their sustainability in the market. The LMC Project is an initiative of TRA and telecom companies to create more job opportunities for young Omanis and build national capacities in the telecommunications sector in general and fiber optics and related services in particular. It also aims to support SMEs and start-ups by training young Omanis to carry out technical works required to deliver broadband services and connect fiber-optic cables from exchanges to buildings, in coordination with all relevant parties such as telecom operators, Riyada, PDO, Oman Development Bank and Oman Fiber Optic Training Institute.

Telecom Egypt and Juniper Networks Sign MoU

Telecom Egypt has signed a memorandum of understanding (MoU) with Juniper Networks which the pair claim highlights 'the companies' intent to scope the Egyptian business landscape for shared opportunities to provide IP-based, high-performance networking solutions to enterprises'. As per the deal, the carrier will also have the option to become an authorized resale partner of Juniper's technology solutions in Egypt. In addition, in a press release announcing the MoU it was confirmed that the telco is also upgrading its own network infrastructure to include Juniper Networks MX Series 5G Universal Routing Platform, QFX Series Data Center Switches and SRX Series next generation firewalls. The upgrade will reportedly create a secure, high-capacity infrastructure from the core and data centers to the network edge and is uniquely designed to carry fixed, mobile, voice and data services traffic for domestic and business connectivity, including 5G services when launched. Commenting on the matter, Adel Hamed, Managing Director & Chief Executive Officer at Telecom Egypt, said: 'The opportunity to agree to a MoU with Juniper and explore the business market potential for transformative networking technology is very exciting for Telecom Egypt as it seeks to pioneer innovation in Egypt. Telecom Egypt appreciates the collaboration with Juniper Networks because Juniper's technology is highly reliable and scalable and it also provides an excellent return on investment. It's a key partnership for us on the journey to help deliver our strategy toward digital transformation and specifically for Egypt's enterprises.'

Telecom Egypt Wins the EMEA Finance 'Best Structured Finance Deal in North Africa' Award

The Europe, Middle East and Africa Finance magazine (EMEA Finance) announced Telecom Egypt as the winner of the 'best structured finance deal in North Africa' in the magazine's 11th refinancing, repricing and restructuring 2018 awards. The award was granted for Telecom Egypt's USD 500mn medium-term syndicated loan signed in October 2018 and arranged by First Abu Dhabi Bank PJSC (FAB) and Mashreq Bank PSC (Mashreq). The USD 500mn syndicated loan was 1.5x oversubscribed and comes in line with the company's financing strategy to reduce its financing expenses and manage the maturity of its debt in line with its cash flow generation. The facility ensures Telecom Egypt's flexibility to continue to invest in its domestic and international infrastructure as well as to meet its working capital requirements. EMEA Finance is a leading information source that is dedicated to periodically report on financial events, challenges, opportunities and triumphs in emerging European, Middle Eastern and African financial markets. It recognizes various corporate financial achievements through its annual awards. Adel Hamed, Telecom Egypt's Managing Director and Chief Executive Officer, commented: "We are delighted to receive this award, which displays Telecom Egypt's robust operational and financial performance and recognizes our team's hard work and dedication in planning, negotiating and marketing a facility with distinct financing terms especially tailored to fulfil Telecom Egypt's financing needs and business plan." Hamed also expressed his appreciation to First Abu Dhabi Bank and Mashreq Bank along with the 11 banks that collaborated to provide this well-structured facility and exhibited a deep understanding of Telecom Egypt's business model and value drivers. Christopher Moore, publisher & CEO of EMEA Finance Limited, said: "Telecom Egypt is quickly advancing on all fronts of it business, and this includes strengthening its balance sheet to support domestic growth and an increasing number of important international partnerships. In 2018, the firm successfully closed its first foreign currency syndicated loan raising an impressive US$500mn. The firm's ability to organize commitments from outside the country's banking sector demonstrates the confidence that EMEA regional and international banks have in the firm."

Bader Al Kharafi: Zain First Operator to Offer 5G Technology in Kuwait

Zain, the leading digital service provider in Kuwait, announced that its network is fully ready for the commercial launch of fifth generation wireless technology (5G) to be the first operator to offer 5G technology in the GCC region via the Kuwaiti market with nationwide coverage of all areas. Zain unveiled that it succeeded in designing

an integrated network for 5G services built on a world-class infrastructure, fully launching the company's potential within the digital community and further reinforcing its leadership in the Information and Communications Technology (ICT) sector. Zain has always been one of the first companies to offer the latest generations of telecommunications technologies. As the telecom sector is currently directing towards digital transformation with significant pace, it is evident that current mobile telecom networks will not be capable of satisfying the future needs of the sector with what is currently available. For that, Zain's impending commercial launch of 5G services comes to keep up with the fast-paced and ever-evolving lifestyle patterns of the community on all levels. The company announced the readiness of its network for the commercial launch of 5G services after the official announcement made by Kuwait's Communication and Information Technology Regulatory Authority (CITRA) to grant Zain the needed licenses for telecom operators to launch 5G services in the Kuwaiti market. In previous statements, Chairman and CEO of CITRA Salim Al Othaina stressed on the importance of 5G technology, describing it as being vital in benefiting consumers and operators alike, as well as being crucial to the further development of the telecom sector in the country. CITRA has specified the 3.5 GHz C-BAND bandwidth for the operation of 5G technology in Kuwait, a step that will allow a great leap for the advancing of the Kuwaiti telecom sector, especially that it coincides with the country's preparations for the "regional corridor" telecom project. The project, which aims at highlighting Kuwait's leading role in information and communication technology, works to make the country a centralized hub for data and digital content by linking international maritime cables between the East and West regions. The project will ultimately contribute to enriching the investment ecosystem for global corporations, as well as enhance business environments. Zain Vice-Chairman and Group CEO Bader Nasser Al Kharafi expressed his gratitude and utmost appreciation to H.H. the Prime Minister Sheikh Jaber Mubarak Al Hamad Al Sabah and H.E. Deputy Prime Minister and Minister of State for Cabinet Affairs Anas Al Saleh for the state's support represented by CITRA. Al Kharafi also valued the support of CITRA Chairman and CEO Salem Al Othaina, as well as his vision in market outlook and telecom sector leadership by offering the latest and most advanced technologies. Al Kharafi commended the decisions that contribute to the continuous development of the telecom sector. Commenting on CITRA's decision to grant 5G technology licenses, Al Kharafi said: "Zain's network is ready for the commercial launch of fifth generation wireless technology (5G). We are proud to be the first operator to offer 5G services in the GCC region and Kuwait, a crucial step that will allow us to offer the most innovative products and services to our customers in consumer, business, IoT, and smart cities sectors". He further noted: "being a company that continuously seeks to adopt flexible tech solutions, we will work on meeting the growing demand for data services by exploring the new business environments this advanced technology will offer. We believe offering innovative solutions for the business sector will be an essential part of the strategic direction of our operations". Al Kharafi added: "we heavily invested in developing our network to keep up with the latest advances of the ever-changing telecom technologies worldwide. It is true that such investments came at a high cost, but Kuwaiti people and all those who reside in Kuwait deserve the best services and the most advanced technologies out there. For this, we have been preparing for this step throughout the past two years by developing the infrastructure of our 5G network, as well as implementing many expansion projects for fiber optic networks". Al Kharafi pointed out that 5G technologies will allow Zain to launch its full potential in its digital transformation journey, where this new technology will lead the next wave of change. In this regard, the company considers itself an active partner of the public sector in contributing to the achievement of the Kuwait National Development Plan (New Kuwait) that stems from His Highness the Amir Sheikh Sabah Al Ahmad Al Jaber Al Sabah's conceptualized vision of a new

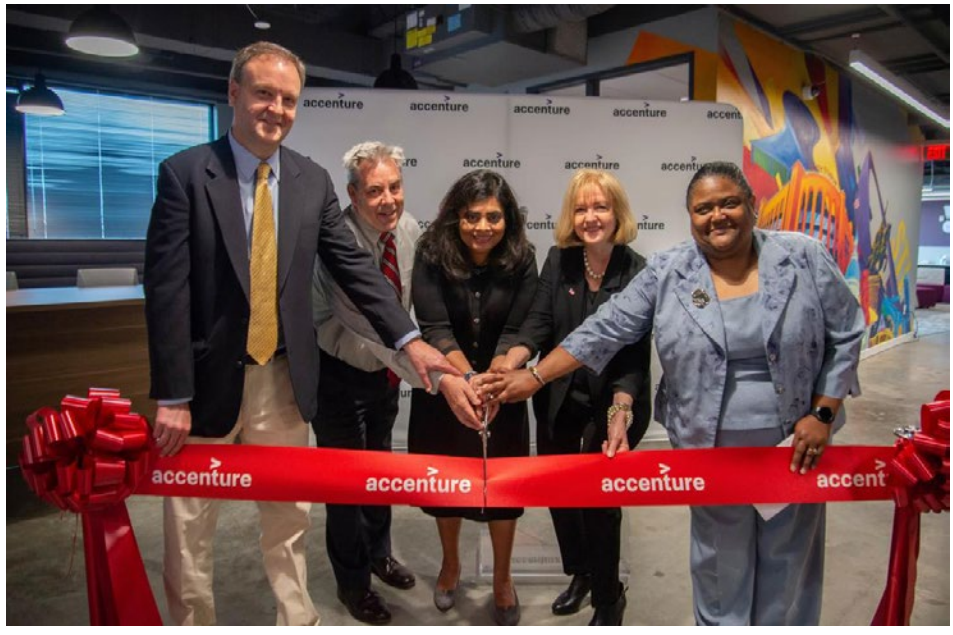
Kuwait by 2035. Al Kharafi also noted: "as part of these efforts, we have achieved advancements in our initiatives that focus on quality, efficiency, and digital innovation, such as elevating customer experience, enhancing smart capital expenditures, working on innovating new business environments for safe and smart city projects, and more. Such practices have empowered and positioned us as leaders in digital innovation". With the widespread use of smart devices, the increasingly fast-paced direction towards smart lifestyles, as well as the lucrative opportunities presented by digital services particularly in the profitable business sector, mobile operators are encouraged to reinforce their investments in the telecom sector. Reports and forecasts refer to the huge potentials that will be offered by 5G technology, as well as the many opportunities it will offer for the various industries, such as e-commerce, retail, government transactions, energy, public and safety facilities, healthcare, public transportation, media, entertainment, and financial services. Furthermore, 5G services will enhance essential services, and will further push the telecom sector to a new phase of growth. 5G technologies will offer ultimate access, where people and smart devices within the community will communicate with each other in entirely new fashions. The flow of information will be smooth and continuous, while the highest degrees of coverage and unlimited speeds will be possible with this generation of networks. The real value of digital information lies not just within the information itself, but rather in the new innovative services that can be obtained from them. The nourishment of digital economy will be possible, as well as achieving positive change in manufacturing methods, current lifestyles, and more. All this will ultimately enhance the lives of people for the better.

Zain Kuwait Launches 5G Bundles

Zain, the leading digital service provider in Kuwait, announced the launch of its 5G Internet bundles for postpaid customers. The launch comes after the company's announcement last month of the full readiness of its network for the commercial launch of fifth generation wireless technology (5G) to be the first operator to offer 5G technology in the GCC region via the Kuwaiti market with nationwide coverage of all areas. Last May, Zain unveiled that it succeeded in designing an integrated network for 5G services built on a world-class infrastructure. This came after the official announcement made by Kuwait's Communication and Information Technology Regulatory Authority (CITRA) to grant Zain the needed licenses for telecom operators to launch 5G services in the Kuwaiti market. This technology will contribute to fully launching the Zain's potential within the digital community and further reinforcing its leadership in the ICT sector. Starting from Saturday 15 January, Zain temporarily changed the name of its network to "Hello 5G" for 48 hours in commemoration of the commercial launch of the service. Zain offers 5G Internet bundles for its postpaid customers through a number of flexible bundles starting at KD 45 monthly with 500 GBs and a 5G BOLT router. The company also offers many other 5G Internet bundles with varying caps that reach up to 4 TBs monthly to suit customers' different personal and business needs. Customers can learn more about all the available bundles through kw.zain.com/5G or by visiting any of Zain's branches all around Kuwait. Zain also offers a variety of additional products and services that offer users the ability to enjoy the revolutionary features of 5G technology even more, including the TP-Link deco-mesh Wi-Fi zone extender, which provides customers with full coverage across their home, as well as other entertainment and gaming devices that can be added to the 5G bundle for an unmatched ultra high-speed Internet experience. Zain has always been one of the first companies to offer the latest generations of telecommunications technologies. As the telecom sector is currently directing towards digital transformation with significant pace, it is evident that current mobile telecom networks will not be capable of satisfying the future needs of the sector with what is currently available. For that, Zain's impending commercial launch of 5G services comes to keep up with the fast-paced and ever-evolving lifestyle patterns of the community on all levels. The revolutionary fifth generation wireless technology (5G) offers endless applications that can be summarized in three main uses. The first use is enhanced mobile broadband (eMBB), which can be considered a direct extension and progression of the current 4G LTE networks, offering faster connections, higher throughput and more capacity. The second use is Ultra-Reliable Low-Latency Communications (URLCC), which means a 5G network is reliable for mission critical applications that requires uninterrupted and robust data exchange. The third use is Massive Machine-Type Communications (mMTC), which will be enabled by 5G networks to serve as an infrastructure and an enabler for the new applications that are expected to mature in the near future. With the widespread use of smart devices, the increasingly fast-paced direction towards smart lifestyles, as well as the lucrative opportunities presented by digital services particularly in the profitable business sector, mobile operators are encouraged to reinforce their investments in the telecom sector. Reports and forecasts refer to the huge potentials that will be offered by 5G technology, as well as the many opportunities it will offer for the various industries, such as e-commerce, retail, government transactions, energy, public and safety facilities, healthcare, public transportation, media, entertainment, and financial services. Furthermore, 5G services will enhance essential services, and will further push the telecom sector to a new phase of growth. 5G technologies will offer ultimate access, where people and smart devices within the community will communicate with each other in entirely new fashions. The flow of information will be smooth and continuous, while the highest degrees of coverage and unlimited speeds will be possible with this generation of networks. The real value of digital information lies not just within the information itself, but rather in the new innovative services that can be obtained from them. The nourishment of digital economy will be possible, as well as achieving positive change in manufacturing methods, current lifestyles, and more. All this will ultimately enhance the lives of people for the better.

Accenture Teams With St. Louis Promise Zone

Accenture and the St. Louis Promise Zone — a federal program that advances economic activity and career mobility in high-poverty areas — have launched a new program to help Promise Zone residents develop the skills they need to pursue the rapidly growing number of information technology (IT) jobs in the St. Louis area. The new program — called "My Path, My Future" — will help individuals who work in at-risk jobs, or are unemployed and have few resources to build new skills to transition to new careers. According to recent research by the Brookings Institute, 45 percent of the tasks that people in St. Louis perform in their jobs have the potential of being automated, putting some jobs at risk. Accenture will also bring its national apprenticeship program to St. Louis, offering individuals IT training and a pathway to employment with the company. "Professional apprenticeships can play an important role in creating opportunities for individuals who might not otherwise have access to digital economy jobs, while helping to close the skills gap for employers," said Julie Sweet, Accenture's CEO – North America. "People are this city's greatest source of competitive advantage, and together with the St. Louis Promise Zone and our skilling partners, we are helping make St. Louis, its people and its economy stronger." Program partners — which include CyberUp, Family and Workforce Centers of America, LaunchCode, NPower, St. Louis Agency on Training and Employment (SLATE), St. Louis County Human Services, and the State of Missouri — will provide participants with opportunities to develop technical skills, complemented by work-based learning opportunities or professional apprenticeships with local-area businesses. Lyft has also signed on to provide transportation for individuals participating in the program. "This public-private partnership is designed to put families on a path toward achieving economic success," said Erica Henderson, executive director and vice president of community investment and real estate at the St. Louis Promise Zone. "The intentionality around equitable workforce opportunities and expanding access to education, training and employment in the Promise Zone footprint is critical to transforming our region and having a substantive, generational and economic impact." The My Path, My Future program began recruiting its first cohort in March, with the intent of placing individuals into training programs during the summer and with prospective employers by the end of the year. "The availability of technology roles in St. Louis will continue to grow, and it's important for employers to make these jobs more accessible to wider pools of talent," said Michael Gallagher, managing director of Accenture's St. Louis office. "We look forward to welcoming our first cohort of apprentices to Accenture and seeing the impact they make on our business."



St. Louis joins Accenture's growing national apprentice program, which is currently offered in Atlanta, Boston, Chicago, Columbus, Detroit, San Antonio, San Francisco, Seattle and Washington, D.C. The national program will have 450 apprentices trained by the end of 2019.

Accenture Collaborates with Corteva Agriscience on Pilot Program to Bring Technology Skilling to Rural Iowa

Accenture and Corteva Agriscience announced during a press conference with Iowa Governor Kim Reynolds, a collaboration bringing together non-profit groups, higher education organizations, and government leaders to help individuals and educators in Jefferson, Iowa, acquire technology skills while remaining in their rural communities. Together with the Des Moines Area Community College (DMACC), the pilot program is designed to train students and educators in rural Jefferson – a community of 4,300 people 65 miles northwest of Des Moines – in high-demand, high-value software development technology skills. "The vibrant collaboration between our business professionals and educators is preparing

Iowans for cutting-edge careers in the ever-changing 21st century economy," said Gov. Reynolds. "Accenture and Corteva Agriscience's investment in Jefferson sends a clear message that rural Iowa can be a tech hub to keep our young people here and attract others." Starting in fall 2019, Corteva will fund 25 scholarships for students in DMACC's Computer Languages program where they will receive computer science training. Upon completing their studies, select graduates will participate in a four-month commercial software development training program at a new office Accenture is opening in September 2019. "Providing students and educators with technology skilling is good for business, good for Jefferson and good for Iowa," said Pallavi Verma, senior managing director – Midwest, Accenture. "Together with Corteva Agriscience and other like-minded organizations, we're looking forward to preparing Jefferson's future workforce for the digital economy." "We are proud to provide 25 rural scholarships to Des Moines Area Community College and fund training for local teachers in the types of critical thinking skills and software development programs that will be necessary for today's youth to drive the future of sustainable agriculture," said Jim Alcombright, IT Digital and Platforms Lead, Corteva Agriscience. "We're looking forward to teaming with Accenture and expect the students who participate in the company's technology training program to one day contribute new valuable digital tools that better the agriculture industry." The Jefferson skilling and workforce development pilot program has also attracted participation from Silicon Valley non-profit organization, The Tech, which will help the Greene County Community School District to better prepare students for STEM (Science, Technology, Engineering, Mathematics) careers. The Tech will conduct an in-person professional development session sponsored by Corteva for Greene County educators on June 6, 2019. The organization will continue to support curriculum development and individual educators throughout the 2019-2020 school year. "Many people who grow up in rural America feel they must inevitably relocate to pursue their education," said Linc Kroeger, Accenture executive who leads the skilling and workforce rural revitalization initiative in Jefferson. "We can keep talent in rural areas by helping students gain valuable technology skills, which are critical for the jobs of today and tomorrow." The pilot program was initiated by Pillar Technology, which was acquired by Accenture in 2018 to strengthen its Industry X.0 capabilities. Industry X.0 is the digital reinvention of industry where businesses use advanced digital technologies to transform core industrial operations, worker and customer experiences, and business models. The new Jefferson location will be designed as a Pillar Technology "Forge."

Arabsat Sponsors and Participates in the Radio and TV Festival in Tunisia

Arab Satellite Communications organization (ARABSAT) sponsors and participates in the 20th Radio and Television Festival, coincides with the 50th anniversary of the Union Establishment, which will take place from 27-30 June 2019 in Tunis. The event will be attended by many media professionals In the Middle East and North Africa. "We have an excellent working relationship, successful projects and coordination in all fields with Arab States Broadcasting Union," said Khaled Bin Ahmed Balkheyour, Chief Executive Officer of Arabsat. He added "Arabsat will showcase its new satellite services, two of them have been successfully launched in the past few months this year."

AT&T Named the Nation's Fastest and Most Reliable Wireless Network by PCMag

After driving nearly 10,000 miles across 30 major cities, PCMag announced that, "AT&T rocketed into the lead this year," and is now the Fastest and Most Reliable Mobile Network in the nation. This builds on our most recent recognition as the Nation's Fastest Wireless Network according to Speedtest by Ookla 1Q 2019 results and recognition as the Nation's Best Wireless Network according to America's biggest test. Based on PCMag results, AT&T's wireless network performed better in more cities and across more regions than any other provider, and offered the best experience in all rural areas measured. This is an acknowledgement that 5G Evolution, our launchpad for 5G, is creating great customer experiences in over 500 markets today. These enhancements are the result of billions of dollars of technology investments to bring our customers a great network experience.

AT&T Extends 5G to Las Vegas; Verizon Adds Denver, Providence to 5G Footprint

AT&T Mobility has launched its millimeter wave (mmWave)-powered 5G network in Las Vegas, taking its total number of partially covered cities to 20. Prior to Las Vegas, AT&T launched its 5G service in twelve cities in December 2018, adding a further seven locations in April this year. Customers can access the 5G network using a Galaxy S10 5G smartphone, in conjunction with a AT&T Business Unlimited Preferred plan. Stephanie Tyler, AT&T Nevada state president, commented: 'Being the first to Las Vegas, and the first to 20 cities across the US, is a testament to AT&T's commitment to our future. This next generation wireless network will be game-changing as we explore the many opportunities and experiences it will bring.' Also in the US, Verizon Wireless officially turned on its '5G Ultra Wideband Network' in select areas of Denver on 27 June, and will launch the service in Providence on 1 July. The network went live in April 2019, in parts of Minneapolis and Chicago. The mobile giant currently offers four 5G-enabled smartphones: the LG V50 ThinQ 5G, the moto z3 and z4 combined with the 5G moto mod, or the Samsung Galaxy S10 5G. This, it claims, represents the most 5G devices available on any 5G network.

AT&T, KPN, Orange and Swisscom Activate LTE-M Roaming Across North America and Europe

The aim is to enable low power IoT devices to operate efficiently on multiple networks in those territories. LTE-M is a standardized, cellular technology designed to supports IoT applications at lower costs than ordinary mobile communications, using compact modules that have far longer battery lives and can penetrate hard-to-reach locations. The networks operate within licensed spectrum with carrier-grade security, adapted to moving objects. The partners say their collaboration is an important step in the maturity of LTE-M as an IoT technology:

- AT&T's network covers the US and Mexico.
- KPN's spans LTE-M across the Netherlands.
- Orange's LTE-M network is available in France and Romania with Belgium, Slovakia, Spain and Poland coming this year.
- Swisscom has deployed LTE-M across Switzerland.

The operators expect others to join their roaming agreement over the next few months to extend cross-border reach. The GSMA predicts that LTE-M networks will provide total European coverage by the end of 2020. John Wojewoda, AVP, Global Connections Management, AT&T said that more of its enterprise customers want global capabilities for IoT devices and applications: "These LTE-M roaming agreements help meet that demand and make it easier for businesses around the world to benefit from the power of a globalized IoT." "Roaming with LTE-M has been one of the most requested features by our customers in the market," Carolien Nijhuis, Director IoT at KPN added. Didier Lelièvre, Director, Mbile Wholesale & Interconnection, Orange, added, "We're proud to be among the first operators to deliver such a roaming capability to our IoT customers and more widely to our partners across this market." His sentiment was echoed by Julian Dömer, Head of IoT at Swisscom.

AT&T and HPE Join Forces to Accelerate Edge Computing for Businesses

AT&T and HPE announced that they have agreed to a go-to-market program to accelerate business adoption of edge computing and edge connections. Whether it is edge computing, FOG computing, or MEC, edge compute is all about moving applications closer to the network edge and the end users. Moving applications to the edge provides faster processing and lower latency, as well as the potential for improved security. AT&T Multi-Access Edge Computing Services allow businesses to take advantage of AT&T's cellular coverage, including LTE today and 5G down the road, to manage cellular traffic through virtual network functions (VNFs.) The partnership has paired AT&T Multi-Access Edge Computing Services with HPE's Edgeline Converged Edge Systems to help create uses cases where applications can reside on premises for lower latency processing. The partnership is a work in progress with no specific timing in regard to when it will be implemented. In February, HPE announced that it had upgraded its edge platform to help carriers transition to 5G services. HPE's Edgeline EL8000 Converged Edge System was designed to help service providers process data intensive, low-latency services directly at the edge of networks.

In addition to 5G, HPE said the EL8000 was also ideal for provisioning smart cities, artificial intelligence, video analytics and media delivery. While islands of 5G deployments are taking place this year, 5G won't really start to ramp until 2020 or later. In order to help grease the migration to 5G, service providers are starting to tap into MEC software to deliver some of the benefits of 5G. HPE previously said it was partnering with systems integrator Tech Mahindra, which develops MEC software, to create MEC solutions. AT&T and HPE are working with enterprises on proof of concepts across IoT, machine learning and augmented reality ahead of large-scale deployments of those services and applications. "AT&T's software-defined network, including our 5G network, combined with HPE's intelligent edge infrastructure can give businesses a flexible tool to better analyze data and process low-latency, high-bandwidth applications," said AT&T Business' Mo Katibeh, chief marketing officer, in a statement. "Bringing compute power closer to our network helps businesses push the boundaries of what is possible and create innovative new solutions."

AT&T Lays the Foundation for 5G and Public Safety with Network Investments

AT&T is investing in its wireless and wired network, including AT&T Fiber, Fixed Wireless Internet and other technologies, across the country. AT&T is enhancing reliability, coverage, speed and overall performance for homes and businesses. By building out AT&T's LTE network, the company is laying the foundation for 5G, the next advance in network technologies. AT&T's investments are also working to improve critical services that support public safety and first responders. The company build upon these investments as we work with the First Responder Network Authority to build out FirstNet – Public Safety's dedicated, nationwide communications platform. FirstNet is for America's police, firefighters, EMS personnel and other first responders, helping them connect to the critical information they need when they need – every day and in every emergency.

AT&T Expands 4G LTE and Fixed Wireless Internet Service in El Dorado County

AT&T added a new cell tower to its 4G LTE network in Grizzly Flats to help give customers and FirstNet subscribers faster, more reliable wireless service. By adding this tower, AT&T is also bringing Fixed Wireless Internet to residents and small business in parts of El Dorado County. The new cell tower in Grizzly Flats is the 4th site to go on-air in El Dorado County in 2019, joining the 9 sites on-air in 2018 – totaling 13 sites for El Dorado County. The other new sites are located in Kelsey, Greenwood, Somerset, Meadow Brook, Georgetown and Northeast Georgetown, Green Springs Ranch, Gold Oak, Echo Lake, Outingdale, Pilot Hill and Sierra Springs. "We continue to invest in rural California to ensure our customers have access to wireless connectivity and high-speed home internet service," said Alice Perez, Director of External Affairs – AT&T California. "These services are critical to El Dorado County's economy, improving access to communication for public safety subscribing to FirstNet, quality healthcare and education as well as the ability for friends and family to stay in touch." By building out our 4G LTE network, we are boosting network speeds and capacity, as we continue to expand the availability and capacity of our network and upgrade our technology. Our investment will help customers get the most out of their mobile devices. With 4G LTE service, customers will experience better network connectivity while streaming videos, sharing on social media or texting family and friends. These upgrades will also benefit public safety and first responders subscribing to FirstNet, public safety's dedicated communications platform. FirstNet is being built with AT&T in a public-private partnership with the First Responder Network Authority. It's designed to help first responders and those who support them in California and across the country connect to the critical information they need – when they need it – so they can keep themselves and the communities they serve safer. California first responders enjoy the fastest overall experience on FirstNet, compared to any commercial network in the nation, thanks to the specialized capabilities enabled by the physically separate and dedicated FirstNet network core, like always-on priority and preemption.1 Our investment in this tower will also help deliver high-quality, high-speed internet to customers living in underserved rural areas. AT&T Fixed Wireless Internet2 delivers an internet connection with download speeds of at least 10Mbps and upload speeds of at least 1Mbps. The connection comes from a wireless tower to a fixed antenna on a customer's home or business for eligible customers.

AT&T Integrates Free Broadcast TV App Locast on DirecTV, U-Verse

AT&T will add Locast's interactive app on its DIRECTV and U-verse platforms. Locast is a public service application that offers viewers with broadband-connected receivers access to their local ABC, CBS, NBC, FOX and other broadcast stations streamed via the Internet and is currently available to 27 million users in nine markets -- New York, Chicago, Philadelphia, Dallas, Washington, Houston, Boston, Denver and Baltimore. AT&T continues to offer consumers new ways to access the video content they want. We believe Locast's public service offering will make sense for many of them. AT&T also will continue to offer its complimentary Local Channel Connector service when a local station is otherwise unavailable. The Local Channel Connector captures stations' over-the-air digital signals via a free digital broadcast antenna and enables customers to select channels using the program guide. AT&T recently provided over 10,000 free Local Channel Connectors to Salt Lake City customers who went without the local NBC affiliate.

AT&T Honors Suppliers Committed to Both Diversity and Sustainability

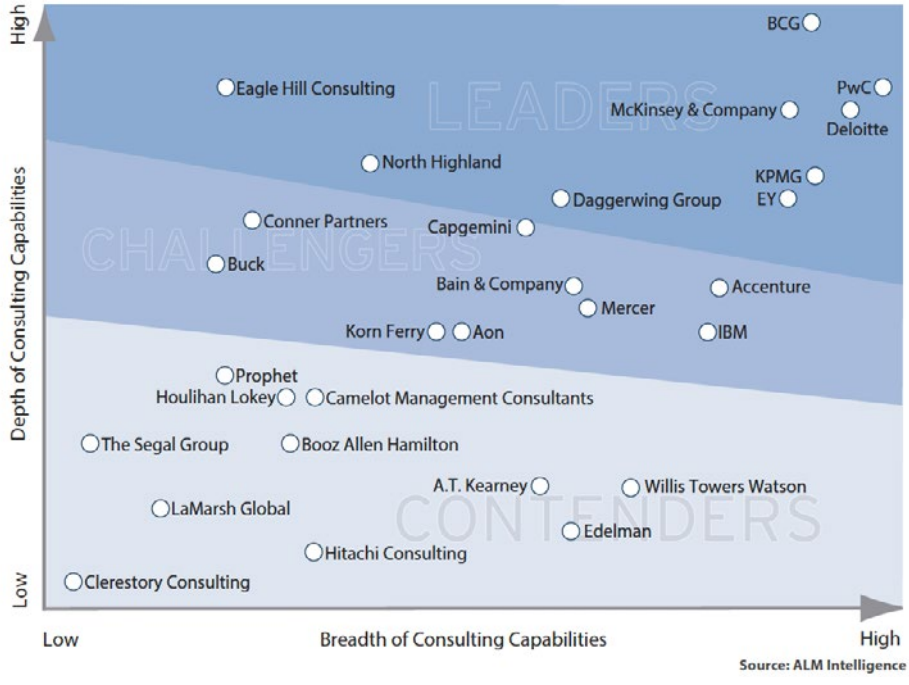
For the first time, AT&T is recognizing top suppliers who prioritize both diversity and sustainability in their corporate practices – just as we do. The exclusive recipients of the revised AT&T* Supplier of the Year Awards are Hewlett Packard Enterprise, Fujitsu Limited and World Wide Technology. Of our 17,000 suppliers, these three excel in both diversity and sustainability. "Diversity and sustainability are the factors that have the most potential to shape our world right now," said Susan Johnson, executive vice president, Global Connections & Supply Chain at AT&T. "More than ever before, we must bring our diverse perspectives together to develop innovative solutions to the challenges we face." Hewlett Packard Enterprise offers an inclusive and welcoming workplace and earned top national ratings for carbon disclosure and decreased greenhouse gas (GHG) emissions. Fujitsu Limited boasts a diverse workforce and achieved high scores in eco-designs, stakeholder engagement, resource efficiency and environmental management. World Wide Technology understands the importance of offering opportunities to other small, minority and diverse businesses. Notable is their performance in supply chain management, environmental management and corporate responsibility. We continue to give our traditional Excellence Awards to suppliers who excel in either of the diversity or sustainability categories. As part of AT&T's Downtown Dallas Discovery District project, The Beck Group was rated atop other suppliers in both spend with diverse suppliers and use of diverse subcontractors. J.R. Bowman Construction, a woman-owned business, is currently ranked highest for use of diverse suppliers in their subcontracting spend portfolio with AT&T. Accenture's high rating in environmental management and ambitious goals in its operations and supply chain align with the United Nations Global Goals for Sustainable Development. Nokia launched the first commercial liquid-cooled base station with the potential to reduce carbon emissions by up to 80%. "The AT&T Excellence Awards are one way we're proving our commitment to building relationships within our supply chain that strengthens our communities and ensures the richness of life on our planet is preserved for future generations," said Rachel Kutz, vice president, Global Connections & Supply Chain, Strategic Initiatives.

BCG Acquires Kernel Analytics to Expand Data Analytics and AI Offering

Boston Consulting Group (BCG) continues to expand its presence in the digital domain by acquiring Kernel Analytics, a leading European consultancy specializing in data science and advanced analytics. The newly acquired firm broadens the capabilities of BCG GAMMA, the analytics powerhouse of BCG that leverages world class analytics and artificial intelligence to unlock the business performance potential of the world's leading companies. Kernel Analytics will be fully integrated into BCG GAMMA and will become part of the BCG ecosystem. As part of the transaction, Kernel's founders and their team of nearly 100 people will join BCG GAMMA. "BCG GAMMA is one of the most exciting parts of our business, and we expect the market for tailored AI solutions to continue growing rapidly. As we further expand our capabilities, this acquisition will help us to continue enabling our clients to deliver on their ambitions," said BCG CEO, Rich Lesser. According to Sylvain Duranton, founder of BCG GAMMA, "This transaction brings us Kernel's deep know-how in key areas such as asset and revenue management, supply chain, and customer value management." "Joining BCG GAMMA gives us the opportunity to tackle the most challenging projects of the day in AI, bringing state-of-the-art solutions to top companies worldwide and increasing the ability to transform companies holistically," stated Pau Agulló and Borja Auria, two of Kernel Analytics' founders. By bringing the experience gained over years developing cutting edge data analytics and artificial intelligence applications, Kernel Analytics will contribute to the growth of BCG GAMMA globally, and will help broaden the capabilities that allow BCG to lead data-driven transformations and provide powerful analytics solutions to its clients.

BCG Tops List of Leading Change Management Providers Worldwide

Boston Consulting Group (BCG) was named the leading change-management provider in the report The ALM Vanguard: Communications and Change Management Consulting 2019, recently released by ALM Intelligence. In this independent annual report that compares consulting companies worldwide, BCG outpaced its competitors to become the top choice for companies undergoing either discrete change projects or enterprise-wide transformation. The firm was singled out from its competitors for its holistic approach to change management. BCG's Agile Transformation Management addresses all stages—from scope and preparation to implementation—and provides key competencies for understanding human behavior, an organization's internal culture, and employee engagement. The approach includes the creation of Impact Centers, unique physical spaces that, as the ALM report notes, "enable everyone involved in leading the change to interact (in person or virtually), coordinate decision making, and remove barriers to change." "Our approach, which covers all aspects of a transformation along three journeys—leader, program and people—is clearly unique," says Reinhard Messenboeck, a BCG senior partner and global lead of the firm's Change Management practice. "Along with our Impact Centers, we provide a variety of digital applications that help overcome the behavioral challenges that often accompany the process of change. As ALM notes, this all-encompassing approach gives BCG a clear differentiating position in the market." BCG's employee-centered approach to change management is supported by ALM's belief that change can be more successful when a broad cross-section of client stakeholders is involved in the planning process. The approach is focused on the role of leaders, from the CEO down, to drive change and support employees in their front-line role of making change processes successful. The approach is designed to be adaptable and transparent, and to create the highest long-term value for the client. The report notes that BCG's Agile Transformation Management approach "helps clients develop a holistic approach where the journey is orchestrated at the leader, individual, and program levels, thus building agility into all strands of organizational DNA…[and] ensures the employee is at the center of all change effort, a goal achieved through experience design and reinforced with the firm's digital tools." The firm's BeSmart initiative combines insights from psychology, cognitive science, and social science to discover how humans actually make choices. BCG then applies these insights to help client teams build positive habits and make better change-management decisions. This approach is often combined with BCG's Smart Simplicity methodology, which helps organizations counter the increasing complexity of business by providing simpler alternatives to traditional management solutions. "Our approach to change management is deeply rooted in behavioral science," notes Julia Dhar, a BCG principal and Global Lead of the BeSmart Initiative. "Smart Simplicity ensures that we're setting the right context for leaders and employees—making sure, for example, that incentives align with desired behavior changes. By basing change management on tangible insights into human behavior, BeSmart enables both leaders and employees to make the process of change as pain-free and successful as possible." According to the report, one reason change programs fail is that the process itself is often put in a 'black box.' "When the program goes live," the report states, "those impacted by the change are often caught off guard," which can lead to fear and resistance to change. BCG's Agile Transformation Management approach prevents these kinds of surprises by inviting more stakeholders—including employees—into all phases of the change process. The report highlights BCG's transparent service delivery model, which combines strategic consulting with inclusivity, technology, and coaching to help the client develop a strong organizational ability to execute change. As the report concludes, BCG's change management "portfolio of complementary frameworks, solutions, and services remains grounded in the scientific rigor and discipline that is BCG's signature." The firm's approach enables change management to become "a driving force that enables leaders, teams, and individuals to act with agency and purpose in the workplace."



BT Chooses Juniper Networks for Unified Cloud Infrastructure

BT wants to create a programmable, automated network to reduce the cost and accelerate the introduction of new services. The move will pave the way for BT's Network Cloud roll-out – the operator is aiming to create a single, cloud-based technology platform to bring various lines of business together and enable a more flexible, virtualised network infrastructure. BT will use the platform to create new converged services, combining mobile, Wi-Fi and fixed network services. BT will be able to integrate a range of currently discrete network functions and deploy them on a cloud infrastructure that is built to a common framework and shared across the organisation, throughout the UK and globally. These include services across BT's voice, mobile core and radio/ access, global services, ISP, TV and IT services, as well as a host of internal applications. Through this, BT aims to cut operational expenditure and simplify operations. Neil McRae, Chief Architect, BT, said, "With growing demand from our ultrafast broadband services and ultrafast 5G services and has the perfect opportunity to combine several discrete networks into a unified, automated infrastructure. "This move to a single cloud-driven network infrastructure will enable BT to offer a wider range of services, faster and more efficiently to customers in the UK and around the world. Bikash Koley, Chief Technology Officer, Juniper Networks, added, "As a renowned global service provider, BT is a shining example of how to evolve networks to become more agile."By leveraging the 'beach-front property' it has in central offices around the globe, BT can optimize the business value that 5G's bandwidth and connectivity brings. "The move to an integrated telco cloud platform brings always-on reliability, along with enhanced automation capabilities, to help improve business continuity and increase time-to-market while doing so in a cost-effective manner."

BT Group Reveals First Eight Locations as Part of Biggest UK Workplace Improvement Program

BT Group has revealed the first eight of the locations that will house its workplaces of the future as part of a three-to-five-year program initially announced in May 2018 to improve and consolidate its workplaces across the UK. 'The Better Workplace Program' will consolidate BT Group's footprint of more than 300 locations to around 30, containing modern, future-fit buildings, including corporate offices, contact centers and specialist sites. It is the largest program of its type in the UK. BT's telephone exchanges will be retained by the Group. Belfast, Birmingham, Bristol, Cardiff, Edinburgh, Ipswich (Adastral Park), London and Manchester are the first towns and cities to be selected and will house a variety of the company's operations. This is a clear signal that BT is committed to the whole of the UK, with locations in all four countries and their capitals. Though detailed plans of BT's footprint in each location are still to be finalized, some existing BT buildings will be refurbished while others will see BT move into new offices. BT Group plays an important role in the UK's four countries and is responsible for generating £1 in every £75 produced across the UK, according to an independent report. It also generated £22.8 billion to the UK's economy in "Gross Value Added" GVA, during the 2017/18 financial year.* All eight locations will benefit from 5G coverage, announced on 22 May. Teams within the future-fit buildings will benefit from state-of-the-art mobile connectivity alongside the existing fiber connections. "The Better Workplace Program is about bringing our people together in brilliant spaces, and transforming the way we work," BT Group chief executive Philip Jansen said. "Revealing these eight locations is just the first step; we have dedicated teams working on identifying the best buildings to move into and which ones to redesign for the future. As a result of this program, BT people will be housed in inspiring offices that are better for our business and better for our customers." As announced in May 2018, BT Group will also exit its St Paul's headquarters in London and is currently identifying a new home for the business in the capital. Further details on 'The Better Workplace Program' will be revealed in due course.

Artists impression of how the proposed workplaces could look under the programme

BT, University Hospitals Birmingham and WM5G Demonstrate UK's First Remote Ultrasound over a Public 5G Network

University Hospitals Birmingham NHS Foundation Trust (UHB), BT and WM5G are showcasing how 5G can transform healthcare and the emergency services - with the UK's first demonstration of a remote-controlled ultrasound scan over a public 5G network. The demonstration is being hosted by the Medical Devices Testing and Evaluation Centre (MD-TEC) in UHB's prestigious simulation lab located in the Institute of Translational Medicine. The showcase brings the concept of a 5G Connected Ambulance to life and provides new technologies to front-line staff to create a facility for patients to be diagnosed and triaged in the most appropriate settings. It enables remote diagnostics performed by paramedics who are supported by clinicians based in the hospital. This is a real-world example of how 5G will support digital transformation in the delivery of public services. It is one example of how activities which can only be performed in static environments today can become mobile tomorrow and which will enable care delivery to be streamlined. The demonstration simulates a paramedic in the field performing an ultrasound scan on a patient, under the remote guidance of a clinician who is able to interpret the ultrasound image in real-time. The ultrasound sensor is manipulated locally by the paramedic under the remote direction of the clinician. This is done using a joystick operated remotely by the clinician which sends control signals over the live 5G network to a robotic or 'haptic' glove worn by the paramedic. The glove creates small vibrations that direct the paramedic's hand to where the clinician wants the ultrasound sensor to be moved. This allows the clinician to remotely control the sensor position, whilst seeing the ultrasound images in real-time. In addition, there is a camera in the ambulance which transmits in high definition a view of the inside of the ambulance covering the patient and paramedic to a second screen located on the clinician's workstation. The images are relayed over a high-bandwidth 5G connection, so the clinician is able to view both the ultrasound examination performed by the paramedic and keep an eye on the overall scene inside the ambulance. The superfast speeds of 5G ensure sharper and more reliable imagery for the clinician than could previously be achieved. Enabling ultrasound scans to be performed by paramedics in the field and reviewed remotely by an expert clinician should bring a number of advantages to patients and to the NHS. As well as speeding up diagnoses for patients, it has the potential to reduce the number of ambulance journeys and emergency department visits. This will improve the overall experience for patients while freeing up ambulance resources and reducing pressure on emergency departments. Faster diagnoses can also assist in triaging patients, ensuring more effective outcomes for the patient, and increasing overall efficiency for the hospital. The demonstration follows a decision by Government to select the West Midlands as the UK's first multi-city 5G test bed. As part of the multi-million pound project, the West Midlands Combined Authority (WMCA) and the Department for Digital, Culture, Media and Sport has set up WM5G to develop a large scale 5G pilot across the region to trail new 5G applications and service at scale. Andy Street, the Mayor of the West Midlands and chair of the WMCA, said: "As the nation's 5G testbed, the West Midlands is leading the way in showing what this exciting technology can do and how it can be rolled out to the rest of the UK. "We have seen today how 5G has the potential to save patients' lives, but its new power and technology can also help grow our cutting edge industries that will create the jobs of tomorrow. "5G will be the backbone of our future economy and society, with local people here in the West Midlands reaping the benefits first." Gerry McQuade, CEO of BT's Enterprise unit, said: "We're really excited to be working with WM5G and University Hospitals Birmingham on the first 5G healthcare trial to take place in the UK over a live public network. BT has a long and proud heritage of working with the NHS to better connect patients and healthcare professionals and the characteristics of 5G will deliver a huge-step change in speed, capacity and reliability. We are focused on delivering new, innovative services which will make lives better and firmly believe in using the power of 5G to bring potentially life-saving benefits to patients. There's no better place to start realizing this vision than in Birmingham, part of the UK's first multi-city 5G test bed." West Midlands Ambulance Service Strategic Operations Director, Craig Cooke, said: "The 5G network will allow us to further enhance clinical care in the mobile environment, building on the electronic patient record system (EPR)

we have already implemented. In simple terms, 5G has the potential to help us provide better care, at the patient's side, and provide increasingly diverse treatment plans for patients. "For example, it could allow us to explore live clinical face-to-face consultation with patients at the scene, before the ambulance has arrived. Equally, crews could access specialist assessments and consultations while with the patient through video conferencing or even using new technologies under the remote guidance of consultants or other clinical specialists removing the need for patients to go to hospital. "As an NHS Global Digital Exemplar, WMAS is already looking at how to extend the use of EPR and explore ways to improve interoperability with our partners such as UHB. One potential development could be the increase of data handover with acute providers to support better patient care. Early access to WMAS information from our vehicles can support the care the patients receive on arrival at hospital and the patient's journey through departments. We already see this in cases such as heart attacks where hospital staff can view the patient's ECG, but this could become a live data stream. "We look forward to working with partners to harness the full capability of the 5G network for the benefit of patients and staff alike." Ultrasonography is the second most common diagnostic test reported by the NHS, with more than 9.5 million carried out last year in England alone. On average, 408,000 patients attend University Hospitals Birmingham Emergency Departments each year, with 113,500 of these patients using an ambulance. With BT's EE mobile arm recently switching parts of Birmingham on to the UK's first 5G services, the company is working with WM5G to illustrate how the technology can deliver significant benefits to the NHS and the wellbeing of citizens across the West Midlands region.

BT Named Major USO Provider for the UK

BT has been named the UK's major Universal Service Obligation (USO) provider by Ofcom. This will increase BT's already pivotal role in connecting the UK more quickly and more cost-effectively than ever before and help transform some of the most remote communities in the UK. The Government introduced the Broadband USO with the ambition to give people the legal right to request a connection to broadband with speeds of 10Mbps, no matter where they lived. Initial estimates showed that 600,000 premises were eligible to request broadband under the USO. As part of BT's work with Ofcom over the past year, we have demonstrated that over 75 per cent of the 600,000 consumers and businesses without access to broadband speeds of 10Mbps can quickly and easily be connected to speeds of around 30Mbps using Fixed Wireless Access (FWA) technology.4G EE Home, EE's FWA solution, launched in early 2018 and is already transforming connectivity in rural areas. As a result, BT - through Openreach - will now be able to focus on the more manageable task of connecting the remaining 25 per cent of premises as part of the Broadband USO. Based on current estimates, approximately 40,000 premises fall within the cost threshold of £3,400 per connection set by Government. BT will initially fund the rollout for these premises, with Ofcom planning to consult industry on cost recovery mechanisms for the USO later this year. To ensure that no one is left behind, BT is keen to work with Government, Ofcom and industry to examine alternative funding mechanisms to connect the remaining premises, currently estimated at around 110,000, as quickly as possible. From March 2020, customers will be able to ring BT's dedicated customer service teams to find out whether they're within the USO area, how best to get online, when by, and at what cost. Chief Executive Philip Jansen said: "BT is very pleased to have been chosen by Ofcom to deliver the Government's promise to connect the UK. It's great news that the majority of homes and businesses in rural areas can choose a fixed wireless service from EE to solve the problem of slow broadband and get speeds way faster than 10Mbps. "Through Openreach we are now extending our fiber broadband network to reach an additional 40,000 premises within the USO area for whom FWA is not the answer. We'll continue to drive discussions with Ofcom, Government and industry to explore alternative options to connect up every property in the country and ensure no-one is left behind." John Lamont MP, Chair of the All-Party Broadband and Communication Group, said: "Connecting the UK with decent broadband is absolutely key to ensuring that Britain's digital infrastructure is fit for the future. Fixed Wireless Access is already transforming people's lives, providing a fast and reliable service that means they can do everything from everyday online tasks like banking or shopping to streaming films or playing games. There's still lots more to be done, but this is a positive step forward in the right direction." Sarah Lee, Head of Policy at the Countryside Alliance, said: "A lack of decent broadband is a major issue for everyday life at home – students rely on the internet for research and to stay in touch with their friends, parents want to work from home, or bank online - and thousands of rural families want to enjoy a wealth of on-demand entertainment. Fixed Wireless Access has made a huge difference to our communities by bringing people closer together, and making life so much easier." BT supports Ofcom's objective to make decent and affordable broadband available to all households and businesses across the UK and has committed to offering, where there is no other connection from another provider, at least one fixed or mobile broadband service at no more than £45 a month.

BT Beefs Up Cyber Capabilities across Europe

BT bolstered its cybersecurity operations in Europe with a new security operations center (SOC) in Paris and upgrades to its facilities in Madrid and Frankfurt. The Paris Cyber SOC will provide advanced incident detection, threat intelligence, orchestration and automation services. It has also been specifically designed to meet both PDIS and European NIS Directive requirements, which would allow BT to qualify as a "Security Incident Detection Service" provider. With increased use of business applications in the cloud, as well as more IoT deployments, security is becoming even more of a priority moving forward. As part of the expansion, BT's Cyber SOC in Madrid will be moved to new, purpose-built facilities, with around 50 cyber experts due to be based at the center. The enhanced Cyber SOC will offer Cloud SIEM (Security Incident & Event Management), allowing its cyber experts to detect and remediate cyberattacks of all types, and to generate on-demand compliance reports with real-time status of organizational risk postures. Next month, BT's Frankfurt SOC will also offer Cloud SIEM services directly to customers, which will further enhance BT's portfolio of services across Europe and worldwide. BT's Frankfurt SOC, which opened in 2017, provides a range of security services to regional and international customers while ensuring that all of the data is handled and stored in compliance with German regulations. With the new SOC and the upgrades, BT now has 3,000 security specialists across its SOCs that protect BT customers against 125,000 cyberattacks a month. BT offers its cybersecurity services to consumers, governments, businesses and well-known brands. BT customers also benefit from real-time intelligence sharing across its global network of SOCs, coupled with in-country capabilities, such as support in local languages and compliance with data protection regulations, including GDPR in Europe. "The ongoing expansion of our security capabilities in Europe shows BT's commitment to providing industry-leading services to customers in the region," said Kevin Brown, managing director of BT Security, in a statement. "We are increasingly regarded as the most trusted experts to mitigate cyber threats, and we're continuing to invest and recruit in order to meet demand. Our services are designed to meet the most demanding standards in the world for cyberattack detection, as well as the rapidly evolving requirements of our customers."

BTC Launches Mobile Money Wallet SMEGA Powered by Comviva's mobiquity® Money Platform

Botswana Telecommunications Corporation Limited (BTC), Botswana's fastest and widely available mobile network, has revamped and introduced SMEGA, its mobile money service. SMEGA now works on Comviva's mobiquity® Money platform, one of the world's largest white-labeled mobile money platform. SMEGA offers consumers a quick, convenient and secure way to perform financial transactions from the comfort of their homes or on the go. SMEGA provides a one-stop-shop for multiple financial transactions such as person to person money transfer, airtime and data purchase, prepaid electricity purchase, water bill payment, BTC postpaid bill payment and salary payment. SMEGA has been designed as an inclusive service. With SMEGA, customers will be able to send money to other SMEGA users as well as to non-registered individuals who will receive a passcode which can be used to cash-out money at BTC outlets. SMEGA is not only for individuals but for businesses also; businesses can leverage SMEGA's bulk payment feature to pay salaries and allowances to their staff and reduce the cost and paper work required for cash and cheque payments. A unique feature offered by SMEGA is Motshelo Club, which is built on group savings culture of Botswana. Motshelo Club allows a number of people to contribute to a group savings wallet and use the money on rotational basis in good and bad times. BTC is the first mobile operator in the country to provide a digital Motshelo Club service. Edward Wicks, Chief Commercial Officer, BTC said, "We are delighted to offer SMEGA which is delivered through the Comviva mobile money platform. SMEGA is focused on enabling access to financial services to improve people's lives and positively contribute towards the economy by accelerating financial inclusion and economic development. We also trust that our customers across the country will find it easy, fast and a more convenient means

of transferring money, making payments and doing other financial transactions." Anil Krishnan, Head of Africa Region at Comviva, said "Mobile phones today are not just communication devices; they have become a holistic channel for digital lifestyle. Comviva is making this reality through its mobiquity® Money platform that enables service providers to provide digital financial services to consumers through mobile phones. In Botswana, we are carrying forward this revolution with BTC through their SMEGA services that delivers a seamless and secure financial service on mobile to financially underserved consumers." BTC was established in 1980 to provide, develop, operate and manage Botswana's national and international telecommunications services. BTC has a wide network covering over ninety percent (90%) of the country. Over the years, it has launched many innovative services that has evolved the ICT market in Botswana and have transformed people's lives. SMEGA is one such relevant service that is taking mobile phones to the next level, by using them for performing financial transactions anywhere anytime. mobiquity® Money is the world's leading mobile money platform that delivers a host of digital financial services that transform the way consumers save, borrow, transfer and spend money. It is designed to seamlessly integrate consumer touch points with a wide ecosystem of banks, billers, merchants and third-party payment systems, creating a convergence powered by interoperability. Apart from delivering convenience to consumers, the solution enables telecommunications service providers to acquire new customers, create long-term loyalty with existing ones, and seize new revenue opportunities to increase their footprint in the market. mobiquity® Money empowers telecommunications service providers to be agile in their markets, with complete focus on the customers. mobiquity® Money has clocked over 60 deployments in more than 45 countries. It provides financial services to over 100 million consumers globally and processes more than 6.5 billion transactions amounting to over $130 billion annually.

Cisco Unleashes the Capabilities of the New Network

Cisco is revolutionizing the role of network professionals and software developers to drive technology innovation and accelerate business. As Cisco reinvents the future of networking, DevNet (Cisco's developer program) is bringing together software developers and certified network professionals into one community to enable unparalleled collaboration and best practice sharing and to pioneer new levels of automation capabilities. In addition, Cisco is introducing an industry-changing expansion of its professional certification program that embraces both the network professional and software developer and adding a new community-based developer center to accelerate adoption and success with network automation. Cisco's intent-based networking has led to a fundamental shift in the role networks play in business and changes how networking is done. The role of the networking professional has changed as it moves away from manual, time intensive tasks and into the world where IT, DevOps and application and cloud developers work together. To fully leverage the capabilities of this new network, organizations must leverage software practices, networking and software skills and an engaged community that solves technology challenges together. "Networking technology has evolved significantly over the last five years and the new network can accelerate business, catalyze new applications, and bring DevOps practices to networks," said Susie Wee, SVP/CTO and founder of Cisco DevNet. "We are bringing software skills to the networking industry with new Cisco DevNet certifications. In addition, we are bringing software practices to networking by having a community of networkers and developers work together to solve tough network automation problems through shared code repositories. This will allow the industry to take full advantage of the capabilities of the new network to accelerate business."

Cisco Beefs Up SD-WAN With Security in the Cloud

Security is top of mind for enterprises as they move wide-area networking (WAN) from the edge to the cloud, but the industry needs to rethink how it does security in the cloud, according to Cisco's David Goeckeler. During a keynote address, Goeckeler, Executive Vice President of networking and security, said that his company has added security measures in the cloud for software-defined WAN (SD-WAN). "You have the cloud and you start adopting SD-WAN," Goeckeler said. "When you start that adoption you start thinking 'Wait a minute all of my security technology is sitting at the edge of my network. That needs to be in the cloud as well.' We have to rethink how we deliver security in this cloud-first world." Last year, Cisco integrated an enterprise-class firewall into its on-premise SD-WAN appliances. At this year's Cisco Live, Gee Rittenhouse, senior vice president of Cisco's security business, announced that his company has broadened its SD-WAN security approach into Umbrella, which is Cisco's secure internet gateway. "We know that when you're considering your SD-WAN topography that security is top of mind. It's ours as well," said Rittenhouse, who was sharing the keynote stage with Goeckeler. "But we also know that you're choosing SD-WAN because you want to make the network simpler. The last think we want to do is force you to bolt on various security technologies that end of the day just complicate your network operations. "Today we're very, very excited that we're extending this approach to Umbrella, the market leader in the cloud security space. So, whether you choose to secure SD-WAN in appliances or in the cloud, we've got you covered." With the latest addition, Cisco is able to create one common policy for DNS for a firewall at a secure web gateway by using a dashboard. Brian Roddy, vice president and general manager of cloud security at Cisco, demonstrated how the intrusion system, which is powered by Cisco's Talos security, works. Using Cisco's Viptela dashboard, a user can automatically send all of the DNS security policies to the cloud with a few clicks and then monitor them there. Cisco is able to create tunnels from the branch office to the cloud, and then provision the devices in that branch office with a few clicks. Once the system sees all of the traffic, it can look at cloud firewall polices across Layer 4 and Layer 7 to see what that traffic is doing. Cisco is in the process of adding its Sourcefire threat protection, which will be available in the coming month.

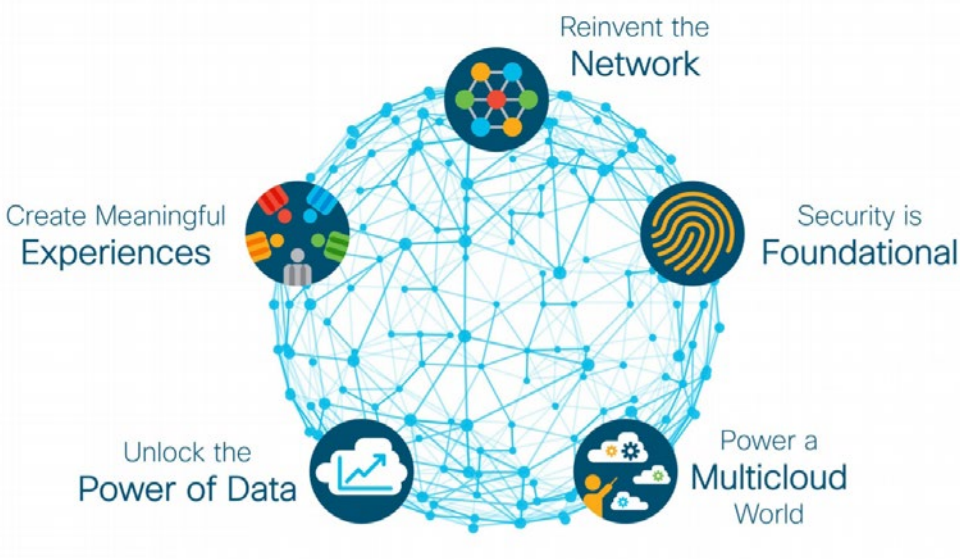
Cisco Issues Critical Security Warnings for Its DNA Center and SD-WAN Software

Cisco announced two critical security warnings in regard to issues with its SD-WAN software and DNA Center software. The most critical warning was for Cisco's Digital Network Architecture (DNA) software that "could allow an unauthenticated, adjacent attacker to bypass authentication and access critical internal services," according to the Cisco Security Advisory. "The vulnerability is due to insufficient access restriction to ports necessary for system operation. An attacker could exploit this vulnerability by connecting an unauthorized network device to the subnet designated for cluster services," according to the advisory. "A successful exploit could allow an attacker to reach internal services that are not hardened for external access." The DNA Center security issue rated a 9.3 out of 10 on the Common Vulnerability Scoring System (CVSS.) The vulnerability affects Cisco DNA Center software releases prior to 1.3. Cisco has released software updates that address this vulnerability, but it said there are no workarounds. Cisco said that system updates are available for installation from the Cisco cloud, but not from the Software Center on Cisco.com. The Cisco DNA Center is the network management and command center for Cisco DNA. It uses software-defined access to help IT professionals establish polices that are provisioned through Cisco's DNA Automation. In 2017, Cisco introduced intent-based networking with the launch of DNA Center at Cisco Live. At last week's Cisco Live conference, the company announced its AI Network Analytics will be a standard piece of Cisco DNA Center Assurance, and will be available in the next version of Cisco DNA Center, which is slated for release this summer. Cisco said AI Network Analytics would be included in the Cisco DNA Advantage licensing tier. The second critical warning was for vulnerability in the CLI (command line interface) of Cisco's SD-WAN solution, which could allow an authenticated, local attacker to elevate lower-level privileges to the root user on an affected device. "The vulnerability is due to insufficient authorization enforcement," Cisco wrote in its security advisory. "An attacker could exploit this vulnerability by authenticating to the targeted device and executing commands that could lead to elevated privileges. A successful exploit could allow the attacker to make configuration changes to the system as the root user." The SD-WAN critical security vulnerability has a CVSS score of 7.8. Cisco has released software updates that address this vulnerability, but said there are no workarounds that address it.

Cisco Boosts Enterprise IT with New Machine Learning and AI Software Features

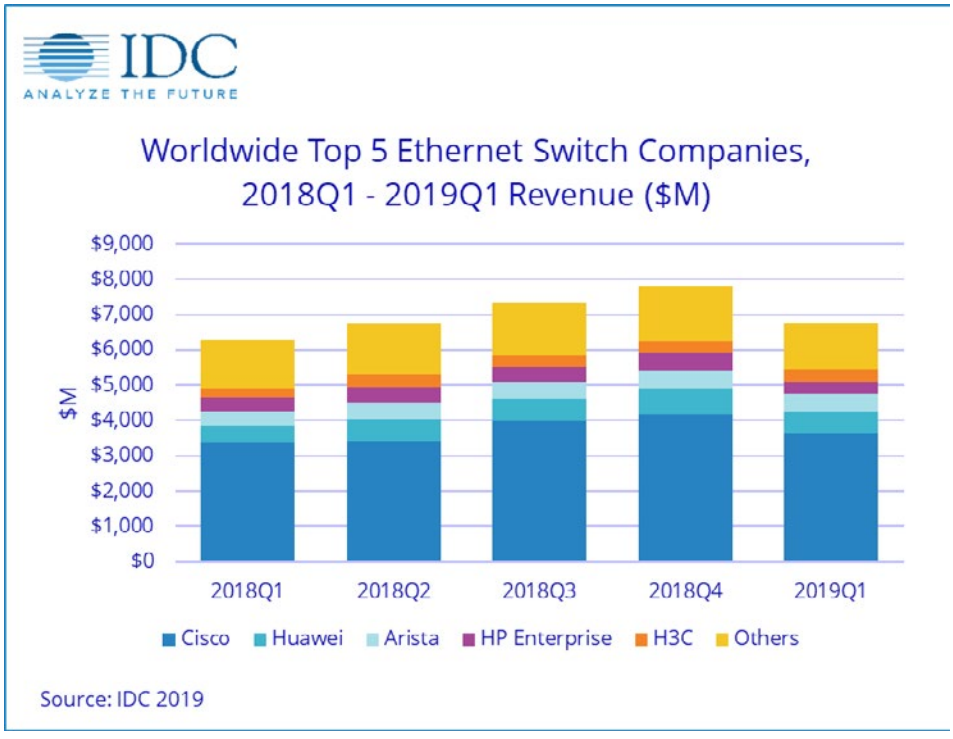
In order to help IT teams focus on innovation, Cisco announced new artificial intelligence (AI) and machine learning (ML) capabilities to help IT teams work at machine speed and scale their work through personalized network insights. With the transition to digital technologies, IT teams are struggling to keep up with increased workloads without adding to their headcounts. According to a survey by 451 Research, more than two-thirds of IT teams have increased their workload, but only one-third are planning on increasing their IT headcount in the next year. Cisco is selling the new AI and ML software on a subscription basis, which brings re-occurring revenues to its bottom line as it moves beyond being a hardware vendor while also allowing customers access to ongoing innovation. Cisco AI Network Analytics will be a standard piece of Cisco DNA Center Assurance, and will be available in the next version of Cisco DNA Center, which is slated for release this summer. Cisco said AI Network Analytics will be included in the Cisco DNA Advantage licensing tier. "As the pace of change and diversity of the environment continues to rapidly evolve, Cisco is committed to continually simplifying our solutions," said Scott Harrell, senior vice president and general manager of Cisco's Enterprise Networking Business, in a statement. "Artificial intelligence and machine learning can enable businesses to efficiently discern which issues to prioritize, becoming more nimble and proactive. This will have a profound effect on network operations and the IT teams that run them. At Cisco, we're future proofing our networks and the workforce through automation and intelligence." While IT teams and the telco industry have been able to collect vast amounts of network data in the past, finding meaningful ways to benefit from all of that information has been a challenge. Cisco said it collects the most context-rich telemetry data sets in the IT industry. Cisco is leveraging new software capabilities designed to utilize de-identified and aggregated data, which results in more intelligent solutions that allow IT teams to operate more effectively.

In order to provide more visibility into networks, the AI and ML software collects the relevant data from local networks and correlates it against the aggregate deidentified data set to create highly individualized network baselines. Those baselines constantly learn and adapt as the number of devices, users and applications evolves, and as environments change. To improve insights into networks, Cisco uses machine learning to correlate the amount of data coming from the network against the individualized network baselines to uncover potential issues that will have the greatest impact on the network, which helps the IT teams find the issues that matter the most. Cisco also uses machine reasoning algorithms and automated workflows to perform logical troubleshooting steps that an engineer would execute to resolve a problem. Cisco said this helps IT detect issues and vulnerabilities, analyze the root cause and execute corrective actions at a faster rate. As part of its intent-based networking initiative, Cisco also announced new optimized solutions across various domains of an enterprise network, including campus, branch, WAN, IoT, data center, and cloud. For network segmentation, Cisco's Software-Defined (SD) Access is integrated with its SD-WAN and software-defined networking-based Application Centric Infrastructure (ACI) in order to make easier for IT teams to authorize, on-board and segment users and devices across branch, data center and cloud networks, even as the users and applications change. Segmentation has been a feature for several SD-WAN vendors for some time, but Cisco' brings breadth and depth to its capabilities. Cisco now automatically conveys application requirements between the data center and the WAN, allowing the network to pick the best path and prioritize traffic even if applications move or change. With this feature, IT teams can dynamically elevate application performance across the enterprise and branch, according to Cisco. Based on its deep security portfolio, Cisco extended the ability to detect threats in encrypted traffic across public clouds. By protecting the branch and WAN against threats, Cisco is also providing end-to-end security to its customers. The new features and software are the end result of Cisco's intent-based networking (IBN) initiative. Cisco introduced intent-based networking with the launch of its DNA Center in 2017 before its Cisco Live event. During Cisco's third-quarter earnings call last month, Cisco CEO Chuck Robbins said his company has rebuilt its entire access portfolio with IBN in mind across wired and wireless. Over the past several years, Cisco has also been working to integrate IBN into its enterprise access portfolio "to help our customers manage more users, devices, and things connecting to their networks," Robbins said.



Cisco Rules Ethernet Switch Market: Report

While Cisco continued to flourish with its first-quarter Ethernet switch revenue, Juniper Networks ran into a speed bump. According to a report by the International Data Corporation (IDC) Cisco finished the first quarter of 2019 with an 8.3% year-over-year increase in overall Ethernet switch revenues, while holding down a market share of close to 54%. By contrast, Juniper's Ethernet switch revenue was down 23% in same quarter, which brought its market share to 2.6%. Cisco is also leading the pack in the highly contested 25 Gbps/100 Gbps segment with almost 40% of that market's revenue. Cisco's combined service provider and enterprise router revenue increased 15.3% year over year, with enterprise router revenue increasing about 16%, while service provider revenue grew by about 15% Overall, Cisco's combined service provider and enterprise router market share rose to 42%, up from 37% in last year's fourth quarter. Juniper posted an 8% decline in its combined enterprise and service provider router sales, which brought its router market share to 10%, according to IDC. Huawei's Ethernet switch revenue increased 19% on an annualized basis, giving the company a market share of 9%, which was an increase from 8.1% a year earlier. Huawei's combined service provider and enterprise router revenue rose 5.7% year over year with a market share of 24.5%. Arista Networks also posted solid results in the first quarter. Its Ethernet switch revenues increased 24%, bringing its share to 7.5% of the total market, up from 6.5% a year earlier. IDC said Arista continues to cater to the higher end of Ethernet switch speeds that are needed by hyperscale and cloud providers. Arista's 100 Gbps revenues accounted for 67% of the company's total revenue. On the other hand, HPE's Ethernet switch revenue declined 5.6% year over year, giving the company a market share of 5.3%. "There continue to be diverging trends across the Ethernet switch market," said Petr Jirovsky, research director, IDC Networking Trackers, in a prepared statement. "Hyperscalers and service providers continue to demand the fastest Ethernet switching speeds in the market, leading to the highest growth rates in both port shipments and revenues. "Meanwhile, the more mature enterprise switching platforms continue to make up a larger share of the overall market." The worldwide Ethernet switch market, which includes Layer 2 and Layer 3, grew by 8% year over year while recording $8.6 billion in revenue the first quarter. The worldwide total enterprise and service provider router market revenues grew 8% year over year in the first quarter to $3.6 billion. The growth rates are according to results published in the IDC Quarterly Ethernet Switch Tracker and IDC Quarterly Router Tracker. IDC's research found that 100 Gbps Ethernet switch revenues continued to grow at robust rate. Port shipments for 100 Gbps switches rose 85.% year over year to 3.6 million. IDC's research found that 100 Gbps revenues grew 59% year over year in the first quarter to $1.2 billion, making up 17.3% of the market's revenue. IDC said that 25 Gbps ports also saw impressive growth, increasing 133% to $304 million, with port shipments growing 105% year over year. On the other side of the ledger, 40 Gbps switches are falling out of favor, with revenues declining 21% year over year. Lower-speed campus switches, a more mature part of the market, showed moderate growth. Shipments for 10Gbps ports rose 8.6% year over year to make up 29% of the market's revenue, while 1 Gbps switches grew 2.9% year over year in port shipments, making up 40% of the market's total revenues. "Organizations across the globe are looking to digitally transform themselves in an effort to meet market and competitive needs and improve user experiences. As they do so, enterprises are realizing the critical role the network plays in their broader IT transformation initiatives," said IDC's Rohit Mehra, vice president, Network Infrastructure, in a statement. "This has led to continued, and growing, investment in Ethernet switching, routing, software-defined networks (SDN), and SD-WAN platforms and architectures that support the increasing demands of an always-connected world."



Cisco Scoops Up IoT Security Startup Sentryo

Cisco said it reached a deal to buy Sentryo, a Lyon France-based IoT Security Company. The companies didn't disclose the purchase price. Sentryo, founded in 2014, automates device visibility and security for industrial control system networks. It has about 34 employees and raised $13.5 million in a seed and Series A funding round that closed last December. Its customers are in the energy, manufacturing, oil and gas, and transportation sectors. The two companies already work together on Cisco's IoT networking platforms, which launched in January. The platforms incorporated Sentryo's Edge Sensor and Cisco's industrial networking hardware and IOx networking software. "By combining Cisco's intent-based network architecture with Sentryo's capabilities, customers can capture IoT benefits, manage networks and devices at scale, enable collaboration across IT and OT [operational technology] departments, and better protect their assets and data," wrote Rob Salvagno, vice president of corporate development and Cisco Investments, in a blog post about the acquisition. In a separate blog post, Liz Centoni, senior vice president and general manager of Cisco's IoT Business Group, said Sentryo's OT asset automation security will help customers solve three specific problems. The first is visibility with network-enabled passive deep packet inspection capabilities to discover IoT and OT assets. "Sentryo's sensor is natively deployable on Cisco's IOx framework, it can be built into the industrial network these devices run on instead of adding additional hardware," she wrote. The second is segmentation to secure these environments. To this end, Cisco will integrate Sentryo's device identification with DNA Center and Identity Services Engine to allow customers to define segmentation policy. And finally, Sentryo's technology will improve customers' OT environments with benefits including maximum uptimes, better production yields, and safety with its operational visibility capabilities like programmable logic controller (PLC) start/stop, operational events, and programming changes being made to PLCs, remote terminal units, and other industrial devices, she wrote. The companies expect the acquisition to close before the end of Cisco's first-quarter fiscal year 2020, which ends October 26. Cisco has made a number of other IoT-related investments over the past few years, beginning with its 2016 acquisition of Jasper for $1.4 billion. Cisco based its connected device platform on Jasper, and has continued to add additional features to its IoT platform such as monitoring and support for low power WAN IoT connectivity standards such as narrowband IoT (NB-IoT) and LTE-M. The company also launched a suite of IoT security products and services in 2017. Also in 2017, Cisco bought AppDynamics for $3.7 billion and then shifted that company's focus to IoT. And last year, Cisco extended its intent-based networking technology to support IoT. In December, IHS Markit ranked Cisco as the No. 2 IoT platform vendor behind Huawei.

Dialogic® BorderNet™ Session Border Controller 3.8.1 Enhances Distributed Cloud-Native Service Delivery

Dialogic, a cloud-optimized applications and infrastructure solutions provider for service providers, enterprises, and developers, announced the general availability of Dialogic® BorderNet™ SBC Release 3.8.1. This release further enables infrastructure and operations (I&O) leaders to move beyond a hardware and software element focus to a service delivery focus. The features in this latest release of the BorderNet SBC allow high-quality, real-time voice business strategies to be realized wherever and whenever needed in private, public, and hybrid cloud environments without compromising performance, availability, and scalability. Dialogic's cloud-native BorderNet SBC solution portfolio has been developed for mid- to upper-tier service providers growing top line revenue from enterprise services including VoIP, SIP trunking, UCaaS, emergency services, and secure payment processing. Forward-looking I&O leaders are implementing the BorderNet SBC as part of distributed web-scale architectures that improve service delivery speed to new markets

and enhance customer experience, while enabling reduced annual capital and operating spend. Enhancements in this release align with what have been identified as top trends impacting infrastructure and operations in 2019 and beyond:

Global Infrastructure – Dialogic's new Element Management

System (EMS) provisioning capabilities enable centralized single-pane network provisioning for SBCs deployed around the globe in any deployment model, including public cloud.

Edge Computing – Dialogic's enhanced public cloud support includes Amazon Web Services, Microsoft Azure, Google Cloud, and Oracle Cloud, with high availability and geo-redundancy options. Service providers can now affordably expand voice services to new and far-reaching international locations in a fraction of the time for high-quality regional voice services not financially feasible in the past.

Network Agility – providers can now implement strategies to maximize revenue while minimizing network infrastructure spend through automated horizontal scaling (elasticity) in Amazon Web Services (AWS). Network elasticity can be used to increase infrastructure capacity on demand such that customer traffic is always carried and billed during peak busy hours and seasonal or event-driven traffic spikes. Network scaling can be triggered by preset variables or manually through operator control.

Asset Visibility and Management – Dialogic's network-wide licensing enhancements and flexible commercial models include a software-only local license server for network deployment anywhere in any deployment model, including public cloud. SIP and software transcoding session license spend can be minimized by dynamically sharing a single enterprise-wide license pool among deployed SBC instances globally.

"The features in this latest release of the BorderNet SBC extends Dialogic's position as a leader in cloud-native service delivery," stated Bill Crank, President and CEO of Dialogic. "The BorderNet SBC can address not only the I&O demands at the core of operators' networks but also has the flexibility to meet the needs of providers delivering enterprise services. The licensing and deployment options now available give operators vastly increased deployment flexibility while also reducing costs and improving the customer experience."

Eutelsat Announces Changes to Its Executive Committee

Philippe Oliva

Jean-Hubert Lenotte

Eutelsat Communications (Euronext Paris: ETL) announced several changes to its Executive Committee, as part of a generational renewal of its management body. These changes will be effective as of 1 July this year. Philippe Oliva, aged 46, currentlyExecutive Vice-President, Sales and Products, succeeds Michel Azibert as Chief Commercial Officer. In this role, he will be responsible for defining and supervising the commercial policy, as well as generating revenue for the Group. Jean-Hubert Lenotte, aged 51, currently Director of Strategy and Strategic Marketing, will also be taking charge of the Deployment Department and will be responsible for Eutelsat's satellite fleet, frequency management and resource planning. This newly revamped department will now be known as the Strategy and Resources Department. Michel Azibert will remain Deputy Chief Executive Officer and, in this role, will participate in all matters of importance to the Group. Previously Director of Deployment, Jacques Dutronc will become Director of Development, coordinating Group-wide business development projects. Michel Azibert, Jacques Dutronc, Jean-Hubert Lenotte and Philippe Oliva will report to Rodolphe Belmer, Group Chief Executive Officer, alongside the other members of the Executive Committee: Yohann Leroy, Julie Burguburu, Antoine Mingalon and Sandrine Téran. Philippe Oliva began his career as a consultant in the consultancy firm CIMAD, before joining IBM in 1999, where he held several senior positions. These included head of Business Services France, then Vice President of the services offered by the Technological Infrastructure Department. He also coordinated the launch of the Cloud business and Hybrid Cloud services in France, then in the United States, where he spent several years. He held the position of Vice President in charge of strategic accounts at IBM before joining Eutelsat in September last year. Philippe is a French national and a graduate of the Ecole Supérieure des Ingénieurs Commerciaux. Jean-Hubert Lenotte began his career with the Bouygues Group, taking part in the creation of its subsidiary Bouygues Telecom in 1994. In 1997, he joined the McKinsey firm in Paris, where he was appointed Associate Director in 2004. In 2009, he joined McKinsey's global Telecommunications, Media and Technology Division, where he was in charge notably of consumer-related issues. He joined Eutelsat as Director of Strategy in 2013 and became a member of the Executive Committee in 2016 as Director of Strategy and Strategic Marketing. Jean-Hubert Lenotte is a Belgian national and an Ecole Polytechnique graduate. He holds a Master's degree in economy and finance from the Institut d'Etudes Politiques in Paris.

Eutelsat Hopes for Return to Top Line Growth

Eutelsat announced its latest quarterly results, which showed stability in its video business. For the three months to the end of March, the operator reported revenues of $241.7 million (215.4 million euros) in video, which represented a slight increase quarter-over-quarter. Overall revenues for the quarter reached 378.2 million (337 million euros), up 0.7 percent compared to the same stage last year. However, fixed data and fixed broadband services struggled in the quarter. Revenues for fixed data were $34.1 million (30.4 million euros), a near 14 percent decrease to the same stage last year. Fixed broadband fared little better, reaching 19.1 million euros ($21.44 million) in the quarter, an over eight percent decrease compared to the same stage last year. However, despite the odd sign of optimism, analysts remain concerned for the company. While Eutelsat is targeting a return to slight top line growth in FY 2019-20, Laurie Davison, a satellite equity analyst at Deutsche Bank, said in a research note that he thought this prediction was "hopelessly optimistic." He added, "Eutelsat performed its fifth downgrade in seven quarters. This time it was a cut to the current fiscal year (FY19) which, having started the year with a target of 'slight growth', was downgraded to 'broadly stable' in October before today's cut to -3 percent. It is worth 22.4 million (20 million euros) downgrade to company-compiled consensus EBITDA." Davison said this cut will be offset by the approximately $33.7 million (30 million euros) incremental from a larger-than-expected benefit from the change in tax territoriality treatment (70 million euros guidance vs consensus of approximately 40 million euros). "However, a sequential worsening in operating vertical revenues from negative 2 percent in 1H to negative 4 percent in 3Q leaves next fiscal year's (FY20; starting July 1) target of a return to 'slight growth' looking hopelessly optimistic. There is more capacity coming on stream next year and new contract impact. But of concern is that Eutelsat has yet to factor in a cut in spend from Sky Italia nor Multichoice in video and is relying on a bounceback in fixed data," Davison adds. Davison said Deutsche Bank has cut FY19 revenues to slightly below the negative 3 percent guidance as it sees the hopes of recovery in fixed data volumes and successful implementation of price rises for the unnamed Video contract dispute as optimistic. "SEShas come clean in downgrading normalised Video revenue growth to 0 percent to negative 4 percent (their 2020E guidance for which there is no major one-offs or new capacity) and flagged pressures emerging not only in EM but also starting in the core Western European orbital positions. These pressures are coming for Eutelsat

and there is no accommodation for cuts in pricing from Sky Italia nor Multichoice, their number one and number three Video clients." Giles Thorne, a satellite equity analyst at Jefferies, said in a research note that it has been noted that this is the third time Eutelsat's management has lowered expectations in the past two years. "As we look across the latest drivers, we see every reason to give Eutelsat the benefit of the doubt: in Fixed Broadband, management have been clear for some time that the near term was a period for teething commercial strategies ahead of the launch of Konnect in 4Q19; in Video, we've learned of longer lead times around the deployment of contracted backlog. Where there should be more cause for concern (the accelerated run-off of professional video; the non-renewal of material Fixed Data volumes in Latam), Eutelsat can rightly point to well-signalled and non-core revenue streams long starved of replacement/expansion cape," he said.

Eutelsat Confirms Successful Launch of Eutelsat 7C

Eutelsat Communications confirmed the successful launch of EUTELSAT 7C. The satellite was lifted into space from Kourou, French Guiana by an Ariane 5 rocket. Manufactured by Maxar Technologies, EUTELSAT 7C is a 3.4 tonne high-power broadcast satellite which will serve markets across Africa, Europe, the Middle East and Turkey, through 49 36-MHz equivalent Ku-band transponders. The satellite will be co-located with EUTELSAT 7B at 7° East, increasing capacity for this dynamic neighborhood by 19 transponders. It is due to enter into commercial service at the end of this year. Currently co-located with EUTELSAT 7B, EUTELSAT 7A will be transferred to another orbital location as part of Eutelsat's fleet optimization strategy. Rodolphe Belmer, Chief Executive Officer of Eutelsat, said: "EUTELSAT 7C will allow us to further develop our 7° East video neighborhood, with two co-located high-power satellites providing the best possible support to customers in this vibrant market. We are delighted to have benefitted from Maxar's state-of-the-art technology and to celebrate yet another successful launch with Arianespace."

Eutelsat Announces Successful 8-Year Bond Issuance

Eutelsat Communications (Euronext Paris: ETL) today announced the successful issue by Eutelsat S.A., of 8-year senior unsecured bonds (the "Bonds") for a total of €600 million. Eutelsat has taken advantage of the current competitive market environment to raise long-term financing with a 8-year maturity on attractive terms. The transaction was well received by a diversified investor base, demonstrating the market's confidence in Eutelsat's long-term business model. The Bonds will be issued at 99.822 per cent and will be redeemed at 100 per cent of their principal amount at maturity. They will have a coupon of 2.250 per cent per annum and will be cleared through Euroclear France, Clearstream and Euroclear. An application will be made for the Bonds to be listed on the Official List, and admitted to trading on the regulated market, of the Luxembourg Stock Exchange. The Bonds will mature on 13 July 2027. Delivery and settlement are expected on or around 13 June 2019. Together with other sources of cash on its balance sheet, the Bonds will enable Eutelsat S.A. to redeem the outstanding bonds issued on 13 December 2013 for a total principal amount of €930 million, bearing interest on its principal amount at a fixed rate of 2.625 per cent per annum and due January 2020. This operation is expected to contribute to maximize Discretionary Free Cash-Flow and will generate a further pre-tax cash interest saving of approximately €10 million on an annualized basis from FY 2020-21, following the €24 million reduction of this item generated by the previous bond issue in September 2018. Furthermore, this transaction will allow Eutelsat to extend its debt maturity profile.

Facebook Strikes a Vital Balance with Cryptocurrency Launch

Any discussion around Facebook launching its own cryptocurrency has the potential to turn to hysteria within a matter of minutes, with increasingly high-pitched voices expressing fears over privacy, security and so forth. It's easy for one's brain to jump ahead a couple of decades and see a dystopian financial future in which Mark Zuckerberg controls all our fiduciary dealings, from bank accounts and pension plans to the £1 coin in a card you get from a distant great aunt every birthday; mine certainly did. But actually, Facebook has struck a really important balance (pun intended) with the launch of the Libra currency. While the impetus has come from the social networking firm, the balance of power is spread amongst the two dozen partners in the Libra Association, which includes telcos Vodafone and Iliad; payment providers Visa, Mastercard and PayPal; non-profit organizations; cryptocurrency companies; investment firms; and other big names like eBay, Uber and Spotify. Facebook will facilitate the use of Libra through Calibra, essentially a digital wallet service operated via a new subsidiary of the same name, but the way is open for the other partners in the association to develop products and services of their own, although admittedly none have made any announcement on that score so far. The Calibra wallet will be available via Facebook Messenger and WhatsApp, and also as a standalone app, and will, in Facebook's words, "let you send Libra to almost anyone with a smartphone at low to no cost." You don't need a Facebook account to use Libra, but if you have one, Facebook has pledged to keep your Calibra information separate from your Facebook data. By separating the currency from its core business and working with big names from around the globe, Facebook could sidestep many of the trust issues it has, while still using its massive global user base to spread awareness and access. The name Libra has a broad resonance, coming as it does from the basic unit of weight in Roman times that underpins the designations given to weights and currencies in a number of markets today, including the English pound. In today's world it perhaps more commonly conjures up an astrological image, the star sign Libra having weighing scales as its symbol. It's well-designed to appeal to a wide market, as Facebook and its partners hope it will. Facebook

is making much of the currency's use for the unbanked, for migrant workers stung by hefty currency exchange and transfer charges, and so on. And indeed, it has the potential to make a difference here. But let's not get carried away. This is not a case of Facebook's altruism knowing no bounds. Libra is backed by a reserve fund, which means it will be more stable than existing cryptocurrencies; in fact, its value will be pegged to that of a basket of major global currencies. The reserve will be invested in low-risk assets that will yield interest over time and investors, Facebook et al, will be paid dividends from that. Given the low-risk element it will also be low-yield, therefore Libra will have to generate some serious volume before the investors see any sizeable returns, but still, there's a business opportunity there. There are also options for additional services further down the line. Facebook noted that "over time, we hope to offer more services for people and businesses – like paying bills with the push of a button, buying coffee with the scan of a code, or riding local public transit without needing to carry cash or a metro pass." There has been talk of weightier financial services too, such as loans and investments that could provide additional revenue streams. Launching the currency itself could well be just the beginning. And then there's the stickiness. The more applications Facebook enables, the more its core service remains an intrinsic part of the lives of its 2 billion-plus users. And that it can monetize. That's true of some of the other parties in the Libra Association as well, of course. Vodafone is heavily involved in mobile banking and transfer services in a number of international markets, services that have helped it to attract and retain customers. The presence of big names like Vodafone in the Libra Association should help Libra gain traction and Facebook is keen to attract others. Zuckerberg said he is shooting for 100 co-founder members of the Libra Association by the time the currency is ready for launch next year. But Libra's success is by no means guaranteed. Facebook has made a shrewd move in launching the currency as part of an association, but it will have to be front and center when it comes to encouraging users to swap their hard-earned cash for Libra, which means users will have to be convinced that its assurances on security and privacy are more than just words... as well as being daring enough to make the leap into cryptocurrency in the first place. Then there's regulation to consider. Cryptocurrency rules vary from market to market, with some major economies coming down hard on bitcoin and the like. Facebook has taken great pains to highlight its work with major financial institutions to help with regulatory issues, but these will still be a major hurdle to overcome. Without knowing how Facebook and others will pitch Libra to end users when the time comes, it's difficult to make a call on take-up. At this stage, there seems to be a strong argument for using it to avoid cross-border currency exchanges and so on, but for use as a daily 'currency' it faces a lot of competition. There are many different payment and money transfer options out there, from the West's ubiquitous credit cards to the micro-finance lending schemes springing up in unbanked, rural areas of the world.

HUAWEI

Huawei Obtains 46 Commercial 5G Contracts in 30 Countries

Chinese telecom giant Huawei Technologies Co. Ltd. said it has obtained 46 commercial 5G contracts so far in 30 countries. It has shipped more than 100,000 5G base stations, ranking top in the world, according to the company. Huawei said it was well prepared for China's 5G commercial use. In February 2018, it made the world's first 5G call and launched the first 5G terminal device, Xinhua news agency reported. Headquartered in the southern Chinese city of Shenzhen, privately-owned Huawei is a world leading telecommunication solution provider and also one of the world's major smartphone brands. China's Ministry of Industry and Information Technology granted commercial -use 5G licenses on Thursday to China Broadcasting Network and the country's top three telecom operators - China Telecom, China Mobile and China Unicom.

Huawei Releases White Paper on Intellectual Property

Huawei has released a white paper on innovation and intellectual property (IP), and warned against the issue being politicized. Speaking at a press conference at the company's headquarters, Song Liuping, Huawei's chief legal officer, said that IP is the cornerstone of innovation and its politicization threaten progress across the world. "If politicians use IP as a political tool, they will destroy confidence in the patent protection system. If some governments selectively strip companies of their IP, it will break the foundation of global innovation," said Song. The paper, titled "Respecting and Protecting Intellectual Property: The Foundation of Innovation," elaborates on Huawei's practices in and contributions to innovation and the protection of IPR. It notes that innovation and intellectual property protection lie at the heart of Huawei's success over more than 30 years. As of the end of 2018, Huawei has been granted 87,805 patents, of which 11,152 are U.S. patents. Since 2015, Huawei has received over 1.4 billion U.S. dollars in licensing revenue. Aside from accumulating patents of its own, Huawei has also paid more than 6 billion U.S. dollars in royalties to legally implement the IP of other companies, with nearly 80% of that paid to American companies, according to the document. Intellectual property is private property, protected by the law, and disputes should be resolved through legal proceedings, said Song, adding that in the past 30 years, no court has ever concluded that Huawei engaged in malicious IP theft, and Huawei has never been required by the court to pay damages for this. Huawei's collaborative and respectful approach to IP is demonstrated by the simple fact that many of its technology breakthroughs are incorporated into the open standards that govern 3G, 4G and 5G. As a result, even though some countries do not buy products directly from Huawei, they still use the essential patents of Huawei, and share in the benefits of the technology Huawei creates, said Song. Song also addressed Huawei's stance on its use of patents, saying the company will not weaponize its portfolio of patents. Rather, he said, Huawei will adopt an open and cooperative attitude and follow the FRAND principle, or "fair, reasonable, and non-discriminatory," when engaging with relevant parties in the industry on patents licensing. "As always, Huawei is ready and willing to share our technology with the world. That includes 5G. It includes U.S. companies and U.S. consumers. Together, we can drive our industry forward and advance technology for all mankind," said Song. The document also elaborates on how sustained innovation has helped Huawei's success; how Huawei's innovation brings huge social value; and Huawei's stance on the use of third parties' IPR and its own.

Huawei Wins Award for Best 5G Core Network Technology

Huawei wins award for the best 5G Core Network Technology at this week's 5G World Summit in London. This is despite seeing its equipment being banned from the core networks of all operators in the US and many in Europe due to the ongoing row about security and state spying allegations, which Huawei strongly denies. The company says the US' actions are politically motivated and conflating the issue with its trade war against China. Huawei calls the 5G core network "the hub for building ubiquitous connectivity and scheduling network resources". It said this part of the network is "centered on latency, connects things in addition to people, and provides differentiated and deterministic network service capabilities." The Chinese company claims its "5G intelligent and simplified" core network is the industry's first core network that supports 2G/3G/4G/5G NSA/5G standalone in-depth convergence. Huawei's 5G core network supports cloud-based technologies such as three-layer decoupling, stateless design and microservices. Despite broad agreement that Huawei's technology is among the most advanced in the world, the UK has banned Huawei from core 5G networks, but will probably allow it in other areas, although the government is yet to announce its final decision. KPN in the Netherlands will insist on a "Western vendor" for the core 5G network, noting this part of the network is more sensitive from a security point of view. Among the telcos planning to operate a 5G network in the Republic of Ireland, none has included Huawei technology in the network core, the Irish Times reported this week. A report published in April by research firm Assembly, commissioned by mobile trade body Mobile UK, found that restricting the use of Huawei kit in the telecoms supply chain – even partially – could delay 5G's widespread roll-out in the UK by up to two years. Ma Liang, Director of the Huawei Cloud Core Network Product Mgmt. Dept., remarked, "We are honored to win this award. Huawei has continuously been investing in 5G core network R&D and has gained expertise in 5G technology. "Huawei collaborates with carriers and industry partners to continuously develop 5G applications in vertical industries, enable a thriving industry ecosystem, and make full preparations for the mature commercial use of 5G." Huawei says it has been awarded 46 commercial 5G contracts globally.

Open Collaboration Key to Success: Huawei Founder

The world ultimately relies on open collaboration for shared success, said Ren Zhengfei, founder and CEO of Huawei, speaking in an open dialogue examining the latest economic and political headwinds affecting the global ICT industry. Addressing how Huawei will engage American companies who wish to keep supplying it with products, Zhengfei commented: "All of the US companies that we work with are great companies that hold themselves to high standards in terms of business integrity and ethics. The current setbacks we are facing are not caused by those American companies, but by politicians who see things differently from the way we see them. We didn't expect such extreme measures, but we did make some preparations." In the coming years, Zhengfei acknowledged that production capacity may decrease. In 2019 and 2020, the company's annual sales revenue will be about $100 billion, according to Zhengfei. But around 2021, he believes Huawei we will regain its growth momentum and provide even better services to society. "When this step is finished, we'll become stronger." Responding to questions about the US/China relationship and being seen together with Huawei, George Gilder, one of President Ronald Reagan's most quoted authors and a venture capitalist in the US, said: "I think that I am contributing to saving the United States from the terrible mistake that it's currently making, epitomized by the outrageous bans and tariffs, as well as restrictions it is placing on Huawei. "But also, I can contribute to a re-construction of Internet architecture to address the terrible security collapse across the Internet that is making everybody paranoid and preventing everybody from trusting anybody else. This is really a technical problem that Huawei can address, and not a political problem." Building on that point, Negroponte added: "We agree on the fact that the United States is making a terrible mistake, first of all, picking on a company. I come from a world where what we value isn't so much about trade, commerce, and stock values. We value knowledge, and we want to build on the people before, and the only way this works is if people are open at the beginning." Nicholas Negroponte, a tech visionary and co-founder of the MIT Media Lab, said: "Only through open collaboration can we meet people's demands, and bring the benefits of new technologies to more people at lower costs. There definitely have been and will be ups and downs during the process of economic globalization, and we need to take the right approaches to these ups and downs. That means we need to use laws and rules to reconcile and resolve issues, instead of imposing extreme restrictions." Recognizing that Huawei's collaboration with a number of American universities and labs has been halted, Zhengfei responded that China is very strong in engineering inventions, and that the company invests heavily in R&D with more than 80,000 engineers. The company now supports more than 300 universities and 900 research institutes around the world. "In doing so, we hope that we can contribute to theoretical innovation. We will not cut our investment in this area. We will work harder. Even if the US government does not allow some universities to work with us, there are many others who are willing to do so," stressed Zhengfei. When asked about whether cyber security is really behind the current confrontation with Huawei, Negroponte said: "Our President has already said publicly that he would reconsider Huawei if we can make a trade deal. So, clearly, it's not about national security. We don't trade national security. It's about something else. And this trade war has got to end, and that, I believe, will end sooner rather than later. "We need to separate the issues of cyber security and information security," added Zhengfei. "Cyber security relates to the networks connecting our society. We can't ever allow these networks to break down or malfunction, and this is a security issue." In terms of information security, or the protection of data across a network, Zhengfei noted that Huawei only provides the network "pipe" and devices. The networks and devices themselves don't determine what passes through them. Instead, carriers and content providers determine this.

Pakistan CMPak and Huawei Complete Deployment of the Longest Distance Microwave MIMO Link

Pakistan CMPak and Huawei has recently completed a joint innovation. Based on the latest microwave technology of 5G, CMPak successfully achieved the industry's longest distance microwave MIMO link innovation test which reached 11km with 5Gbps capacity, this is the first commercial use of 5G microwave MIMO solution for large-scale commercial use in Pakistan. This technology innovates to solve the problem of bandwidth upgrade under limited spectrum resources and can be flexibly expanded to double capacity, 5G microwave MIMO solution provide a new and mature solution for the network evolution towards to 5G. As a leading and innovative carrier in Pakistan, CMPak faces the problem of how to greatly improve the microwave transmission bandwidth under limited frequency resources. Based on that, Huawei proposes the 5G microwave MIMO solution which can improve the microwave spectrum efficiency by 100% to double the capacity, shorten the installation distance (Rayleigh distance) by 67%, and reduce the requirement of MIMO deployment of tower space. These benefits promote the large-scale commercial use of the 5G microwave MIMO technology. Using 5G microwave CA (Carrier Aggregation) technology, which can aggregate 4 carriers into one hardware, the innovative solution combining MIMO and CA is proposed to increase the capacity by 8 times with the same hardware as the traditional 2x2 MIMO solution. In this way, smooth capacity expansion can be achieved without climbing towers and the delivery cost is reduced to 33% of the traditional solution with greatly tower space save. Generally, the microwave MIMO technology is applied to the distance less than 7km, but the innovation test reached 11.03km which is the longest microwave MIMO link in the industry. Using innovation algorithm, the 5G microwave MIMO link can stably provide 3.5Gbps capacity and reach maximum 5Gbps with 2* 56 MHz channel spacing which is known as the longest microwave and largest MIMO link in the industry. In the future, hundreds of MIMO links will be deployed in a large scale in CMPak. This is the first commercial use of the microwave MIMO solution in the industry. The success Innovative of MIMO and CA is of great significance to operators with limited spectrum resources, which means that operators do not need to wait for more spectrum resources and can further improve the evolution of the 5G technology. Perry Yang, the president of the microwave product line, said: "Creating value for customers with innovative technologies is the survival reason for Huawei microwave. Huawei microwave is looking forward to joint innovation with more operators to contribute to network development."

Huawei: Work Together To Bring the Best 5G into Reality

The 11th Huawei User Group Meeting was held in Wuzhen, Zhejiang with more than 500 guests from telecom industry. Focusing on the theme, "Redefining the Future Together", in-depth discussions on how to accelerate the evolution to 5G and how to implement intelligent operations through AI were held. In addition, top issues of 2019 were identified for continuous improvement. Ryan Ding, Executive Director of Huawei and CEO of the Carrier BG, gave the keynote address titled, "Pave the Way Towards 5G". Ryan Ding shared with attendees that when going from 4G to 5G, carriers will have different business focuses in each of the four phases: planning, deployment, operations, and optimization. Huawei will provide leading end-to-end 5G solutions to address carriers' business requirements with the aim to bring the best 5G into reality. Ryan Ding pointed out: "Cyber security and privacy protection are our top priorities. We ensure the security of carriers' 5G networks with our secure products and trusted services. " Secure products is made possible through Huawei's active membership of 3GPP's 5G Security Assurance Specification project. Huawei also supports the Network Equipment Security Assurance Scheme (NESAS), jointly defined by 3GPP and GSMA. To ensure trusted services, Huawei follows the ISO 27001 and actively applies for more third-party security certifications. "Huawei's vision is to bring digital to every person, home and organization for a fully connected, intelligent world. 5G will be a key enabling technology for this world. We will continue to increase investment in 5G and work with our customers and partners to make this vision a reality," Ding concluded. Over the past 30 years, Huawei has operated in over 170 countries and regions around the world, deployed 7.4 million FTTx lines and built more than 800 cloud data centers. Huawei has assured more than 200 major events and maintained more than 1500 networks and their smooth operations. Huawei has worked with 17 out of the top 30 global CSPs on customer experience management and 24 CSPs on excellent network improvement. "As a trusted partner, Huawei continuously invests in people, business platforms and competences to secure reliable & available networks." said Bill Tang, president of Huawei Global Technical Service Dept. China Mobile, China Unicom, China Telecom, Vodafone, Orange, Elisa (Finland), Etisalat (UAE), and other guests shared their best practices in 5G and AI, and thoughts on the future. Improvement results of top issues of 2018 were displayed. In addition, to continuously resolve issues and create value for customers, and improve customer satisfaction, the discussion on top issues of 2019 was initiated. Huawei User Group Meeting has been held for 11 consecutive years, involving nearly 3,000 customers. For 11 years, the Huawei User Group Meeting Advisory Board consisting of 12 customers, and over 440 volunteer customers have been collaborating with Huawei project teams, and they have participated in more than 50 top issue improvement projects. With their help, Huawei continuously improves the quality of its products, services, and solutions, and continuously creates value for customers.

Nokia Seeks Rule Change for 5G Backhaul

Nokia says it isn't proposing a new concept, but it is asking the FCC to change its rules for the E-Band to enable the deployment of smaller, more visually attractive antennas for 5G. Specifically, Nokia is asking the FCC to amend its microwave rules to reduce the minimum antenna gain from 43 dBi to 38 dBi, which would allow for deploying lower gain antennas where the use case demands it while retaining the discretion to deploy higher gain antennas where applicable. The E-Band refers to spectrum at 71-76 GHz and 81-86 GHz, or 70/80 GHz. In a recent presentation (PDF) to the FCC, Nokia explained that a 38 dBi gain is necessary for street level applications for various reasons, including the visual impact and weight/space constraints on street furniture. Not all cell sites are served by fiber, especially at street level for 5G millimeter wave and small cell deployments, so microwave remains in demand. Nokia acknowledged in its filing that its request is nothing new. The Fixed Wireless Communications Coalition (FWCC) asked for such a change as far back as 2012 and has reiterated the growing need for smaller antennas. Last year, the coalition told the commission (PDF) that the demanding requirements for data capacity limit most backhaul connections to either fiber or point-to-point microwave, and in some environments, fiber is too expensive or impossible to install, leaving microwave as the only practical option. "For emerging 'small cell' backhaul applications, including the necessarily small cells for 5G services, 70/80 GHz is often the best choice," the FWCC said. "The very high available radio bandwidth—up to 10 GHz total—can manage needed data loads, while the high directivity and space attenuation simplify designs for frequency reuse." Indeed, Nokia and FWCC garnered the support of 5G Americas, which last month (PDF) urged the commission to act with haste to amend its rules to allow a minimum gain of 38 dBi for directional antennas in the E-Band. To tap the E-Band's full potential, it's essential to allow service providers greater flexibility to decide antenna size based on the use case, according to the organization. T-Mobile has been one of the champions for more flexible antenna standards in the E-Band. The operator told the commission last year that it found the E-Band to be ideally suited for providing LTE and 5G links due to its light licensing approach and 10 gigahertz of available spectrum. At the time, it said it had conducted extensive tests with partner Ceragon Networks showing how current E-Band antenna rules are not well suited to supporting the extensive antenna deployments needed for expanding LTE and 5G networks.

Nokia Hails 5G Progress; Sets Sights on India, LatAm

Nokia revealed it had 42 commercial 5G deals in place with operators, more than any other vendor has announced, as the pace of the technology's rollout progresses. In a statement, the Finnish vendor said 22 of the 42 commercial deals were with named customers including T-Mobile US, Telia and SoftBank. It noted early 5G rollouts in North America, South Korea and Europe as driving the uptake, and said it expects to announce more deals in emerging nations and areas including India and Latin America over the coming months. The company's latest progress update follows an announcement at the end of March, when it said it had 30 commercial 5G contracts. Since then, Nokia said it had won an average of one major contract each week, "with a steady pipeline in place for further agreements". Nokia talked up its 5G portfolio as a reason behind its progress so far, adding it believes, cumulatively, it has a "higher share with these customers in 5G than we did in 4G". CEO Rajeev Suri said that through the transition from 4G to 5G, it was "Nokia's time to shine". "The pace of 5G progress is accelerating across the globe. We are delivering significant performance increases to operators and the power of Nokia's end-to-end portfolio is being recognized," he added. Nokia competes with rival vendors including Ericsson and Huawei for 5G contracts. However, with Huawei's security struggles continuing to grow, there is an opportunity for the European companies to capitalize. Huawei CEO and founder Ren Zhengfei said last week a US export ban will reduce a two-year lead it believes it has over Nokia and Ericsson in the next-generation technology.

China Mobile First to Deploy Nokia's New Massive MIMO Solution, Accelerating the Transition to 5G Services

Nokia announced that China Mobile (CMCC) will adopt its new AirScale mMIMO Adaptive Antenna (MAA), created specifically for the massive bandwidth and coverage requirements of the Chinese market as it transitions to 5G. Building on CMCC's leadership in the 2.6 GHz 5G ecosystem, the Nokia MAA ensures that, as one of the world's biggest operators, CMCC can more efficiently allocate network resources between 4G and 5G users and address the demand for high-bandwidth 5G use cases. As a 5G pioneer, CMCC already leads in the development of 2.6 GHz mobile services in the Chinese market. But it requires even greater bandwidth, coverage and flexibility to ensure it can deliver the most optimized 5G experience across its markets. Nokia worked directly with the operator to create the new version of the MAA which - at 320W - is at least 80W greater than the closest MAA on the market. CMCC is now able to support 4G and 5G in concurrent mode in the 2.6 GHz frequency band, which helps CMCC to flexibly balance the two technologies. In addition, the 160 MHz, 320W version ensures CMCC has better coverage and capacity, which helps to reduce CAPEX as the operator transitions its subscribers to 5G. Mark Atkinson, Head of 5G and Small Cells business at Nokia, said: "Nokia has been operating in China for 40 years, and we are pleased to have this opportunity to work so closely with an industry leader like China Mobile. The development of the AirScale MAA with its industry-first 320W output is the direct result of input from the China Mobile team on what they needed to speed the deployment of 5G services to their customers. We look forward to continuing to work with CMCC as its 5G plans evolve." The MAA uses 64 transmit and 64 receive antenna elements, which combined deliver a total of 320W output power, the highest of any MAA in the industry. Nokia currently has 43 commercial 5G deals with operators around the world and is involved in more than 100 5G-related customer engagements. During Mobile World Congress in Barcelona, Nokia won the coveted 5G Leadership Award for demonstrating leadership across the 5G ecosystem - through innovation, collaborative R&D, a wide range of industry partnerships and significant contribution across both the technical and business aspects of this technology.

Nokia Collaborates With du To Highlight the Importance of 5G-Ready Cloud-Based Future Network Architecture

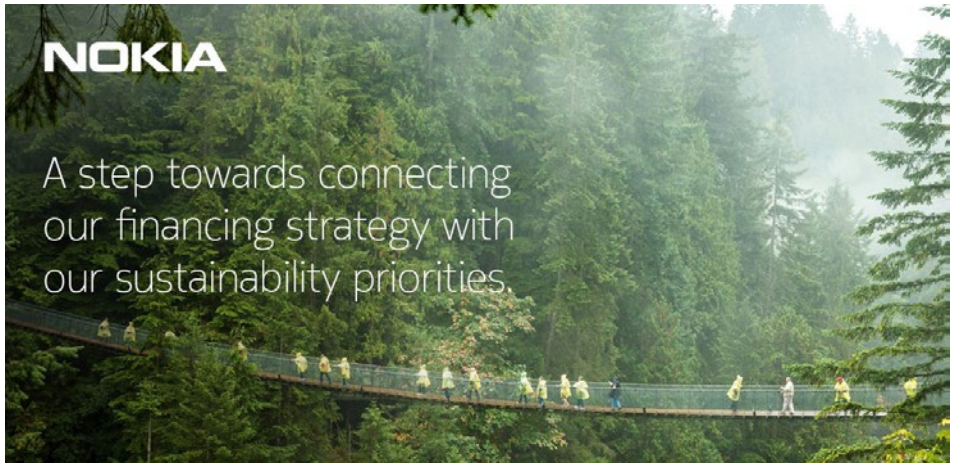
du, from Emirates Integrated Telecommunications Company (EITC) has developed a white paper in conjunction with Nokia to highlight the need for cloud-based future network architecture for new 5G and IOT use cases. Additionally, the whitepaper discusses the changes needed for adopting the new architecture and the ways to address new security threats through holistic security management. "The digital world is changing very fast, and the arrival of 5G will bring about a plethora of transformation for all industry verticals," said Saleem AlBlooshi, CTO, EITC. "With the cloudification of our network, this will mean that the future network architecture will be more agile, dynamic, and optimized, opening up a new array of use cases and new product offerings based upon next generation technologies such as 5G and IoT," he added. 5G is being designed to enhance existing mobile broadband services, but more importantly, it will open new capabilities and achieve network efficiencies, which are not possible with today's networks. There are endless possibilities with 5G, but to turn them into real business cases there is a need for a future-proofed network architecture. Telco cloud based on Network Function Virtualization (NFV) and Software Defined Networking (SDN) is the key enabling technology for future network architecture. Adoption of NFV and SDN technology helps to automatically adapt to changing requirements, efficiently scale, constantly self-optimize, and make use of innovation from the wider ecosystem. Currently EITC is in the midst of such technology and architecture transition. The future for telcos is in offering differentiated ICT products and services, which are a far cry from purely offering connectivity solutions of the past. The cloudification of EITC's network with the support of partners such as Nokia offers the promise of an agile, optimized and future-ready network that will open new ICT and use cases based on IoT and 5G business streams that are more in tune with meeting customer demands in the future.

Nokia Signs Revolving Credit Facility with Its Pricing Mechanism Linked to the Company's Sustainability Targets

Nokia announced the signing of a EUR 1,500 million five-year multicurrency revolving credit facility ("RCF") with two one-year extension options and introduced a sustainability pricing mechanism linking the margin of the RCF to two of Nokia's key sustainability targets:

1. Reduction of greenhouse gas emissions attributed to Nokia's operations and;
2. Reduction of greenhouse gas emissions attributed to Nokia's customers' use of Nokia's products

Nokia's targets include a 41% greenhouse gas emission reduction of its own operations and a 75% greenhouse gas emission reduction arising from the use of sold products by 2030 compared to the 2014 baseline. The margin of the RCF will increase or decrease depending on Nokia's progress towards reaching these targets. Nokia's sustainability targets are accepted by Science Based Targets, ensuring that Nokia's greenhouse gas emissions targets and paths towards those targets are independently validated to be in line with the Paris Agreement goal "to hold the increase in global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the increase to 1.5°C above pre-industrial levels". Science Based Targets is a collaboration between the international not-for-profit organization CDP, the United Nations Global Compact (UNGC), World Resources Institute (WRI), and the World Wide Fund for Nature (WWF). Kristian Pullola, Chief Financial Officer (CFO) at Nokia, said: "We're delighted with the strong support and commitment from our key banking partners in this refinancing transaction that connects our financing strategy with our sustainability priorities." Karoliina Loikkanen, Head of Corporate Responsibility at Nokia, said: "Linking the pricing of the revolving credit facility to our sustainability targets is an important step towards demonstrating our broad-based commitment to our sustainability priorities. Our sustainability vision is to create the technology to connect the world, in a responsible way." The RCF will replace the EUR 1,579 million revolving credit facility agreement dated 26 June 2015.



Nokia Selected As Primary Partner To Supply SoftBank Corp's 5G RAN

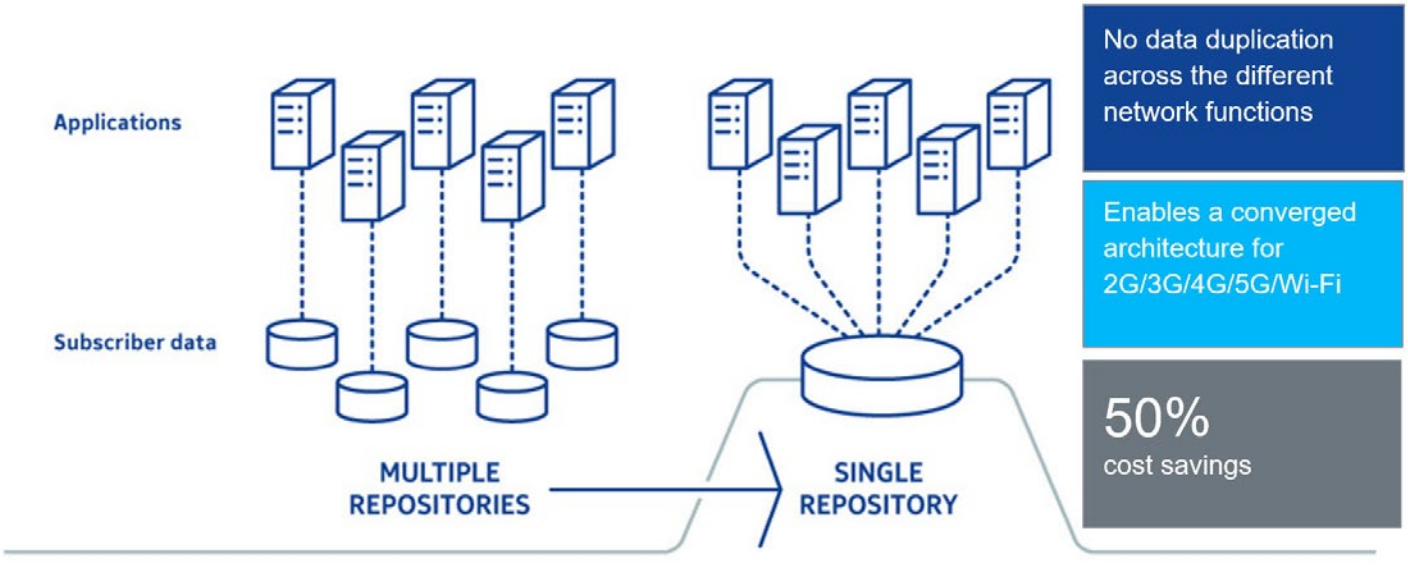
Nokia has been picked by SoftBank Corp as primary partner to deliver its 5G Radio Access Networks (RAN) in Japan. The Finland-based vendor confirmed that it has been selected to drive the MNO's commercial 5G offering with its Nokia AirScale solution, which it claims will allow the telco to meet growing consumer and industrial demands for 5G. The agreement builds on a long-standing supplier agreement between the two firms which they note covers 'multiple technologies'. Nokia's 5G AirScale supports multiple frequencies, in both distributed and centralized architectures, giving SoftBank increased flexibility in its network evolution. Nokia says that '5G investment will benefit consumers by bringing them a 5G enhanced Mobile BroadBand (eMBB) service, with 5G Ultra Reliable Low Latency Connectivity (URLLC) and enhanced Machine Type Communication (eMTC) enabling multiple new applications and services for industries in the 5G era'.

AT&T, Nokia Open up the Radio's Edge to Third Party Apps

AT&T and Nokia have developed a radio edge cloud (REC) appliance that the two companies plan to release into open source via the Linux Foundation. The REC will make it possible for third parties to develop apps and get access to the radio access network (RAN). REC is part of the Telco Appliance blueprint within the Linux Foundation's Akraino project. Akraino is an open source software stack that optimizes edge computing systems and applications. Akraino is made up of more than 11 blueprint families, and more than 19 specific blueprints are under development to support a variety of edge use cases. Michael Murphy, CTO of North America for Nokia, explained that the primary use case right now for REC is the near real-time RAN intelligent controller, or RIC. The O-RAN Alliance, which is a group of carriers and vendors devoted to virtualizing the RAN, developed the RIC platform. The RIC platform is a network element that controls certain aspects of the RAN. Today all these network controls are managed by the vendors that make telco gear. However, in an open source world, the REC opens up the RIC to applications (called xApps) and those xApps can be used to manage the RAN. Murphy said that some operators want the RIC open to third parties because they believe these third parties can more efficiently manage certain aspects of the RAN for a specific application. For example, there may be a third-party vendor that has expertise in video load balancing and by allowing them access to the RAN through the RIC and a xApp, an operator may be able to deliver video more efficiently. Murphy said that while opening up the radio's edge to these types of applications is something that Nokia supports it doesn't necessarily agree with opening it up for every use case. "We thought there was merit in this and there was value in accelerating innovation and reducing costs," he said. "But there are some use cases that we don't agree with." He added that the REC is fairly low in the network and there are a lot of controls established to prevent any problems. "There is a lot of cooperation being done to make sure it does exactly what we said it would do," he said. In a blog post, Tapio Tallgren, lead architect of MBB architecture at Nokia, said that REC is the first example of a blueprint with the Telco Appliance blueprint family. The REC includes automated configuration and integration testing of the full stack starting from below the OS layer up through the RIC. In addition, the REC will share many hardware and software components, including installation, configuration management and APIs with other family members. Murphy said that it is not easy to predict all the use cases for REC but added that having an open source edge cloud with open interfaces to the RAN control will allow operators to have more options.

Nokia Deploying Subscriber Data Management Solution for Vodafone Egypt

Finnish vendor Nokia is deploying a cloud-based Subscriber Data Management (SDM) solution for Vodafone Egypt that will enable the cellco to offer 'innovative' services to its 4G customers. In a press release Nokia claimed that the deployment will help the Egyptian mobile operator to continue transforming its operations around telco cloud technology. Specifically, the adoption of Nokia's Telco Cloud Network Functions Virtualization (NFV) will allow Vodafone Egypt to scale its network to meet 'unprecedented' increases in data traffic, while also simplifying its operational model. Nokia is also providing cloud integration and implementation services to enable a smooth transition to the SDM solution. Meanwhile, by deploying Nokia Registers, Vodafone Egypt claims it will be able to manage its subscriber data and authentication from a centralized location and across all technologies, fixed or mobile, leading to better network efficiency and faster, smoother introduction of new services.



Nokia and UNICEF Launch Partnership to Boost Digital Literacy in Primary Schools in Kenya

Nokia and the Finnish National Committee for the United Nations Children's Fund (UNICEF) and UNICEF Kenya have launched a shared-value partnership during this year's Nairobi Innovation Week, to increase equitable access to digital literacy for some of the most disadvantaged children in Kenya. This includes girls and children with disabilities in urban informal settlements and some of the most remote areas of Kenya. The partnership builds on the Government of Kenya's investment in the Digital Literacy Project which provided one million tablets to primary schools with a focus on improving the availability and use of quality digital content. The partnership between Nokia and UNICEF Kenya brings together stakeholders from the Government of Kenya's Ministries of Education and ICT, as well as the Kenya Institute of Curriculum Development (KICD), children, teachers, content providers and mobile network operators in Kenya, to address challenges and unlock opportunities for digital learning and literacy. As an initial step, the Accessible Digital Textbook with special features for children, with hearing, visual and intellectual disabilities, has successfully been piloted in schools during the first quarter of 2019 and will be launched by the Government of Kenya later this month. The textbook, which is the first of its kind, was produced by KICD with the active involvement of disability stakeholders who infused different media-overlays with audio for children with visual impairment, simplified text for children with intellectual disabilities, and Kenya Sign Language video inserts for children with hearing impairment. Dr. Julius Jwan, CEO of KICD, said: "With technical and financial support provided by UNICEF and active participation of children with disabilities, KICD has successfully produced the first accessible digital textbook for children in Grade 1, contributing to equitable access to digital literacy. This textbook provides quality digital content for children with disabilities on the Digital Literacy Project devices. This accessible digital course material is for Grade 1 in Environmental Activities and within the same platform caters for children with visually impairment, hearing impairment and intellectual disabilities. It also allows learners without disabilities to access features like Kenya Sign Language videos, thereby contributing to inclusive education. This project is scalable to cover the other learning areas." Going forward, the partnership will provide support to the Government of Kenya to avail more digital learning materials to schools in urban informal settlements of Nairobi and the frontier counties of Garissa and Turkana. This will be achieved by connecting them to the internet using the latest Nokia connectivity technology. Scaling-up of internet connectivity in schools is planned to allow students to access quality digital learning materials that are aligned to the new competency-based curriculum and approved by the Government of Kenya. Maniza Zaman, Representative of UNICEF in Kenya, said: "UNICEF is working in partnership with the Government of Kenya and the private sector through innovative partnerships to empower the most disadvantaged children to get quality education with the most powerful tool of the century - the internet. We are proud to have contributed to the development of the first Accessible Digital Textbook with support from the UNICEF Innovation Fund and Nokia. This is a major step in furthering inclusive education through innovative technology for children in Kenya and beyond." Joachim Wuilmet, Nokia's head of Marketing and Communications, Middle East and Africa, said: "Children are the leaders of the future, so we are excited to work with UNICEF and the Government to connect schools in remote areas to inspire tomorrow's leaders in Kenya. We are committed to using our technologies to meet the goals of sustainable development worldwide."

Nokia Selected by Cleco to Modernize Its Microwave Communications Network

Nokia has been selected by Cleco to modernize its microwave communications network to support approximately 290,000 customers Cleco serves through its retail business and those it supplies wholesale power to in Louisiana and Mississippi. The new network is based on Nokia's microwave packet radio technology and its new Microwave Packet Transceiver Plus (MPT-HLC Plus), designed to deliver the reliability and performance needed to support Cleco's expanding capacity needs, while providing the scalability and flexibility to enable it to introduce new services in the future. Nokia was selected to provide the backhaul of Cleco's digital mobile radio system that is critical to the safety of its customers and more than 1,300 employees. By moving to an all packet-based architecture, Cleco is also able to increase its operational efficiency. For the project, Nokia is replacing Cleco's legacy hybrid radio equipment with its Wavence (TM) microwave packet radio portfolio, the latest in microwave packet radio technology and the leading 'pure packet' product portfolio on the market. Nokia Wavence was developed with mission-critical stringent requirements for security, reliability, latency and resiliency in mind. The portfolio incorporates features specifically designed to address the unique needs of Cleco, smoothing

its transition from older time division multiplexing (TDM) technology to more advanced Internet Protocol (IP)-based networks. The high system gain provided by Nokia Wavence will enable Cleco to expand its capacity in support of new IP-based applications without requiring a new antenna infrastructure and without forcing a disruption of existing communications, thus reducing costs and facilitating a seamless, incremental migration from TDM to IP. Nokia's Microwave Packet Transceiver Plus (MPT-HLC Plus) provides increased capacity utilizing industry leading 4096 QAM and up to 7.5 dB more in system gain. Higher system gain can reduce the size of antennas required, lessen tower loading and extend the path distance, eliminating expensive repeater sites or just improving the availability of existing paths. Robert Mathews, Manager of Telecommunication Services, Cleco, said: "Cleco's selection of Nokia was based on Nokia's commitment to the microwave business, the advanced packet capabilities over legacy hybrid radio architectures and a single network management system for the microwave, router and optical transport products. Nokia's Network Services Platform brings network management under one umbrella, simplifying Cleco's provisioning and troubleshooting processes across our IP/MPLS and microwave networks, as well as helping us ensure reliable communications to support our customers and employees." Chris Kent, Area Vice President, U.S. Energy & Transportation, Nokia, said: "Nokia understands the needs of mission-critical communication businesses like Cleco, and has dedicated a great deal of effort to ensuring that our packet microwave technology can meet the requirements today, while preparing networks for the introduction of even more advanced technologies in the future."

PCCW Global

PCCW Global Chosen for a Safer Asia-Pacific CRV Aviation Network

At a recent launching ceremony held in Bangkok, Thailand, the representative officers of the Asia/Pacific Office of International Civil Aviation Organization (ICAO) and its Member States in the Asia Pacific Region (APAC) announced commencing use of a new, secure, and robust Common aeRonautical Virtual (CRV) private network commissioned at the beginning of 2019 through a successful pilot testing conducted jointly by a number of Member States and PCCW Global. This gave PCCW Global, the international operating division of HKT, Hong Kong's premier telecommunications service provider, the green light to begin connecting about 40 ICAO Member States/Administrations in the APAC to the new service. Regional Aeronautical Network Service Providers (ANSPs) have historically not shared a common networking infrastructure, which has led to network management and security challenges, technology upgrade difficulties, and inefficient operations. Also, the aviation industry has over the past few decades experienced dramatic growth in the volume of air traffic, resulting in the need for a more robust and secure aviation network. The ICAO Member States in the APAC took the decision to engage with a single telecommunications operator to provide private network services for the exchange of aeronautical information between the various ANSPs, and PCCW Global was successful in the APAC tender for this region's CRV. The APAC CRV has been built leveraging PCCW Global's high-speed international IP network, with mission-critical connections running across a diversified infrastructure supporting multiple aviation-specific applications. The CRV overcomes historical aeronautical communication challenges, while modernizing the network and improving standardization and escalation processes. Air Traffic Management (ATM) stakeholders in the various regions will utilize the CRV to transfer aviation-critical data and other information across the new network environment provided and supported by PCCW Global. Other benefits delivered by the CRV include support for the ICAO's Aviation System Block Upgrades (ASBUs), improved voice quality and enabling of new aeronautical applications initiatives such as SWIM (System Wide Information System). Mr. Frederick Chui, Chief Commercial Officer, PCCW Global, said, "High quality for a network such as the CRV is paramount, and therefore resilience, security, and other features must be engineered at the heart of the CRV. Our proven global network infrastructure, extensive industry experience and agile human capital placed PCCW Global in an ideal position to deliver this high quality application together with its demanding aviation-specific services. The CRV even provides for various contingency routing scenarios across our extensive network, ensuring that the service will always be up and running securely. CRV is the network for civil aviation operation that will optimize cost, enhance efficiency, and provide new services to the users."

SES President and CEO Steve Collar to Chair World Space Week 2020

SES and World Space Week Association jointly announced that SES President and CEO Steve Collar will be Honorary Chair of World Space Week 2020. “I'm excited to chair World Space Week, the biggest space event on Earth, as it focuses global attention on the broad benefits of satellite technology to humankind," said Collar. “At SES, we always say that we do the extraordinary in space so that our customers can do amazing things on Earth. We believe passionately in the need for content and connectivity everywhere and this belief aligns perfectly with the focus of World Space Week. Space touches the human experience in so many ways and I am proud to help highlight the impact that we, as an industry, have today and will continue to have in the future." “We are thrilled that SES's Steve Collar is using his voice as an industry leader to support World Space Week," said Dennis Stone, Association President. “Over the course of his career, Steve has demonstrated a steadfast commitment to leveraging the ingenuity of the space industry to positively impact the lives and experiences of people in every corner of the globe. We're proud to provide him with a platform to shine a light on the important contributions of this exciting field." World Space Week is a United Nations-declared event held each year between 4-10 October. In 2018, World Space Week included 5,400 events in 86 nations. In 2019, World Space Week will feature the Moon, with astronomy groups globally focusing telescopes on our nearest neighbor. In 2020, World Space Week will focus on satellite technology and the key role of satellites in today's world. Every year, teachers use space during World Space Week to inspire students and

a myriad of space events to educate the public about space activities. Collar will encourage the space and satellite industries to participate in World Space Week and will keynote an awards event to recognize top supporters. Today, nearly 2,000 satellites support crucial functions such as broadcasting, communications and connectivity, navigation, weather forecasting and Earth observations. World Space Week 2020 will also feature new uses of satellites enabled by miniaturization and next-generation systems such as SES's new O3b mPOWER medium Earth orbit (MEO) system.

SES Delivers FTA Channels across Brazil via the SES-10 Satellite

TV viewers across Brazil can now receive some of the country's most popular channels, such as TV Cultura, via SES's new, Ku-band, free-to-air (FTA) solution on the SES-10 satellite located at 67 degrees West. To ensure that TV viewers can easily access these channels, broadcasters can send their content to SES's teleport in the city of Hortolândia and uplink to the satellite's Ku-band capacity. Regional channel affiliates and TV viewers will only need to purchase an available DVB-S2 compatible Set Top Box (STB) to receive the signals from SES-10 which allows them to use more affordable and easier-to-install 60cm to 75 cm antennas. TV Cultura, among other channels and content owners, have been testing SES's newest Ku-band uplink and are reaping the benefits of getting to market faster and being able to broadcast to millions of viewers at a lower investment cost. Broadcasters and radio operators will also be able to leverage the Ku-band distribution solution. SES is participating at the Church Expo and will be showcasing this FTA solution on SES-10 as well as the company's new Over-The-Top (OTT) platform on stand #1. By reaching broadband connected viewers via IP and all other users via satellite, SES's hybrid distribution networks help customers seamlessly deliver content to their largest possible audience.

SES Networks Enables EMSA's Environmental Protection Service in Iceland

Icelandic maritime authorities are utilizing the European Maritime Safety Agency's (EMSA) Remotely Piloted Aircraft System (RPAS) portfolio enabled by SES Networks' managed connectivity services to support the country's requirements for environmental protection and fisheries control, SES announced. The connected ELBIT HERMES 900 RPAS will perform maritime surveillance tasks in areas extending as far as 200 nautical miles from the shoreline, covering important areas of the Icelandic Exclusive Economic Zone, with missions lasting as long as 12 hours. SES Networks' connectivity is utilized for this Medium Altitude Long Endurance (MALE) RPAS to empower multiple Icelandic authorities – such as the Icelandic coast guard, the fisheries directorate, the environment agency, the customs directorate, and the search and rescue association – to remotely follow the missions via a dedicated data center and to ensure timely decision-making. Under a framework agreement, SES Networks will deliver managed satellite communications (SATCOM) connectivity services for EMSA missions, including secure end-to-end satellite and terrestrial links, capacity and teleport infrastructure, as well as distribution of the RPAS data via satellite internet services to end-users. "Reliable connectivity is critical for timely decision-making during maritime missions, especially for search and rescue operations," said EMSA's Executive Director Ms. Maja Markovčić Kostelac. "Stable, high-performance connectivity not only enables quick situational assessment, but it also boosts the cost-efficiency of resource deployment by the national authorities using our services. This matters all the more when critical data is being delivered to and from a moving platform in harsh meteorological conditions where there is no terrestrial infrastructure." "We have been developing our space and ground assets, as well as secure managed connectivity service capabilities, to support a variety of critical missions required by government customers," said Nicole Robinson, Senior Vice President, Global Government at SES Networks. "RPAS missions are one of the key areas where we have built extensive expertise supporting a variety of global platforms, including processing and delivering data from multiple sensors to those fulfilling and monitoring mission-critical tasks. We are honored to support EMSA and Icelandic authorities for these important missions in a geographically dispersed area."

New Sersat and SES Satellite TV Platform to Enable Easy Content Delivery across Latin America

Pay TV operators, content owners and broadcasters will now be able to deliver their video content on a newly-developed platform on the SES-14 satellite to reach more than 33 million TV homes across Latin America. The C-band platform is developed by Sersat, a Datco Group company and a leading telecom company in Argentina for video solutions and services, and hosted via SES's new video position for the Americas via 47.5 degrees West. Local and international content operators and owners who want to broadcast over Latin America will be able to enjoy the benefits of instantly reaching millions of households that are currently served by the satellite via the platform hosted at the Sersat teleport in Buenos Aires. SES-14 reaches 33.3 million TV homes directly in the region. In addition, its channels are being picked up by other direct-to-home platforms which serve another 29.3 million homes, bringing the total number of TV households it serves to 62.6 million. "Having worked with SES in the past, we are confident that they can provide us with high-quality services for our operators in the region. From our teleport in Buenos Aires, we manage the end-to-end transmission signals for local and international channels, enabling pay TV providers in Latin America to build differentiated content networks and provide more channels across the region," said Verónica Martinez, President of Sersat. "Across Latin America, the demand for content has never been greater. Through our assets and partnerships, we are pleased to be able to leverage the power of satellite to deliver content to mass audiences. The latest agreement with Sersat is an extension of our long-term partnership to offer more and better video solutions to satisfy the demand of content distributors and owners that want to deliver more content across Latin America," said Jurandir Pitsch, Vice President Sales, Latin America & Caribbean of SES Video. SES was a strategic partner to Sersat when broadcasting the Rally Dakar Peru 2019 using the SES-10 and SES-14 satellites.

For Sersat, the challenge of broadcasting an event in hostile terrain such as the Dakar Rally requires peak performance of both technical and commercial teams. Next to having the best satellite coverage, teams from both companies collaborated well and complemented each other with their strengths, making the event broadcast a successful one.

Tech Mahindra Introduces K2, Artificially Intelligent Human Resource Humanoid

Tech Mahindra Ltd has introduced K2, the first Human Resource (HR) Humanoid for its Noida Special Economic Zone Campus in Uttar Pradesh, India. A perfect blend of knowledge and kindness, K2 will take over the routine HR transactions to provide constant assistance to the HR team in creating an enhanced employee experience. Tech Mahindra's first HR humanoid was introduced in its Hyderabad campus, earlier this month. K2 leverages state of the art Artificial Intelligence technology and initiates conversation without any need for wake-up commands. Keeping in mind the needs of the especially abled, K2 can respond to queries with text display along with Speech. K2 can address general and specific HR-related employee queries as well as handle personal requests for actions like providing payslip, tax forms etc., and will enable the HR team to focus on other important areas for employee development. Harshvendra Soin, Chief People Officer, Tech Mahindra, said, "In today's digital era, the changing talent landscape is making it imperative for organizations to not just be customer focused, but more 'human experience' centric. At Tech Mahindra, we are focused on leveraging technology to further enhance human experiences by making them more personalized and meaningful. K2 has been designed to add value to the employee lifecycle across various touchpoints and ready ourselves to be a workplace of the future. We believe the future will be more human than we think." Tech Mahindra plans to deploy the next Humanoid in its Pune campus following the NSEZ campus and will further enable K2 software for an enhanced engagement with improved communication skills to carry out empathetic conversations from associate's wellness perspective. The organization will also enable it to leverage mobility and spatial awareness to engage with Associates rather than just keeping it unidirectional. Tech Mahindra has already implemented an Artificial Intelligence based Facial Recognition System to register the attendance of employees that has drastically reduced the time spent by an associate in updating the timesheet. Recently, Tech Mahindra also launched Talex – the world's first AI-driven marketplace of talent that maps skills of the existing talent pool. As part of the TechMHRNxt charter, Tech Mahindra is betting big on next gen technologies like Artificial Intelligence, Machine Learning to address real time HR issues by delivering innovative solutions and services. The organization is continuously looking to develop and invest in futuristic tech enabled possibilities for the benefit of its employees, which would serve them throughout the employee life cycle and help build the workplace of the future.

Tech Mahindra and UiPath Launch AI Driven End-to-End Automation Solution for Enterprises

Tech Mahindra Ltd announced it has been named a winner in the 2019 Microsoft Partner of the Year Award. The company was honored among a global field of top Microsoft partners for demonstrating excellence in innovation and for implementation of customer solutions based on Microsoft technology. Awards were presented in several categories, with winners chosen from a set of more than 2,900 entrants from 115 countries worldwide. Tech Mahindra was recognized for providing outstanding solutions and services in Media and Communications segment. Rajesh Dhuddu, Global Practice Leader, Blockchain, Tech Mahindra, said, "We are delighted for this recognition by Microsoft. This amply validates relevance of our Blockchain solutions for global businesses and the outcomes they are driving. With the right technology expertise,

operational experience and continued partnership with Microsoft, we hope to continue such stellar work in the future as well." This year, Microsoft acknowledged partners in various categories celebrating each of the solution areas, industries and sectors in which Microsoft technologies are used. "It's an honor to recognize finalists and winners of the Microsoft 2019 Partner of the Year Awards," said Gavriella Schuster, Corporate Vice President, One Commercial Partner, Microsoft Corp. "These companies are successfully leading their industries, building intelligent solutions, addressing complex business challenges and making more possible for customers around the world. I'm honored to congratulate each winner and finalist." The Microsoft Partner of the Year Awards recognize Microsoft partners that have

developed and delivered exceptional Microsoft-based solutions during the past year. As part of the TechMNxt charter, Tech Mahindra is betting big on next gen technologies like Blockchain to address real business needs of the customers by delivering innovative solutions and services. The organization, through its aggressive re-skilling and research programs, plans to develop internal capabilities to handle Blockchain solution and expand its forte in the segment further.

Tech Mahindra and IIT Kanpur Collaborate to Address Future Cyber Security Challenges

Tech Mahindra Ltd signed a Memorandum of Understanding (MOU) with Indian Institute of Technology Kanpur (IIT Kanpur) towards the knowledge enrichment and conducting joint research in the field of cybersecurity. Through this partnership, Tech Mahindra will bring real world industry exposure to students of IIT Kanpur. Tech Mahindra will be working closely with IIT Kanpur on research projects to develop and foster an environment to deal with automation in cyber security and to enhance digital resilience of critical national infrastructure. As a part of this research partnership, Tech Mahindra will share real world challenges in cyber security with IIT Kanpur teams to find suitable solution. Rajiv Singh, Global Head of Cybersecurity, Tech Mahindra, said, "At Tech Mahindra our primary objective is to ensure that the customer's business is secured against national grade threats and attacks. Through our partnership with IIT Kanpur, we aim to collaborate and co-create superior research based solutions in cyber security. Our global experience of securing Enterprise and Telecom customers provides a great opportunity to build customized Cybersecurity products in the space of Advanced Threat Management, Internet of Things (IoT), 5G, connected devices and securing Internet of Everything in our digital world." Prof. Abhay Karandikar, Director, IIT Kanpur, said, "We are excited to partner with Tech Mahindra for building innovative solutions in the area of Cyber Security. With IIT Kanpur's strong footing in research capabilities and critical infrastructure, I am confident that our association with Tech Mahindra will lead to novel indigenous technology developments in Cyber Security." Prof. Sandeep K. Shukla, Head of the Department of Computer Science and Engineering, Joint coordinator, C3I Center, IIT Kanpur, said, "Cyber Security is our national imperative. Developing indigenous tools and technologies to protect the cyber infrastructure is of extreme importance. IIT Kanpur's Center for Cyber Security and Cyber Defense of Critical Infrastructure (C3I center) is pleased to partner with Tech Mahindra in transferring technology developed at the center for commercialization by an Indian software company, as well as in further joint development in the cyber security space. We hope this joint research and development activity can become a model for academia-industry partnership in the country." As part of our TechMNxt charter, Tech Mahindra is betting big on next gen technologies like Cybersecurity to solve real business problems of the customers by delivering innovative solutions and services. The organization, through its aggressive re-skilling and research programs, plans to develop internal capabilities to handle cyber security solution and expand its forte in the segment further.

Tech Mahindra Bets Big On Sustainability to Drive Business Profitability

Tech Mahindra Ltd. a leading provider of digital transformation, consulting, business reengineering and software solutions announced that it is betting big on sustainability to drive business profitability. The company has undertaken a thoughtful and comprehensive program to reduce its absolute scopes 1 and 2 GHG (Greenhouse Gas) emissions 22% by 2030 and 50% by 2050, from a 2016 base-year. Tech Mahindra aims to leverage technology enabled green solutions to tread on the path of responsible growth, and is actively engaged in various Smart cities project to undertake a modernization drive. Tech Mahindra was recently recognized for its leadership on climate change and awarded MSP (Microsoft Supplier Program) Sustainability Winner. The company has installed solar generation at its plants in Pune, Chennai, Hyderabad, Bangalore, Noida and Chandigarh. CP Gurnani, Managing Director and Chief Executive Officer, Tech Mahindra, said, "Sustainability is a long-term issue that will require decades of persistence. At Tech Mahindra, we are committed to pursue plans that will have long-term impacts on the communities and will lead to a balance between sustainability and overall business profitability". Sandeep Chandna, Chief Sustainability Officer, Tech Mahindra, said, "We are committed to adopt a strategy which will deliver innovative solutions without adversely affecting the environment. Our emphasis on our green eco-system is seen through our commitment to go carbon neutral, making optimum use of resources and moving towards a low emission technology". As a responsible business entity, Tech Mahindra concentrates on integrating sustainability into all aspects of the business and develops strategies for Environmental, Social and Governance (ESG) dimensions. With a structured stakeholder program, Tech Mahindra has been able to design strategies and initiatives to build solutions, which not just improve its sustainability credentials but reinforce the overall business philosophy too.

Tech Mahindra & Strands Collaborate to Provide Customized Digital Banking Solution to Financial Institutions Globally

Tech Mahindra Ltd. a leading provider of digital transformation, consulting and business reengineering services and Strands, a leading FinTech company that helps banks leverage Artificial Intelligence-based tech to grow customer loyalty and boost their bottom line, have announced a strategic partnership to provide an integrated suite of secure and customized digital banking solution to financial institutions globally. Tech Mahindra will leverage Strands' Artificial Intelligence capabilities along with its existing domain expertise in financial services to enable enhanced customer experience. By providing data-driven analytics of user behavior, the digital banking solution will enable financial institutions to create personalized and contextual offering for their customers. In addition, the solution will provide them with relevant insights to take informed decisions to generate cross and up-sell opportunities. The solution will lead to multiple touch-points across the customer journey which will further translate into a higher customer engagement and retention rate. Gautam Bhasin, Global Head, Banking, Financial Services and Insurance, Tech Mahindra, said, "As part of our TechMNxt charter, Tech Mahindra is focused on enhancing customer experience by leveraging next generation technologies like Artificial Intelligence to deliver world-class solutions. Our collaboration with Strands will further enable us to implement this unique digital financial solution to enhance end-customer experience and faster time to market of products & services by banks, as well as increase return of investment for our customers". Tech Mahindra will offer Strands solutions to its global clientele to enable their complete digital transformation, and will also undertake system integration and service portfolio management. Erik Brieva, CEO at Strands, said, "Our white-label digital money management solutions give financial institutions an edge over the competition, speed up internal processes and help them reap the benefits of a more engaged relationship with their customers. This strategic partnership with Tech Mahindra will accelerate the delivery of tangible business value". Strands product portfolio includes PFM (Personal Financial Management), BFM (Business Financial Management, CLO (Customer Linked Offers), Engage (insight-driven solutions) and API (Application Programming Interface) Hub to connect multiple APIs and external services. As part of the TechMNxt charter, Tech Mahindra is focused on creating a partner ecosystem to create a suit of next generation technology enabled solutions and services to serve global customers. The partnership with Strands will further strengthen the offering in financial space and help in gaining access to newer enterprise across the Globe. Tech Mahindra's digital transformation offerings include robust solutions that enable banks to successfully overcome outdated approaches and transform the traditional customer operations model into new business models based on digitization.

Tech Mahindra and MKI Collaborate to Develop Next-Gen Digital Enterprise Solutions for Japanese Market

Tech Mahindra, a leading provider of digital transformation, consulting and business re-engineering services and solutions announced a collaboration with Mitsui Knowledge Industry Co, Ltd. (MKI) to develop next generation digital enterprise solutions, in the Japanese market. As part of this collaboration, Tech Mahindra and MKI aim to address the lack of SAP skilled workforce for ECC migration to SAP S/4HANA by 2025 in the Japanese market by creating a 600-member engineering pool in Japan and India, out of which Tech Mahindra is expected to bring 300 members. In addition, both the teams will leverage tools, technologies and best practices to manage various aspects of the customer's SAP S/4HANA transformation journey including pre-sales, assessment, requirement gathering, implementation and support. CP Gurnani, Managing Director and Chief Executive Officer, Tech Mahindra, said, "This announcement is a watershed moment in our long-standing collaboration with Mitsui Knowledge Industry to implement enterprise solutions in Japan, in addition to programmes on Talent-exchange and Human Resource, Research & Development. Japan is a key market for us, and we hope to further create a long-term value through this alliance." This announcement marks the next phase of collaboration between MKI and Tech Mahindra to set-up dedicated infrastructure to help Japanese enterprises in their journey to migrate to next generation enterprise solutions. As part of the TechMNxt charter, Tech Mahindra is betting big on next generation technologies like Artificial Intelligence, Blockchain, Cybersecurity, 5G, and Internet of Things to deliver enhanced experience to customers globally.

Nezar Banabeela Appointed As the New CEO of VIVA Bahrain

VIVA Bahrain Board of Directors have announced the appointment of its new CEO, Eng. Nezar Banabeela effective June 2019, replacing Mr. Mohammed Al Khushail, who was the acting CEO of the company since the beginning of the year. Prior to Mr. Al Khushail, VIVA Bahrain was spearheaded by Mr. Ulaiyan Al Wetaid as the CEO of the company who has joined the STC Group recently. Eng. Banabeela has over 15 years of experience and over 10 years in the Telecom sector with STC Group and VIVA Bahrain, where he held various positions for five years since VIVA's inception in 2009 including the position of Chief of Enterprise and Wholesale sector, where he played an instrumental role in launching the company and its Enterprise sector in 2012. Additionally, Eng. Banabeela had been a member of Board of Directors of various companies and recently has held key leadership roles in different sectors, including the President of Bahri Dry Bulk which is considered the main national carrier for maritime in the Kingdom of Saudi Arabia and world's foremost transportation and logistics companies. He holds a bachelor's degree in Electrical and Computer Engineering from Umm Al-Qura University in Makkah (KSA) and has attended various executive leadership programs in top-ranked institutions across the globe including the General Management Program from Harvard University in the United States.

VIVA Bahrain Wins "Best Digital Transformation" and "Best Customer Service" From the International Finance Awards 2019

VIVA Bahrain, the Kingdom's leading telecommunications service provider, was awarded from the International Finance Awards 2019, winning the distinguished "Best Digital Transformation Telecom Company" and "Best Customer Service company in Telecommunications" award. The awards were presented to VIVA in acknowledgement of its digital transformation journey and world-class customer experience. VIVA Bahrain CEO. Eng. Nezar Banabeela commented: "We are honored to be highly recognized from the International Finance Awards 2019 for our strides in Digital Transformation and Customer Service. These awards stand testament to our game changing digital services, such as VIVA Cash, a smart digital wallet, VIVA Self Service Machines, innovative self-service digital branches, VIVA Skiplino, a cloud-based queuing system, VIVA Connected Life and more". He added "As our digital transformation journey trail blazes ahead, it steps us closer to our vision for 5G, to enrich the lives of our customers even further and create and elevate a truly integrated digital service experience". This award adds to the many awards, which VIVA has won since its inception, including "Best Digital Transformation" and "Best Customer Service" at Global Business Outlook Awards 2018, "Best Enterprise Service" in Telecoms World Middle East (TWME) 2018 Awards, LYNX Awards for Best campaign at the Dubai LYNX 2018 and Excellence in Community at the Bahrain International CSR 2018 and "Best Digital Service" at TWME 2016 to name a few. The International Finance Awards is hosted by International Finance, a premium financial and business analysis magazine, a UK based company that aims to recognize and reward excellence in business to companies all over the globe.

Viva Bahrain Launches Home Broadband 5G Network

Viva Bahrain, the Kingdom's third largest mobile network operator, has announced the launch of its home broadband 5G network through new add-on plans and 5G-enabled devices. Speaking at the launch of the service, which offers download speeds of up to 1Gbps, Viva CEO Nezar Banabeela claimed: 'Driving Bahrain's digital telecommunications future with investments in revolutionary technologies and applications has been the forefront of VIVA Bahrain's ICT services. The start of our 5G commercial journey is a milestone for us towards this direction as we pave the way for future connectivity and add it to the Kingdom's leading 4G network.' According to the company's website, a 5G add-on for its home broadband plan is priced at BHD5 (USD13.2) a month, with rental of the 5G Home device costing an additional BHD12.5 a month. Viva announced the completion of 5G readiness in selected locations across Bahrain in February 2019, before signing an MoU with Chinese equipment vendor Huawei later the same month in preparation for a nationwide launch by June.

Zain Bahrain Announces a New Enterprise Partnership with CHAPO Bahrain

Zain Bahrain, a leading telecommunications provider in the Kingdom has announced a new enterprise partnership with CHAPO Bahrain W.L.L through providing them with state-of-the-art telecom connectivity solutions. The partnership was signed at Chapo Bahrain Offices in Askar between Yazan Zaytoon, Zain Bahrain Enterprise & Corporate Manager and

Aymen Al Alawi, Zain Bahrain Enterprise Business Development Manager along with Hussain AlKhars, CHAPO Bahrain Bahrain Head of Administration and HR. Under this partnership, Zain will be providing fixed line, Mobile and connectivity services. "Zain Bahrain is pleased with CHAPO Bahrain partnership, such a collaboration goes further to demonstrate a sincere commitment in delivering a total communications solution to customers and providing industry-leading customer service. Zain Bahrain is focused on showing its commitment to excellence and innovation to deliver a comprehensive portfolio of high-quality communication services," said Yazan Zaytoon, Zain Bahrain Enterprise & Corporate Manager. "We are very happy with Zain Bahrain as our communication partner. Zain Bahrain has been a valuable telecom organization for years in Bahrain and have proved to add value to the market in general, but also to its partners through

showing its commitment for operational excellence and translating opportunities for customers," said Hussain AlKhars, CHAPO Bahrain Head of Administration and HR. CHAPO Bahrain W.L.L is a highly successful, multifaceted contracting and civil engineering company with operations centered in Bahrain and active in other commercially strategic locations throughout the Middle east. Zain Bahrain is committed to offering quality services and to continuously provide solutions that help enterprises and startups excel in their businesses.

Zain KSA Rolls Out 5G Services

Zain Saudi Arabia (Zain KSA) has launched 5G services in the Kingdom using Nokia's end-to-end portfolio. The 5G network utilizes spectrum in the 2600MHz and 3500MHz bands, along with Massive MIMO, to deliver enhanced network capacity, coverage, and improved downlink and uplink speeds. In addition, Zain will introduce E-Band microwave in certain areas to allow for ultra-high capacity backhaul networks. Under the three-year deal with Nokia, 'thousands of 5G sites' will be deployed going forward. Zain KSA's CEO Sultan Abdulaziz AlDeghaither said: 'Zain Saudi is a pioneer in introducing next-generation telecoms services and with this 5G deployment we continue that tradition, as we will launch a wide range of new applications and services for our customers.'

ARTICLE

CyberSecurity Is No Longer The Keyword, 'Survivability' in a Geo-Poli-Cyber™ Threatened World Is

Khaled Fattal
Chairman, MLi Group &
Creator & Producer 'Era of the Unprecedented' Investigative Program

Today, traditional cyber strategies are failing on daily basis and at an unprecedented scale. Deloitte, Equifax, Yahoo, Marriott, Maersk, and Cosco are giants that discovered the hard and expensive way they were not immune to cyber threats. The WannaCry Ransomware attack on May 12, 2017 singly hit more than 150 countries. All this reflects on a seismic shift in the global cyber and non-cyber threat landscape, must prompt industry players and governments to re-consider and re-prioritize industry and the government sector to prioritize their understanding of cyber threats and to add and devise new strategies.

> *With resiliency, continuity and cyber security strategies and solutions failing to protect and defend on unprecedented scales, nation-states and corporate leaders must re-consider the security strategies they are currently following.*

With Resiliency, Continuity & Cyber Security strategies & solutions failing to defend and protect governments & organizations on unprecedented scales from financial, ideological, terrorist, and politically motivated cyber-attacks, answers to two key questions are of critical importance: First, *how do you secure your National or Corporate security, let alone safeguard your effective 'Survivability'?* Second, *how can sector leaders, such as Telecom, convert these unprecedented & devastating cyber & non-cyber threats into unprecedented Competitive Advantage Opportunities today & for the 21st Century?*

Unprecedented Damage & Cost - Lessons Still Unlearnt

In October 2016 the Mirai botnet delivered the largest DDoS attack ever. It shut down Twitter, New York Times, PayPal and hundreds of others and was highly likely to have "Geo-Political" motivation. Yet, not even a ransom was demanded.

Yahoo's 1 Billion user accounts hacked in 2013 got revised to 3 Billion Shortly after. As a result, Yahoo's acquisition price was reduced by Verizon by a massive $350 Million following this hack

In October 2015 TalkTalk, the UK telecom company suffered a cyber-attack at the hands of three teenagers who hacked it to impress their peers. MLi estimated the hard cost of the hack to be in excess of £250 million.

In January 2019 a British hacker was jailed for a commercial cyber-attack on a telecom operator paid for by a rival which took Liberia offline. If a paid hacker can devastate a business & shut down a country, just imagine the carnage an 'ideological' or destruction motivated cyber terrorist or national enemy can do to the economy and security of your nation state.

> *Poli-Cyber™ & Geo-Poli-Cyber™ are MLi Group created labels in 2012-13 to identify and differentiate them from traditional financially motivated cyber attacks; they represent a new direction in political, ideological, 'religious' and destruction motivated cyber attacks that we predicted long before they became the daily devastating occurrences of today.*

And a host of other politically-motivated cyber attacks have also surfaced over the past several years.

Naming the Threats to Mitigate Their Impact

Poli-Cyber™ & Geo-Poli-Cyber™ are MLi Group created labels in 2012-13 to identify and differentiate them from traditional financially motivated cyber attacks; they represent a new direction in political, ideological, 'religious' and destruction motivated cyber attacks that we predicted long before they became the daily devastating occurrences of today.

These labels were created to define new threat vectors that can cause devastation on unprecedented scales and to offer solutions to mitigate them that did not previously exist.

It is a fact, if you cannot name the threat you cannot mitigate the threat. Therefore, we identified Geo-Poli-Cyber hacks as attacks perpetrated by a new breed of local, regional & global political, ideological, 'religious' and destruction motivated cyber hackers.

Geo-Poli-Cyber™ attacks are those perpetrated, directed, or inspired by extremist groups, national security agencies, rogue states, proxies, among others.

Direct Looming Threats to Sector Players such as Telecom Operators

Another looming threat to many sectors and ecosystem players, including digital service providers and telecom networks, will challenge national telecom authorities worldwide. The imminent prospect of Internet services being deployed from satellite by global private sector players will bypass local authorities and challenge traditional telecom models, revenue streams, customer retention and loyalty like never before.

For some, this might prove to be a lost cause in the making. But for others who are truly forward-thinking and who start building new strategic relationships that can offer new and compelling solutions and services their individual and corporate customers do actually need will increase their chances of mitigating these threats successfully. In fact, doing so will set them on course to thrive competitively in the 21st century.

Lack of Priority and Prompt Action are the Worst Enemies

Each one of the facts below should have triggered a need for serious change in mind-sets, strategies and solutions at national and corporate levels, but they haven't yet systematically.

Irrefutable Facts:

1. Cyber attacks are breaching organizations & governments daily, globally & at unprecedented scales
2. Politically-Motivated cyber hacks with the aim to change the political & economic directions of nations are now routine occurrences
3. Destruction-Motivated new breed of cyber terrorists are on the rise
4. The up-scaled sophistication & intensification of cyber criminals is ever growing
5. Technology, AI, Machine Learning & IOT are evolving at breakneck speed – law enforcement can't keep up
6. Artificial Intelligence is being weaponized
7. Current resiliency, continuity and cyber security strategies and solutions are failing governments and organization too routinely
8. A 16-year-old can hack a government, a hacker can shut down a city or a country, and they have.

> *The imminent prospect of Internet services being deployed from satellite by global private sector players will bypass local authorities and challenge traditional telecom models, revenue streams, customer retention and loyalty like never before.*

Alarmingly, the aggregate of all these facts and lack of proportionate strategic change make the new threats even more critical and imminent.

Rise of the New Breed of Cyber-Terrorists

The Geo-Poli-Cyber hacker is a new breed of destruction-motivated cyber-terrorists, with a political aim to change the economic and political direction of nations.

These players are a critical and alarming new dimension in an already extremely challenging global threat landscape. While conventional financially motivated cyber-attacks continue to increase in their frequency and grow in sophistication, the new Geo-Poli-Cyber attackers are even more threatening.

They are not interested in your customers' bank details or in disrupting your service

for a ransom; financial gain is not their primary motivation. They simply want to cause maximum damage. They want to cause devastation or even the destruction of their targets including infrastructure networks, multinational companies and state-owned assets.

> *Leaders of organisations and governments must ask themselves some very hard questions about their true readiness in this changed threat landscape and seek answers, and new solutions before it is too late.*

Destroying a target creates publicity to boost morale amongst their followers, strengthen their global recruitment drive, and inspire followers to wage similar attacks. The higher the national or corporate brand or profile of the target, the greater the publicity they stand to gain.

Leadership Considerations to Survive & Thrive Competitively

With resiliency, continuity and cyber security strategies and solutions failing to protect and defend on unprecedented scales, nation-states and corporate leaders must re-consider the security strategies they are currently following. These are the same strategies and solutions that continue to fail governments and corporations on daily basis. They must get modified, appended to, or changed, with a great sense of urgency, and before the next breach happens, when it becomes too late.

What must national and organizational leaders start considering urgently starting at the strategic level?

For nation-state leaders, a national Cyber-Survivability Strategy with a Specifically Formulated & Accelerated Legislative Road Map & Plan is necessary.

Similarly, for corporate leaders, a corporate Cyber Survivability Strategy with a Specifically Formulated & Accelerated Implementation & Operating Plan is fundamental to surviving in the new digital age.

Tough questions leaders you must ask of themselves

While more and more governments and organisations today operate online, virtually all are still relying on traditional cyber strategies that are failing daily and cannot defend against these new attackers. Failing to adapt not only to the increase in number and sophistication of attacks but the new motivations of Geo-Poli-Cyber hackers is an existential risk even for the biggest organisation.

Leaders of organisations and governments must ask themselves some very hard questions about their true readiness in this changed threat landscape and seek answers, and solutions before it is too late.

Fundamentally they must understand how to test or 'Audit' their current plans' effectiveness in mitigating the emerging Geo-Poli-Cyber threats that could cripple or devastate them.

How do they safeguard their continued existence in a competitive market place? How do they secure their effective 'Survivability' and remain a competitive player?

Turning Unprecedented Threats into Competitive Advantages

Front Line Service Providers (FLSP), such as Telcos, who adopt new business models, strategies, solutions and services, as well as their corresponding policies and narratives to implement on themselves to help them mitigate latest 21st century Geo-Poli-Cyber threats can in parallel offer them to their stakeholders to do the same. This will not only be very rewarding financially short and long term, but they can also help them attain the ultimate competitive edge.

Forward-thinking FLSP leaders with the right mind-set and who can acquire the right strategies, solutions, services, tools, will discover how to convert these unprecedented threats into 21st century competitive advantages with cutting edge innovative services and solutions they would implement on themselves as well as offer them to their customers and stakeholders.

Unique Leadership Opportunities for Telecom Sector Players

Telecom operators that aspire and desire to turn these unprecedented and still unmitigated 21st century Geo-Poli-Cyber threats into competitive business advantages, new revenues, and to become more relevant to their customers and the nations they belong, can do so by aligning themselves through strategic partnerships to offer never-before-considered Cyber-Survivability Security Strategies, Solutions and Services.

> *Front Line Service Providers (FLSP), such as Telcos, who adopt new business models, strategies, solutions and services, as well as their corresponding policies and narratives to implement on themselves to help them mitigate latest 21st century Geo-Poli-Cyber threats can in parallel offer them to their stakeholders to do the same.*

Ideally, telco leaders will then be in a position to adopt and implement new solutions and services on themselves, as well as, offer them to their consumers and corporate clients through a uniquely developed MLi platform specially designed to better mitigate the 21st century financial and devastating Geo-Poli-Cyber motivated threats and attacks to achieve:

- Security of infrastructure against latest cyber & non cyber threats
- 21st century Geo-Poli-Cyber Data analytics
- Testing of infrastructure as well as consumer and corporate set up
- Continuous testing and updating of the infrastructure of the Telco
- Continuous testing and updating on customers infrastructures & offered

services
- AI enhanced data analytics offerings to clients leveraging the client's own data, with their consent, to help clients better secure their Cyber-Survivability and mitigate the changed global cyber and non cyber threat landscape
- Compliance with current and future government regulatory requirements, by offering customers new services, solutions and tools
- Continued relevance among telecom operators to their customers but also to their nation's cyber Survivability & security
- Increased customer base, market share, loyalty and reduction in customer churn, while delivering short to long term competitive edge and market advantages

A Cyber-Survivability™ Strategy is Unavoidable

Today, with the seismic shift in the global cyber & non cyber threat landscape, top decision makers and boardrooms need to stop focusing on cyber-risk and start looking into 'Survivability risk' & Cyber-Survivability. They must now urgently address how to survive the new Geo-Poli-Cyber attacks capable of devastating governments, nations and organizations and impacting people's daily lives all over the world.

Determining the ideal Cyber-Survivability Strategy™ for any stakeholder starts with a new mind-set among leaders across public and private sectors and direct engagement with the MLi Group.

If you can't answer these questions and are not implementing a comprehensive Cyber-Survivability strategy and some if not all its solutions and services to append or replace existing cyber security or information security plans, your national and corporate 'Effective Survivability' is at significantly high risk.

Local & Global Digital Economies under Unprecedented Threats Unless…

In April 2019, I was the guest of the UN WSIS 2019, where I spoke at the high-level panel on the global digital economy & trade which was very well received by many government and business leaders. But I fear neither enough leaders are fully aware of the grave and unmitigated cyber threats nor, for the most part, their exists a good understanding of the ways to mitigate them locally and globally. US$29 trillion is the size of the global digital economy today and it is under unprecedented cyber threat and constant attack. As robust as it may appear, it is however such a fragile ecosystem that any attack on it or disruption to it can have devastating consequences on people's daily lives locally and globally.

To continue "as is" or with the same mid-sets, modalities, and business models is a recipe for disaster. Furthermore, to depend on current models of government legislation to mitigate these threats is wishful thinking at best because these legislative models are too archaic and

Today, with the seismic shift in the global cyber & non cyber threat landscape, top decision makers and boardrooms need to stop focusing on cyber-risk and start looking into 'Survivability risk' & Cyber-Survivability. They must now urgently address how to survive the new Geo-Poli-Cyber attacks capable of devastating governments, nations and organizations and impacting people's daily lives all over the world.

cannot help in defending the states and and their inhabitants and stakeholders from Geo-Poli-Cyber attacks, which can devastate a business or a nation state without a single military target or critical national infrastructure being targeted. Front line service providers (FLSP) such as telecom operators, ISPs, law firms, etc., have a unique role in the society today at many levels. Any cyber threat materialized on any one of these or similar service providers has drastic implications on the well-being of the entire society.

For those who are still not convinced or compelled that "*CyberSecurity is No longer the Keyword – Survivability is*", or that "*Survivability in a Geo-Poli-Cyber™ threatened world*" does not need to be the new top priority and focus, may heed the following words:

"*Adapt or die*": Vint Cerf.
"It takes 20 years to build a reputation and five minutes to ruin it. If you think about that you'll do things differently": Warren Buffet.

Once compelled, true leaders don't hesitate to act in taking the first step when an unprecedented opportunity to acquire the 'competitive advantage' in the 21st century stares them in the eye.

REGIONAL NEWS

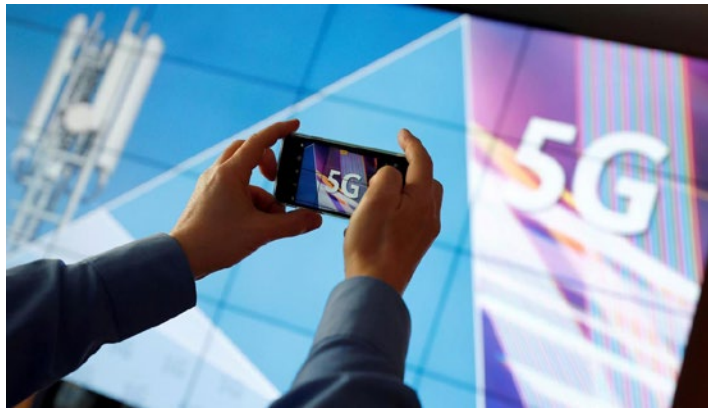
UAE a Global Model for AI Tech Adoption

Minister of State for Artificial Intelligence (AI) Omar bin Sultan Al Olama

The UAE is a global model in adopting AI in government work as well as in its future strategies, along with key sectors and government services which will improve the community's quality of life, the nation's Minister of State for Artificial Intelligence (AI) Omar bin Sultan Al Olama said while participating in the "CogX: The Festival of AI and Emerging Technology 2019" in the United Kingdom The event was attended by leading government officials, experts and innovators from around the world, as well as academics from the most prestigious international universities, WAM reported. During the session, attended by over 1,000 people, Al Olama reviewed a series of projects and the accomplishments of the National Program for Artificial Intelligence, while highlighting the UAE's experiences and the lessons it offers to other governments. "The UAE launched an integrated strategy that focusses on developing the nation's capabilities and benefitting from global expertise, to create advanced technological solutions for government and private sector challenges and develop legal and organizational legislation that comply with the adoption of AI," he said. Al Olama also highlighted that the UAE Government is keen to expand its cooperation with other governments and international institutions and companies, in promoting the role of AI in vital and future sectors. The event, which attracted about 15,000 participants from many countries, and featured 500 speakers from various industrial, academic, government and technological sectors, is a global platform for gathering the best minds to discuss future challenges and opportunities created by AI, as well as emerging technologies to build the future world. It also focusses on specific sectors, such as the internet, genetics, self-driving vehicles, blockchain, virtual reality and enhanced reality.

UAE Telcos Increasing CAPEX As They Race To Deploy 5G Networks

Etisalat of the United Arab Emirates (UAE) says it is expecting to invest AED4 billion (USD1.09 billion) in 2019 upgrading its infrastructure as it looks to expand 5G services, which were launched last month. Dr. Ahmed bin Ali, Senior Vice President of Corporate Communication at Etisalat, told the Emirates News Agency WAM: 'The upgrade will cover the company's mobile phone and fibre-optic networks, along with infrastructure development as well as Etisalat's 5G network.' Etisalat plans to have 600 5G base stations in service by the end of this year. Meanwhile, rival UAE telco Du says its own 5G investment will reach AED1.5 billion this year. Du, which launched its first 5G-capable handset earlier this month, has 120 5G towers in operation now, with 700 planned by year-end.



Security to Boost Adoption of Contactless Payments in Saudi Arabia

The launch of Apple Pay last month and Mada Pay last year mark key milestones in Saudi Arabia's digital transformation agenda and one that is instrumental in ushering the adoption of contactless payments in the Kingdom. Digital wallets and mobile payments are one of the fastest moving payment technologies globally. It is estimated that by 2022, the payment volume of mobile payment apps will reach nearly $14 trillion signifying the fast-pace of the industry. Across the globe, many consumers have already transitioned from paying in cash for their purchases to using a card or digital wallet. According to a recent Visa whitepaper, "Contactless & 'the Pays': the catalyst for digital payments growth", in Saudi Arabia, the demand for a better alternative to cash – such as contactless payments - is driven by high smartphone penetration (74%) and a technologically savvy millennial constituting 40% of the population. Furthermore, it is observed that among Saudi consumers there is an overall desire to try new solutions - 80% of respondents in KSA that had performed a contactless transaction were open to doing so again. When payments transactions are contactless, there is bound to be some apprehension regarding its security especially among non-users. However, Visa contactless chip cards, protected by cryptography and the latest fraud-detection technology, are as secure as "standard" Visa Chip cards that require cardholders to enter PIN for every payment transaction. Let's consider two likely scenarios of card data theft:

- A fraudster attempting to steal cardholder data during a contactless transaction: For every contactless transaction using a contactless card, a unique/one-time encrypted code is created without containing any details of the cardholder thereby securing cardholder's information. So, if the fraudster attempts to skim off a cardholder's information during a transaction, it is rendered useless to him as the code cannot be copied and used for any other transactions.
- Card is lost or stolen: The cardholder is immediately notified of the unauthorized activity on his/her account through SMS alerts and the cardholder should immediately report it to the bank. Also, In KSA there is a payment limit set to contactless transactions without cardholder validation up to SR100 per transaction. Like contactless cards, mobile wallets – such as Apple Pay, Samsung Pay, Google Pay, and mada Pay (the Saudi national payment scheme) - use the same NFC (Near Field Communication) technology. Visa tokenization is a key enabler for mobile wallets, securing mobile payments both in-app and in-store, making them safe for cardholders to use. Tokenization keeps sensitive account information safe on the Visa network and away from the mobile device itself. It replaces information like the 16-digit account number on the card by a unique digital identifier, known as a "token", which allows the payment to be processed without exposing any account details, thereby reducing the threat of sensitive cardholder data being compromised. Tokenization is also helping power the growth of eCommerce and mCommerce platforms enabling them to deliver innovative retail experiences to consumers without the burden of handling sensitive payment account data. Furthermore, embedding biometric technology in the smartphone device or the activation of a mobile passcode adds an extra layer of security, which effectively means that the device never leaves the cardholder's hand when making a payment, thereby putting the cardholder in control of the transaction. So, while the convenience aspect of contactless cards and enabled devices is a given – allowing cardholders to pay with a simple tap, it is indeed security features safeguarding cardholder data that is driving the growing preference for contactless payments among users. The initial response among consumers following the launch of Apple Pay and Mada Pay has been very positive – we've seen double-digit growth in the usage of wallets and contactless payments in the Kingdom. This shows how quickly the tech savvy Saudi consumers are embracing digital wallets and integrating it into their daily lives as it meets their need for convenience and security better than cash does. For merchants, the benefits of accepting contactless mobile payments include (i) speedy checkout, (ii) loyalty (e.g. you can integrate your loyalty programs directly into the hands of your customers), and (iii) supports with knowing your customers better (e.g. Digital wallets can be a conduit for gathering an extra layer of consumer data and using it to enhance the purchasing experience). To accelerate the use of Apple Pay in Saudi, Visa recently collaborated with Hardee's and Starbucks to run joint customer promotions across all their respective outlets in the Kingdom. Besides clear benefits for consumers and merchants, the adoption of contactless payments is an important step forward in supporting the government's efforts to achieve a fully digital economy by 2030. So, it is evident that contactless payment is the future and here to stay. Consumers' growing preferences for easy, reliable and security ways to pay combined with government's digital transformation efforts is likely to boost its adoption and acceptance levels in Saudi Arabia in the coming years.

Roshan to Usher in Afghanistan's Digital Era in Telecommunications

MATRIXX Software, an innovation powerhouse committed to transforming global commerce, announced that Roshan, Afghanistan's leading telecommunications service provider, has selected MATRIXX Digital Commerce to transform their operations and grow revenue. Roshan is partnering with MATRIXX Software to change the way its six million customers use telecom services by bringing real-time digital experience and personalization for all voice, data and digital services. MATRIXX has a global customer footprint across Europe, the Middle East, Asia and North America. Roshan selected MATRIXX because it is the only vendor providing a single platform that both protects and grows revenues from traditional prepaid voice and messaging services while also delivering the tools to attract smartphone users and increase data usage. As the digital revolution sweeps through emerging markets, mobile operators need cost effective, scalable solutions that improve their existing operating portfolios while building for the future of smartphones and digital service revenues. In a signing ceremony in Dubai, UAE, Roshan's CEO Karim Khoja said, "Since our founding, Roshan has always embraced implementing new technologies and applications to provide our customers with the best experience. This partnership with MATRIXX Software showcases that the digital experience is quickly becoming a reality in Afghanistan." "Afghanistan's communications infrastructure has come a long way in 16 years and Roshan has played and continues to play a significant role in making that happen," said Dave Labuda, MATRIXX Software co-founder and CEO. "It is only natural that Roshan is leading the way into a new era of digital connectivity. We are proud to be a part of helping Roshan deliver the future of customer experience and service innovation that Roshan aims to bring to their customers." Built entirely from scratch, the multi-patented, award-winning MATRIXX Digital Commerce Platform enables a digital-first reinvention of Telco BSS. It brings together traditionally separate network and IT functions into a single platform including product design and lifecycle management, customer engagement, service delivery and monetization. Built for digital, the MATRIXX Digital Commerce Platform offers operators the agility and seamless scalability required to compete and win now and in the future. Roshan has always been a pioneer in leveraging its robust network infrastructure and technology to support the government and the people of Afghanistan. These include the launch of Afghanistan's first ever mobile money service, M-Paisa, which has contributed to increasing financial transparency and financial inclusion. Roshan also launched the first Telemedicine program in Afghanistan in 2007, linking hospitals in Badakhshan, Bamiyan and Kandahar provinces to the French Medical Institute for Children and Mothers (FMIC) in Kabul, one of the most modern hospitals in the country. Since its launch, almost 30,000 patients across Afghanistan have received treatment through this telemedicine link.

Egypt Moves to Boost Its AI Expertise through a Partnership with Japan

From June 6, 2019, Amr Talaat, Egypt's Prime Minister started an official visit in Japan. During the visit, he will discuss training, research and development cooperation in the artificial intelligence sector with his Japanese peer Masatoshi Ishida. This meeting is a sequel of the one held in Cairo on June 3, 2019, by Amr Talaat and Japan's ambassador to Egypt Masaki Noke, for stronger IT cooperation between the two countries. The cooperation sought by Egypt in the artificial intelligence sector will boost its expertise in that segment of the information technology for which a national strategy is being developed. Egypt is gathering every competence required to succeed in the sector once the 5G is available within two or three years. Since January 2019, it has agreed to partner with many countries on artificial intelligence. This is the case of Russia (on March 19, 2019), Finland (May 26), China (May 26), and Saudi Arabia (May 31).

Egypt is Home to Highest Number of Internet Users in the MENA Region

Admitad MENA, a branch of the Global Affiliate Network Admitad, has released its second annual industry report that has comprehensively researched the increasing growth of e-commerce and online users across Egypt. Although the internet is only used by half the population of Egypt, it is still developing at an exponential rate. In fact, by the number of users alone, Egypt

ranks first in the whole MENA region. By the year 2030, the growth of e-commerce in the country is expected to be remarkable - the road map includes improved Internet Networks (5G) and the opening of more than 4000 post offices for logistical convenience to aid this active development. In a recent report by PHD Egypt, Nour Saleh evidently notes how the Egyptian government is getting involved at all levels to increase awareness of the vast opportunities that digitization can bring to the country overall. As Egypt ventures the translation of their public sector and economy towards a digital platform, the availability of data is voluminous. The country is making prominent efforts to simplify mundane tasks and provide a smooth pathway into a digital era, including encouraging businesses to equip this transformation. An analysis by Bain & Company estimates that the e-commerce market in the MENA Region is expected to reach $28.5 billion by 2022. As this industry continues to rise, even the small pool of internet users in Egypt is impressively active. Today, a vast majority of Egyptian people rely on social media communities, Facebook being at the top to search for information on goods and where they can find the best deals. Though only 15% of online users in Egypt shop online, the populous is becoming progressively approachable in online communications and are therefore being profoundly influenced by recommendations. Through this conscious endeavor, Egypt is proving that today is the best time to be in the e-commerce market in the MENA Region and advertisers need to start getting ready for an era of digitization. “Despite the low rate of internet users currently, we are seeing an exponential growth in the e-commerce market in Egypt. As governments get involved and aim to simplify these processes through the addition of updated logistics and easy bank processes, we are already seeing a rise in advertisers penetrating the Egyptian market and expect to see this continue. There is no doubt that more advertisers in Egypt will start to embrace digital transformation very soon and we are seeing many of them jump onto the bandwagon already!” - Artem Rudyuk, Head of Admitad MENA.

Tunisia Gets US$175 Million Loan for Digital Transformation

In a statement issued June 14, the World Bank reported it has granted Tunisia two loans both worth $175 million to finance two projects in digital transformation and economy. First project investment ($75 million) intends to improve access to financing for innovative start-ups and SMEs. It aligns with the government's “Start-up Tunisia” program that aims to foster the creation and growth of small companies and SMEs in the digital sector, and boost economic and employment opportunities for youth. “The project will finance equity and quasi-equity investments in innovative startups and SMEs, as well as support for concept development, investment readiness and technology adoption,” said the World Bank. Second project, $100 million, targets digital transformation for user-centered services. It will support an approach in promoting public administration technology (GovTech) in view to improve social protection and education systems. The aim is to ensure that vulnerable populations (including low-income groups, rural women, illiterates and the disabled, etc.) have access to these important services. Specifically, the project will focus on improvements in welfare services (cash and benefit transfers), broadening of pension and health insurance coverage and digital education management services (online enrolment, student/ school monitoring and drop-out detection, digital learning management system to improve learning).

UAE's e-Commerce Market to Be Worth US$17.8 Billion In 2020

The UAE e-commerce market is poised to grow to $17.8 billion in 2020, and the logistics providers they choose will play a key role in the exponential growth of online shopping, according to industry specialists. Average annual online spend per-capita in the UAE is around $300, significantly higher than Saudi Arabia at $90 and France at $94, according to UK-based consultancy firm Business Monitor International (BMI). Online shopping is growing faster in the UAE than other countries. The UAE currently ranks 33rd in the world, in terms of the size of its e-commerce market. The UAE is also a leading emerging market player in the logistics industry as the country ranks first in the Gulf region and third globally after China and India, according to the latest Emerging Markets Logistics Index. Gulf Pinnacle Logistics chairman Shailesh Dash said: "The aggressive growth of the e-commerce market in the UAE increases demand for professionally qualified logistics service providers to meet the logistics requirements of their customers." Logistics include many aspects like product handling, packaging, billing, labelling, inventory management, warehousing, transportation, cash on delivery, payment, product return and exchange, in addition to other value-add services. More than 80 per cent of UAE's 8.2 million internet users make purchases online, according to the annual report of Admitad – a global affiliate network. With the rise of digital retail platforms, such as Namshi, Noon, Ounass, Amazon.ae (formerly Souq.com) and several others, the UAE's e-commerce market is estimated to be worth an astounding $27.1 billion by the year 2022, says Admitad report. Once an online order is placed, the customer becomes eager to receive the shipment and a sophisticated logistics and delivery system plays a key role to provide timely and efficient delivery of goods or products. Once a customer is satisfied with a combination of metrics such as the quality of the product, its price point, speed of delivery and ease of payment, he/she engages in more frequent purchase orders and becomes a regular and retained customer fuelling the growth of e-commerce players. Many e-commerce giants have realized and tied the importance of a reliable, efficient and timely logistics system to their own success. Hence, those e-commerce giants who can afford vertical integration, started to either acquire state-of-the-art logistics providers or build a logistics arm internally to ensure a reliable, speedy, on-time, delivery services to their clients. For example, Amazon in the US, have established their own warehouses, and plane delivery network (Amazon Air) and are even purchasing abandoned malls in densely populated areas which are treated as fulfilment centers to reduce delivery times. In contrast to the very large players who have a significant volume of shipments to be able to support an in-house delivery and logistics network, medium and small-sized e-commerce players still seek an external vendor like Century Express, which specializes in express e-commerce delivery and is highly regarded by its corporate clients. In order to retain existing customers by offering them an exceptional delivery service and attract new ones, some e-retailers offer free or low-cost shipping for many products. None of this is possible without logistics management, as it is the cornerstone of the e-commerce industry. Turab Ur Rahman, General Manager of Last-mile Division in Gulf Pinnacle Logistics, said: "It is in the best interest of the e-commerce players to entail professional logistics service which would result in faster growth, success and dynamism for the company." BMI forecasts e-commerce market in the Middle East to be worth $48.6 billion in 2022, up from an estimated $26.9 billion in 2018. An estimated $51 billion of e-commerce sales were registered across the Middle East, North Africa and South Asia (Menasa) in 2017, according to new research launched by Dubai CommerCity. E-commerce is fuelling logistics opportunities and reputed logistics companies will grab the opportunities and grow their businesses in the UAE as well as in the region, Dash said.

Jazz Reaches 10 Million 4G Data Subscribers in Pakistan

Jazz, Pakistan's leading digital communications company, has achieved yet another milestone by crossing the 10 million mark for super 4G data subscribers. Not only is Jazz the country's largest mobile operator with 59+ million subscribers, but is also the largest internet provider in the country with the largest data user base of over 35 million 2G, 3G and 4G subscribers. The exponential increase in Jazz's 4G data subscribers is down to its superior data network. As per Ookla®, the leader in mobile and broadband network intelligence, testing applications and technology, Jazz is Pakistan's fastest mobile broadband network. The mobile operator has won Ookla's Speedtest Award twice in a row; Jazz achieved a Speed Score™ of 16.01 with average speeds of 17.13 Mbps for download and 10.74 Mbps for upload. Jazz's Speed Score™ was significantly higher than other competing networks, who averaged 8.04 for the same tests (Q3-Q4 2018). Commenting on crossing the 10 million mark, Aamir Ibrahim, CEO – Jazz, said, "Jazz's philosophy is based on providing constant enablement and empowerment

through technology, digital services and high speed connectivity. This philosophy has established us as Pakistan's network of choice, for voice and data services."

Saudi Arabia is the Key Driver for m-Commerce in the MENA Region

Over 70% of online purchases made by Saudis in 2019 were through smartphones, reports Admitad in their second annual research on key KSA online market indicators. Admitad MENA, a branch of the Global Affiliate Network Admitad, has released its second annual industry report where it outlines several key trends and factors on today's online shopping and e-commerce trends in Saudi Arabia. In a highly digitized era that will continue to grow exponentially, it is becoming increasingly evident that consumers are moving their shopping needs towards online platforms. The Admitad research reported that Saudi Arabia is home to one of the youngest populations in the world, i.e. 70% of the country's population are under the age of 35 - with a largely tech-savvy consumer base, it is one of the many reasons for their significantly high online consumer activity. The report also indicates that mobilization is a very popular movement amongst the consumer base in Saudi Arabia. Over 70% of the population have made online purchases through the use of smartphones. Infact, mCommerce purchases are at an all-time high with over 50% of purchases across all sectors being made through mobiles. Research And Markets reported that B2C eCommerce sales in Saudi Arabia have been expected to double between 2018 and 2022. With one of the highest smartphone penetrations in the world, Saudi consumers are looking more towards their phones for product information and purchases. Admitad highlights that mobilization is no longer a trend, but an important characteristic when it comes to eCommerce. Cross-border sales is another huge contributor to the online market- an analysis by ystats.com states that over 50% of KSA's market is attributed to purchases made on international platform. Admitad reports that one of the of the main accelerators for the development of eCommerce is the expansion and standardization of the delivery system in 2018- an implementation that will essentially speed up the delivery of goods via the Internet and make logistics as convenient as possible. “The era of mCommerce is increasing at an astounding rate- today, we are seeing that most consumers in Saudi Arabia use their mobile devices to make all kinds of purchases. Advertisers are becoming smarter with the way they approach these consumers, so that they can have the convenience at the tip of their fingers! It is no longer a growing prospect but rather an existent one, and we will continue to see more brands get on board with this change." - Artem Rudyuk, Head of Admitad MENA As the driver for smartphone penetration continues to increase, the behaviours of consumers are simultaneously evolving. However, businesses, advertisers and publishers are also consistently preparing for a large online consumer base. Businesses are establishing online platforms for their consumers to reach them comfortably, advertisers are targeting their consumers on platforms like Facebook that is very popular amongst Saudi internet users. It has become evident that as the populous becomes majorly digital, businesses will also need to get smarter.

Algeria, Mauritius and South Africa Most Mature African Telecom Markets

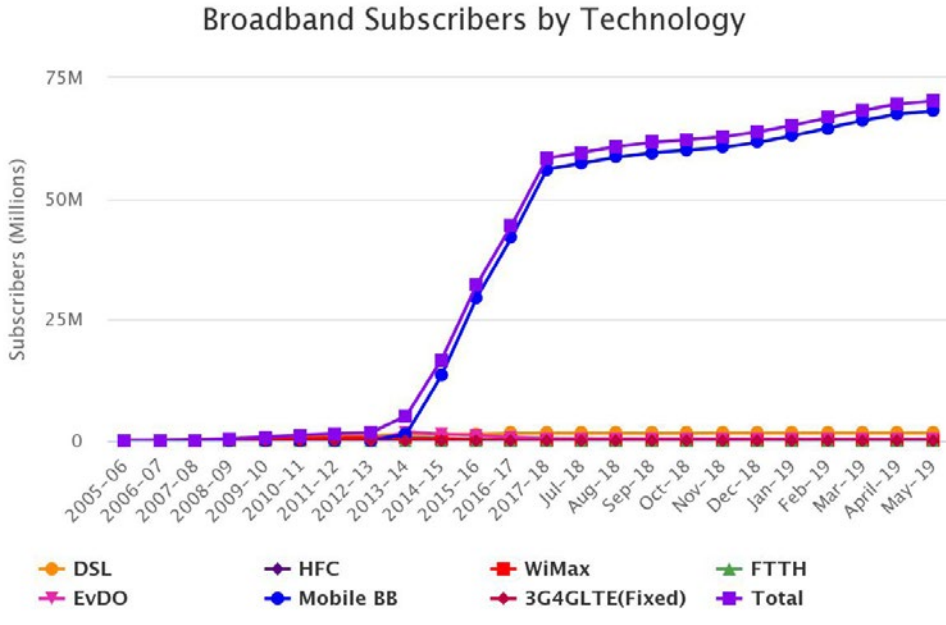
Mauritius remains the most mature African telecoms market, while Algeria and South Africa have taken over Ghana and Tunisia's respective second and third places in the annual BuddeComm Telecoms Maturity Index. The TMI is designed to analyze the broadband, mobile and fixed markets of a country in addition to a range of economic parameters to rank it on a scale of 1 to 100 and compare it to its region. The report says that Mauritius is the top-ranking country in Africa where the thriving tourism market has stimulated the broadband sector. Fibre is available to about 85 percent of the company's fixed broadband customer base. In Algeria, Mobilis, one of the three major mobile operators, has contracted Huawei as a partner for its network migration to 5G. Mobile penetration approaches 116 percent and mobile internet accounts for about 92 percent of all internet connections in the country. The study also found mobile penetration in South Africa by early 2019 approached 169 percent, driven partly by the popularity of multiple card use as well as take-up of mobile broadband services. Mobile internet accounts for about 95 percent of all internet connections.

Omani SME to Expand to Saudi Arabia

Qonsults, an Omani SME that already had a success story in Oman, has been awarded three mega projects in Kingdom of Saudi Arabia (KSA), which will lead to collaboration between Omani and Saudi companies in the field of E-commerce. Qonsults is closely working with Saudi small and medium enterprises (SMEs) based out of Riyadh and Jeddah on digital transformation solutions, and has now partnered with WADAL, a local Saudi company. Muhammad Haris Aslam, who leads Qonsults, said, "Now that I have experienced the SME scene in the KSA, my deepest realization is that businesses are changing rapidly and so the ways of connecting with customers. SMEs in all the Gulf Cooperation Council (GCC) countries are extremely welcoming to other and they like to work together in building a product with multicultural inputs." According to a statement by Qonsults, "The projects are based on fashion and lifestyle e-commerce industry in KSA." "Qonsults has already soft launched the first project, DarNijood.com, out of Jeddah. Another part, the mobile apps with eWallet solution of Dar Nijood will be launched soon," the statement added. "The best part is that all the start-ups and SMEs that Qonsults is mainly focusing on and working with are visualizing that their business model must function for the entire region and not specifically to a country. This ambition and new business thinking encourages them to work closely with service providers across GCC," Aslam added. Qonsults is an investment of a tech fund based out of Muscat and Dubai, chaired by Muhammad Sultan Al Salmy, while WADAL is a partner company based out of Riyadh and is led by Walid Abu AlSaud. About the potential of the market, the CEO of Qonsults said, "When we started Qonsults this year, we didn't expect such a response from Oman and KSA market. We went out and met a couple of SMEs operating in Riyadh and Jeddah, and realized there is a huge potential." "We interacted with many companies and because of our experience in ensuring the overall business modelling rather than only implementing the technology, we were awarded some challenging and great projects," he added

Total Broadband Users in Pakistan Hit 70 Million

Total broadband, 3G, 4G and landline internet users, in Pakistan have reached a milestone of 70 million, according to latest data by the Pakistan Telecommunication Authority (PTA). Out of the 70 million users, 67 million are 3G and 4G subscribers. The number of total cellular subscribers in Pakistan had reached 161 million by end-April 2019, 1.26% more than 159 million in the previous month, according to PTA. The total count of Jazz's 4G users grew from 8.774 million by end of March to 9.618 by end of April, according to PTA data. However, the company released a presser on Friday that it has crossed the 10-million mark for 4G data subscribers. The company's 3G user number stood at 13.393 million by end-April compared to 13.622 million by end-March, a decrease of 0.229 million. Telenor 4G subscribers jumped to 6.186 million by end-April 2019 against 5.905 million, while the company's 3G users decreased from 8.764 million in March to 8.640 million in April. Zong 4G users also soared from 11.6 million by the end of March 2019 to 12.056 million by end-April. 3G subscribers of the Chinese cellular company increased from 8.764 million in March to 8.779 million in April 2019. Ufone 4G users stood at 1.156 million in the month under review, while its 3G users declined from 7.846 million in March to 7.646 million in April, down by 0.2 million. Improved internet penetration has a positive impact on the economy of any country, said an industry official. Due to increased broadband, Pakistan is moving towards financial inclusion. People in remote areas could not use financial services before, but now they are using banking on mobile, due to which the number of accountholders has reached 53 million, according to the State Bank of Pakistan report of June 2018.

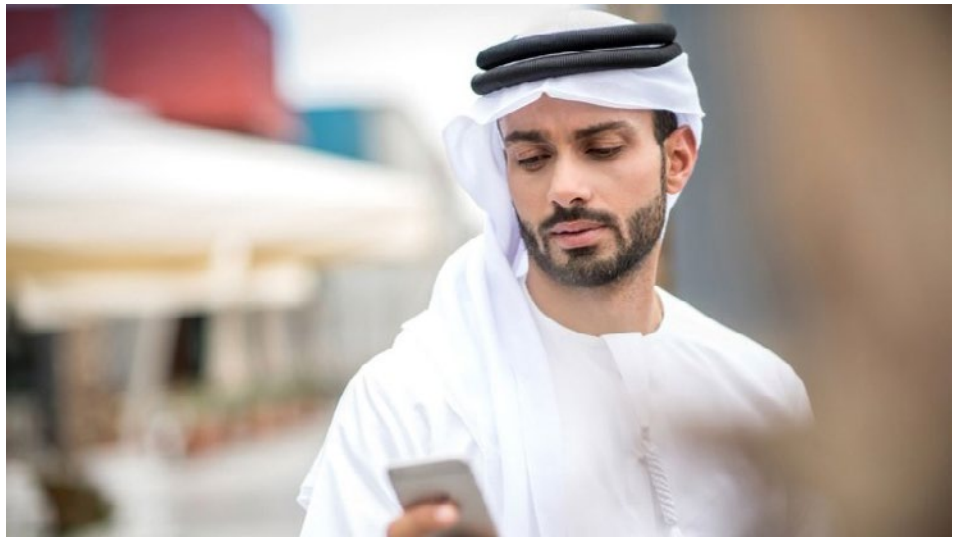


Tunisia Telecom Market Revenues Up 5.2 Percent in Q4

Tunisia's telecom market revenues rose by 5.2 percent year-on-year in the fourth quarter of 2018 to reach TND 730 million, according to the latest figures from regulatory authority INT. The growth was supported by the ongoing strong performance in the fixed data (+25.3%) and mobile data (+14.6%) segments, based on revenues of TND 120.1 million and TND 172.7 million respectively. Mobile telephony still accounts for the largest share of revenues, at TND 338.6 million, and fell by 1.8 percent year-on-year. MVNO Lycamobile showed the strongest growth, more than doubling its revenues on an annual basis to TND 3.2 million. Tunisie Telecom remains the biggest player with revenues of TND 281 million, up 9.1 percent from a year earlier. Ooredoo Tunisia was the only operator to show an annual decline in revenues, down 1.8 percent to TND 253.8 million. The number of active mobile connections rose by 3.1 percent on an annual basis while falling 1.9 percent versus Q3 to reach 14.77 million. Ooredoo was the leading mobile operator with a customer base of 6.012 million, up by nearly 300,000 from the end of 2017, while Tunisie Telecom closed the fourth quarter with 4.590 million connections, up by almost 200,000 over the year. Orange's mobile base stood at 3.966 million, after adding 216,000 lines during the year. Lycamobile saw the number of connections decline to 204,000 from 471,000 a year earlier. The report also shows a steady increase in penetration of fixed and internet services in Tunisia. At the end of 2018, 34.5 percent of households had a fixed data connection, up from 28.0 percent a year earlier, and 43.4 percent subscriber to fixed telephony, versus 37.9 percent at the end of 2017. Mobile data penetration rose to 75.8 percent of the population from 65.2 percent a year earlier, equal to 8.8 million mobile internet users. The data traffic over smartphones and USB modems ncreased to 67,956 TB in Q4 from 50,265 TB a year earlier, equal to annual growth of 35.2 percent. Growth in both mobile data penetration and traffic came to a halt in Q4 compared to Q3 2018.

GCC Mobile Phone Shipments Rise to 6 Million in Q1

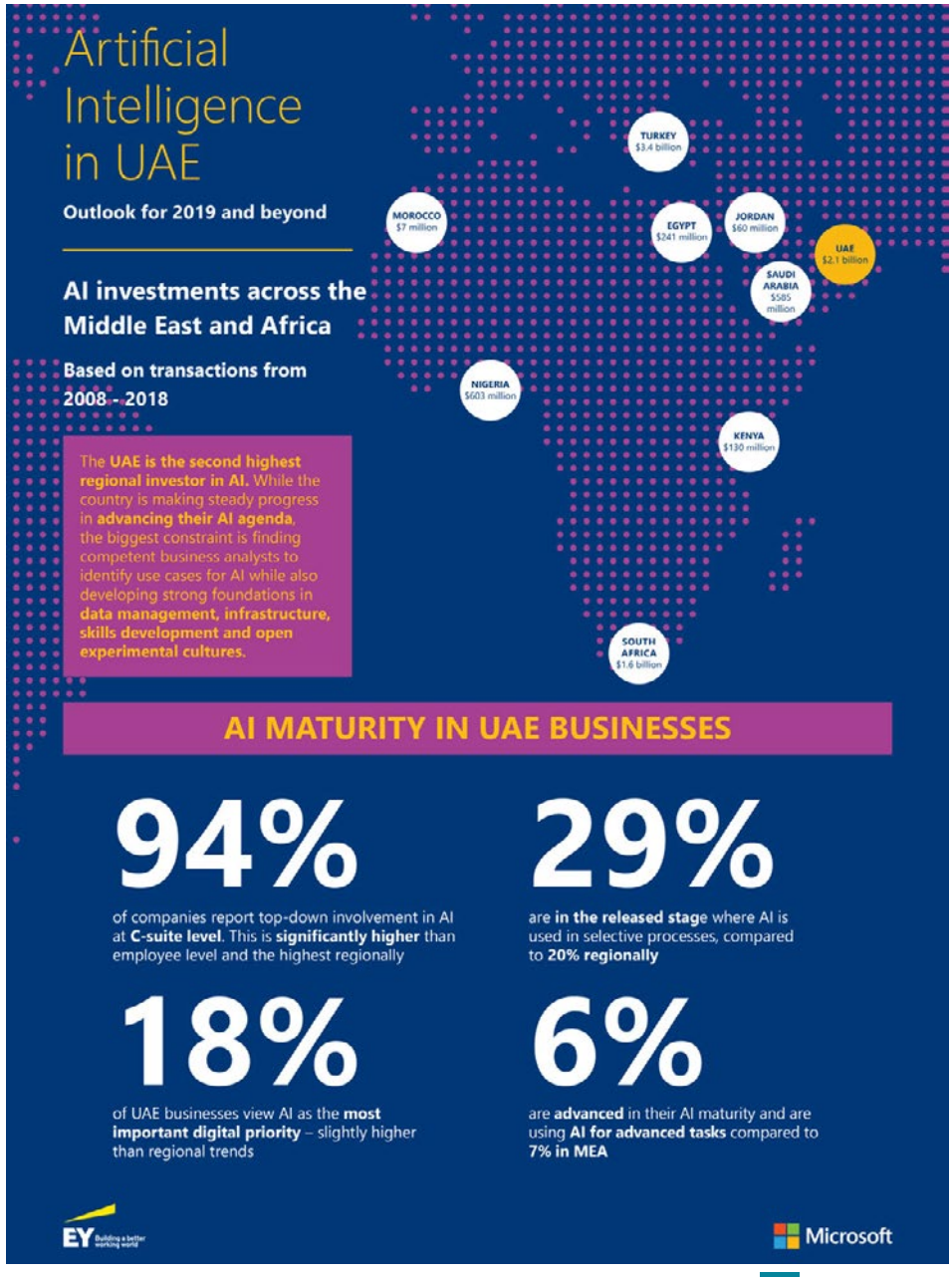
Mobile phone shipments to the Gulf region totalled 6 million units in the first quarter of 2019, up 2.7 percent on the previous quarter and a 1.1 percent increase on the corresponding period of 2018. Latest figures from global technology research and consulting firm, International Data Corporation (IDC), showed that the market's growth was spurred by smartphones, with the feature phone segment continuing its decline. IDC's research revealed that smartphone shipments to the GCC totaled 4.3 million units in Q1, up 10.4 percent quarter on quarter and 5.5 percent annually. Conversely, shipments of feature phones declined 13.1 percent and 8.7 percent respectively to total 1.7 million units for the quarter. "The GCC mobile phone market has faced a number of challenges over the past year, brought about by a combination of unfavorable macroeconomic conditions, changing government policies, and a lengthening of the smartphone refresh cycle," said Akash Balachandran, a senior research analyst at IDC. "However, when viewed against the major declines that characterized much of 2018, the quarterly growth figures for Q1 2019 suggest a degree of stabilization in the market." Balachandran said the GCC's two largest markets, Saudi Arabia and the UAE which together account for around 74 percent of the region's mobile phone shipments,



both posted respectable quarterly growth of 3.6 percent and 1.3 percent respectively. "This was due to strong quarter on quarter growth in the smartphone segment, with shipments increasing 15.1 percent in Saudi Arabia and 10.8 percent in the UAE, spurred by the strong sell in of vendors like Samsung and Huawei," he added. Some of the smaller GCC markets also had mostly positive results in the smartphone segment but Bahrain and Kuwait saw smartphone shipments for the quarter decline. Samsung remained the clear market leader in the GCC smartphone space, with 32.6 percent unit share in Q1 while Huawei continued its steep rise, recording quarterly shipment growth of 16.5 percent to account for 25.9 percent share of the market's smartphone shipments. Apple maintained its third position. "Huawei's strong performance maintains its reign at number two in GCC smartphone market, mirroring its global ranking of smartphone vendors," said Nabila Popal, a senior research manager at IDC. "While IDC does not expect to see any major growth in the GCC mobile phone market in 2019, the performance in Q1 suggests we are now past rock bottom." IDC said it expects overall mobile phone shipments to grow 0.1 percent in 2019, with smartphone shipments increasing 2.6 percent over the same period.

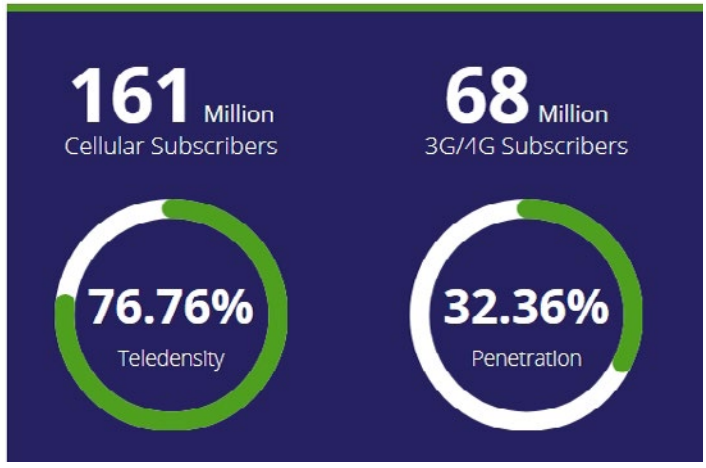
UAE's Investment in AI Reaches US$2.15 Billion

The UAE is the second highest regional investor in Artificial Intelligence (AI) over the past 10 years, investing $2.15 billion in total, according to the AI Maturity Report in the Middle East and Africa (MEA). "The bulk of this investment went towards social media and Internet of Things, IoT, transactions. This was followed by notable spend across a further eight technologies, including smart mobile, gamification, and machine learning," the study commissioned by Microsoft and conducted by Ernst & Young (EY) said, according to state news agency Wam. In fact, respondents ranked machine learning as the most useful AI technology, with primary emphasis placed on decision support solutions. This was followed by smart robotics and text analysis, where customer interactions were the key focus. The new research shows the state of AI within businesses across the UAE is expected to improve dramatically over the next three years, particularly as a growing number of executives look to AI to drive their digital agendas. Already, 18 percent of businesses in the country consider AI their most important digital priority. Much of the UAE's progress in elevating the AI agenda is a direct result of leaders across the country recognizing that the technology is quickly becoming a key differentiator across all sectors and actively pursuing their AI agendas accordingly. In fact, 94 percent of companies in the UAE report involvement in AI at executive management level – the highest percentage of any surveyed country in MEA. "When we examine companies with high AI maturity, it's clear that the technology is driven directly by the CEOs themselves. This high level of involvement typically results in greater investment in AI, broader adoption and a greater number of successful implementations," says Sayed Hashish, regional general manager at Microsoft Gulf. Leadership capability in the UAE is also rated high when compared with other countries in MEA. While 64 percent of respondents believe they have moderate, little or no AI leadership competency, 24 percent of executives in the UAE rated themselves as highly competent, with another 46 percent indicating they are either competent or very competent. The UAE's open culture around AI is another highly positive indicator of the health of the technology within the country. Up 94 percent of UAE companies have 'AI Strategy' as an important topic at C-suite level and a significant 35 percent of companies say AI discussions are filtering down from top management right the way through to non-managerial levels? "Executives across the UAE are already investing significantly in the training and education of their employees. At the same time, businesses are engaging with external parties to promote skills transfer and making a concerted effort to identify relevant use cases for AI," continues Microsoft's Hashish. "The country has made significant progress in elevating its AI agenda over the past three years, and all indicators point to the near future bringing significant improvement in the application of the technology as well." Drawing on multiple sources of data, the AI Maturity Report in the Middle East and Africa determines, why, where and how AI is currently being used in business. The study is based on surveys, interviews and case studies from 101 companies across the Middle East and Africa. Seven major sectors were covered, including Health, Manufacturing and Resources, Financial Services, Professional Services, Retail, ICT and Media, Infrastructure and Transport.



Number of 3G, 4G Users Crosses 68.07 Million in Pakistan

The number of 3G and 4G users in Pakistan reached 68.07 million by end-May 2019, said Pakistan Telecommunication Authority (PTA). Number of mobile phone users in Pakistan reached 161.183 million by end-May compared to 161.01 million by end-April, which registered an increase of 0.173 million during the period under review. Jazz's total count for 3G users stood at 13.192 million by end-May compared to 13.393 million by end-April, which registered a decrease of 0.201 million. Jazz 4G user numbers jumped from 9.618 million by end-April to 10.337 million by end-May. Zong 3G subscribers decreased from 8.779 million by end-April to 8.678 million by end May while the number of 4G users jumped from 12.056 million by end-April to 12.302 million by end-May. The number of 3G users of Telenor network decreased from 8.640 million by end-April to 8.374 million by end-May i.e; Which registered a decline of 0.266 million. The number of 4G users jumped from 6.186 million by end-April to 6.301 million by end-May. Ufone 3G users decreased from 7.646 million by end-April to 7.187 million by end-May, registering a decline of 0.459 million. The number of 4G users of Ufone increased from 1.156 million to 1.694 million during the aforementioned period. Teledensity for cellular mobile increased from 76.67 percent by end-April to 76.76 per cent to end-May and broadband subscribers reached 70.164 million by end-May compared to 69.577 million from end-April. The PTA received 8,452 complaints from telecom consumers against different telecom operators including (cellular operators, PTCL, LDIs, WLL operators and ISPs) as of May 2019. According to the PTA data, Jazz (Mobilink + Warid) leads the chart with 2,525 complaints and Telenor stands at second position as the most complained telecom operator with 1,862 complaints. The PTA said that it was able to get 6,959 complaints resolved i.e; 97.18 percent. The cellular mobile subscribers constitute major part of overall telecom subscriber base; therefore, maximum number of complaints belongs to this segment. Total number of complaints against CMOs by May stood at 7,161. In terms of the segregation of complaints on operator basis, a total of 2,525 complaints were received against Jazz which is 35.26% of the total CMO related complaints. Telenor, which has the second largest number of consumers, was also second with 1,862 complaints ie. 26 percent complaints were received against it. Zong stood third with 1,570 complaints ie. 21.92 percent of total complaints. Ufone had 1,204 complaints against its various services which make up 16.8 percent of the total CMO related complaints. The PTA also received 434 complaints against basic telephony of which 426 were addressed during May 2019. Further 840 complaints were received against ISPs of which 831 were addressed.



Pakistan Post Embraces Digitization to Improve Efficiency

Pakistan Post, in a bid to ensure speedy communication among society for their domestic and business needs, has opted for modern technology and taken revolutionary steps to improve its efficiency and expand its network across the globe. The Pakistan Post has taken inclusive steps to develop better perception of the services among public by making sure timely delivery of mail, money and articles at their doorsteps, said the spokesperson Zakir Ullah while talking to APP. The affordability was also the corner stone of the department's policy due to growing competitiveness in the postal market. Highlighting its projects producing significant results, he said Electronic Money Order (EMO), MobileAPP, E-Commerce Initiatives, and Same Day Delivery services had received good feedback from the public on its portal. To make the lives of people easier, the EMO service known as Post-to-doorstep was initially offering window services only at GPOs. He said the consumers could send up to Rs 50,000 via EMO, adding that a mobile company deducted Rs 2, 500 for the transfer of Rs 25,000 cash while the Pakistan Post was charging only Rs 550 against Rs 50,000 money transaction. Zakir said the Pakistan Post had also launched a mobile application which would allow the customer to track and trace their articles online on their Android mobile devices. It had another feature to take-up all the complaints of the customers to enhance their experience and improve Pakistan Post efficacy via this app. Same Day Delivery, services was initiated initially for 26 cities aimed at facilitating the delivery of packages and documents within a day, the spokesperson said and added that the consignments would also be delivered on the same day if it was booked before the noon. He said the post and National Database and Registration Authority had recently signed an agreement for Renewal/ Modification of CNIC through post offices. The pilot project was launched in 10 POs and soon would be extended to 100 Pos, he added. Another agreement between the both signed for expansion of franchise post offices with NADRA to offer postal and financial services through 15000 NADRA outlets. E-Commerce Initiatives has also launched to capitalize the fast growing e-commerce sector and created its own web portal to register partners. He said 580 online businesses have been registered under Pak-Post umbrella which encouraged on-line businesses.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ARTICLE

Protecting What Matters Most

> *Up until recently, technology has been seen as an enabler of business.*

A way to make organisations more productive, more efficient or easier to buy from, for example. But increasingly organisations are designed for "digital business success", putting technology at their core.

In a world where everybody in the enterprise works and thinks digitally, research from MIT[1] has found that IT units are more important than ever to building the success of the company. They talk about digital savvy leadership in terms of a strategic CIO, digital discipline, customer engagement and operational efficiencies.

But there is one area for me that should be above all of these, and that's security.

With technology at the core of an organisation, security becomes paramount to protect what matters most. Yet a business falls victim to ransomware every 14 seconds[2], down from 40 seconds less than three years ago.

I talk to customers about the importance of security a lot, and there are a few common discussions.

The first is the importance of people. Not just from a training and cultural point of view, making sure that your entire organisation understands the value of security, but also from a skills and attitude point of view. It's an area where we all face a scarcity of skills and resource, which is why almost the half the graduates we've hired this year will be focused on security, because we're hiring for tomorrow.

But your senior leaders are important too. A CISO who is focused on growth and being a 'guide dog', not a 'guard dog', is more likely to create an environment of 'how' instead of 'no'. That will help organisations achieve their business outcomes, but in a secure way.

Another area in the importance of reinvesting savings. In an era when we're all constantly seeking operational efficiencies, we need reinvest those savings into what matters – security.

Chet Patel
Managing Director, Commercial
BT

That doesn't just mean buying more technical solutions, it means seeing it as an opportunity and investing in it.

And thirdly, I talk about risk registers. Not the sexiest of topics. But when it can take businesses six months to spot a data breach[3], security is a rapidly changing landscape that needs to be on your risk register. By having it there, you and your board can make strategic decisions, you can put in place plan to mitigate the risks and it forces the entire board to be aware of the risks – and consider the opportunities.

Security can help your organisation grow whilst protecting the very core of your organisation.

[1] Companies with a digitally savvy IT unit perform better, Woerner and Weill, MIT Sloan Center for Information Systems Research, March 2019
[2] https://cybersecurityventures.com/global-ransomware-damage-costs-predicted-to-exceed-8-billion-in-2018
[3] https://www.zdnet.com/article/businesses-take-over-six-months-to-detect-data-breaches/

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SATELLITE NEWS

European Satellite, Telco Operators Collaborate on 5G Vehicle Trials

One of the largest telcos in the United Kingdom, O2, has partnered with Spanish satellite operator Hispasat, the Universities of Oxford and Glasgow, the European Space Agency (ESA), and a consortium of startup companies for a major project to test satellite and 5G technologies to support connected and autonomous vehicles. The four-year trail program will be called "Project Darwin." Project Darwin will be housed at the Harwell Science and Innovation Campus in Oxfordshire, U.K. The project will begin work next month, with plans to explore key connected vehicle and vehicle-SIM platforms plus AI neural network integration. Hispasat will supply satellite connectivity for the trials. "Project Darwin is an important piece of the connected and autonomous vehicle puzzle," O2 COO Derek McManus said in a statement. "The research taking place at Harwell during the next four years will be vital in the creation of new transport ecosystems for the UK public and the companies that will offer these services," adding that O2 will be activating its 5G network at the Millbrook Testing Ground for self-driving cars in Bedfordshire. Project Darwin is also receiving support from the U.K. Government to launch a partner study to help discover the different elements needed for the larger program. "Autonomous vehicles need robust, high-speed mobile data connections to operate effectively," said U.K. Space Agency Director of Growth Catherine Mealing-Jones. "Building the technology to link them to telecoms satellites will allow you to take your car wherever you want to go, and not just to areas with a strong mobile signal."

Satlink Chooses Hispasat to Provide Maritime Satellite Connectivity Services in Europe and Latin America

Telecommunications company Satlink, which specializes in products and services intended for the maritime sector, has chosen HISPASAT, the Spanish satellite telecommunications operator, to strengthen its satellite connectivity solutions (VSAT) portfolio in Europe and Latin America. This new solutions will be provided through the operator's platforms in Bogotá (Colombia) and Arganda del Rey (Spain). Using Ku band VSAT (Very Small Aperture Terminal, small satellite connection antennas) terminals pointed to HISPASAT's satellites located at 30º West orbital position, merchant vessels, ferries, yachts sand fishing boat companies will be able to enjoy high-capacity connectivity on their ships. This will allow them to offer applications such as Internet access for the crew and passengers, high quality links to receive television, emergency services and telephone solutions, all tailored to the needs of each individual client. For José Antonio Guerra, HISPASAT's Sales Office Manager, "we are very proud to rely on Satlink in order to reinforce our presence in the maritime mobility sphere, one of the fields with the greatest potential for growth in satellite telecommunications in upcoming years, and one where Satlink has a powerful presence". Jean-Paul Geelen, Satlink's Satcom Division Director, added that "with this agreement, Satlink is expanding its service options for the maritime sector where we have acquired a great deal of experience thanks to the applications that are benchmarks in the sector today. HISPASAT's high throughput satellites will be able to offer new connectivity solutions specific for every type of vessel. We hope to achieve the same recognition as we have with the rest of our portfolio". The maritime sector is one of the main drivers for growth in the satellite market in upcoming years for operators and service providers. Satellites are the ideal option to offer connectivity in the maritime sphere where it is impossible to roll out terrestrial infrastructures. The demand for connectivity in this market is expected to grow ten-fold in upcoming years. In fact, it is estimated that the number of antennas on ships will practically double by 2023, from 24,500 today to 45,000 within 4 years. HISPASAT's fleet features optimized coverage in the Ku band to offer efficient, high-quality services available in the Mediterranean, Canary Islands, north-western rim of Africa, the Caribbean, the coast of Chile and other areas in the Pacific.

O2 and European Space Agency to Test Satellite Connectivity for Self-Driving Cars

O2 and the European Space Agency have teamed up to collaborate on a four-year trial program to research new connectivity solutions for connected and autonomous vehicles (CAVs). The initiative, Project Darwin, will test solutions including 5G and satellite communications. Based in the Harwell Science and Innovation Campus in Oxfordshire, 'Project Darwin' will bring together Oxford and Glasgow Universities, Spanish satellite operator Hispasat, start-ups specialized in self-driving mobility solutions and Darwin Innovation Group Oxford, which connects terrestrial and satellite communications. From July 2019, the high-level design and definition phase will begin at Harwell to explore key connected vehicle and Vehicle-SIM platforms as well as AI neural network integration. From 2020, the team plans to showcase the first 'proof of concepts'. Derek McManus, COO at O2 said, "Project Darwin is an important piece of the connected and autonomous vehicle puzzle. The research taking place at Harwell during the next four years will be vital in the creation of new transport ecosystems for the UK public and the companies that will offer these services. "Our approach to this project is part of our wider strategy to collaborate with British businesses, partners and start-ups to unlock the possibilities of 5G for customers and wider UK economy." Catherine Mealing-Jones, Director of Growth, UK Space Agency, explained, "Autonomous vehicles need robust, high-speed mobile data connections to operate effectively. Building the technology to link them to telecoms satellites will allow you to take your car wherever you want to go, and not just to areas with a strong mobile signal." Research last year from O2 found that CAVs are expected to generate unprecedented levels of data – 4Tbytes per hour. Earlier this year, O2 announced that its 5G network would power autonomous vehicle testing at the Millbrook Proving Ground in Bedfordshire.

Tom Choi's Airspace Internet Exchange Launches Saturn Satellite Networks to Build GEO Satellite Platforms

Airspace Internet Exchange Inc. (AirspaceIX) wireless technology company, founded by Thomas Choi, which launched Curvalux, has launched Saturn Satellite Networks Inc. (Saturn), a U.S. Delaware Corporation that is building a space qualified, small, GEO satellite platform named Nationsat. Built entirely in the USA with heritage-based payload and bus components, Nationsat features a full-digital payload and 2.5 kW bus design that enables complete frequency agility and bandwidth channelization for users that demand wide-beam C- and Ku-band capacity as well as an HTS version that provides more than 80 Gbps. Saturn is led by one of the most senior and experienced team of satellite engineers — the top three members of the executive team have more than 100 years of experience and have manufactured over 60 GEO satellites at Boeing, Hughes, Lockheed Martin and Intelsat. The Nationsat satellites are designed to be low cost and highly flexible, enabling users to save over 70 to 80 percent of current market pricing for bent pipe GEO satellites — the company's HTS models will cost less than $1 million per Gbps delivered on-orbit. Tom Choi, the Executive Chairman of AirspaceIX and Saturn, said the company is extremely proud to announce Saturn's Nationsat project. The firm has been quietly working on this since the end of 2017, to deliver the most advanced, flexible and cost optimized, GEO satellite platform in the world. Over 95 percent of satellite capacity users in the world use their satellites for domestic applications and, for the first time ever, the firm has a satellite that has been designed and optimized for these end-users and nations. The company hopes to serve as a vital cog in the global effort to bring affordable, satellite connectivity to the emerging markets of the world and to over 150 nations that have not been able to afford satellites in the past. This will change with the introduction to the market of Nationsat, by Saturn. Vern Smith, the Managing Director of Saturn, added that the company is making history with the most affordable and innovative GEO satellite solutions. The firm has already executed an early development contract with our first customer, valued more than $10 million and recently passed a rigorous Preliminary Design Review (PDR) on the firm's path to delivering the Nationsat systems in 2020.

Hughes JUPITER Provides Connectivity across Indonesia

Hughes Network Systems' JUPITER System platform was selected by five service providers to help bridge the digital divide across Indonesia. The service providers – including Lintasarta, Pasifik Satelit Nusantara (PSN), Teleglobal, and Telkom/TelkomSat – won the tender bids from BAKTI, a division of the Indonesian Ministry of Communications and Information, to deploy 8,000 cellular backhaul and Internet access sites using over 7 Gigahertz (GHz) of satellite capacity across multiple satellites. Each service provider independently chose the JUPITER System as part of its solution to extend cellular services to Indonesians in areas outside the reach of terrestrial (fiber or microwave) networks and to connect government offices and community centers to the internet. "The selection of the JUPITER System by each of the winning service providers is testament to the value of Hughes technology in meeting operator needs for high performing, economical and efficient satellite solutions," said Vaibhav Magow, associate vice president, International Division at Hughes. "The JUPITER System shines as the platform of choice in Indonesia and around the world, with its superior architecture enabling cost-effective satellite broadband to connect the unconnected."

Tom Choi's AirspaceIX Launches Saturn Satellite Networks

Airspace Internet Exchange (AirspaceIX) wireless technology company, founded by Thomas Choi, launched Saturn Satellite Networks (Saturn). Based in Delaware, the company is building the world's first space qualified small Geostationary Orbit (GEO) satellite platform named Nationsat. Built entirely in the U.S.A. with heritage-based payload and bus components, Nationsat features a full-digital payload and 2.5 kW BUS design to help enable complete frequency agility and bandwidth channelization for its users, demanding wide-beam C- and Ku-band capacity as well as a High Throughput Satellite (HTS) version that provides over 80 Gbps. Saturn is led by a team of experienced team of satellite engineers; who have amongst the top three members of the executive team, boasts over 100 years of experience, and have manufactured over 60 GEO satellites at Boeing, Hughes, Lockheed Martin, and Intelsat. The Nationsat satellites are designed to be low cost and highly flexible, enabling users to save over 70 to 80 percent off of current market pricing for bent pipe GEO satellites, and its HTS models will cost less than $1M per Gbps delivered in orbit. Tom Choi, the Executive Chairman of AirspaceIX and Saturn remarked "we're extremely proud to announce Saturn's Nationsat project. We have been quietly working on this since the end of 2017, to deliver the most advanced, flexible and cost optimized, GEO satellite platform in the world. Over 95 percent of satellite capacity users in the world use their satellites for domestic applications and for the first time ever, we have a satellite that has been designed and optimized for these end users and nations. We hope to serve as a vital cog in the global effort to bring affordable, satellite connectivity to the emerging markets of the world and to over 150 nations that have not been able to afford satellites in the past. This will change with the introduction to the market of Nationsat, by Saturn." Jim Simpson, the CEO of Saturn states "it has been very rewarding and an honor, teaming up with Tom and leading this incredibly talented and innovative Saturn team as its Chief Executive Officer. Our unique satellite system and service enables Nations that previously could not afford their own satellite systems, the ability to take advantage of the economics of ownership at a fraction of the cost of a traditional satellite system. Our ability to use a very small satellite platform, that efficiently utilize power, and takes advantage of the theory of the microcosm, with digital payloads, provides a revolutionary approach to delivering in-orbit reconfigurable broadband capacity."

FCC Dismisses Studies of Potential 5G Interference with Satellite Weather Observations

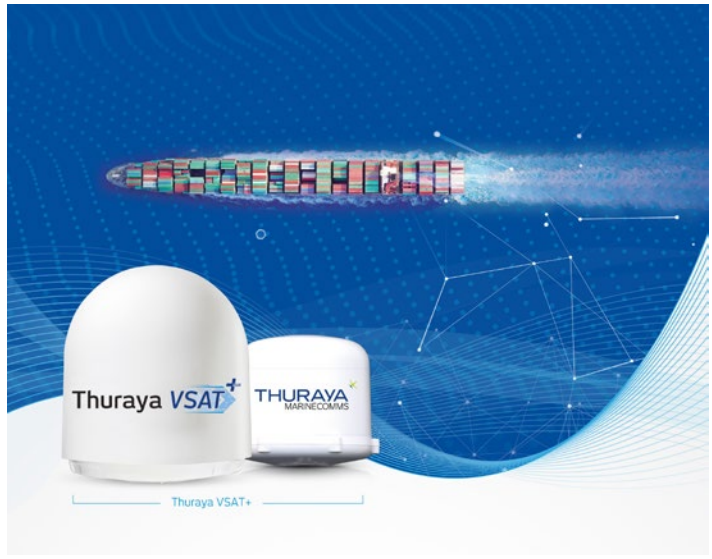
The chairman of the Federal Communications Commission defended the use of spectrum for 5G wireless services while a key senator called for a hearing on potential interference such services could have with space-based weather observations. At a hearing of the Senate Commerce Committee June 12, FCC Chairman Ajit Pai dismissed claims that 5G services operating at the 24 gigahertz band could interfere with weather observations and thus degrade the accuracy of forecasts, saying studies that made those claims were flawed. "Over the last two and a half years we have patiently waited for a validated study to suggest that our proposed limit is inappropriate. We've never gotten such a validated study," he said on one of several occasions during the two-and-a-half-hour hearing when the subject came up. He said the commission did receive a study that made such claims. Once the FCC's staff obtained the source code for the modeling that estimated the potential interference, "the assumptions that clearly underlaid were so flawed as to make the study, in our view at least, meaningless." Pai's comments were the latest salvo that has pitted the FCC against the Department of Commerce and NASA regarding use of the 24 gigahertz band for 5G services. Commerce, which is the parent department of the National Oceanic and Atmospheric Administration, and NASA have argued that allowing use of that band for 5G services could create interference with satellite observations of water vapor used in weather forecasting. Asked about potential interference at the hearing by Sen. John Thune (R-S.D.), former chairman of the committee, Pai referred to "one of our federal partners" who offered that study but only in the last month provided the source code. "In our view, the assumptions that undergird that study are fundamentally flawed," he said. That included not taking into account that 5G services will use beam-forming technologies rather than wider broadcasts to limit potential interference. "We believe, ultimately, that we can have the best of both worlds. We can allocate the 24 gigahertz band for 5G and we can protect those very important passive weather sensors and other functionalities that other agencies and other parts of the government work on," he said. He also said that the debate could affect planning for the upcoming World Radiocommunication Conference this fall. "If the Department of Commerce's position were to prevail, not only would this spectrum be unusable for 5G domestically, but we would also put at risk the U.S. position at the upcoming international conference in October," he said. That would affect the use of the band worldwide. "This is not a road we want to go down." "I'm personally frustrated," he said at one point. "The Department of Commerce has been blocking our efforts at every single turn." The two other Republican commissioners at the hearing, Brendan Carr and Michael O'Rielly, agreed with Pai when polled by the committee's chairman, Sen. Roger Wicker (R-Miss.) about whether 5G services at 24 gigahertz posed any interference issues. The FCC's two Democratic commissioners, Jessica Rosenworcel and Geoffrey Starks, were more noncommittal, instead arguing that the interagency dispute could disrupt ongoing auctions of spectrum. "We have to resolve issues like this before we go to auction," Rosenworcel told Wicker. "I have not been in the meetings where we have gotten to the bottom of just what threshold for out-of-band emissions should apply, but I share your disappointment that we are in this position right now. I don't think it's fair and I don't think it is right." Earlier in the hearing, Sen. Maria Cantwell (D-Wash.), ranking member of the committee, brought up the interference issue. "Peer-reviewed science research has concluded that, without key vapor data that could vanish due to actions on where spectrum has been allocated, this could impact our weather forecasting," she said in her opening remarks. Cantwell also discussed the potential 24 gigahertz interference issue during a May 14 hearing of the committee's space subcommittee, asking NASA Administrator Jim Bridenstine and Kevin O'Connell, director of the Office of Space Commerce, about interference. Bridenstine and Commerce Secretary Wilbur Ross had previously warned about interference in a letter to the FCC in February. "The 24 gigahertz band is critically important for our ability to characterize the amount of water vapor in the atmosphere," Bridenstine said. "There is a risk that, if we do not have access to that spectrum, that our weather forecasting could be degraded. We are working right now with the FCC to work through a solution."

Iran Plans Three Communication Satellites

The government of Iran is looking to improve satellite communications services following the devastating floods which hit parts of the country earlier this year. A report from the Financial Tribune says the Iranian Space Agency is working with government-owned wholesale network operator Telecommunications Infrastructure Company (TIC) to develop three new satellite platforms which will provide coverage of the provinces of Tehran, Isfahan and Hamedan. Satellite communications enabled authorities to maintain contact with affected areas during the recent floods when fixed and mobile networks were out of action.

Thuraya Unveils Their Dual Mode Tracking and Monitoring Solution @ CommunicAsia 2019

Thuraya Telecommunications Company, a subsidiary of the Al Yah Satellite Communications Company (Yahsat), has unveiled their newest smart solutions for the fast growing APAC market at CommunicAsia 2019. The role of mobile satellite communications in shaping a connected future is certainly not minuscule. By combining the power of L-band with the dexterity of GSM and the global reach of Ku, Thuraya provides users unrivaled access to voice, broadband and Machine-to-Machine (M2M) communications on a plethora of platforms and networks – multiplicity, being a key enabler of smart, connected technologies. Providing in-depth coverage across Asia and the Oceania, Thuraya has a two decade old record of fulfilling its commitments to governments, MNOs, energy and maritime corporations. The company is, therefore, well positioned to meet the burgeoning needs of APAC customers. Affirming Thuraya's plans to strengthen its services across the region, CCO Shawkat Ahmed said he foresees exciting times ahead for the company in APAC, which is fully committed to expanding the firm's capabilities, diversifying portfolio offerings and improving Thuraya's relevance in the region, where the company has had a strong foothold since 2001. Asia constitutes a great opportunity and a key area of growth for the firm's partners and the many sectors the company serves. During the past year, Thuraya has signed a number of strategic partnership agreements and are redoubling the focus on this strategic market. At CommunicAsia 2019, the company is on the lookout for new partners and ventures to advance the firm's Maritime, IoT/M2M businesses as well as fuel further interest in the company's award-winning voice solutions.



SpaceX Successfully Launches NASA Satellites

A SpaceX Falcon Heavy rocket carrying 24 satellites as part of the U.S. Department of Defense (DoD) Space Test Program-2 (STP-2) mission launched from Launch Complex 39A, June 25 at NASA's Kennedy Space Center in Florida. Four NASA technology and science payloads that will study non-toxic spacecraft fuel, deep space navigation, "bubbles" in the electrically-charged layers of Earth's upper atmosphere, and radiation protection for satellites are among the two dozen satellites put into orbit. The missions, each with a unique set of objectives, will help aid in smarter spacecraft design and benefit the agency's Moon to Mars exploration plans by providing greater insight into the effects of radiation in space and testing an atomic clock that could change how spacecraft navigate. With launch and deployments complete, the missions will start to power on, communicate with Earth and collect data. They each will operate for about a year, providing enough time to mature the technologies and collect valuable science data. Below is more information about each mission, including notional timelines for key milestones. "This launch was a true partnership across government and industry, and it marked an incredible first for the U.S. Air Force Space and Missile Systems Center," said Jim Reuter, associate administrator for NASA's Space Technology Mission Directorate. "The NASA missions aboard the Falcon Heavy also benefited from strong collaborations with industry, academia, and other government organizations."

Orbit Fab Demonstrates Satellite Refueling Technology on ISS

A startup company that plans to develop tankers for refueling satellites has completed a key test of its technology on the International Space Station. Orbit Fab announced June 18 it completed tests of an experiment called Furphy on the ISS, demonstrating the ability to transfer water between two satellite testbeds. At the end of the tests, the water was transferred into the station's own water supply, the first time a private payload supplied the station with water in that manner. "The Furphy mission has allowed us to test the viability of refueling satellites in orbit," Jeremy Schiel, cofounder and chief marketing officer of Orbit Fab, said in a statement. The tests, he said, were intended to measure the effectiveness of the company's propellant transfer technology in microgravity and its ability to handle issues like sloshing. Orbit Fab announced plans last fall to fly the Furphy experiment to the ISS with the support of the ISS National Laboratory, the organization that operates the portion of the station's capabilities designed as a national lab. "With their recent successful completion of in-orbit water transfer operations aboard the space station, Orbit Fab became the first private company to supply the ISS with water using its own proprietary refueling equipment and processes," Ken Shields, chief operating officer of the ISS National Laboratory, said in a statement. He said that aspect of the test demonstrated "NASA's flexibility and desire to accommodate private sector clients who are utilizing the ISS U.S. National Laboratory as a steppingstone to an industrialized low Earth orbit." The tests on the ISS used water, but the company says the same technology could support a wide range of other propellants. That includes hydrazine, a common propellant for spacecraft thrusters, as well as "green" alternatives and even xenon, used in electric propulsion systems. Part of the company's technology is a new interface for spacecraft refueling called the Rapidly Attachable Fuel Transfer Interface, or RAFTI. Orbit Fab has been working with satellite manufacturers on the development of RAFTI, which is intended to replace existing fill-and-drain valves on satellite fueling systems, allowing them to be fueled on the ground before launch as well as refueled in space. The first RAFTI system will be delivered to an unidentified customer later this month. The company plans to use the technologies tested on the ISS for future in-space tankers to enable refueling of satellites. The company has acknowledged that it is getting ahead of the market, since no satellite refueling systems yet exist and most satellites are not designed to be refuel able in orbit. Orbit Fab argues it is demonstrating that technology to assure the industry that the infrastructure needed for satellite refueling will be ready.

Inmarsat's Type Approval Received by Intellian for Their New Antenna

Intellian has received Inmarsat Type Approval for the new GX100NX antenna, authorizing the antenna's use on the Global Xpress satellite network and for the Inmarsat Fleet Xpress service. Launched in May of 2019, the GX100NX empowers maritime customers with maximized RF performance and 10W high power BUC option to ensure high availability of Ka-band connectivity. The GX100NX is a new addition to Intellian's expanding NX series, a new generation of faster, lighter and stronger antennas delivering high performance on all major satellite networks. The product features a single cable design which, along with new AptusNX software, enables fast installation and maintenance. The focus on streamlining installation delivers cost efficiencies, without compromise on link performance. More savings come from the NX platform's modular design, enabling spare part stocks to be reduced by up to 40%. Further, the GX100NX Below Deck Unit integrates the Antenna Control Unit, GX modem and mediator function for dual antenna configuration in a single box, contributing further to reducing the time and costs of installation and commissioning. The GX100NX will be commercially available in July 2019.

Inmarsat, Hyundai Global Service Develop Maritime Digitalization

Inmarsat signed a business cooperation agreement that allows Hyundai Global Service (HGS) to offer ship owners and managers a digital solution route to maritime digitalization. HGS was established in 2016 by parent group Hyundai Heavy Industries as a digital transformation solutions provider to optimize ship operation and performance. HGS was recognized as an Inmarsat Certified Application Partner (CAP), and will use the Fleet Xpress Dedicated Bandwidth Services to support its digital services for ship-owners. The CAP program aims to allow application and software developers to choose their own route to digital enablement via either a Dedicated Bandwidth Service over Fleet Xpress or FleetBroadband or through a dedicated API that allows access to Fleet Data, Inmarsat's cloud-based Internet of Things (IoT) platform. Stefano Poli, VP, Business Development, Inmarsat Maritime described the agreement with HGS as a significant milestone in the offering being made to third party service providers enabling maritime digitalization. "The Hyundai-Inmarsat agreement is effectively the first of its kind and marks the commercial service introduction of Inmarsat's Fleet Xpress Dedicated Bandwidth Services as part of our portfolio of solutions for Certified Application Providers" he said. "With this new service, HGS is now strengthening its value proposition of applications to monitor and analyze ship performance for existing and new customers"

LinQuest Receives $562 Million Contract from US Air Force SMC

LinQuest Corporation received a $562 million award from the U.S. Air Force Space and Missile Systems Center (SMC) to provide architecting and full life-cycle systems engineering, integration, and solutions support to the military satellite communications enterprise. The portfolio of SMC programs supported by MSEIT includes all satellites, terminals, and networks for worldwide tactical, strategic, and wideband military communications. "We are proud to sustain our nearly 40 year heritage of helping SMC design, develop, deploy, and operate their MILSATCOM portfolio of programs. We are grateful to know that SMC continues to recognize and value our digital engineering tools and subject matter expertise as integral ingredients to their future success," said Tim Dills, LinQuest President and CEO. "MILSATCOM is where LinQuest began and we are honored to be selected for continued mission support. We recognize that SMC 2.0 is where our customer is headed and are prepared and excited to partner with the government as they reinvent how future space systems are designed and acquired to ensure we remain ahead of all threats to the national security space enterprise," said Chris Beres, General Manager, Space Systems Engineering & Integration Group.

Viasat, Arianespace Modify ViaSat-3 Satellite Launch Contract

Viasat and Arianespace modified their original ViaSat-3 satellite launch contract, signed in 2016. Under the new agreement, the two companies agreed to move the ViaSat-3 satellite from an Ariane 5 ECA launch vehicle to the next-generation Ariane 64 (A64) launcher. With this contract, Viasat will become the first commercial customer to commit to launch on the A64. The A64 launcher is expected to maintain launch quality and reliability, but with added mission effectiveness, efficiency, and flexibility. The A64 launch vehicle will feature a modular configuration based on core stages powered by lower and upper liquid propellant modules, which is supplemented by four solid rocket motors. The A64's configuration will also provide added performance to deliver a ViaSat-3 satellite into a high-energy geostationary transfer orbit where it can begin on-orbit operations faster. Dave Ryan, president, Space and Commercial Networks at Viasat commented, "We have a long-standing partnership with Arianespace, and trust their A64 launcher will allow Viasat to meet key business objectives, which include bringing high-speed, high-quality broadband connectivity to end-users, worldwide. The A64 vehicle is a highly competitive launcher, and incorporates key features to ensure a more cost-effective, dependable ViaSat-3 spacecraft launch."

Honeywell to Build Canadian Quantum Encryption Satellite

The Canadian government will launch a new satellite in 2022 to demonstrate the use of quantum technology for protecting commercial and national communication networks. Honeywell has received a 30 million Canadian dollar ($23 million) contract from the Canadian Space Agency for the design and implementation phases of agency's Quantum EncrYption and Science Satellite, or QEYSSat. Under the contract, Honeywell will build, test, deliver, provide training for and commission the QEYSSat satellite, which will create a link between ground and space to transmit encryption keys. The microsatellite is expected to be completed in early 2022. QEYSSat's mission is to test quantum technology with an aim to develop a system to protect both commercial and national communications infrastructure. The Canadian government expects current encryption methods to be rendered obsolete within the next decade because of the exceptional processing power of quantum computers. As quantum computers will be millions of times faster than any conventional computer, they will be able to decipher passwords, personal identification numbers and other current safeguards quickly, putting confidential and personal information at risk, according to Canadian officials. Current quantum encryption technology, OKD, relies on ground fiber-optic cables and is, at this point, limited to a 200- kilometer distance. QEYSSat will seek to demonstrate quantum encryption technology between a satellite and a ground network as a way to overcome the distance limits, according to the Canadian Space Agency. The mission will allow Canadian scientists to study how QKD behaves in space, and potentially lay the groundwork for a network supporting the exchange of quantum keys over long distances. That, in turn, could led to more secure communication infrastructure for the country. Canadian Space Agency spokeswoman Audrey Barbier said the agency is hoping for a launch of the satellite in the first half of 2022. “CSA has not yet awarded a contract for the vehicle that will launch the satellite,” she told SpaceNews. “We expect to award that contract by the end of 2019.” QKD uses photons and the laws of physics to generate private encryption keys between two users. Individual photons will be sent through a laser link from a ground station to the microsatellite, which will use the QKD protocol to establish a key that will be retransmitted to a second ground station. Navdeep Bains, minister of innovation, science and economic development, said in a statement that the QEYSSat mission furthers the Canadian government's data security goals while at the same time as developing new technologies that can play a role in the country's economy.

SpaceX Launches Canadian Radar Satellites

A SpaceX Falcon 9 successfully launched a trio of Canadian synthetic aperture radar (SAR) satellites June 12 that promise higher resolution imagery with shorter revisit times. The Falcon 9 lifted off from Space Launch Complex 4E at Vandenberg Air Force Base. The launch took place on schedule and without any issues despite dense fog that prevented the rocket's liftoff from being seen. The Falcon 9's first stage made a pinpoint landing nearly eight minutes after liftoff at the Landing Zone 4 next to the launch site. The launch was the second for that stage, which launched the company's Crew Dragon spacecraft on an uncrewed test flight called Demo-1 from Florida in March. The rocket's upper stage deployed its payload, the three-satellite Radarsat Constellation Mission (RCM), about an hour after liftoff. The three satellites were released from the upper stage over a span of seven and a half minutes. MDA, the Canadian subsidiary of Maxar Technologies, built the three RCM satellites for the Canadian government. Each satellite weights 1,430 kilograms will be spaced evenly in the same 600-kilometer sun-synchronous orbit. The satellites' C-band radars will be able to produce SAR imagery with resolutions as sharp as three meters. The development of the constellation, rather than a single satellite, is intended to increase revisit times. The system will be able to view 90 percent of the Earth's surface every 24 hours, with enhanced coverage of Arctic regions. The satellites also carry Automated Identification System (AIS) sensors to identify and track ships. The RCM satellites ensure continuity with Radarsat-2, launched in December 2007. That satellite remains in service but is far beyond its seven-year design life, hence the desire by the Canadian government to get RCM in orbit to avoid any data gap. The Canadian government expects to spend $1.2 billion Canadian ($900 million) on RCM, including the construction of the three satellites, their launch and operations over their projected seven-year lifetime. The government owns the full imaging capacity of the RCM constellation, unlike the Radarsat-2 mission where MDA Corp. sold imagery to the Canadian government and other customers.

The Pacific Satellite Connectivity Project In Samoa Is Launched With The Help Of Kacific

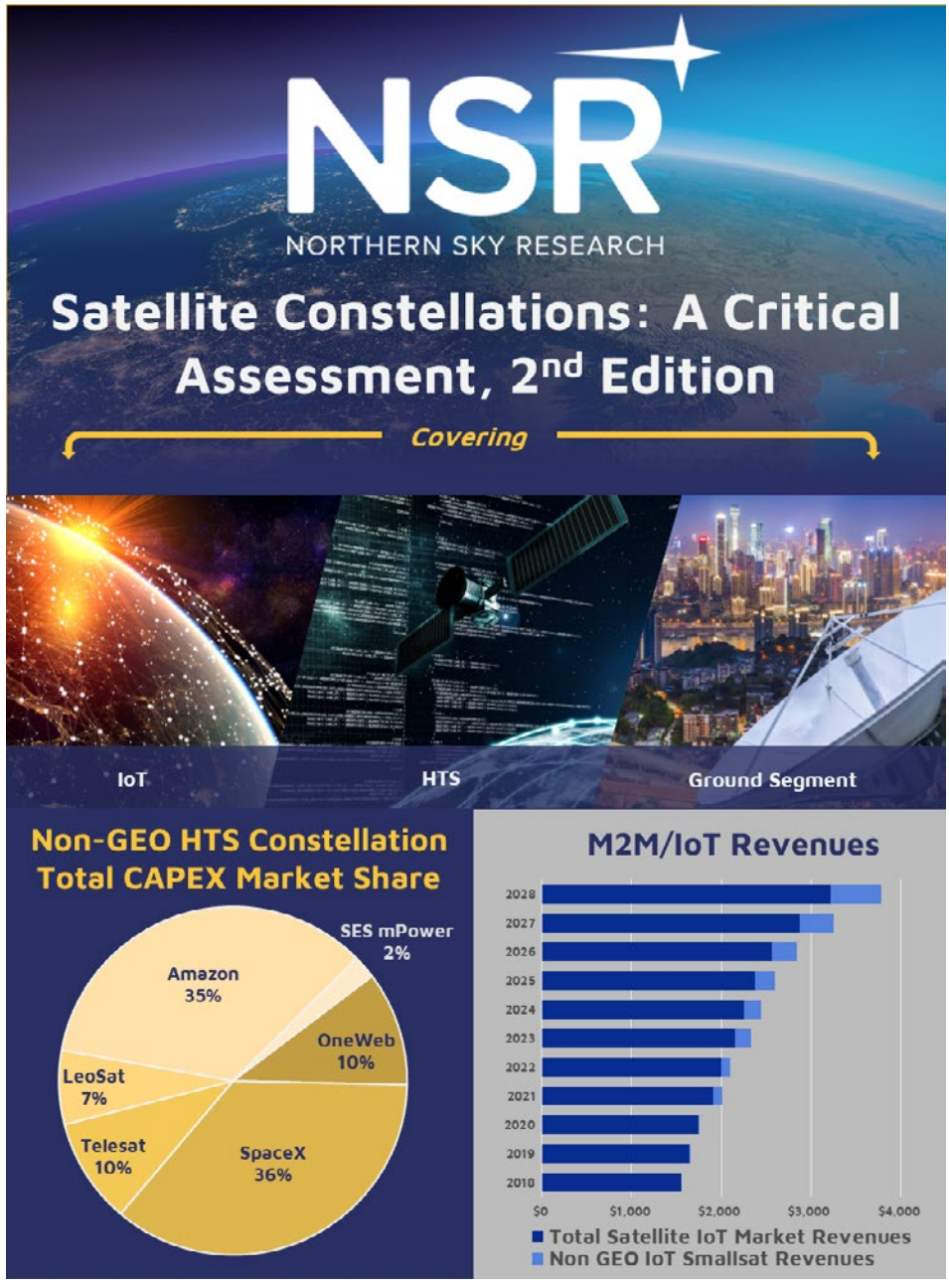
The Samoan Honorable Minister of Communications & Information Technology, Afioga Afamasaga Lepuia'i Rico Tupai, and the Office of the Regulator (OOTR), the Itu o Tane College Staff & Students and the Matautu District, have officially opened the Pacific Satellite Connectivity Project. The students now have the best access to knowledge from around the world and can now access more tutors for online tutorials, materials and assistance anytime and from any location. The Itu o Tane College has two computer labs, one of which is dedicated as a learning center, and the other for classes from Yr 9 to Yr 13 which now has internet access for the first time. This is an opportunity for all villagers at Matautu and neighboring villages to access information when mobile services are down and during and after disasters. The five VSAT satellite dishes are now the new tools to equip them for preparedness and coordinating activities. The project is installed to five (5) sites from Upolu and Savaii, all of them schools, such as Itu o Tane College. The Pacific Satellite Connectivity Project is made possible with the assistance from International Telecommunication Union (ITU) for engineering capacity building and negotiation. The satellite equipment and the internet access was provided by Kacific Broadband Satellite Company (Kacific) and the OOTR will provide technical assistant. All five schools can use the link to access the internet at no charge for a period of 12 months. Before the initial 12 month period of time is over, the Regulator will send a report to ITU and Kacific for their review. Furthermore, OOTR will continue to work with ITU and Kacific to make certain sustainable mechanisms are built into every process so that it is easier for key stakeholders to maintain, with the intention to expand the VSAT operation as the next phase. The project was signed between ITU and the Samoan Government in 2014 as part of the Small Island Developing States meeting, but have only now been realized. The hope is that the teachers and the students will continue to use these opportunities while OOTR continues working with ITU and Kacific for the sustainability of these useful and important projects for Samoa.

Globalstar Receives MSS and Terrestrial Authorizations Across Africa

Globalstar received Mobile Satellite Services (MSS) and terrestrial authorizations in South Africa, Mozambique, Gabon, and Rwanda. These countries join Botswana in representing over 1.1 million square miles of territory, a population greater than 100 million people, annual GDP of over a half a trillion dollars and more than 1.7 billion MHz-POPs of licensed coverage across Africa. In these countries, Globalstar has obtained terrestrial LTE authority over its entire 16.5 MHz of S-band spectrum (2483.5-2500 MHz), most with permissible power limits suitable for both macro and small cell deployments. "Africa is a rich market for our terrestrial and satellite services, and Globalstar is committed to bringing its unique mix of solutions to the continent to meet the communications needs of the next generation of African businesses and consumers," said Jay Monroe, Globalstar's Executive Chairman of the Board. "Satellite and terrestrial-based industrial IoT solutions will be critical to facilitating enhanced communications and data solutions in regions that have not previously had reliable wireless and wireline communications."

NSR Report Assesses Viability for Satellite Constellations Worldwide

NSR's SC2 report provides a complete assessment of key satellite constellations set to disrupt the satcom market in the next decade. Through a bottom-up assessment of non-GEO demand across core applications, matched against the cost, project specifics and launch likelihood for each key constellation, NSR provides its foresight into this critical market. NSR forecasts a mixed outcome for operators planning projects involving satellite fleets. High-throughput constellations come with very high costs for satellite manufacturing and launch, as well as ground infrastructure. However, IoT constellations have a more favorable CAPEX-to-revenues ratio, driven by much cheaper satellites and diversification of demand for M2M/IoT services. "Satellite manufacturing and launch costs are quite a significant hurdle to overcome for constellations, with the added challenge of replenishment, or the cost of a long-term, ongoing system," notes Dallas Kasaboski, Senior Analyst and report co-author. "While mass production of satellites has been shown to significantly reduce cost, supply chain management becomes increasingly more challenging. Then, the trade-off often comes at the price of a more expensive ground network infrastructure." NSR's latest report further examines the development of ground systems for HTS constellations, finding that next-generation terminals are a vital piece of the viability picture. Demand for non-GEO HTS capacity and service is growing in all verticals, but it remains smaller than GEO at least until 2028. "Constellations aim to offer higher throughput, lower latency, and global connectivity. And while the Total Addressable Market (TAM) for these services is substantial, the challenges of competition with terrestrial and 5G services, as well as price-sensitive addressable markets, limit the captured market", adds Shagun Sachdeva, Senior Analyst and report co-author. "However, new players like Amazon show growing interest in integrating terrestrial and satellite businesses, creating new opportunities, competition, and changing market dynamics." As such, NSR expects greater pressure on capacity pricing going forward, with an aggressive industry focus on addressing consumer broadband customers later in the forecast. The case for non-GEO constellations remains challenging, given high CAPEX considerations and long development times. However, interest and investment remain high, with more funding and value chain collaboration shown in recent years. Ground terminals remain a significant challenge, but technology is developing quickly. Bottom Line: Closing the business case will require a thorough assessment of upstream costs and technology development, coupled with vertical-specific expertise to effectively target difficult and hard to reach markets.



Arianespace, ESA Announce New Launch Contract

Arianespace and the European Space Agency (ESA) signed a launch services contract with an Ariane launch vehicle for Jupiter Icy Moons Explorer (JUICE). JUICE is the first large-class mission in ESA's Cosmic Vision 2015-2025 program, and its mission is devoted to completing tour of the Jupiter system. The mission will spend at least three years making detailed observations of the giant gaseous planet Jupiter and in-depth studies of three of its largest moons as well as the potentially ocean-bearing satellites, Ganymede, Europa, and Callisto. The JUICE mission will utilize an Ariane 5 or an Ariane 64 launch vehicle, with the launch period starting in mid-2022 – depending of the final launch slot from the Guiana Space Center, Europe's Spaceport in French Guiana (South America). With the currently-nominal launch window in May 2022 the mission would end in June 2033. Airbus Defense and Space is developing and building the JUICE spacecraft. "Arianespace is honored to be awarded this new scientific mission from ESA, which will advance our understanding of the Universe," Arianespace CEO Stéphane Israël said. "Less than a year after the launch of BepiColombo to Mercury, we have won the launch contract for the JUICE mission to Jupiter's moons, further confirmation of Arianespace's ability to ensure Europe's independent access to space for all types of missions. We are once again marshaling all of our strengths and capabilities to support Europe's spaceborne ventures, with a launch services offering based on Ariane 5 and Ariane 6 so we can deliver the availability and flexibility needed by ESA for its latest emblematic mission."

China Gains New Flexible Launch Capabilities with First Sea Launch

China successfully launched a Long March 11 solid rocket from a sea launch platform Wednesday, bringing its burgeoning space program new, flexible launch capabilities. The Long March 11 solid propellant light launch vehicle lifted off from a mobile launch platform in the Yellow Sea at 12:06 a.m. Eastern, with launch success declared within half an hour. The 20.8-meter-long, 2-meter-diameter and 58-metric-ton four-stage rocket lifted seven satellites into 600-kilometer altitude orbits. The satellites included Bufeng-1A and B, designed by the China Academy of Space Technology to monitor ocean wind fields and improve typhoon monitoring, Xiaoxiang-1-04, a small satellite developed by Changsha-based private firm Spacety, an experimental communications satellite, Tianqi-3, developed by Guodian Gaoke, and two 'Tianxiang' Ka-band communications test satellites for the China Electronic Technology Group. The final payload, the Jilin-1 03A high resolution optical satellite for Changguang Satellite Technology Co. Ltd., a commercial offshoot of the state-owned Changchun Institute of Optics, Fine Mechanics and Physics under the Chinese Academy of Sciences, has a mass of 42 kilograms. The company's first optical satellites, launched in October 2015, had masses of 420 kilograms. The mission was the first sea-based launch globally since multinational spacecraft launch service provider Sea Launch in May 2014. Leena Pivovarova, an analyst at consulting firm Northern Sky Research, told SpaceNews that the move fits into wider developments, with the small launch industry as a whole trending toward offering more flexible launch solutions. "We are seeing several emerging launch actors developing responsive launch capabilities in different ways, such as designing mobile spaceports or remote mission ops centers," Pivovarova said. "For example, players like Virgin Orbit/VoxSpace will not be tied to a specific runway, and will be able to offer launches to any orbit and destination without the traditional launch constraints. The sea launch of Long March 11 will demonstrate a similar mobility factor, specifically being able to hit any orbit without being constrained to a set geographic area." Sea launches also allow low-inclination launches, with the greater rotational speed of the Earth near the equator meaning lower fuel requirements or higher payload capability.

NASA Releases ISS Commercialization Plan

NASA unveiled a multi-pronged effort June 7 to increase commercial use of the International Space Station, from changes in policy to making a docking port available for commercial modules. The plan, announced at an event at the Nasdaq stock exchange in New York, is the latest push by NASA to encourage both increased commercial use of the ISS while building up a supply of commercial facilities that could eventually succeed the station. The initiative announced by NASA features five elements. One is a new commercial use policy for the station that will allow activities ranging from manufacturing to marketing to take place on the station. That includes a pricing schedule for cargo to and from the station and services there. Those activities must fall into one of three categories, said Robyn Gatens, deputy director of the ISS program at NASA Headquarters: a "connection" to NASA's mission, stimulation of the LEO economy or needs to make use of the unique environment of microgravity. NASA will also allow commercial crew providers to transport private astronauts to the station. The agency will allow two such missions per year to the station for no longer than 30 days each. Those astronauts will be charged about $35,000 per day by NASA for use of station resources, like life support, as well as the fees charged by the companies arranging the flights. NASA plans to release a long-awaited solicitation to give companies access to a docking port on the Harmony module of the station to which they could attach a commercial module. That request for proposals, part of NASA's Next Space Technologies for Exploration Partnerships (NextSTEP) program, will be released June 14, and Gatens said NASA expects to select a company by the end of the year. A separate NextSTEP solicitation, to be released on July, will focus on studies of free-flying commercial space stations. NASA had discussed offering that port to companies as far back as 2016, but held off on a formal solicitation until now. Gerstenmaier said the upcoming competition is informed by studies that NASA awarded last year to a dozen companies examining LEO commercialization concepts, and why it was now rolled into this broader initiative. "We thought it was important that, rather than doing this piecemeal, one at a time, it was good to put it all together," he said. "It took us a little bit of time to get that all together." The final two elements of the initiative focus on demand. NASA will seek proposals for studies on commercial uses of the station as well as identification of "real and perceived" barriers to using the station. It also released a forecast of its minimum long-term demand for services and activities in LEO. NASA is encouraging greater commercial use of the station as part of a long-term vision that sees a gradual transition from the ISS to commercial space stations, of which NASA would be one of many customers. That would, in turn, free up NASA resources for its exploration plans, such as returning humans to the moon. NASA, though, has backed away from proposals last year to end direct federal funding of the ISS by 2025. The end of station is less certain now, although there have been efforts in Congress to extend NASA's authorization to operate the station through 2030. The main principle in NASA's eventual transition from the ISS, Gatens said, "is that there will be no gap in human spaceflight in low Earth orbit." With this new initiative, "we're hoping that new capabilities can develop that can one day take over for the space station, and we will begin to do that transition when those capabilities become available." However, Mike Gold, Chairman of the regulatory and policy committee of the NASA Advisory Council, said that the policy alone likely can't address all industry concerns about IP rights, as NASA can't waive the IP rights for other federal government agencies. His committee has raised that issue in their previous work, including at the council's most recent meeting May 31. Gerstenmaier said that NASA will be open to change policies or pricing in response to industry input. "This is the beginning of us actively starting an open dialogue with industry to figure out how we can open up space to commercial activities."

Thuraya to Unveil VSAT+ Service at Europe Event

UAE-based Thuraya, a global satellite operator, will unveil its ground-breaking maritime satellite service VSAT+ in Europe at this year's Nor-Shipping conference and exhibition event in Oslo, Norway. The unveiling comes three months after its commercial launch at the annual Thuraya partner conference in Dubai, UAE. With digitalization now a major driver of change in the maritime sector, Thuraya VSAT+ is the ideal satellite service to help fleet operators increase operational efficiency, gain market advantage and meet growing demand for monitoring and compliance. Thuraya VSAT+ seamlessly integrates the high-bandwidth speeds of Ku-Band and reliability of L-Band with affordable global coverage and high levels of security, resilience and flexibility. As the flagship of Thuraya's progressive maritime vision, it has been designed to help maritime customers achieve their goals and overcome the challenges of today's market. Nadeem Khan, director of Maritime M2M & IoT at Thuraya, said: "As demand for data increases exponentially, satellite communication is the only realistic option for ship-to-shore and inter-ship communication. That is why we designed VSAT+ to offer optimum flexibility and affordability. We believe it can help deliver significant savings for fleet operators – perhaps as much as 20-40% of operating costs through intelligent fleet management." VSAT+ gives Thuraya a unique proposition in the Scandinavian and wider European markets, where it has maintained a strong maritime presence since 2001. The VSAT+ coverage in Europe, and globally, is enabled by the Panasonic global mobility network. Thuraya accesses the network through its partnership with Panasonic subsidiary ITC Global. Europe provides a great opportunity for growth to Thuraya and its partners. As global Master Distributor for VSAT+, IEC Telecom will be central to service delivery in Europe and Scandinavia. Awarded Best Maritime Thuraya Service Partner in 2018, IEC Telecom will offer a range of value-added services and help Thuraya diversify its portfolio in the region. Alf Stian Mauritz, VP - Business Development IEC Telecom Group and managing director of IEC Telecom Norway, said: "Sustainability of the maritime industry is one of the key challenges for Europe. Next year the IMO2020 rules on clean fuel will come into effect imposing dramatic reductions in carbon emissions by 2030.Satcom technologies enable vessel owners to reduce their carbon footprint by optimizing operational efficiency of their fleets. VSAT+ can play an important role in the ongoing transformation of the maritime sector, enabling on board smart applications for remote control and maintenance." Analysis of data from ships and fleet operations can provide insights into where and how efficiencies and savings could be made. Operators who fall behind in the race to gather and utilize their data in this way risk losing data through a single integrated, flexible and affordable service. Data acquisition and the rapid growth of digitalization augment online risk from cyber criminals. However, Thuraya helps users mitigate this threat by offering comprehensive cyber security packages through its VSAT+ partner network.

Antenova Adds a Tiny embedded Antenna for Dual-Band WLAN: Minuta

Antenova Ltd, manufacturer of antennas and RF antenna modules for M2M and the Internet of Things, has added a new, ultra-compact dual-band Wi-Fi antenna to its range of tiny embedded antennas. The antenna, named Minuta, is a ceramic antenna measuring 1.0mm x 0.5mm x 0.5mm making it one of the smallest embedded antennas available today. Antenova has developed this antenna for the newer 4.9-5.9GHz frequency which is less cluttered than 2.4-2.5GHz and gives enhanced performance with less interference. The Minuta antenna, part number SRC2W006, operates at 2.4-2.5GHz and 4.9-5.9GHZ and matches the Wi-Fi 802.11a/h/j/n/p/ac standards. It offers designers some useful flexibility in the layout of a PCB, as it does not need a position on a corner, it can be placed along one of the long edges of a board. The antenna is ideal for access points and portable devices, and in particular Antenova recommends Minuta for wearable technology and body-worn devices because it is less susceptible to de-tune when used close to the human body.

WHOLESALE NEWS

TPG Singapore to Offer Unlimited Data Roaming in Malaysia, Indonesia

Singapore's new fourth cellco TPG says it has signed up close to 200,000 users for its twelve-month free trial, adding that in a bid to retain them, it is offering them free unlimited data when they roam in Malaysia and Indonesia – two of the top travel destinations for Singaporean travelers. Following the public response to its service trial which was launched in December 2018, on 12 March 2019 TPG said it was significantly expanding its free mobile service trial in the city-state, ahead of its full commercial launch. The newcomer's trial plan is promoted as 'completely free for the first twelve months and includes unlimited data, unlimited local mobile-to-mobile calls, 20 local SMS messages and 20 minutes of outgoing calls to local fixed lines each month' The free unlimited data offer will kick in from mid-July, with TPG's users also allowed to make unlimited calls to Singapore mobile numbers while

roaming, with incoming calls/SMS also free.

Safaricom, Ethio Telecom Agree to Apply Equal Voice Termination Rates

Ethiopian incumbent operator Ethio Telecom has reached an agreement with Kenya's Safaricom to apply equal termination tariff rates for voice calls. Ethio Telecom said this follows its request in January to apply equal voice call termination rates among operators in Africa to help spur integration. It said Safaricom agreed to implement the initiative as of 10 June. The agreement allows the two operators to provide affordable interconnect voice tariffs to their customers. The two companies have also discussed how to further implement equal interconnect termination rates with other operators in Africa. The two operators have also discussed how to boost business relations between them. Ethio Telecom and Safaricom have existing partnerships in various areas including international gateway and interconnect.

Lebanon Ministry of Telecom Launches Roaming Service

The Ministry of Telecommunication (MoT) has assigned the Switzerland-based company Wonet, to provide a new Value Added Service (VAS) for Roaming. At $25 per month, Wonet's service will allow Alfa and Touch users to use the Internet abroad, consume data, receive and make phone calls at tariffs to local rates. Wonet is a mobile application that is activated through a chip that can be purchased, using the subscriber's existing phone number. The service will be activated within two weeks, according to the Ministry. The profits from Wonet's service will be equally split between Wonet, the service provider, Alfa and Touch. The two mobile operators will be responsible for marketing the service, and the MoT has approved the allocation of $100,000 for service's marketing campaign. Wonet offers its data services in more than one hundred countries.

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ARTICLE

5G Innovation on Steroids

Manish Vyas
President, Communications, Media & Entertainment Business, and the CEO, Network Services
Tech Mahindra

The pace of innovation has never been this fast, yet it will never be this slow again. To wit: Telephone took 75 years to reach 50 million users, Internet took 4 years to reach the same number and Pokemon Go reached 50 million users in just 19 days.

Welcome to the Digital world.

> *Explosive growth of web scalers, trillion-dollar FANG's market cap, uberization of economy, rise of the OTT, growing mobile video consumption can all be attributed to the continual evolution of networks. 5G is poised to accelerate this even further and deliver innovation on steroids.*

Networks are the heart of accelerating this pace of innovation. Explosive growth of web scalers, trillion-dollar FANG's market cap, uberization of economy, rise of the OTT, growing mobile video consumption can all be attributed to the continual evolution of networks. 5G is poised to accelerate this even further and deliver innovation on steroids.

5G Use Cases

5G will accelerate innovation for a broad set of industry verticals, including Media, Entertainment, Healthcare, Agriculture etc., each with its unique requirements and use-cases. Broadly,5G use-cases are classified into three buckets: eMBB (Enhanced Mobile Broadband), MIoT (Massive IoT) and uRLLC (Ultra-Reliable Low Latency Communication).

Each of these use cases will put different demands on the network:

- eMBB: requires ultra-high bandwidth, low latency to deliver enhanced user experience on mobile devices and to enable new applications like AR/VR.
- MIoT: requires low-bandwidth and even low data rates to connect sensors, but must support extended battery life for sensors, powering Smart Homes, Smart Stadiums, Smart Cities and more.
- uRLLC: requires ultra-reliable, ultra-low latency, high bandwidth to enable new applications like Autonomous Vehicles, Telemedicine, Public Safety and more.

5G Network

5G is changing the network's anatomy. With 5G, network can be arranged into different slices catering to diverse needs of applications and content. One physical infrastructure yet multiple different arrangements. Never before have networks had such flexibility, agility and programmability. To achieve this, three key pillars driving innovation for 5G networks are:

- 5G-AN (Access Networks): which will be virtualized, splitting the real-time and non-real-time functions of Base Stations.
- 5GNR (New Radio) will enable operators to tap into mm Wave spectrum bands to create fat OTA (over the air) pipes to meet ultra-high bandwidth and ultra-low latency requirements and simultaneously rely on lower spectrum bands(<6GHz) for ubiquity and reliability.
- 5GC (Core Network): which will truly be cloud native. 3GPP for the first time has specified'Service Based Architecture 'for the Core Network, built on the principles of Network Function dis-aggregation, containerization, microservices, APIs and more. Furthermore, control and user plane functions are being separated (CUPS) to enable independent scaling and unprecedented programmability. Finally, Edge Computing (MEC) will enable CSPs to dynamically place Network Functions (NF) closer to the end application to address ultra-low latency requirements. MEC will also enable industry verticals to place their own applications closer to the network end point.
- Hyper Automation: which will be mainstream to enable auto-pilot mode of operations for 5G networks. Orchestration, closed-loop-control, AI/ML, RPA (Robotic Process Automation) will all play a key role in dynamically creating different network arrangements that best meet the needs of end applications and use-cases.

5G network will be completely cloud-native, software defined, dis-aggregated delivering unprecedented agility. SDN/NFV will be the bedrock foundation for 5G. Best-of-breed solutions will dominate 5G networks and will enable CSPs to aggressively bend their cost curve. Today's networks connect 5 B people on the planet, ~ 70% of the world's population. We still have to solve for connecting the unconnected 30%. Technologies developed out of 5G will play a key role in solving this.

Like Cloud, 5G will enable industry verticals with new self-service DIY on-demand service models that will allow them to dynamically request network capabilities and resources that best meet the end application needs. With 5G, network can be sliced and differentially priced. Network Slicing automation and assurance will be the new paradigm. New charging models and business models will emerge to comprehensively enable IoT and Digital Transformation. This in turn will necessitate holistic transformation of BSS/OSS systems.

5G – An Innovative Platform

5G is much more than just the network infrastructure. 5G will be an innovation platform that will present unprecedented opportunities and challenges to every industry vertical. Those who prepare well to understand 5G capabilities will greatly benefit by delivering unprecedented experiences to their end costumers, disrupting the marketplace and create strategic differentiation for their business. Others run the risk of being left behind and being disrupted.

For instance, here are some examples of how 5G can potentially transform the Media and Entertainment industry:

- eMBB will deliver ultra-high bandwidth with peak data rate of 10 Gbps and average data rates of 1Gpbs. Consumers will be able to download 4GB HD movie in a matter of seconds. This will disrupt existing content distribution and consumption models.
- New immersive experiences for both content and gaming can be delivered with VR. One minute of VR on average consumes 1 GB data. With 5G data rates real-time, high quality VR experiences can be delivered and monetized.
- Edge Computing will enable content to be brought closer to the consumer's devices, delivering ultra-low latency and much improved customer experience. With MEC, the industry can collaborate with CSPs and deliver a truly differentiated experience to their customers in a secure way.
- New real-time gaming experiences will be unleashed leveraging ultra-high bandwidths, ultra-low latency and with hosting games on the Network Edge (MEC). Customers will indulge in new, immersive gaming experience with very high quality and with imperceptible latency.
- Smart Stadiums will be able to draw crowds back to the stadium by delivering new experiences to their customers. With 5G and MEC, stadiums can cache content locally in their data center and deliver multiple viewing angle video streams to in-stadium game watchers. While broadcasters will stream only one or two angles, in stadium experience will be further enriched and differentiated.
- Stadiums and Broadcasters can monetize outside stadium tailgate parties by delivering immersive VR experience of the game to the party goers.
- Broadcasters will be able to hyper-personalize content and monetize micro-moments with fans who miss the game. While at work, broadcasters can send real-time game highlights (like touchdown, home run etc.) to the fans and can even customize it further based on the fan's preference. Bringing social media, network and AI together the opportunities seem unbound.
- MIoT will enable broadcasters to better manage their crew and equipment. It will give them the unprecedented visibility and flexibility to dynamically deploy crews based on real-time events and even drive cost optimization initiatives for their business.

5G presents unprecedented opportunities for innovation and for developing strategic business differentiation. Only our imagination will be the limiting factor. Programmable networks coupled with Edge Computing facilities and IoT will enable industries to massively transform their business and to deliver rich, immersive experiences to their customers.

Tech Mahindra has geared up to deliver on the promise of 5G. These are exciting times for all of us with so much to transform, so much to collaborate and so much to innovate!

TECHNOLOGY NEWS

KPN and QuTech to Collaborate on Quantum Internet

The Dutch operator and QuTech have signed an agreement to partner on making quantum internet a reality. Telia Carrier offers global connection to 'world's first climate-positive data center'. KPN will provide the infrastructure and locations that QuTech, a collaboration between Delft University of Technology (TU Delft) and Netherlands Organization for Applied Scientific Research (TNO), will use for research and development. The quantum internet is an optically-connected network of small quantum computers. Such a system would enable the exchange of quantum bits between any of the connected quantum processors in order to address problems that have to date been impossible to solve.

Timing is all

This includes high-precision timing as well as secure access to quantum computers in the cloud. Another goal of a quantum internet is to provide virtually unbreakable privacy and to become a foundation of secure communication. Jaya Baloo, CISO and Quantum Ambassador at KPN, said, "Our cooperation on forging the initial links will hopefully lead to a more secure and innovative post-quantum future since the arrival of quantum computers will ultimately render much of today's encryption unsafe. "Improving online safety is a top priority for KPN, and this cooperation paves the way to deliver a new, quantum-based internet."

Joint effort

The partnership comes after an announcement earlier this month that several EU Member States signed a declaration to work together on a space-based and terrestrial infrastructure for quantum communication. Jan Kees de Jager, CFO KPN and Chairman Economic Board Zuid-Holland, commented, "We are very impressed by the world-leading capabilities at TU Delft and TNO in both fundamental and applied quantum technology exploration. KPN is eager to work with QuTech on the road to a quantum-based internet."

Essential step

The ongoing research is focused on a network based on quantum entanglement. It aims to connect multiple Dutch cities in a rudimentary quantum network. "The collaboration with KPN forms an essential step in bringing quantum technology closer to our ultimate dream, namely that anyone in Europe – and ultimately the world - can themselves make use of a quantum internet," said Stephanie Wehner, Roadmap Leader Quantum Internet and Networked Computing at QuTech.

Milestones

In 2015, QuTech passed what is seen as an important milestone towards a rudimentary multi-node quantum internet in The Netherlands: the first "loophole-free Bell test". In a loophole-free Bell test two remote systems – in this case, 1.3 kilometres apart – show correlations "that defy any explanation through classical physics". QuTech also leads the European Quantum Internet Alliance in the EU Flagship on Quantum Technologies.

Mayor of Moscow Announces Plans to Launch 5G Network

During the St Petersburg International Economic Forum, Sergey Sobyanin, the Mayor of Moscow, and Alexey Kornya, CEO of mobile network operator MTS, signed an agreement on cooperation for the purposes of developing communication services and information-telecommunication technologies in the city of Moscow. The agreement envisages pilot projects aimed at developing new digital technologies and communication services in Moscow, including in the fields of virtual and augmented reality, Internet of Things, Smart City, and 5G technologies. For these purposes, the required information-telecommunication infrastructure will be created in the city. The authorized agency responsible for implementing the agreement on behalf of Moscow is the city's Department of Information Technology (DIT). "Moscow is setting itself the task of reducing operator expenditure on creating infrastructure for the commercial launch of 5G by removing administrative barriers," said Eduard Lysenko, Head of DIT. The agreement has been signed in light of the provisions of the state program Digital Economy of the Russian Federation, which calls for the creation of pilot segments of the fifth generation mobile communication networks by the end of 2019 and the commercial launch of 5G by 2022.

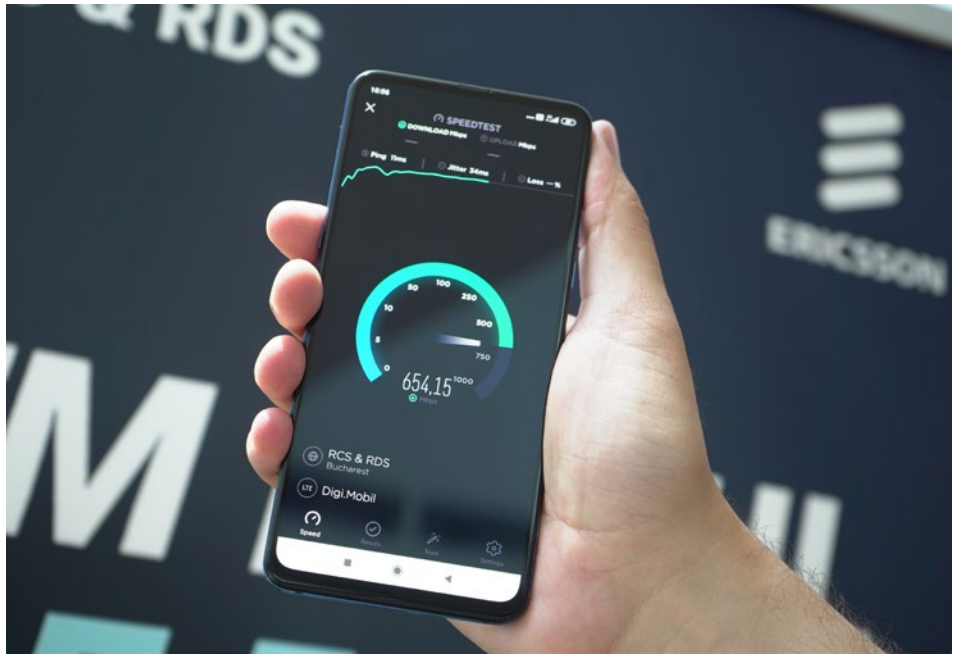
South Korea Hits 1 Million 5G Subscribers in 69 Days

Claims that 5G adoption would outpace early uptake of 4G networks appear to be coming true, at least in South Korea, where the government announced a new milestone today: 1 million 5G subscribers in only 69 days, markedly faster than the 80 days it took to get the country's first 1 million 4G subscribers in 2011. Confirmed by South Korea's Ministry of Science and Technology (via Yonhap), the 5G subscriber number exceeded 1 million on June 10 — following the country's official April 3 launch of commercial 5G services — and has seen an average 17,000 new 5G customers each day. The numbers have notably come despite limited availability of 5G service throughout the country, with many areas experiencing spotty coverage or having no 5G service at all. SK Telecom presently holds a 40% share of the 5G market, with KT and LG Uplus each taking 30%. Of the carriers, LG Uplus appears to be making gains on its rivals, seeing an increase in its total number of subscribers while SK Telecom and KT largely saw customers upgrade from 4G to 5G. The Korean launches have been marred by concerns over potentially illegal subsidization of 5G hardware and services to spike early demand, as regulators have noted suspiciously aggressive promotions that can bring 5G handsets down to low or no cost with service commitments. They may also have been affected in the opposite direction by well-publicized complaints over service quality and availability. Even so, Yonhap suggests that the total South Korean subscriber number is expected to reach between 4 million and 5 million by year's end, particularly if Samsung's Galaxy Fold and Galaxy Note 10 ship with 5G capabilities in the country. Each new hardware release creates a spike in local interest, and marketing of new 5G services such as VR, AR, live sports, and gaming content are also contributing. Carriers outside of South Korea, such as Verizon, AT&T, and Sprint, have not released any subscriber numbers for their 5G networks. Verizon and AT&Tnotably launched their initial 5G networks last year, while Sprint's went online at the end of May, but the actual scope of the larger carriers' 5G services and numbers of home or mobile customers remains ambiguous at best.

Park Jung-ho, CEO of SK Telecom, attends a launching ceremony for its 5G service

RCS&RDS Launches 5G Service in Bucharest

RCS&RDS (DIGI), Romania's fourth largest cellco by subscribers, has announced the launch of its first 5G commercial service, 'Digi Mobil 5G Smart', in the busiest areas of Bucharest. The operator is deploying Ericsson's 3GPP standards-based 5G New Radio (NR) hardware and software on top of its 4G network to enable customers to connect to both 4G and 5G simultaneously. In the coming weeks, the two companies plan to activate more 5G base stations in the capital as well as another five locations in Romania, namely Constanta, Mamaia, Oradea, Cluj-Napoca and Iasi, before extending the service to Sinaia, Busteni, Predeal, Brasov, Poiana Brasov, Timi oara, Craiova and Sibiu in September. The announcement comes a day after Vodafone launched the first commercial 5G service in Romania.mCustomers can now pre-order 5G-compatible handsets on the operator's website. 'As usual, our promise is that we will serve our customers with reliable and affordable mobile data services, including 5G, in selected areas in Bucharest and other big cities of Romania already in 2019,' notes Digi's Vice President Valentin Popoviciu. Although Romania plans to begin the auction for additional spectrum needed for 5G wireless networks in the fourth quarter of 2019, RCS&RDS is able to offer initial 5G services through its current 3.6GHz-3.8GHz rights.



ZTE and Hutchison Drei Austria Provide Austria's First Real, Continuous 5G Network in Linz

ZTE Corporation and the operator Hutchison Drei Austria have partnered to develop and deploy Austria's first operational 5G network, available to selected business clients in Linz. As part of 5G launch, selected business clients of Hutchison Drei Austria have received state-of-the-art ZTE E2E 5G solutions, in order to exclusively test-drive the ultra-fast internet of the future. For the showcase in Linz, ZTE and Hutchison Drei Austria have activated a total of 20 5G sites, creating the first ever continuous 5G coverage throughout an Austrian city. Previous 5G tests in Austria have been conducted using "inhouse"-networks, consisting of one 5G site only.

ZTE and Hutchison Drei Austria are also the first in Austria to implement the latest industrial 5G network standard, facilitating maximum security and connectivity. Hutchinson Drei Austria is aiming for full 5G coverage of the city and other regions throughout Austria. In order to advance the 5G network implementation, Hutchison Drei Austria's CEO Jan Trionow calls for participation: "We would like to invite companies, institutions and municipalities throughout Austria to contact us with project ideas." Due to its stability, high performance and extremely low latency 5G is particularly interesting for large-scale business applications. The technology can further enable whole new fields of businesses and services from virtual reality and self-driving cars to robotic surgery. Moreover, 5G positively impacts the associated network eco-system such as cloud-services. 5G early deployments like the one in Linz are crucial to evaluate the performance of the 5G network and technology in order to guarantee that best-in-class service and utmost speed are achieved once 5G is deployed nationwide.

China Gets Set For 5G

China's Ministry of Industry and Information Technology (MIIT) was tipped to be on the brink of issuing commercial 5G licenses, clearing operators to begin deploying services, Xinhua News Agency reported. The agency quoted MIIT as stating China is ready for a commercial 5G launch, with overseas enterprises including Nokia, Ericsson and Qualcomm deeply involved in the development of the technology. China's government granted licenses to the country's three major operators to conduct 5G trials in 2018, however a commercial launch is yet to be approved. An exact launch date was not announced, but it is expected soon. MIIT reportedly said China owns "more than 30 per cent of standard essential patents for the technology", built through a combination of independent innovation and open cooperation on 5G standards. Launches are expected to provide a major boost to the country's economy and its technology sector. They would be timely as the country's major vendors Huawei and ZTE face scrutiny from the US over security. Ernst & Young predicted China's three major operators will spend almost $5 billion on 5G-related infrastructure in 2019 alone, with their total spend estimated to hit $217 billion between 2020 and 2025. While China's operators were widely expected to deploy commercial 5G services in 2020, launches in the US, South Korea and parts of Europe, including the UK, appear to have spurred regulators to accelerate the schedule.

InterDigital Participates in 5G Slicing and Ultra-High Throughput Demonstrations at EUCNC

InterDigital, Inc. a mobile and video technology research and development company, today announced its involvement in two significant next-generation wireless technology demonstrations at the European Conference on Network and Communications (EUCNC) event this week. The demonstrations highlight specific application use cases for 5G network resource slicing to meet URLLC and eMBB goals, and ultra-high throughput encoder and decoder solutions for various beyond 5G use cases. In the first demonstration, InterDigital will show how the H2020 5G-CORAL architecture – a distributed and virtualized computing hierarchy deployed using dense low-cost fog nodes – can be used to support simultaneous 5G slices for a remote robotic control and actuation application based on adaptive 360-degree video technology. With each element requiring different connectivity performances, one slice is dedicated to the 360-degree adaptive video stream, across three tiers – low, medium and high – of computing nodes, answering the bandwidth requirements specified for eMBB profiles. A second slice is dedicated to the remote robotic control and actuation application in near real-time based on the 360-degree adaptive video stream, answering the latency requirements specified for URLLC profiles. The demonstration also shows how the eMBB and URLLC slices can be automatically provisioned and controlled, using the SDN/NFV-based 5G Mobile Transport and Computing Platform (MTP) developed in the H2020 5G-Public Private Partnership (5G-PPP) 5G-TRANSFORMER project, and specifically for service orchestration and vertical slicing. These are enabled by "Fog05", or Fog Operating System, developed by The Eclipse Foundation, which provides a virtualized infrastructure that distributes computing, storage, control and networking functions closer to the users. In the second demonstration, the EU EPIC consortium, composed of world-leading inventors, academics, and industry members including InterDigital, will highlight its substantial progress in solving the ultra-high throughput encoder and decoder challenges for beyond-5G wireless systems. Solving these challenges represents an important step towards the anticipated data-rate requirements in 6G technology, which is likely to operate in the Terahertz bands and offer Terabits-per-second data rates. The consortium is showcasing a first-in-class 100Gb/s end-to-end length-1024 Polar codes and ultra-high throughput LDPC-CC codes on FPGA platforms. These encoder and decoder forward-error-correction IP solutions represent superior performance trade-offs in terms of power consumption, data rates, and latency, which will be critical for extremely diverse use-cases in beyond-5G systems, such as Ultra-HD virtual reality, immersive applications, and haptic communications. "Great progress has been made towards 5G goals, but the success of our industry relies on constant evolution and collaboration. Whether its driverless cars, or drone delivery systems, we are only just beginning to imagine the possibilities that lie ahead, but it's clear that many of them will have technology requirements that lie beyond 5G," said Alan Carlton, VP R&D, InterDigital. "These demonstrations at EUCNC – and others like them – are critical in showcasing the progress the industry is making, and InterDigital continues to play a key role by contributing wireless technology intellectual property and co-ordination." In November last year, InterDigital and other members of the 5G-CORAL consortium conducted their first 5G trial at Global Mall Nangang Station Store in Taipei, Taiwan. The trial was significant in demonstrating how 5G can effectively work across a modern end-to-end network deployment -- from the cloud down to the extreme network edge -- to advance the next generation of connected services. The trial demonstrated several applications such as augmented reality (AR), virtual reality (VR) and edge cloud robotics delivered in a real-world environment over the 5G-CORAL integrated fog and edge virtualized radio access network solution. The series of demos exhibited how 5G can effectively work across multiple tiers of virtualized and distributed computing.

Turkcell Deploys Software-Defined Networking for Corporate Customers

Working with vendor Versa Networks and systems integrator Odine Solutions, Turkcell has deployed an SD-WAN network core. The move aims to enable Turkcell's corporate customers to benefit from a software-defined and secure infrastructure-as-a-service. Alper Tunga Burak, Managing Partner at Odine Solutions, says that moving to SD-WAN is likely to be "one of the most significant milestones in [an] operators' digital transformation journey". The SD-WAN deployment will allow Turkcell's customers to use the Internet, VPN and security services on a single customer premises equipment (CPE). Multiple connection types like ADSL, fiber, MPLS and cellular can be used simultaneously, and security services such as next-generation firewalls (NG-FW). Turkcell can also provide unified threat management (UTM) on the same single CPE. By aggregating multiple connections, customers experience fast data speeds at low cost using SD-WAN, Odine Solutions says. Gediz Sezgin, CTO at Turkcell, said, "SD-WAN is not only a major step forward in our digitalization journey but more importantly it helps customers lower their costs and simplify their operations through central management while enabling real-time application visibility capabilities." Chris Kenny, VP-Sales, EMEA, Versa Networks said that SD-WAN is now becoming "a mainstream technology."

Three to Launch the UK's Fastest 5G Network In August

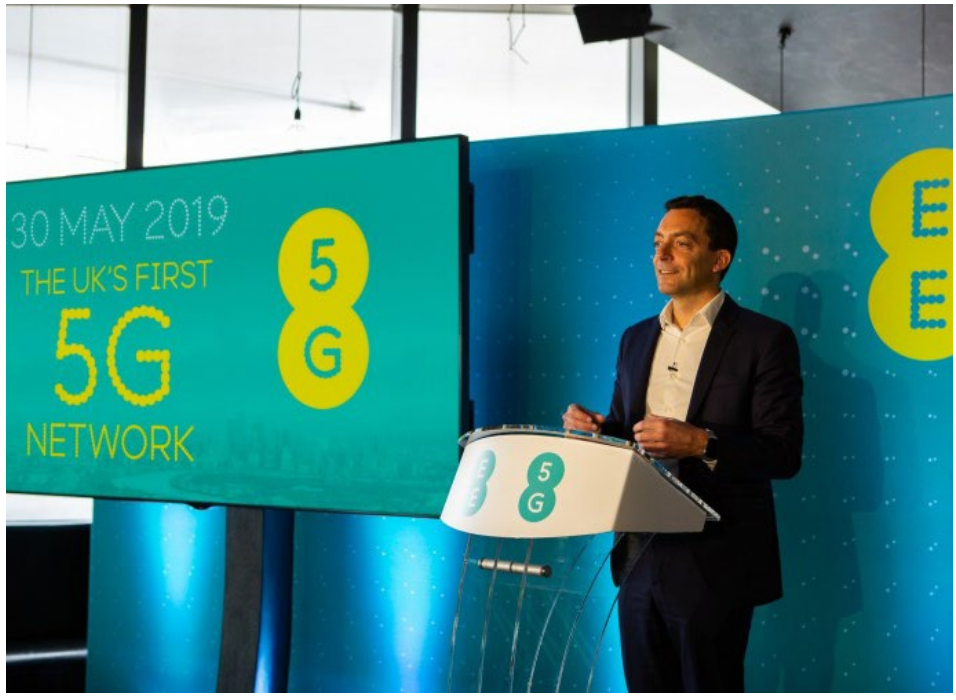
Following successful trials with customers in London, Three UK has today announced it will launch 5G in August with a 5G home broadband service in London. Three will then launch both mobile and home broadband offerings in 25 towns and cities across the UK before the end of the year. Network improvements are being carried out across the busiest areas of the UK, including London, Cardiff, Glasgow, Birmingham, Manchester and Liverpool, as part of Three's £2bn 5G infrastructure investment commitment which includes a new 5G-ready world first cloud core network provided by Nokia. Three has more than twice as much 5G spectrum as its closest competitor, which will deliver significantly faster speeds for its customers. Importantly, Three is the only operator who can offer a 'true' 5G experience which requires 100MHz of 5G spectrum, as set out by the ITU, the global standards body on 5G technology. This market-leading spectrum portfolio, alongside investment in high capacity smart antennas, will deliver the fastest 5G network in the UK. At launch, peak mobile speeds will be at least 2x faster than other mobile network operators and will provide a more reliable connection and experience for customers. This investment will also help Three meet the anticipated future demand for data, with UK consumers expected to use 13 times more mobile data in 2025 than today. Three's mobile customers are particularly data-hungry, already using 3.5x more data per month than the industry average. Three's 5G home broadband customers will also benefit from the simplicity of plugging a hub into the wall to immediately become connected, without lengthy engineer wait times or a long-term contract. This 'plug and play' 5G service is set to offer comparable speeds to fiber, while offering more flexibility and better value for money. Over the next three years, Three's 5G rollout will continue to ramp up to cover 80% of its network traffic. The network investment program also includes upgrades within Three's 4G network, expected to deliver up to 400% improvements in speed and capacity. This will be achieved through deploying more 4G spectrum, converting 3G spectrum to 4G and using advanced antenna technology. Dave Dyson, CEO at Three, said: "It's clear that consumers and businesses want more and more data. We have the UK's best network for data and we have led the market on customer usage on both 3G and 4G technologies. We have worked hard over a long period of time to be able to offer the best end to end 5G experience. 5G is a game changer for Three, and of course I am excited that we will be the only operator in the UK who can offer true 5G." The announcement follows Three's 5G network debuting at London Fashion Week in February, installing the world's first 5G mixed reality catwalk featuring model Lennon Gallagher, and marking the UK's first permanent consumer-facing 5G installation. Three will be announcing more detail around handset range and pricing in July.

China Mobile to Launch 5G by Year-End

China Mobile, the world's largest wireless provider by subscribers, has brought forward plans to launch 5G services commercially, announcing that the service will go live in 50 cities by the end of the year rather than in 2020 as previously stated. RCR Wireless cites the operator as saying that it would deploy over 50,000 5G base stations across the country by the end of the year, whilst in 2020 it aims to expand coverage to every city of prefecture level and above. The operator is also lining up investment of CNY3 billion (USD436 million) for the development of 5G content, giving HD videos and games as examples.

EE Launches 5G in Six Cities

In line with its previously announced plans, British mobile network operator (MNO) EE has launched its 5G network in six cities, namely: London, Birmingham, Cardiff, Manchester, Edinburgh and Belfast. In inaugurating its infrastructure in what it termed the 'busiest parts of the UK, where 5G can really make a difference by providing a more reliable data connection to businesses and consumers', the cellco said it expects customers to experience an increase in speeds of around 100Mbps-150Mbps 'even in the busiest areas'. Further, it has claimed that some customers will be able to achieve speeds in excess of 1Gbps on their 5G-capable handsets. At launch EE is offering access via either smartphone, mobile broadband device or home broadband router for users looking to connect to the 5G network. In addition, it is marketing a range of new 5G plans with 'Swappable Benefits', and all subscribers will receive two Swappables from a choice of five – BT Sport App HD, Gamer's Data Pass, Music Data Pass, EE Video Data Pass, and Roam Further Pass – which they can swap in or out anytime they want. Customers taking the cellco's plan offering a 120GB monthly data allowance, meanwhile, get three Swappables. Looking ahead, the MNO has set out its stall to introduce 5G across the busiest parts of Bristol, Coventry, Glasgow, Hull, Leeds, Leicester, Liverpool, Newcastle, Nottingham and Sheffield this year. Beyond that, in 2020 ten more towns and cities will get 5G sites, namely: Aberdeen, Bournemouth, Brighton, Cambridge, Dundee, Exeter, Ipswich, Norwich, Plymouth and York.

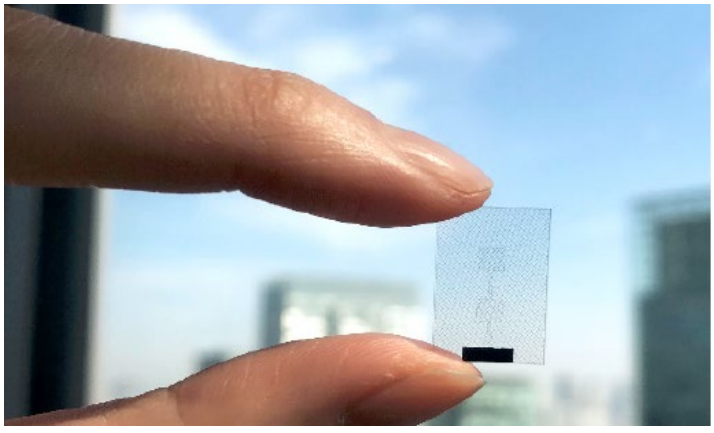


Mobitel Hits Speeds of 1.55Gbps in 5G Tests

Sri Lanka Telecom (SLT) mobile subsidiary Mobitel has completed a series of 5G trials using a commercially available 5G-equipped smartphone, achieving data speeds in excess of 1.55Gbps. The trial, which took place on 7 June and was verified by benchmarking firm Ookla, used Huawei network equipment at 3.6GHz, by dint of trial spectrum allocation from the Telecommunications Regulatory Commission of Sri Lanka (TRCSL). As previously reported by CommsUpdate, in April this year Mobitel revealed it will spend upwards of USD50 million in 2019 to deploy a 5G network and to further develop its existing infrastructure. CEO Nalin Perera was quoted as saying that 5G trials were well underway, noting that towers equipped with the next generation of mobile technologies will provide data transfer speeds ten times higher than those afforded by its current 4G LTE network. In FY 2018 Mobitel's CAPEX reached USD100 million he said, a significant portion of which went to converting 3G base stations to 4G. Indeed, up until end-2018 Mobitel's total investment topped USD600 million over its 25-year history. 'This process is continuing and Mobitel will soon be dropping our 3G network,' he said, adding that despite heavy infrastructure investment and foreign exchange losses last year, the unit was able to post revenue in excess of LKR3.9 billion (USD22.3 million) in FY18. 'This is a 10% year-on-year increase,' he confirmed, noting that while voice revenue is dropping, 'if you analyse our profits, almost 80% has been generated from voice. But this is declining.'

Docomo, AGC and Ericsson Achieve World's First 5G Communication Using Glass Antenna for 28GHz

NTT DOCOMO, INC., AGC Inc. and Ericsson announced today that they have achieved what is believed to be the world's first 5G mobile telecommunications using an antenna embedded in synthetic fused silica glass to transmit and receive 28 GHz 5G radio signals for stable, high-speed mobile communication in buildings, vehicles and trains. The antenna was used to verify 28 GHz 5G mobile communication with downlink speeds averaging 1.3 Gbps within a 100-meter range and reaching a maximum of 3.8 Gbps at 400 MHz. The verification tests, which used a vehicle fitted with multiple antennas and traveling about 30 km/h, were conducted in the Sumida area of Tokyo between April 22 and May 28. Radio signals in the 28 GHz band are more linear than 4G LTE signals, so they are not strong enough to adequately penetrate windows in buildings, vehicles and railway cars. The new glass antenna can be attached to window surfaces to enable radio waves to be received and relayed in ideal directions for stable, high-speed 5G communications under challenging indoor and in-vehicle conditions. Image of 5G glass-embedded antenna 5G glass-embedded antenna Antennas were used in multiple spots on the test vehicle, including the windshield, side windows and rear window, enabling data to be transmitted and received in ideal directions for maximum signal strength. As a result, stable, high-speed communication was achieved even in urban areas where signals were blocked or reflected by obstacles. The 5G glass antenna's small size and transparent appearance allow it to be installed unobtrusively in buildings, vehicles, etc. without impairing the installation object's appearance or design, or people's line of sight. Going forward, DOCOMO, AGC and Ericsson will continue to refine antenna technology to enable the glass antenna to function compatibly with Massive MIMO, a technology that uses multiple antennas to transmit and receive data, aiming to achieve faster 5G communication speeds and expanded 5G use under diverse conditions.



Japan to Green Light 5G Base Stations on 200,000 Traffic Signals

Japan's government will allow NTT Docomo and its three major mobile rivals to set up 5G base stations on traffic signals, hoping to reduce the cost and time it takes to roll out the ultrafast networks by taking advantage of the nation's high density of traffic lights. The roughly 200,000 traffic signals are administered by local governments. Local authorities will be able to use the networks for self-driving vehicle projects and emergency communications in natural disasters. The plan is included in the government's draft IT strategy blueprint, obtained by Nikkei and expected to be approved by the cabinet by mid-June. Tests of 5G equipment on traffic signals are to begin in multiple cities in fiscal 2020, which runs through March 2021, with a goal of completing the nationwide introduction by the end of fiscal 2023. Relevant government bodies -- including the communications ministry, the National Police Agency, the transport ministry and local governments -- are to set up a council to coordinate the initiative. Nationwide fifth-generation coverage is expected to require several hundred thousand base stations. Carriers will continue to use existing 4G stations, but as 5G signals reach shorter distances -- frequencies in the 28 GHz band, for example, have a range of only a few hundred meters -- the country's four carriers will need to find additional locations. The four companies -- also including KDDI, SoftBank Corp. and newcomer Rakuten -- intend to make a combined investment of about 1.6 trillion yen ($14.8 billion) over five years through fiscal 2024. Carriers often set up base stations on rooftops in areas lacking vacant land to build transmission towers. But most of the available space has already been used, an insider at a major carrier said. Negotiating with landlords also takes time and effort. The government sees the traffic signal plan as a workaround that could significantly speed up 5G's arrival, particularly given that Japan has

a higher density of traffic lights than other countries. And it should go a long way to curbing expenses. Docomo invested about 2.4 trillion yen in 4G base stations between fiscal 2010 and fiscal 2018 and had 208,500 stations at the end of that period, equating to more than 10 million yen each. The average cost for 5G stations should be lower, since existing facilities can be made compatible with the new service by just upgrading the software, and piggybacking on traffic lights would slash the outlays required for building new stations. The central government plans to discuss the idea with carriers, looking to have them split the cost of using the traffic signals with local governments. Details including how the expenses will be divided have yet to be determined. Sensors will be installed on the lights to create "trusted mesh networks" -- local networks that can transmit information even if an emergency cuts connections to the broader internet. Carriers, police and local governments would each have their own private mesh networks. Municipalities would be able to use base-station-equipped lights to develop services for residents. In an emergency, for example, people could scan their My Number identification cards at signals to confirm their safety, which would them be communicated to their families.

Japanese Operators Focusing on Partnerships for 5G

Japanese mobile operators are preparing for commercial 5G launches between March and June 2020, with the country's two largest players planning to take a very different approach to deployments in other countries by focusing on cooperation and co-creation rather than higher speeds and lower latency. Speaking at a recent 5G event in Seoul, NTT Docomo chief technology architect Seizo Onoe said given the significant investment required to build the networks, 5G will need something new and its priority is on creating new business models. He called for 5G to be a platform for cross-industry collaboration, which he insists is the key to making the next-generation technology a success. More than 2,600 companies signed up to Docomo's 5G open partner program. Onoe believes 5G will spread in a very different way from previous mobile generations. The operator has a clear 5G plan and is targeting a commercial launch next "spring", but Onoe wouldn't be more specific. Rival KDDI, which plans to start 5G service in March 2020, is also highlighting partnerships as it looks to services, with its focus on co-creating IoT services through collaboration with enterprise partners. It aims to develop a next-generation IoT platform running on its 5G network, Yoichi Iwaki, KDDI's chief strategy officer, said at the same event. Iwaki noted the business proposition is not just about connectivity: "We are gathering data then visualizing, analyzing and forecasting before sending it on". The operator is currently developing an IoT infrastructure with Toyota Motor for connected car services in Japan. He said more than 150 customers are conducting projects at its open innovation lab in Tokyo. KDDI, the second largest operator in Japan, has a long history in IoT services, with the number of connections growing more than 20-times since 2001. It started with home security and auto telematics, with growth accelerating in 2016, he said. The country's four mobile players together earmarked nearly JPY1.7 trillion ($15.7 billion) for 5G rollouts over the next five years. The government allocated spectrum in the 3.7GHz and 28GHz bands in April. SoftBank and newcomer Rakuten Mobile are also targeting launches in 2020, in March and June respectively. The three current incumbents are also working toward launching limited commercial 5G services this year, with pilots due to take place at the Rugby World Cup, which kicks-off in September. The first wave of commercial 5G services for consumers recently came in South Korea, Australia, the US and UK. Japanese launches will be part of the next wave in Asia, likely joined by three of the largest operators in the world. On 6 June, China's Ministry of Industry and Information Technology issued commercial 5G licenses to the country's three major mobile operators and national cable giant China Broadcasting Network. Chinese operators are expected to spend about $150 billion to deploy commercial services sometime in 2020. Meanwhile, Singapore is pushing deployment of the standalone version of 5G from the start, with plans to allocate suitable spectrum in December. Harin Grewal, director of network, technology and resilience at the Infocomm Media Development Authority of Singapore, said he doesn't expect services to be launched in the city state until 2021. He believes the business models and use cases are far from clear. With China operators now holding licenses, there could be growing pressure for operators in Singapore not to get left behind and push the timetable forward. Vietnam, which just started to move to LTE in early 2017, also has ambitious 5G aspirations, as do Globe Telecom and Smart Communications in the Philippines. Perhaps Docomo and KDDI will lay out a clearer path on the business case for those who follow.

Ooredoo Kuwait Joins Rivals in Launching 5G Home Broadband

Ooredoo Kuwait has joined its rivals Zain and Viva in launching a commercial 5G home modem device and associated data plans – matching Zain and Viva's KWD45 (USD148) monthly cost for a 500GB package, plus a KWD65 1TB bundle. Ooredoo is offering a Huawei 5G 'CPE Pro' Router (H112-370) device, claiming download speeds 'up to 2.3Gbps'. The launch follows last month's decision by the country's Communication and Information Technology Regulatory Authority (CITRA) to grant 3.5GHz 5G technology licences. 5G smartphone launches are yet to be announced.

ARTICLE

Middle East 2.0: From Oil to Digital Economy

Today, the Middle East is at an important juncture in its history, as it tries to navigate away from its overdependence on the oil economy, while encouraging new businesses. One of the primary concerns is diminishing oil reservoirs, leading to the question – what comes next?

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In this context, the Middle East can be said to be very lucky, owing to its growing smartphone penetration. According to the GSMA intelligence, UAE tops the region in smartphone penetration with 84.76 %, followed by Kuwait with 73.77%, Qatar with 73.2 % and Saudi Arabia with 70.84%. Middle East's high smartphone penetration combined with its young social media savvy population, make it ripe for digital disruption. This is critical for the future development of the Middle East, as Digital will drive GDP, with Accenture estimating that a 10 % increase in digital density will help adding US $ 13.8 Billion and US $ 7.8 Billion by 2020 to the economies of UAE and Qatar respectively. On the employment front, digital will help the Middle East to maintain current levels of employment by 2020 by creating 75 million new jobs.

Considering the state of digital readiness, the Middle East should have provided fertile grounds, necessary for incubating more digital unicorns. However, Middle East unicorns, like Careem or Souq, are few and far in between. A report by Gartner in 2016 put the number of SMEs that had gone digital at only 15%, with 2% of the retail online. Similarly, the lack of local content was glaringly apparent, with most content procured from outside. The reasons for these abysmal showing have been put down on the high usage

Ramy Moselhy
Vice President & Head of MENA Region
Comviva

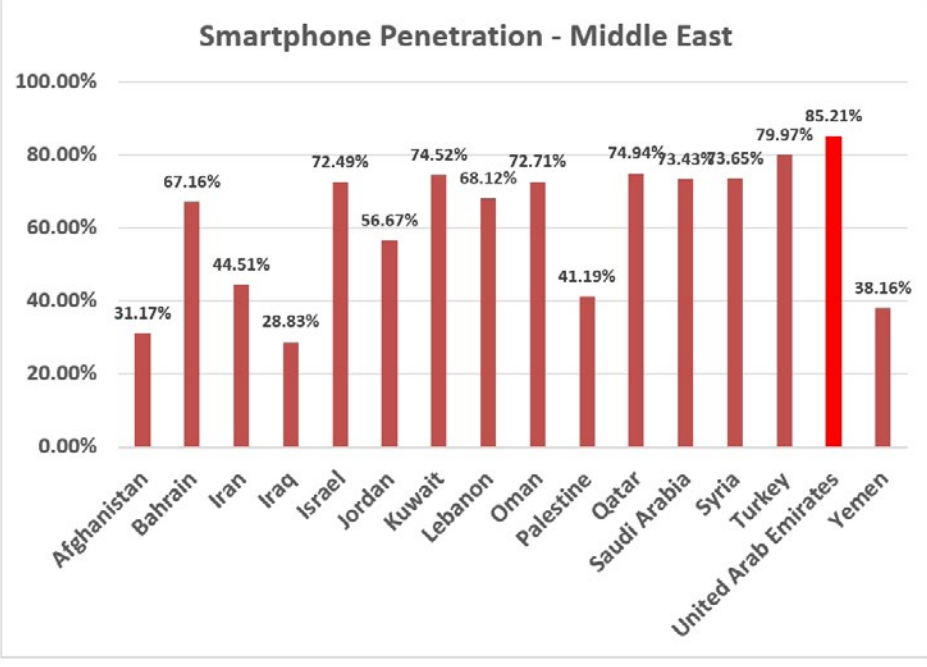
> *The UAE launched a new initiative aimed at training a million Arab youth in programming, considered the language of the future, with the aim to create new opportunities in the field of AI, Big Data, blockchain.*

of cash, lack of skilled programmers and local artists lacking an adequate platform to monetize their content. At a larger level, this is a growing concern for Middle East economies, as they are striving to plug the oil price gap with new digital opportunities in the field of finance, media, healthcare and so on.

It is by no means fair to say that the Middle East has not risen to the challenge, as the GCC countries like the UAE, Saudi Arabia, and Qatar have acted very proactively in laying the roadmap for the new digital ecosystem powering the new economy. Some of these measures are very far reaching. For example, the government of Dubai's Future Accelerator Program measures success with a happiness quotient, with the aim to drive 95 % happiness by 2021. Similarly, digital technologies are at the heart of Dubai's National Innovation strategy and Saudi Arabia's vision 2030. Also, on the privacy front, the Dubai Data initiative provides the best template to drive the shift to an insights base economy, with transformative results in healthcare, environment, education and so on. In the same vein, the UAE launched a new initiative aimed at training a million Arab youth in programming, considered the language of the future, with the aim to create new opportunities in the field of AI, Big Data, blockchain.

In this shifting digital paradigm, Telecom companies, with their assets, network and ubiquity in reach become key players in Middle East's digital transformation. The shift is easily visible from outside, in the form of billions dollar investments in improving networks, building capabilities through new acquisitions and driving agile, start-up thinking. At the same time, the telco incumbents will have to re-invigorate existing systems, with Open API thinking, as well as driving convergent systems for facilitating innovation, like in quadplay, whilst keeping a strict control over costs.

Although the Middle East operators command high ARPUs for now, in time OTT will eat into their profits, which makes it essential for them to explore new business models like platform as a service. By building and curating a robust digital ecosystem through a platform based model, the Middle East operators will be in a better position to drive customer stickiness as well as revenues. Content and payments will become key ingredients in the telecom digital transformation journey, as they will strengthen and facilitate digital interactions.



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In content, telecom should move towards a digital market place, with the aim of bringing the producers and consumers of content on a single platform. Success factors would include platform's ability to ingest content in various formats like AR/VR, 360 degree content, live streaming and distributing seamlessly across customer's channel of choice in the time and place of their choosing. While there are many players in this segment, telcos should choose a player with a deeper understanding of the market and proven expertise in similar deployments. Finally, telecom must invest in robust payment solutions for enabling the digital ecosystem, whether it is carrier billing or mobile money.

REGULATORY NEWS

ICT Sector's Growth in Jordan a Reflection of Policies over Past 20 Years

His Majesty King Abdullah has given the information and communication technology (ICT) sector great care and focus over the past 20 years to help companies and workers grow and develop, Int@j CEO Nidal Bitar said. Bitar highlighted King Abdullah's support to the sector in a recent e-mail sent to The Jordan Times. Since His Majesty's Accession to the Throne, the ICT sector has been granted incentives and exemptions, including a 15 per cent reduction in income tax, and a zero per cent sales tax on exports, according to Bitar. The ICT sector's revenue has jumped from JD210 million in 2003, to more than JD480 million in 2017, Bitar said, adding that the sector's exports also increased in value from JD48 million, to more than JD189 million during the same period. The number of ICT employees and workers also rose from 8,117 in 2003, to 17,672 in 2017. Int@j's CEO stressed that King Abdullah's efforts to increase the number of business incubators and accelerators in the Kingdom also led to Jordan's rise on the Global Entrepreneurship Index. Jordan now ranks 49th on the index and contains more than 25 business incubators, accelerators and creative centers. Last year saw the creation of the Innovative Start-ups and SMEs Fund, as well as the Venture Capital Law, both of which aim to support small enterprises and encourage innovation. Since His Majesty's Accession, a "Financial Culture" course has been integrated into all Jordanian schools. The course aims to encourage students to pursue entrepreneurship. Jordanian corporations have also hoisted flags at various international platforms, including the Mobile World Congress in Shanghai and Barcelona and the San Francisco games development conference. In May, an Int@j statement noted that females now occupy 21 per cent of leadership positions in the ICT sector. The statement added that 27.6 per cent of software developers are female, and women occupy 13.2 per cent and 12.3 per cent of jobs in technical support and network systems respectively. In the mobile applications and gaming sectors, Jordan organized its first app challenge for students in 2008, according to the founder and CEO of Maysalward, Nour Khrais. In an e-mail he sent to The Jordan Times, Khrais said that in early 2011, His Majesty issued directives to set up The App Challenge (TAC) to help prepare young Jordanians to be entrepreneurs and take part in the field. Today, smartphones and app stores not only play a role in entertainment, but also in the medical, engineering and education fields, the CEO said, adding that TAC "gave the Jordanian gaming ecosystem a boost of strength and created hundreds of indie developers and several mobile gaming start-ups that are the biggest contributors of Arabic app content in the region". His Majesty also inaugurated the Jordan Gaming Lab in May 2011, which currently has branches in several governorates and over 8,000 members, Khrais said. He added that the lab offers people state-of-the-art tools and access to major partners like Unity, Sony, Microsoft and others. His Majesty also supported Oasis500, a business accelerator that helps start-ups find funding and support. However, one of the ICT sector's most recent achievements took place at the end of May, when the Crown Prince Foundation, the Ministry of Digital Economy and Entrepreneurship and the UAE's ministry of cabinet affairs and the future launched the "1 Million Jordanian Coders Initiative". The initiative aims to train 1 million young Jordanians in coding and computer programming techniques through free online courses, granting them accredited international certificates and equipping them with skills to enter the labor market.

Vision 2030 Enables Saudi Arabia's Public Sector to Drive Digital Transformation

Digital transformation (DX) will remain a prime objective for the public sector with the entrants of new technologies steering away legacy systems providing value potentials, ease, convenience and improved methods to effectively deal with citizens providing them convenience and transparency of government services. Government DX Summit is Saudi Arabia's most diverse digital transformation conference taking place on 5 - 6 November 2019 in Riyadh, Saudi Arabia. The summit emphasizes on driving digital initiatives to achieve Vision 2030 and beyond. It addresses the significance of the Vision's theme focusing on achieving government operational excellence as a pillar to drive digital transformation. It is set to host some of the most influential government tech and strategic thought leaders, investors and entrepreneurs addressing the digital journey and how achieving operational excellence in the public sector matters to citizen's satisfaction and economic prosperity. Under the leadership of the Saudi Government, Vision 2030 was created to fulfil a roadmap for economic growth and national development. Dr. Adnan Mustafa AlBar, Vice Chairman of the Jeddah Municipality City Council mentions: "With the leadership of the Crown Prince Mohammed Bin Salman who has a clear vision and is driving the whole country's transformation, the Saudi Vision 2030 has effectively open doors to the world promoting the Kingdom as the next big digital powerhouse not just in the Arab and Islamic world, but it has become a global digital identity." Speaking about the conference Dr. Adnan Mustafa AlBar said: "The Government DX Summit is a key event to attend where you will learn and discuss with local and international experts in Government Digital Transformation and how Saudi Arabia is effectively achieving the vision and the NTP plan." Dr. Fatmah Baothman, Doctor of Artificial Intelligence with King Abdulaziz University from the College of Computing and Information Technology highlights: "The adoption of artificial intelligence will bring massive reforms to Saudi Arabia's digital journey to achieve Vision 2030. Over 82% of Saudi businesses will have AI deployed by 2020. We have seen a paradigm shift in the acceptance of AI and RPA since 2017 where over 94% of Saudi businesses did not favor its adoption to the current analysis forecasted for 2020 showing 82% are favoring the adoption of AI and RPA with 95% intending to embrace AI implementation until 2025. AI is no longer a doubt instead it is now the new norm of urgency to embrace it. By 2030, AI will contribute over US$ 320 Billion to the Middle East's GDP with Saudi Arabia to gain over US$ 48 Billion from AI. The public sector will be one of the major achievers with AI adoption and its strategy. The Government DX Summit is the ideal platform to know more about Saudi Arabia's role in transforming into an AI-powered society. There is a global responsibility to develop an AI model for improving the world. We need to define the mission for all humans supported by a vision of technology. This must attend summit will highlight key factors about achieving the Vision 2030 to drive digital transformation across the Kingdom." Bringing his experience to the conference's speaker roster, Eng. Mohammed Mahnashi, Information Technology Advisor at the Ministry of Foreign Affairs Saudi Arabia mentions: "By 2021, the global DX investments are forecasted to reach US$ 5.9 trillion where Saudi Arabia is ambitiously working along the adoption of the National Transformation Program to execute Vision 2030 creating new digital technology investment opportunities. I will be speaking at the Government DX Summit and we will provide a holistic view of the digital technologies that Saudi Arabia will reap benefits from and what are to be invested in the country to prosper into an ironic digital economy. I urge professionals from across the world not to miss this high-profile must attend conference." Saudi Arabia vows to revolutionize their financial systems by using Blockchain to integrate the system across the government entities as per the Vision 2030. "With the Vision 2030 as our key adoption to prosper Saudi Arabia as a rich digital economy in the world, the implementation of a Blockchain strategy is key to ensure an efficient financial services culture across all industries in the Kingdom. Representing the healthcare sector, the adoption of blockchain in the health industry globally is expected to hit US$ 5.61 billion by 2025. Saudi Arabia's healthcare industry will reap massive benefits with blockchain. Saudi Arabia is committed to establish a Blockchain Laboratory by 2020 to bring new ideas and solutions to develop and enhance government procedural services which leads to improving citizen services with blockchain technology. At the conference, we will be discussing about creating a blockchain laboratory and how that will benefit Saudi Arabia in its digital transformation journey." Dr. Mustafa Hasan Qurban, Chief Information Officer at the King Fahd Military Medical Complex (KFMMC) shares his views about the industry and the conference. The summit aspires to bring together over 300 global dignitaries and decision makers to discuss the latest generation of government and smart cities. The conference is an international platform for organizations to discuss and share the new era of organizational transformation, new governance policy and trends by providing strategic understanding initiatives for organizational leadership and operational excellence. The summit hosts a group of world class speakers representing Ministry of Education, Ministry of Civil Service, General Authority for Statistics, Ministry of Communications & Information Technology – Egypt, Ministry of Economic Affairs and Communications – Estonia, Information & eGovernment Authority – Bahrain, Cabinet Office – Government Digital Service - United Kingdom, Secretary State for Justice – Portugal, MonshaatSA, Capital Market Authority, National Housing Company, King Saud University, King Abdulaziz City for Science and Technology and others, bringing diversity and a domain inclusive roster addressing futuristic technologies in government. Commenting on the occasion, Fahd Ali the Director of the Government DX Summit said,"this summit enables our efforts in providing government entities, enterprises, entrepreneurs and

start-ups with a platform to explore endless opportunities and draw inspiration from the several success stories from all over the world, and hence further positioning Saudi Arabia as a world-class innovation hub. We are exceptionally electrified with the response from the public and private sector that recognizes the event as their home to declare their successes and the way forward to deal with digital transformation". From simplifying and automating across government operations; and revolutionizing IT and embracing agile ways of working, the Government DX Summit explores these opportunities and more with over 40+ visionary speakers, visionary keynotes, fireside chats, a cyber tech panel, international case studies, and a host of unique features across the event.

Indian Telecom Minister Proposes Relief Measures But Will Pursue Aircel Spectrum

Indian Communications Minister Ravi Shankar Prasad has proposed a series of relief measures for the telecom sector, but is also pressing for the revocation of bankrupt cellcos spectrum licenses, the Economic Times reports. The minister has suggested reducing the universal service obligation fund (USOF) fee to lower the overall license fee from the current 8% of earnings (split 5% USOF levy, 3% administrative charges) to 6%, as well as lowering the goods and service tax (GST) rate on mobile services from 18% to 12%, although the latter is outside of the remit of the communications ministry. The Department of Telecommunications (DoT) is also pursuing the immediate refund of INR300 billion (USD4.3 billion) blocked or delayed GST credits owed to telcos. At the same time, however, the minister told parliament that the government would seek to revoke the spectrum rights of bankrupt provider Aircel for non-payment of dues. As previously noted by TeleGeography's CommsUpdate, the DoT has argued that Aircel does not own the spectrum and, as such, the frequencies cannot be sold as an asset as part of the company's bankruptcy resolution process. The National Company Law Tribunal (NCLT) has ordered the DoT not to take any 'coercive action' against the telco but the DoT has challenged the order. Aircel is relying on the sale of its spectrum licenses to repay its creditors, and the firm's bankruptcy resolution professional has warned that revoking the airwaves would cause the company to go into liquidation immediately. Reliance Communications (RCOM) may be facing similar treatment, with the minister saying that a legal opinion on its options was being examined.

Antiguan Government Proposes Amendments to Telecoms Bill to Benefit APUA

The Daily Observer writes that, amid an ongoing dispute with Digicel over the reallocation of 850MHz spectrum, the government of Antigua and Barbuda now proposes to make changes to the proposed Telecommunications Bill that will benefit state-owned telco Antigua Public Utilities Authority (APUA). Senior Counsel Anthony Astaphan reportedly confirmed the government's plan to secure protection for the state asset to prevent it from being placed at a disadvantage by foreign companies. 'I agree with the position that there should be some protection because I have noticed coming from the Privy Council in some one of the jurisdictions that they accept that parliament or the government may make decisions to ensure that private enterprises or public enterprises that are locally owned are not wiped out by the competition,' he said, adding: 'So … with the Prime Minister's specific permission, we will spend the next five to seven days looking at to see how best we can reformulate some of the provisions to give some protection to our local asset, which is APUA, and not open it up to the extent that it may or may not be unfairly prejudiced by having to comply with certain things.' It is understood the amendments – which will be subject to parliamentary approval – will allow for the sharing or distribution of the digital space while leaving room for compensation if necessary. Earlier this month, Prime Minister Gaston Browne turned up the heat in the government's ongoing spat with foreign-owned mobile operators over the administration's plan to reallocate spectrum to APUA, putting Digicel Group's local subsidiary on alert by suggesting that his government would not hesitate to buy out competitors to ensure that APUA is not left behind in the local market. After both Digicel and Flow ignored calls to comply with an edict to share spectrum with APUA, Browne claimed that 'No court can tell us to whom we can license our spectrum, our national asset', but the two foreign-owned companies filed litigation against the government and Digicel subsequently secured a court order to prevent the government from seizing or confiscating any of its 850MHz spectrum.

ComReg Consulting On Detailed Plans for Multi-Band Spectrum Award

Irish telecoms regulator, the Commission for Communications Regulation (ComReg), has published both a response to feedback to a consultation it launched last year, which focused on the issue of which spectrum bands should be included in its proposed award of spectrum suitable for the provision of mobile broadband services, and a fresh consultation on its plans in this area. In a June 2018 consultation, the regulator had said its preliminary view was that spectrum in the 700MHz, 2100MHz, 2300MHz and 2600MHz bands should be included in that proposed award. Having accepted feedback on this publication, ComReg has now published both a response to its initial consultation and a new consultation regarding its more in-depth plans. As such, the regulator has now confirmed it does plan to offer spectrum in the four aforementioned bands, with it proposing to award '470MHz of spectrum rights' in total, a figure it claims would mean a 46% increase in the frequencies available for wireless broadband services in Ireland. This spectrum will be made available in a competitive award process which will be open to both existing operators and potential new entrants. Further, in line with European obligations, ComReg has said it will offer the frequencies on a technology- and service-neutral basis. Included among the key aspects of the proposed award are: a proposed duration of 15 years for rights in the 700MHz, 2300MHz and 2600MHz bands, and a duration of 'circa 13 years' for the 2100MHz band; the use of an open competitive award format based on a combinatorial clock auction (CCA); the setting of proposed spectrum fees at 'a conservative level based on a benchmarking methodology'; and the implementation of two sets of spectrum competition caps, one for the sub-1GHz spectrum, and another for total spectrum holdings. Feedback on the regulator's plans is being accepted until 30 July 2019, with ComReg noting that a longer-than-normal consultation period – six weeks versus the standard four required by its consultation procedures – was due to 'the complexity of material contained in the [consultation] document'. Following its receipt and consideration of submissions to the consultation, ComReg has said it will publish a response and a draft decision.

Thailand to Merge State-Owned Operators TOT and CAT

The Thai government plans to merge state-owned operators TOT and CAT Telecom into a single entity called National Telecom (NT). The planned merger would take place in November. National Telecom is expected to begin operations by year-end, Bangkok Post reports, citing the country's Minister of Digital Economy and Society. The merger has already been approved by the State Enterprise Policy Commission (Sepo). According to Pichet Durongkaveroj, Minister of Digital Economy and Society, the merger of TOT and CAT Telecom would boost business efficiency, reduce redundancy of operations and add value to the existing assets of TOT and CAT. "Sepo urged us to put the issue of the merger process to the cabinet for approval, but it will have to wait for a new cabinet", the Minister said. Durongkaveroj said the merger will not affect existing employees of the two companies, and no layoffs are expected from the move. TOT has about 13,000 employees, and CAT employs around 6,000 people. TOT and CAT Telecom will need to combine their existing management structures, which could lead to some chain-of-command complications. The Minister said there would be a new business unit under NT's management structure to capitalize on digital and innovative development, as well as rearrange current management positions. "After the establishment of NT Co, the new entity will not be under TOT or CAT, but be 100 percent held by the Finance Ministry", he said. The DE Ministry has also sent a letter to the National Broadcasting and Telecommunications Commission (NBTC) to clarify whether TOT and CAT can each use their existing spectrum until 2025. The NBTC is expected to take a decision by November. CAT Telecom's board has approved the merger with TOT, and the creation of a "national telecom company" in July 2018. The merger was proposed in April last year, after the DE Ministry suspended the spinoff of TOT and CAT Telecom into two subsidiaries. The DE Ministry has shifted its timeline for splitting the state enterprises into two new companies from last year. Under the initial plan, TOT would have split into a new company called National Broadband Network (NBN), with CAT becoming the Neutral Gateway & Data Centre company (NGDC). However, CAT and TOT labor unions filed a suit in the Central Administrative Court against the procedure, claiming it would damage state assets in the future. Thus the DE Ministry suspended the transfer process of TOT and CAT to NGN and NGDC.

Telenor Norway Mulls Appeal as NOK 788 Mln Competition Fine is Upheld

Telenor said that the Competition Complaint Board has upheld the Competition Authority's decision to impose an administrative fine of NOK 788 million on the operator for creating barriers to the creation of a third mobile network in Norway. Telenor had submitted an appeal against the fine in December 2018. CEO Petter-Bore Furberg said the Complaint Board decision had not been unanimous and Telenor has three months to appeal. The Competition Authority said that the pricing model in Telenor's wholesale agreement restricted competition in the Norwegian market from 2010-2014. Telenor's view is that its agreement with Network Norway neither limited competition nor hindered the development of a third network, and the price model was legal. Telenor says one of three members of the Competition Complaint Board agrees it in this regard. The operator has three months to issue a writ of summons before the Gulating Court of Appeal and it will now thoroughly review the Competition Complaint Board's decision, said Furberg.

Nkom Consulting on Plans for Allocating 5G-Suitable Spectrum

China's State Council has set out new targets for fixed and mobile internet services, continuing the government's efforts to reduce prices and increase access speeds, Xinhua reports. The decision was made at the State Council's executive meeting chaired by Premier Li Keqiang and noted that, as required by the Central Economic Work Conference and the Government Work Report, efforts must be intensified to make the country's internet services faster and cheaper. This would achieve 'multiplying effects' of increasing domestic demand, whilst also boosting investment and employment and improving the lives of Chinese citizens. The specific targets set at the meeting include rolling out gigabit broadband services to 300 cities – gigabit broadband is currently being piloted in around 100 cities, the paper cited regulator the Ministry of Industry and Information Technology (MIIT) as saying – and improving fiber-to-the-home (FTTH) coverage as a percentage of all broadband ports to 90%. In addition, broadband networks should cover 97% of primary and middle schools nationwide by the end of the year. Meanwhile, the government is aiming to reduce the average broadband service rate for SMEs by 15%, the average price for mobile data by 20% and the roaming charges for data traffic between the mainland and Hong Kong and Macao by 30%. In a bid to improve competition, the government has also ordered operators to implement mobile number portability (MNP) by the end of November 2019. As noted by TeleGeography's GlobalComms Database, China has dabbled with the idea of introducing MNP for more than a decade but has been reluctant to mandate its rollout, citing substantial technological barriers and questioning the level of user demand for the service. Commenting on the plans, the Premier was quoted as saying: 'Industrial internet, education and medical care are our priorities in upgrading internet services in order to boost industrial development, improve access to quality medical resources and promote fairness in education … There is huge consumer demand for internet services in our country. We must encourage fair competition, and ensure that our measures to lower internet service charges are fully delivered as they are an important part of our efforts in improving people's lives.'

FCC Chairman Keen to Free Up 2.5GHz Band for 5G

Federal Communications Commission (FCC) Chairman Ajit Pai has unveiled plans to open up access to unused spectrum in the 2.5GHz band, which is currently reserved for Educational Broadband Service (EBS) use. The band is understood to comprise 114MHz of spectrum, which has been earmarked for educational TV use since 1995, but remains unused in many rural areas. According to Pai, the item will be put up for vote at the FCC's open meeting on 10 July. A blog post written by Pai explains: 'I'm circulating an order to open up the 2.5GHz band for 5G. This is the single largest band of contiguous spectrum below 3GHz. But much of this public resource has been unused for decades. That's partly because the technology that policymakers conceived many years ago for this band hasn't materialized as some thought, and partly because arcane rules hampered providers from putting the spectrum to its highest-valued use. At long last, we're going to put more of this critical mid-band spectrum to work for the American people.'

Tajikistan's Tcell Awarded 5G License

Tajik mobile operator Tcell, owned by Aga Khan Fund for Economic Development (AKFED), has announced that it is the first cellco in the country to receive a commercial 5G license, also claiming that it will 'launch the first 5G network in Central Asia'. A company press release lacked details such as 5G spectrum band(s) allocated or launch timeframe, however. The release highlighted how 'the introduction of 5G technology will allow Tcell to create a new technological basis for Tajik society', supporting 'government e-services, smart cities and innovative entrepreneurs', adding that 'for the full implementation and development of … 5G services, Tcell has to do a lot of work and make considerable investments to prepare the existing platform. Tcell has already started this investment.' The release went on to say: 'For 5G, it is necessary to identify new frequencies that will provide a higher speed and a denser coverage. Also, an infrastructure update is needed: 5G will work in parallel with 4G and 3G, and smartphones will switch between networks. This is a very large amount of work and a bold move, but 5G is not far off, and Tcell expects very soon to please subscribers, all Tajik people and guests of the country with the amazing possibilities of this technological breakthrough.'

DoT Asks Regulator to Reconsider Spectrum Recommendations

The Digital Communications Commission (DCC) – the highest decision-making body at the Department of Telecommunications (DoT) – will ask the sector regulator to reconsider all of its recommendations for the upcoming spectrum auction, the Economic Times reports. The Telecom Regulatory Authority of India (TRAI) will be asked to review its recommendations, with the DCC asking it to take into consideration the consolidation of the sector and spectrum coming up for renewal in 2021. A senior DoT official was quoted as saying: 'We will ask them to review the entire architecture of auctions, so they will look at reserve prices, participation, possibility of greater competition, and Digital India and policy objectives.' The DCC acknowledged the comparatively low turnout at recent auctions – only around 40% of the frequencies auctioned in October 2016 were sold – and suggested that greater levels of competition might lead to higher government earnings from the airwaves. Despite the government's high hopes for the tender, participation is expected to be limited. Over the last three years the number of players in the market has narrowed sharply, due in part to the high prices set at previous spectrum auctions, in combination with a fierce price war. Of the surviving seven operators, two are in the process of exiting the market and two more are state-owned and have sought to receive spectrum allocations through an administrative process rather than bidding at auction. Of the remaining three, Reliance Jio Infocomm (Jio), Bharti Airtel and Vodafone Idea, only Jio has expressed any enthusiasm for the sale. As previously reported by CommsUpdate, the government hopes to launch the mega auction – which will include frequencies in the 700MHz, 800MHz, 1800MHz, 2300MHz, 2500MHz and 3400MHz-3600MHz ranges – by the end of the calendar year.

GTA Scoops Five Licenses in FCC 24GHz Auction

Guam-based GTA has won five millimeter wave (mmWave) licenses in the 24GHz band, the Federal Communications Commission (FCC) has confirmed. Bidding as TeleGuam, the telco – which has been majority owned by Utah-based Huntsman Family Investments (HFI) since July 2017 – has agreed to pay a total of USD470,000 for the concessions. Meanwhile, local rival DOCOMO Pacific ended the FCC's Auction 102 sale process empty-handed, FCC documentation confirms. As far as TeleGeography has been able to ascertain, no other telco's representing Guam or the Northern Mariana Islands successfully bid on spectrum in Auction 101 (28GHz) or Auction 101, although the real identities of a number of bidders were obscured by holding companies during the bidding phase, meaning another party may have secured spectrum.

ITU's Annual Governing Meeting Kicked Off with State of The Union Speech

At the start of the annual ITU Council in Geneva, Switzerland today, Fabio Bigi of Italy was confirmed as Council Chair to take the reins of the member-led governing body that ensures that ITU's activities, policies and strategies fully respond to today's rapidly changing telecommunications environment. "I count on your spirit of international cooperation to reach commonly agreed solutions for continuous progress in worldwide solutions," said Mr. Bigi. At the opening of Council 2019, ITU Secretary-General Houlin Zhao presented a State of the Union address, during which he outlined some of the key roles ITU plays — and the increasing importance of information and communication technologies (ICTs) in today's digital economy. "What's at stake is our ability to leverage technology to tackle some of the most important issues of our time," said Mr Zhao. "In turn, this requires that our Union be efficient, transparent, open and accountable. And that starts with using ITU's resources efficiently."

State of the Union

The Secretary-General outlined some of the results of the recent ITU Plenipotentiary Conference 2018 (PP-18) — ITU's supreme decision-making meeting where its 193 Member States agree on the Union's overall strategic and financial plans, leadership and direction for the next 4 years. "PP-18 also gave us a new Strategic Plan that asserts ITU's role in facilitating progress towards the implementation of the United Nations 2030 Agenda for Sustainable Development, sets bold and ambitious targets of the Union for the next four years based on five strategic goals – growth, inclusiveness, sustainability, innovation, and partnership – as well as a vision and mission," said Mr. Zhao. "These goals are at the center of our work."

A modern ITU

"Across ITU, we are modernizing how we work to better serve the needs of our Members," said Mr Zhao. "Efforts are being made to streamline and digitize internal processes. We've already centralized finance and administrative tasks. And we will continue to do more. We will do our best to meet your expectations and more – and make ITU a model among UN agencies." Mr. Zhao highlighted ITU's expanding membership, which comprises 193 governments as well as some 900 private sector companies, universities, and other international and regional organizations – a unique and distinctive feature of ITU as a specialized UN agency. "A modern ITU is an ITU that attracts members who reflect the rapidly changing nature of today's digital economy," he said. "I'm pleased that the ITU family is growing and becoming ever more diverse, with both large and small companies active in all sectors of the economy – from energy and cybersecurity to automotive and shipping and logistics." He mentioned that these efforts to modernize have also led ITU to accelerate work on cutting-edge, transformative technologies. "A modern ITU is also an ITU that serves as a leading global platform for transformative technologies ranging from the Internet of Things and smart cities to AI and 5G, and looks to the future with confidence."

Focusing more on development

Mr. Zhao also highlighted ITU's role in leveraging ICTs to speed progress on the UN's Sustainable Development Goals. "Although the role of ITU as the lead UN specialized agency for ICTs has been widely recognized, our role and potential as an ICT development agency is still overlooked," said Zhao. "We have to change the perception of our Union as being more than just a technical agency. We have to show what ITU can do for development, and to strengthen our role in this area. With ICTs being so critically important for development and the implementation of the SDGs, I count on your support and cooperation in this effort." For instance, Mr. Zhao highlighted recent efforts to bring together ICT Ministers from across Africa to ITU to develop a common strategic framework for Africa-wide digital priorities and initiatives — a framework that "could help overcome the hurdles to investment that can often stifle progress."

Welcoming new elected officials

Mr Zhao also took a moment to recognize Doreen Bogdan-Martin's historic election as Director of the Telecommunication Development Bureau. "For the first time in our Union's history, a woman sits on the ITU Management team," said Mr Zhao. "It was long overdue and more progress needs to be made on the gender issue in ITU. I take this opportunity to encourage you to nominate more women in your delegations to ITU meetings and to leadership positions. I will continue to track gender balance in delegations and report on our progress in strengthening gender equality both in ITU and in our industry." He also recognized Mario Maniewicz as the new Director of ITU's Radiocommunication Bureau in an important year as the quadrennial World Radiocommunication Conference approaches this autumn.

'A new cycle begins'

"A new cycle begins: a four-year period that will drive the growth of our Union and technology into the third decade of this century. … As the new decade opens, information and communication technologies are transforming the world we live in. And our Union is at the forefront of this digital revolution," said Zhao. "May we continue to work together to build a stronger, more open, more transparent and more efficient ITU – a people-centered, service-oriented and results-based organization that will increasingly have a profound and positive impact on the lives of people across the world."

Ethiopian Parliament to Approve Telecoms Liberalization Law

Ethiopia's parliament will approve a law covering the liberalization of the telecommunications sector, a parliament spokesman said, opening up one of Africa's last remaining state-controlled telecoms markets. Prime Minister Abiy Ahmed, Africa's youngest leader, pledged economic reforms shortly after he took office in April 2018 aged 41. The Parliament will discuss comments on the draft telecom law made by the standing committees for Human Resources and Technology, as well as Trade and Industry. After that MPs will approve the proclamation, parliament's communications Director Qusquam Mamo said. The law establishes an independent communications regulator accountable to the prime minister and will be responsible for promoting a competitive market, draft legislation seen by Reuters showed. International telecommunications firms have shown interest in entering Africa's second most populous nation and one of the few telecoms sectors on the continent still protected by a state monopoly. Telecoms executives have told Reuters that they are satisfied with the draft law which was circulated in December and the power it ascribes to the regulator. There is no indication as to whether the government will sell a minority stake in state monopoly Ethio Telecom or open the sector up to competition through the granting of licenses to multiple operators. Ethiopia has a population of more than 100 million and Ethio Telecom boasts over 60 million mobile subscribers. Companies that have expressed interest since Abiy's pledge to transform Ethiopia's tightly state-controlled economy by opening up strategic sectors include France's Orange, MTN of South Africa, Britain's Vodafone Group, the UAE's Etisalat and Zain of Kuwait.

FCC Issues 5G Spectrum Warning

Members of the US Federal Communications Commission (FCC) blasted the Department of Commerce (DoC) for obstructing efforts to free new spectrum, warning such activity threatens 5G progress. The FCC and other federal agencies recently clashed over whether commercial use of the 24GHz band would interfere with critical government weather forecasting sensors. But in testimony before a congressional oversight committee, Commissioner Michael O'Rielly explained disagreements extend "to every other band" under discussion. "They want to come back and retest and re-challenge decisions we are making. That's very problematic." An auction of licenses in the 24GHz band closed in May: spectrum in the 37GHz, 39GHz and 47GHz bands will be sold in December. FCC Chairman Ajit Pai revealed there are some members of the federal government who believe 5G deployments may interfere with official uses. One department in particular had been "very active in trying to undermine the US position in international negotiations and make it more difficult for us to free up spectrum in 5G". He expressed frustration the DoC was "blocking our efforts at every single turn", adding it has become increasingly difficult for the pair to work together following the abrupt resignation of a key telecom adviser last month. Commissioner Jessica Rosenworcel called the public disputes "embarrassing", warning they could undermine future 5G auctions and US negotiations at the ITU World Radiocommunication Conference in October. Pai requested Congress pass a resolution demanding the development and deployment of 5G as quickly as possible. "That one sentence resolution alone would give us, I think, some momentum."

Regulator Warns 5G License Auction Will Not Proceed Unless Government Cuts Asking Price

The Vice Presidents of Romania's National Authority for Management and Regulation in Communications (ANCOM), Eduard Lovin and Bogdan Iana, have warned that the country's 5G spectrum auction may not take place this autumn unless the government repeals the telecoms industry provisions contained in the controversial Ordinance 114 (OUG 114), reports Ziarul Financiar. Speaking at an industry event in Bucharest, the managers said they believed spectrum prices for some frequencies would rise to an 'unrealistic' price of billions of euros, while starting prices for other frequency bands cannot be established as the ordinance makes no reference to them. 'In our opinion, OUG 114 is inapplicable and the components that can be applied lead to some starting prices that are completely at odds with the reality in Romania. We have told parliament and the government that we believe all provisions regarding telecoms in OUG 114 should be repealed. We want to revert to the provisions of OUG 111, whereby ANCOM proposes to the government the starting fees in the auction,' said Eduard Lovin.

Germany's 5G Auction Ends

Auction exceeds expectations raising almost €6.6 billion over 52 days. Last week Germany's telecoms regulator, the Bundesnetzagentur (BNetzA), took drastic steps to hasten the conclusion of the auction, raising the minimum for new bids for certain spectrum to €13 million. Deutsche Telekom (DT) spent €2.2 billon, Vodafone €1.9 billion, Telefónica €1.4 billion and market entrant Drillisch coughed up €1.1 billion. DT said it was relieved, but complained about how much it had been forced to pay. Dirk Wössner, a DT board member, said in a statement that it left a "bitter taste". He added, "The network rollout in Germany has suffered a significant setback. The price could have been much lower. "Once again, the spectrum in Germany is much more expensive than in other countries. Network operators now lack the money to expand their networks." Hannes Ametsreiter, who leads Vodafone's German operations agreed, saying the outcome was a "disaster for Germany". However, Italy's 5G auction also reached €6 billion, and there are many more yet to come, including in the UK, Europe's second biggest economy and France, the third largest. The German operators are also concerned that some spectrum has been held back and will be allocated to industrial groups that want to build their own 5G infrastructure. Volkswagen and BSF have already expressed an interest in going down this route. Germany's Finance Minister, Olaf Scholz, has pledged to use the funds to upgrade country's poor digital infrastructure. Although it is by far Europe's biggest economy, Germany was listed as thirtieth out of 34 European countries regarding fiber to the home/building penetration, at just over 2% by the FTTH Council in March (see graph below) and its 4G coverage and capacity is far worse than that of many of its neighbors too. Jochen Homann, President of the BNetzA, which ran the auction, said ,"The frequencies will be used not just for the new 5G mobile phone standard but also for better mobile phone coverage in Germany." It is now up to the companies to quickly make use of the frequencies." The winners of the auction will be obliged to provide 5G coverage to 98% of all German households by 2022 under a "national roaming" scheme.

Operators Scathing Over German 5G Auction Outcome

Deutsche Telekom and Vodafone Germany slammed high prices in the country's auction of 5G suitable frequencies, which has concluded after 52 days, as four bidders committed to spend a total of €6.6 billion. In a statement, Germany's Federal Network Agency announced the conclusion and results of the auction, which kicked-off in March. The auction comprised of 497 rounds of bidding and will pave the way for the entrance of a fourth operator, 1&1 Drillisch, which spent €1.1 billion on two blocks of 5MHz spectrum in the 2GHz band and five blocks of 10MHz in the 3.6GHz band. Market leader Deutsche Telekom bid the most, committing a total of €2.2 billion for four blocks in the 2GHz band and nine blocks in the 3.6GHz band. Vodafone will spend €1.9. Billion on 90MHz in the 3.6GHz band, along with two blocks of 15MHz and two of 5MHz in the 2.1GHz band. Telefonica Deutschland bid €1.4 billion for two blocks in the 2.1GHz range and seven blocks in the 3.6GHz band. The conclusion of the auction means operators can begin to upgrade networks, a move considered vital to the success of Germany's economy and its ambitions around smart cities and connected industries. Jochen Homann, president of the Federal Network Agency, hailed the end of the auction as "the starting gun for 5G in Germany". However, the conclusion was swiftly followed by criticism from the major operators regarding the prices and length of the process. Deutsche Telekom said in a statement the auction left a bitter taste. "The network rollout in Germany has suffered a significant setback. The price could have been much lower. Once again, the spectrum in Germany is much more expensive than in other countries. Network operators now lack the money to expand their networks," said board member Dirk Wossner. Vodafone Germany's head of operations Hannes Ametsreiter described the auction as a "disaster for Germany". "I'm very unhappy about how long the process took and the high price that we as bidders must pay," he told German newspaper Westdeutsche Allgemeine Zeitung.

Moroccan Government to Offer 6% of Maroc Telecom to Local Investors

The Moroccan government, which announced plans to sell an 8% stake in Maroc Telecom (IAM) earlier this month, will offer 6% of the Morocco's largest telecoms operator by subscribers this month as a block order to local institutional investors, such as retirement funds, insurance companies and banks, according to the Ministry of Finance. Reuters reports that the remaining 2% stake will be sold on the Casablanca Stock Exchange (CSE). Maroc Telecom, which is listed on the CSE and Euronext Paris, is 53%-owned by UAE-based Etisalat Group, with the Moroccan state in possession of a 30% stake. The sale is the first step in a government privatization plan to pump USD527 million-USD633 million into the state budget by selling state assets, with a view to cutting the 2019 budget deficit to 3.3% of GDP.

Singtel Says IMDA Should Issue 5G Licenses 'For Free' To Ease CAPEX Requirements

The Straits Times quotes Singtel's Yuen Kuan Moon as saying that the country's telecoms regulator, the Infocomm Media Development Authority (IMDA), should give out the two 5G licenses it proposes awarding 'for free' to cut the investment burden on the companies looking to offer next generation services. However, the CEO of the operator's Consumer division went on to add that if the IMDA does assign airwaves as anticipated, Singtel has 'all the right ingredients' to win the rights to operate the network in the city-state and furthermore 'will put up a very strong proposition for the beauty contest'. With the government keen to see two nationwide networks being rolled out as early as next year, the regulator is currently conducting a public consultation on its planned 5G regulatory framework, including how it plans to pick operators. Whilst the IMDA is apparently less keen on a full auction, Yuen was quoted as saying that Singtel hopes the watchdog will reconsider its plan to hand out the licenses to the two winning proposals. 'Some other countries have given 5G licenses for free, without an auction or without a beauty contest,' he told the paper.

Japan Considers Slashing Mobile Phone Cancellation Fees to Encourage Switching

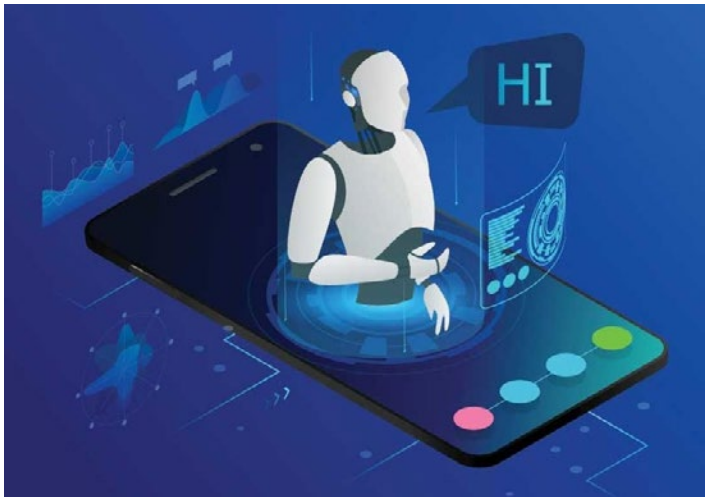
The Mainichi newspaper writes that the Japanese government is mulling plans to compel the country's mobile network operators (MNOs) to slash contract cancellation fees from the current figure of JPY9,500 (USD87.8) to JPY1,000 or less, to make it easier for customers to switch service provider. The Ministry of Internal Affairs and Communications (MIC) has been tasked with reviewing the current rules which have allowed the likes of NTT DOCOMO, KDDI (au) and SoftBank Corp to continue charging the punitive sums to anyone wishing to terminate their contract mid-way through the standard two-year term. There are no rules in place to regulate how MNOs levy breach-of-contract penalties, and as such, they stand accused of essentially entrapping users. Further, the paper notes that the MIC will also look to review limiting discounts on handsets to JPY20,000 or less, and the banning of device discount offers tied to long-term contracts. It is understood that the ministry is considering implementing the regulatory changes through an updated ordinance in the autumn, coinciding with the forthcoming implementation of the revised Telecommunications Business Act mandating the clear separation of mobile device and communications charges.

Industry Group Pushes for Inclusion of 26GHz, 28GHz Airwaves in Auction

Industry group the Cellular Operators Association of India (COAI) has requested that the government include spectrum in the 26GHz and 28GHz band in the upcoming frequency auction, the Economic Times writes. In a letter to Telecom Secretary Aruna Sundararajan, the COAI suggested that the Department of Telecommunications (DoT) urgently consult with the Telecom Regulatory Authority of India (TRAI) on pricing for the airwaves. The COAI highlighted the importance of the band to potential industry applications, arguing that it would enable India to leverage 'global 5G ecosystem developments around this band,' as well as provide impetus to local manufacturing of 5G smartphones, networking equipment and connected devices, with an official from one cellco suggested autonomous farm vehicles as an example. Indian space agencies are reluctant to vacate their spectrum holdings in the 28GHz and 3.5GHz bands, however, potentially delaying their use in 5G systems. Earlier this week, meanwhile, newly-appointed Telecom Minister Ravi Shankar Prasad announced that 5G trials would begin within the next 100 days, whilst the planned mega auction – including frequencies in the 700MHz, 800MHz, 1800MHz, 2300MHz, 2500MHz and 3400MHz-3600MHz ranges – would go ahead by the end of the current calendar year.

FCC Gives Telcos the Authority to Block Robocalls

The Federal Communications Commission (FCC) today voted unanimously to give telcos the authority to identify and block robocalls without having to first get permission from subscribers. However, phone companies are not required to block robocalls. And they also are not prohibited from charging for robocall blocking services. The FCC said it received 232,000 complaints about unwanted calls in 2018. In an FCC meeting today, Chairman Ajit Pai called the automated unsolicited calls "the scourge of civilization." And Commissioner Jessica Rosenworcel said Americans have been getting about 5 billion robocalls a month, of late. "That is 2,000 robocalls every second of every day," she said. "That is insane." Today, the FCC commissioners voted to approve a rule that enables voice service providers to target and block calls that technology reveals are likely to be scams or other unwanted calls. Consumers have the choice to opt out of call blocking, in the unlikely event that they would want to do that. Commissioner Rosenworcel voted for the order, but she voiced dissent on one aspect: that it doesn't prohibit carriers from charging for the anti-robocall service. "There is nothing in our decision today that prevents carriers from charging consumers with this blocking technology. I think robocall solutions should be free to consumers," she said. Chairman Pai said, "We have cleared the path for a dramatic expansion of call blocking technologies so that a phone call can be stopped before it even gets to your phone." Pai also acknowledged recent reports that some businesses — such as debt collectors, banks and healthcare providers — like robocalls. "Earlier, I said everybody wants to crack down on unwanted robocalls," Pai said. "That's not entirely accurate. Many robocallers oppose what we are doing and asked us to delay our vote today. Today was not the time for delay and stalling tactics. It was a time for action." The FCC plans to monitor the adoption and implementation of the STIR/SHAKEN framework which was developed by industry groups ATIS and SIP Forum to tackle the issue of phone spamming and robocalls. The FCC plans to hold a summit on July 11 to seek information from carriers about that framework. Pai also said the agency would continue to "pursue aggressive enforcement action" against robocallers. The U.S. Senate recently passed Senate bill 151, creating the "Telephone Robocall Abuse Criminal Enforcement and Deterrence Act" (TRACED Act) to deter robocalls. According to YouMail, a free robocall blocking software for mobile phones, some of the most prevalent robocalls include Social Security scams and student loan scams. Washington, D.C., surpassed Baton Rouge, Louisiana, as the city with the most robocalls per person, according to YouMail. And areas in the South continued to receive the most robocalls in 2019, just as they did for all of 2018.



DoJ Wants to Maintain Fourth National Operator If Sprint, T-Mobile Merge

Senior Department of Justice (DoJ) officials want T-Mobile US and Sprint to prepare the groundwork for a new nationwide wireless operator as a condition for approving their long-running USD26.5 billion merger, a person familiar with matter has informed Bloomberg. Earlier this month Federal Communications Commission (FCC) Chairman Ajit Pai approved the deal on the proviso that the enlarged operator spins off Sprint's pre-paid unit, Boost Mobile. However, this gesture is considered insufficient by DoJ Antitrust Chief Makan Delrahim, who would like to preserve a competitive landscape comprising four nationwide mobile players. It seems likely that the companies will now come under pressure to agree to spin off their other self-contained brands, namely: Metro by T-Mobile (formerly MetroPCS) and Virgin Mobile. According to Reuters, Boost Mobile has been valued at USD3 billion, and the asset has already attracted industry interest. Issa Asad, CEO of MVNO Q Link Wireless – a major provider of federally-subsidized Lifeline services – told the news agency that he would be prepared to pay between USD1.8 billion and USD3 billion for the business, depending on 'the quality of Boost's customers, such as their level of churn, the devices they are using, and what type of phone plan they are on'. Elsewhere, Stephen Stokols, CEO of fellow MVNO FreedomPop, said that he is advising a private equity firm on a rival bid for Boost, which could potentially be merged with his company if the transaction comes to fruition.

Europe Leads for Mobile Network Experience, Says New Report

The report, which aims to offer a 'snapshot' as we move into the 5G era, examines mobile experience across five areas: 4G availability; video; download speed; upload speed; and latency. "A look at the leading countries across Opensignal's metrics shows the pre-eminence of Europe. In a ranking of the ten countries who scored highly across all five of our key metrics, only two were from outside Europe," said report author, Peter Boyland, Senior Analyst at Opensignal. South Korea was the only country to score over 50 Mbps for download speed, with the majority of countries scoring in the 10-20 Mbps range. Opensignal reported a huge range of scores in this metric, with the lowest average score being less than 2 Mbps. When it comes to latency, only 13 of the 87 countries rated scored under 40 milliseconds (ms), while none scored under 30ms. Six countries in the top ten were from Europe, including Belgium, Czech Republic, Netherlands and Switzerland – all of which posted sub-40ms scores. Of the top 25 countries who achieved 'very good' ratings in video experience, only six were from outside Europe. The top five were Norway, Hungary, Czech Republic, Austria and Denmark. Norway and Hungary both scored just over 74 points (out of 100), meaning no country has yet achieved an 'excellent' video experience rating. Four European countries made the 4G Availability top 10 (Norway, Netherlands, Hungary and Sweden – the fewest of any of Opensignal's award metrics. The widest variation between upload speed experience scores was at the top end of the table. The gap between number 1 (Denmark) and number 10 (Canada) was over 5Mbps. Below this, there were 40 countries within 5Mbps of Canada's score. Boyland said, "It's very early days for 5G, but we're already seeing some notable commercial network launches. 5G won't just deliver faster speeds. The new technology will provide a blanket of capacity, built using new high-bandwidth, high-frequency spectrum bands that will help mitigate the congestion which we see impacting the mobile network experience across many of our metrics. "And the upgrades won't just be felt in speed – 5G will offer great improvements to latency, opening up a whole new world of mobile use cases." He added, "But it will take 5G a long time to become as ubiquitous as 4G. This report offers a snapshot of the 4G mobile network experience as we step into the 5G era." Opensignal looked at data from January to March 2019, examining 87 countries and comparing their performance across all five key award metrics.

Skype Facing Telecoms Sector Regulation

The European Court of Justice ruled Skype and similar internet-based comms providers are subject to rules governing electronic communications services in some cases, following a dispute between the company and the Belgian telecoms regulator. In 2011, the Belgian Institute for Postal services and Telecommunications (BIPT) requested Skype provide notification of its services in accordance with telecoms regulations. A particular factor in the case is that Skype enables customers to make calls to landlines using its SkypeOut feature. Skype, in response, said that it did not provide electronic communications services as defined by the regulation, since it did not transmit signals itself. It also said that for SkypeOut, it works with international operators which send signals on its behalf. This initiated a long period of back-and-forth, leading Belgium's Court of Appeal to the door of the Court of Justice. Submissions were also made by the German, Dutch and Romanian governments, and the European Commission in the case. The ruling declared VoIP services which enable users to terminate calls on fixed or mobile networks are an electronic communications service if the software publisher is remunerated for the provision of services – Skype sells bundles of minutes and subscriptions covering these calls – and the provision of that service involves agreements with telecoms service providers which are authorized to send and terminate the calls. Other Skype features, such as its core VoIP proposition and instant messaging, were not affected by the ruling. Reuters reported Skype's owner Microsoft said it will comply with the regulation, which will make it subject to more onerous regulation. The decision will also affect rivals which offer SkypeOut-type services.

DoT to Oppose Sale of Spectrum Rights by Bankrupt Cellcos

India's Department of Telecommunications (DoT) intends to use all legal means to oppose the sale of spectrum by bankrupt cellcos, the Economic Times reports, citing an unnamed senior DoT official. The move is expected to cause further difficulties for Reliance Communications (RCOM) and Aircel, both of which are currently progressing through insolvency proceedings. The official explained that the DoT's view is that the spectrum belongs to the government and not the telco and, as such, the state is the only entity entitled to sell the resource. If the spectrum rights were sold via as part of the bankruptcy process the value would be far below its market price, and the DoT would be amongst the last entities to be paid from the proceeds as financial lenders take precedent over operational creditors such as the ministry, a second DoT official with knowledge of the matter was cited as saying. Without their spectrum holdings, however, the companies are likely to be of little value to potential buyers, leaving the cellcos with little opportunity to clear their outstanding debts.

Montenegro and Albania Sign MoU on 700MHz Coordination

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ECTEL Announces Launch of MNP across All Member States

Regional regulator the Eastern Caribbean Telecommunications Authority (ECTEL), which oversees activities in the Commonwealth of Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines (SVG), has announced that from mobile number portability (MNP) will be launched in all five member states, from June 3rd. The formal announcement was made on 23 May at the 39th ECTEL Council of Ministers meeting in Saint Lucia, ending the long-running saga to bring number portability to fruition – ECTEL originally launched the MNP project back in 2015 with a decision by the ECTEL Council of Ministers to implement local number portability for both fixed and mobile phones. The watchdog confirms that MNP will be available to post-paid and pre-paid users across all five ECTEL states, as long as the customer's number has not been barred, restricted, suspended, or handsets reported stolen or lost to the current provider. Whilst there will be no charges for porting a number, the current service provider may levy a fee for a new SIM card and to unlock the handset, before the number is carried across.

Japanese Government to Place Telecom and IT Sectors Under Foreign Ownership Restrictions

Telecom Lead reports that this week (27 May) the government of Japan announced its intention to place foreign ownership restrictions on its IT and telecoms sectors, issuing the new rules amid increased pressure from the US to deal with the potential threat of cyber-security and technological transfers involving China. Having already updated its procurement regulations last year to bolster its ability vis-a-vis security and place an effective ban on purchases of equipment from Chinese telecoms equipment makers Huawei Technologies and ZTE, Japan has also extended the measures to 5G spectrum licensing rules for private companies, meaning Japan's telecoms operators are increasingly unlikely to use network equipment from the two Chinese vendors.

Executive Not Jazzed About License Renewal Price Hike

Aamir Ibrahim, the CEO of Pakistan's largest cellco by subscribers – Jazz – has criticized Islamabad for its handling of the company's license renewal process in an interview with Reuters. The executive highlighted the short time scale, pointing out that the government had had two years to draw up plans but had only settled on a price for the renewal three weeks before the 25 May deadline and had included an unexpected price increase, which the official described as 'big shock'. Jazz and fellow cellco Telenor, which is also due to renew its license, are currently challenging the government's policy in the courts with the next hearing scheduled for 3 June. Islamabad set renewal fees at USD450 million apiece, an increase of more than 50% from the USD291 that the pair had expected to be charged, based on their original cost and the renewal fee paid by part state-backed rival Ufone in 2014. The executive also disagreed with the government's decision to charge in US dollars rather than Pakistani rupees, noting that it charges customers in the local currency and saying: 'There is no precedent of the government offering (in dollars) any kind of a concession or a license to a company in Pakistan selling things in Pakistan. Pricing in dollars is completely unsound.' Exacerbating the issue, the rupee's worth has plummeted in recent years, losing around 40% of its value against the dollar in the last 18 months, Reuters notes. The companies can expect to pay around PKR68 billion (USD450 million) for the license renewal but, based on the 2004 exchange rate, the companies had paid around PKR17 billion for the original USD291 million license fee. Mr. Ibrahim acknowledged the government's financial struggles, with Islamabad having recently signed a preliminary agreement for a USD6 billion bailout from the IMF, but warned against the potential impact of squeezing businesses: 'I understand the government is cash-strapped but what they're trying to do is milk for short-term gain. But that, in the process, leaves the country behind.' Imposing higher fees on cellcos would leave the companies with less to invest in infrastructure, the official explained, adding that the development of digital services is vital for the country's efforts to modernize its economy and drive growth.

Antigua-Based Cellcos Flow and Digicel to Sue Government over Spectrum Sharing Plan

Antigua and Barbuda's two largest mobile network operators, Flow and Digicel, are suing the government over the state's plans to force them to share their mobile spectrum 'equally' with another competitor – state-owned fixed and mobile operator Antigua Public Utilities Authority (APUA). Prime Minister Gaston Browne, who has a track record of falling out with the two foreign-owned companies, said at the weekend that both cellcos are 'resisting' the move. The PM wrote to them recently to order them to comply with an edict to share space with APUA in the lower frequency band, which he claims has been placed at a disadvantage in terms of its spectrum holdings. With neither firm yielding, Brown said bullishly: 'No court can tell us to whom we can license our spectrum, our national asset, so we are allowing for due process, we are allowing for a period of negotiation.' However, Digicel and Flow have already filed litigation against the government. In the interest of maintaining the peace though, the government intends to 'extend the period for them to comply by a further three months …. in that case, we expect that in that 90-day period they will cooperate with us because ultimately the spectrum is an asset for the government and people of Antigua and Barbuda.'

A SNAPSHOT OF REGULATORY ACTIVITIES IN SAMENA REGION

Bahrain

The Telecommunications Regulatory Authority's (TRA) Board of Directors held their second meeting this year, at TRA's headquarters. The Board members discussed key issues related to the telecommunications sector; in particular those that are of interest to the general public. This includes the progress of the projects related to the Fourth National Telecommunications Plan (NTP4) and the progress of achieving the NTP4's objective of establishing the National Broadband Network ("NBN"), which is supported through a single fixed fiber network. These projects are considered important to address consumers' concerns and promote their welfare, which is a step towards achieving the vision and policy of Bahrain's leadership. The Board also discussed the market review conducted by TRA for the access to international connectivity to which the Board expressed their appreciation to TRA for its outstanding efforts in providing sufficient and reliable international services which is a key element to achieve the Kingdom's strategic vision and enhance the competitive position of Bahrain in the region. As a big proportion of the international capacity is used to serve consumers with reliable and world-class telecoms services. The Board also discussed the latest market indicators in Bahrain which highlight the continued growth of the sector and the rapid increase in using the most advanced telecommunications technologies and services. The Board commended TRA on its leading role in the progress and development of the sector. The Board also praised TRA for its efforts in working towards enabling the launch of 5G networks through securing the necessary spectrum and adequate frequency licenses to keep pace with the latest developments in telecommunications technologies and services for the benefit of consumers in Bahrain. This makes it among the first countries in the region to launch a 5G network. In addition, the Board discussed updates related to regulating and rectifying the telecoms towers situation in Bahrain which is of a high importance in the telecommunications sector. They hailed the endeavors and the actions taken by TRA to rectify the telecoms towers situation and find the appropriate solutions in coordination with the concerned government bodies, in particular the development of a rectification plan which focuses on important aspects as a priority among other things. Moreover, The Board expressed their appreciation to TRA for its significant efforts in launching registration for Domain Names (.bh), which enables consumers to register domain names (.bh) through several local and global channels providing consumer choice and competition in the domain name market place. The Board also discussed updates related to the SIM Card Registration Regulation and its progress indicators as to prepaid and postpaid registration. The Board expressed their thanks and appreciation to the TRA management for its support and professionalism and outstanding role in developing the sector. (June 25, 2019) tra.org.bh

In line with its unwavering commitment to ensure the mobile telecommunications network operators compliance with the license terms related to the safety of radio frequency emissions as stated in Order no. (4) of 2009 of the Public Commission for the Protection of Marine Resources, Environment and Wildlife of the Kingdom of Bahrain, the Telecommunications Regulatory Authority's (TRA) initiated an exercise to measure the level of emissions produced by radio-communications stations of mobile telecommunication operators that have successfully launched 5G Services in the Kingdom of Bahrain. Using specialized equipment acquired by the TRA's Spectrum Management Department, the measurements collected are compared to guidelines set forth by the International Commission on Non-Ionizing Radiation Protection "ICNIRP" as detailed in the aforementioned Order. ICNIRP provides its recommendations, guidelines, and research results to the World Health Organization (WHO), which adopts these recommendations and guidelines as a basis for health regulations and notices concerning protection from electromagnetic field strength (EMF) Radiation. "As per the condition stated in licenses granted by the TRA in Bahrain, telecoms operators are required to ensure that emissions from each radio installation are within ICNIRP limits. They are also required to comply with any future radiation emission standards set by ICNIRP, or have been or will be adopted by the Kingdom of Bahrain." Says Eng. Mohamed Al Noaimi, Director of Technical Operations Frequencies used for 5G are the same as previously used for WiMAX and some 4G Services that were introduced in Bahrain since 2007 and 2013 respectively. Over the past four years, TRA has measured more than 4,500 sites including the newly deployed 5G enabled radio sites; none of which have exceeded the limits and radiation standards of ICNIRP. Furthermore, the results of the measurements done on the 5G sites specifically showed that the maximum value observed was less than 1% of the maximum permissible threshold as indicated in ICNIRP guidelines. Moreover, in January 2019, the historical measurements including WiMAX and 4G results (which is currently used for 5G) were shared with a delegation from WHO (World Health Organization). The delegation's report was presented to The Council of Ministers in February 2019 where it showed that the level of the signals emitted by the telecom towers are well below the maximum permissible threshold set by ICNIRP. All measurement results are available on TRA's website for public viewing. The TRA invites the public visit this site to view the levels

of radiating emissions measured in the different areas around the kingdom. These results reflect the number of measurements and not the number of towers.

(June 22, 2019) tra.org.bh

The Telecommunications Regulatory Authority (TRA) has renewed the mobile frequency licenses held by mobile network operators (MNO) Batelco and Zain for a further ten-year period. This is the first time an MNO has invoked its right to request a renewal of the 15-year license granted in conjunction with the promulgation of the Telecommunications Law in 2002. The TRA said in a press release that it had engaged with consultancy firms to determine the spectrum usage fees applicable, although no details were provided. 'The request from Batelco and Zain to renew their licenses is a reflection of the healthy and competitive environment created by the TRA's regulatory framework over the past 17 years,' said the TRA's Acting General Director, Nasser Bin Mohammed Al Khalifa. (June 10, 2019) telegeography.com

Bangladesh

Bangladesh ended May with 160.82 million mobile phone subscribers, up from 160.59 million at end-April, according to data from the Bangladesh Telecommunication Regulatory Commission (BTRC). Grameenphone led the a market with 74.78 million mobile customers in May, up from 74.47 million in April, followed by Robi Axiata with 47.69 million, up from 47.57 million the previous month. The BRTC figures also show that there were 94.44 million internet service subscribers in May, up from 93.70 million in April. The fixed-line internet user base was little changed at 5.734 million compared to 5.732 in April, while the WiMax subscriber base dropped to 55,000 in May from 60,000 users in April. Internet subscribers are defined as people who have used the internet at least once in the past 90 days.

(June 29, 2019) telecompaper.com

Bangladesh Telecommunication Regulatory Commission has allowed the mobile network operators to charge the mobile financial service operators each time for accessing mobile operators' network. Telcos were given the scope to charge more under a directive of the BTRC issued last week following long demand from the mobile operator. However, whether the customer or the MFS operators would bear the cost is yet to be settled, officials of BTRC and the MFS operators said. Under the directive of BTRC, mobile operators were allowed to charge revenue generating MFS Tk 0.85 and non-revenue generating mobile financial transaction Tk 0.4 for each session of unstructured supplementary services data (USSD) of 90 seconds. Revenue generating session means a session that would allow the MFS operator to generate revenue. While the non-revenue generating session means a session that would not generate any revenue for MFS operator. Both the session would include 5-4 steps and two SMSs. Any USSD session exceeding 90 seconds would be treated as second session and the mobile phone operator would be allowed to charge for the second session. The BTRC directive mentioned that the mobile operators would get charge from the MFS operators based on the usage of USSD sessions by the MFS subscribers. But, the BTRC directive also mentioned that the MNOs would not get any charge for the latters' technological failure. It, however, did not mention whether the MFS operator would charge its customers or not. Asked, Bkash head of corporate communications and public relations Shamsuddin Haider Dalim told New Age that they were aware about the directive but yet in consultation with the telecom regulator and with the stakeholders to finalize that who would bear the cost. At present, the MFS providers were allowed to charge 1.85 per cent of the transaction amount for over-the-counter transactions, and a Tk 5 service fee for account-to-account transfers. The MFS providers are delivering the services through the mobile operators' network and for that they share 7 per cent of the revenue with the carriers. But in last few years, the mobile operators have been complaining that the MFS providers were delivering different services at free of charge, putting pressure on their network. Based on the argument, the telcos were urging for session-based charges, prompting the telecom regulator issuing the directive. On the other hand, MFS operators have been opposing the demand of the mobile phone operators saying that the imposition of session based charging would increase cost for the MFS customers. If the BTRC's directive comes into effect, the MFS operators will have to pass on the charge to the customers. The MFS operators claimed that they were now paying MNOs Tk 0.20 for every successful transaction. Under the new rules, MNOs will get the USSD charge from the MFS operator.

(June 18, 2019) newagebd.net

Egypt

The Minister of Communications and Information Technology Amr Talaat opened "Tech Invest 3" annual conference, organized by the Digital Economy and Technology General Division (DETGD) of the Federation of Egyptian Chamber of Commerce (FEDCOC), under the theme "Invest in Egypt Future – Digital Economy". The opening was attended by FEDCOC Chairman Ahmed el-Wakil, DETGD Chairman Khalil Hassan Khalil, Chairman of the Egyptian National Post Organization (ENPO) Essam Al-Saghir, Acting CEO of the Information Technology Industry Development Agency (ITIDA) Hala El Gohary, a number of officials from the Ministry of

Communications and Information Technology (MCIT), the Central Bank of Egypt (CBE), other banks, the Small and Medium Enterprise Development Agency (MSMEDA), international funding agencies, IT investors, heads of chambers of commerce nationwide, finance and business leaders, and over 300 technology companies. MCIT is reaping the fruits of implementing its strategy, stated Talaat in his inaugural speech. He added that the ICT sector achieved the highest growth rates, according to the recently issued reports on the economic indicators of the current fiscal year. Growth rates exceeded 15%, and reached 18% in one of the reports. Talaat said that MCIT strategy is based on several pillars, the most important of which is establishing a strong and broad base of skilled calibers in modern ICTs, to come up with effective technological solutions to overcome challenges in all aspects of life, and compete in local and global markets. The ICT Minister also presented the major initiatives and projects carried out to achieve this purpose, including establishing eight innovation hubs and branches for training institutes, affiliated to MCIT, inside eight universities, to provide graduates and undergraduates specialized training courses and innovation promotion programs. Moreover, Talaat said that MCIT is in the process of creating "Maharatech", a digital academy to provide lectures of more than 100 hours by specialized experts in nine ICT fields. This is in addition to implementing Fekretak Sherketak initiative, in collaboration with the Ministry of Investment and International Cooperation (MIIC), through which youth exceptional ideas are incubated and transformed into successful businesses. In addition, the Knowledge City is being established in the New Administrative Capital, including a number of training institutes and specialized academies in capacity building, to provide various training programs to young people, starting next year. Furthermore, Talaat said that the transformation into a digital society is currently under way. The second half of this year will witness transforming Port Said city into the first digital city in Egypt as a pilot project. In addition, 25 key e-government services will be launched successively, through a number of platforms including EG Gate e-portal, mobile applications, Egypt Post offices, and call centers, to ensure access of all segments of society to these e-services. The ICT Minister added that a number of digital projects is currently being implemented, including the health insurance project, automation of tax system, in cooperation with the Ministry of Finance, and development of investment zones. In addition, the first integrated Atlas for managing Ministry of Awqaf assets and rationalizing its resources was recently launched, as well as a number of government services, in collaboration with the state sectors. Talaat stated that modern technology is being introduced, and that MCIT has concluded developing the national strategy for Artificial Intelligence (AI), in cooperation with the Ministry of Higher Education and Scientific Research, for the next three years, with identifying the areas to focus on for harnessing AI techniques, and the various experiences required in this field. Moreover, Talaat added that MCIT seeks cooperation with a number of countries including China, Russia, Japan, Rwanda, South Africa, Saudi Arabia, and United Arab Emirates, in areas including cybersecurity, AI, integrated software, and data science. This provides ICT startups and creative young people in Egypt with a great opportunity to work and expand business in regional and global markets, especially in Africa. On his part, FEDCOC Chairman Ahmed el-Wakil acknowledged the significance of e-services, benefiting 4.5 million merchants nationwide. He added that FEDCOC is currently working on updating the business databases through connecting chambers of commerce with the state institutions, including the Ministry of Finance, Tax Authority, and Customs Authority, to put the e-payment system into effect and issue secured e-certificates, thus achieving financial inclusion and a non-monetary economy. Furthermore, Khalil, DETGD Chairman, asserted that the Division is keen on organizing Tech Invest conference on annual basis, because of its great importance to the ICT sector in general, and to DETGD member companies in particular. He added that the event addresses key issues of interest to the state, including digital transformation, e-commerce, fintech, participatory economy, digital media, and digital health. In addition, the ICT Minister took a tour in the exhibition held on the sidelines of the conference. He explored the major projects implemented by the participating companies, and hailed the youth's creative and exceptional ideas that represent innovative solutions in various sectors.

(June 11, 2019) mcit.gov.eg

In a precedent that is the first of its kind, the Telecom Regulatory Authority (NTRA) has decided to impose a fine of 10 million Egyptian pounds on Vodafone Egypt for the failure of telecom services on the evening of June 3, 2019, just prior to Eid Al Fitr for a number of hours for a large number of customers in several areas. This procedure comes in implementation of Clause No. 18 of the licenses awarded by NTRA to the operator and related to the quality of services provided. The NTRA has also underscored the fact that the company should compensate the subscribers affected by this interruption, and keep the Egyptian regulatory authority updated on mechanisms implemented to deal with such incidents in the future, to meet its obligations towards its customers in Egypt. Moreover, the NTRA has emphasized that, it, in its capacity as the Egyptian regulatory authority, will never hesitate to take all necessary measures and procedures to ensure the provision of high quality of telecom services to citizens and enhance them, including the imposition of fines on any violating company as per the contracts concluded in this regard. It is worth mentioning that NTRA has conducted an investigation to find out the reasons for the service failure, which came as a violation of service level agreement (SLA) stipulated in the licenses granted to the operator and the agreements between it and the NTRA.

(June 10, 2019) tra.gov.eg

Iran

The government of Iran says it plans to push ahead with the rollout of 5G mobile technology in the face of economic and trade sanctions imposed by the US. ICT Minister Seyyed Mohammad Javad Azari Jahromi wrote on Twitter: 'Despite sanctions, we plan to establish the fifth-generation of telecoms networks. We have held good meetings on the launch of the 5G network. It would be a great step forward for the country.' He did note, however, that the sanctions could impact the speed of network deployments. Earlier this year Hossein Fallah Joshaqani, the Director of Iran's Communications Regulatory Authority (CRA), said that preparations for 5G deployment were 'high on the agenda' for 2019, with preliminary work already underway to allocate bandwidth and update regulations for 5G mobile services. The Iranian government has an interest in the country's largest cellco by subscribers, Mobile Communications Company of Iran (MCI), via fixed line incumbent Telecommunication Company of Iran (TCI). The market is also home to two other national operators – MTN Irancell and Rightel – plus regional cellco Taliya Mobile.

(May 29, 2019) Mehr News Agency

Iraq

The Communications and Media Commission (CMC) has transferred a 44% stake in mobile provider Korek Telecom from Iraq Telecom – a joint venture of France's Orange Group and Kuwaiti logistics firm Agility – to local investors via an administrative order, Bloomberg writes, citing documents seen by the news agency and dated to March this year. The stake was transferred to three investors, including Iraqi Kurdish businessman and Korek Managing Director Sirwan Barzani, who now reportedly controls 75% of the cellco's shares. The order is the latest development in a years-long dispute between the regulator and the two shareholders. A spokesperson for the French group was quoted as saying: 'The shareholding owned by Orange and Agility has been unlawfully expropriated and Orange will continue to take all steps to seek full compensation for this act'. Agility, meanwhile, stated that it had 'multiple legal proceedings' underway in Dubai, New York and before the World Bank's International Centre for Settlement of Investment Disputes to try to recover its holding. Orange and Agility had purchased their stake in the operator in 2011, but in 2014 the CMC notified the company that it was cancelling the tie-up and reverting Korek's shareholding structure to its pre-2011 form, on the basis that conditions relating to investment and network construction imposed by the regulator on the joint venture had not been met. Orange and Agility challenged the order, and the latter kicked off international arbitration proceedings in early 2017. More recently, in March 2018 the joint venture filed a complaint accusing Korek's directors of misappropriating millions of dollars, claiming that the executives had been syphoning funds from the telco to pay CMC officials.

(May 30, 2019) telegeography.com

Jordan

Space Hellas' subsidiary Space Arab Levant Technologies Company (LLC) received a telecommunication license from the Jordan Telecommunications Regulatory Commission (TRC) to provide a full range of telecommunication services through its Jordan telecommunication hub. The Space Hellas facility provides telecommunication services and interconnection with broadband telecommunications providers, bringing Jordan to Europe and its Space Hellas nodes in Greece, Cyprus, Malta, Serbia and Frankfurt. As part of expanding its operations abroad, Space Hellas Group consolidates its presence in the Middle East by acquiring a telecommunication license and installing an interconnection and data transfer node in Amman, Jordan. Space Arab Levant Technologies Company is now ready to offer its customers complete interconnection, guaranteed bandwidth, and service level agreement (SLA) telecommunication services, using all available local and international telecom operators.

(June 22, 2019) telecompaper.com

Kuwait

The Communication and Information Technology Regulatory Authority (CITRA) has called telecommunication companies to commit to the marketing schemes for the newly launched 5G service including its various segments, categories, and prices. CITRA would carry out all legal actions against companies that fail to launch the new service with all its segments and categories, CITRA's Chairman and CEO Eng. Salim Al-Ozainah affirmed. It is also important that telecom companies commit to CITRA laws regarding competition; otherwise, CITRA would be forced to take legal procedures against them, added Al-Ozainah. The 5G technology would be so essential for users and service providers in enhancing the telecom market in the country, he noted; adding it had already made a quantum leap in the Internet system around the world with a peak speed of 20 Gbps. Established in 2014, CITRA is responsible for overseeing the telecommunications sector, monitor and protect the interests of users and service providers and regulate the services of telecommunication networks in the country, while ensuring transparency, equality of opportunity and fair competition. (June 19, 2019) citra.gov.kw

The International Telecommunication Union (ITU) hailed the performance of Kuwait's delegation in the meeting of ITU Council, currently held in Geneva. In a special session to present Kuwait's experience in the telecommunication field on Wednesday, ITU's Secretary General Houlin Zhao hailed the country's projects and efforts to turn Kuwait into a regional and international center in the field. On his part, ITU's Regional Director Ibrahim Al-Haddad noted that Kuwait is one of the oldest members in the union. He also expressed appreciation for Kuwait's fruitful participation in ITU's meetings. Al-Haddad said that Kuwait was one of the first Arab countries to introduce mobile services and one of the first in the world to provide the 5G network. Meanwhile, Chairman and CEO of Kuwait's Communication and Information Technology Regulatory Authority (CITRA) Eng. Salim Al-Ozainah stressed on the importance of communication and information technology in achieving development in the social, economic and commercial fields. He called on ITU members to cooperate in achieving the union's vision in creating a world where information technology is a key factor in improving the lives of individuals. Al-Ozainah noted that the ITU had facilitated all issues facing the execution of the UN's 2030 Sustainable Development Goals. The union also encourages innovation related to digital economy and society and the participation of small and medium-sized enterprises (SMEs) in ITU's sessions. (June 12, 2019) citra.gov.kw

The Chairman and CEO of the Communication and Information Technology Regulatory Authority Eng. Salem Al-Ozainah completed the pilot operation of the fifth-generation mobile operator networks after coordinating with CITRA, in anticipation of the launch of the fifth-generation commercial service by mid-June. The statement said in a press statement on Tuesday that the provision of this service comes as CITRA seeks to develop the telecommunications sector in Kuwait to keep abreast of the modern technological development of communications. He added that this step also comes in line with the recommendations of the International Telecommunication Union (ITU) and international organizations specialized in setting the technical standards for this technology, which has been adopted for more than two years, and in coordination with the mobile telecommunications operators in the country allowing them to conduct experiments on this technology. The authorization confirmed that the activation of this service is in line with the announcement of the special frequency banding for this service with a bandwidth of 3.5 GHz in Kuwait and allowing mobile operators to test their networks to launch the fifth-generation service. He added that the activation of the service comes to be one of the first countries in the world and the region that organizes and operates this new technology, which will benefit the telecommunications sector in the country. He pointed out that the service applies the latest technologies to become a qualitative leap in the world of communications, which will increase the speed of Internet connection to high speeds to access high volumes of data, as well as the support of Internet of things (IOT) and applications of artificial intelligence (AI) and smart cities which is an added value to the industrial, commercial and financial sectors as well as individuals. (May 28, 2019) citra.gov.kw

Lebanon

Lebanon has plans for a new Internet submarine cable to link the country to Europe, said Minister of Telecommunications Mohamad Choucair. The aim is to boost the Internet service locally and to turn Lebanon into a hub for Internet distribution to countries in the region, he said. Once the studies related to the project are completed, a tender will be launched which will be implemented in partnership with other parties. Lebanon will pay part of the cost of the cable project and will later share in the revenues that it will generate from its operation. Another cable project is scheduled to be launched this year. This new undersea cable will replace the 'Cadmus' cable which links Lebanon to Cyprus. The project will be executed in partnership with the Cyprus Telecommunications Authority (Cyta). Besides 'Cadmos', Lebanon is currently connected to the outside world by the submarine cable 'Alexandros' which links the country to France through Cyprus. According to Choucair, the 4G mobile network now covers 85 percent of the Lebanese territory and will become available in the remaining areas in the coming months.

He said that the MoT is working with international companies to test the 5G service and assess its potential efficiency. The MoT is deploying exceptional efforts to complete the fiber optic project within two years and as a result the fiber optics network will cover the entire country, Choucair said. (June 16, 2019) businessnews.com.lb

The Telecoms Minister Mohamad Choucair said in an interview with XinhuaNet that Chinese technology giant Huawei is providing his Ministry with equipment for ten 5G test base stations, which will be used for 5G networking tests 'later this year', adding that the government will 'decide on the launching of the 5G technology in Lebanon soon after we finish our research about its health aspects, efficiency and profitability'. The minister noted that Huawei has already partnered Lebanese cellco Touch in 5G tests in Q4 2018 (whilst TeleGeography notes that the country's other mobile provider Alfa has partnered Sweden's Ericsson and Finland's Nokia in 5G technology trials). In the same interview, Mr. Choucair said that the telecoms ministry is preparing to launch an open tender for up to two mobile operators to enter the Lebanese market, stating: 'We [will] invite companies from all over the world, including China, to come and take part in the new tender if they are capable of providing us with good services at competitive prices.' Both Alfa and Touch are wholly state owned, but currently managed on behalf of the Lebanese government by Kuwait's Zain Group (Touch) and Egyptian-owned Orascom Telecom Lebanon (Alfa). (June 13, 2019) telegeography.com

Recent U.S. moves against China's telecom company Huawei will not impact Lebanon's cooperation with Huawei, Lebanese Telecommunications Minister Mohamad Choucair has said. "Our cooperation with Huawei will not be impacted at all, and we will do what is in the interest of Lebanon," Choucair told Xinhua recently. Huawei is now involved in several telecom projects in Lebanon, including the fiber optics and 5G services. According to Choucair, the fiber optics project will be operational in Lebanon in two years and involves different multinational companies including Huawei. Huawei's latest 5G equipment also enabled Touch, a mobile telecommunications and data operator in Lebanon, to perform the first commercial 5G trial in the country last November. In addition, Huawei has offered the Lebanese Telecom Ministry 10 cell towers, which will be used to test the 5G technology in the country, said Choucair. "We will decide on the launching of the 5G technology in Lebanon soon after we finish our research about its health aspects, efficiency and profitability," he said, adding that 5G tests will start later this year. Choucair said his ministry has five main goals to achieve in the near future, including the 300-million-U.S. dollar fiber optics and 5G projects. "We also aim at supplying all locations in Lebanon with 4G and LTE in addition to creating a submarine cable," he added. Choucair said his ministry is preparing to launch a tender to allow two new mobile operators to enter the Lebanese market. "We invite companies from all over the world, including China, to come and take part in the new tender if they are capable of providing us with good services at competitive prices," he said. Choucair, who is also head of the Chamber of Commerce, Industry and Agriculture, added that Lebanon can cooperate with China in other areas as well. "We can, for instance, make more efforts to take part in exhibitions taking place in China to introduce our products to the Chinese market and increase our exports to the country," he said.
(June 12, 2019) therahnuma.com

Morocco

Morocco's retirement pensions fund Regime Collectif d'Allocation de Retraite (RCAR) has acquired 16.229 million shares of Maroc Telecom (IAM), following the government's decision to float 8% of the company's shares on the local stock market. The Moroccan Capital Market Authority (AMMC) disclosed that the transaction increased RCAR's shareholding in IAM to 5.81%. The first stage of the floating includes the sale of 6% of the capital (52.746 million shares) as 'block order to local institutional investors (three pension funds, five insurance companies and three banks)', while the remaining 2% (17.582 million shares) will be floated on Casablanca Stock Exchange (CSE) as a public offering. (June 28, 2019) telegeography.com

Maroc Telecom (IAM), Morocco's largest telecoms operator by subscribers, has revealed that the government is planning to sell a portion of its stake in the company via a public offering. Maroc Telecom, which is listed on the Casablanca Stock Exchange and Euronext Paris, is 53%-owned by UAE-based Etisalat Group, with the Moroccan state in possession of a 30% stake. A public offering for up to 8% of the Moroccan operator will be announced in the next few weeks on the Casablanca Stock Exchange. The sale is the first step in a government privatization plan to pump USD527 million-USD633 million into the state budget by selling state assets, with a view to cutting the 2019 budget deficit to 3.3% of GDP. (June 3, 2019) telegeography.com

Morocco reached 23.1 million internet subscribers at the end of March, up 9.3 percent from a year earlier, according to the latest statistics from the regulator ANRT. This takes the internet penetration to 65.6 percent. The vast majority use mobile internet, at over 21.5 million, up 9.2 percent from a year earlier. The expansion of 4G networks helped drive the growth in the past year, with 11 million people using LTE at the end of March, an increase of 56.7 percent year-on-year. FTTH subscribers also rose 88 percent over the 12 months, to 82,693, while nearly 1.44 million people had an ADSL connection. The mobile telephony base was up 2.37 percent to 44.73 million at the end of March. That's good for a penetration rate of 127 percent. Postpaid subscribers rose nearly 20 percent to 4.13 million, while prepay users were largely stable, at 40.6 million. Maroc Telecom remained market leader with 19.3 million customers, up by around half a million from a year ago. Orange grew faster, gaining nearly 1 million customers in the past year to reach 15.6 million and nearly 35 percent of the market. Inwi's base fell to 9.9 million from 10.3 million a

year ago, equal to a share of just over 22 percent. Mobile voice traffic reached 13.7 billion minutes during the quarter, up 7.2 percent year-on-year. That's equal to an average 103 minutes per customer per month, up from 98 minutes a year ago. SMS traffic continued to decline, down around 20 percent to just over 1 billion messages in the quarter. Mobile prices were largely stable, at an average 22 cents a minute, compared to 23 cents in March 2018.
(June 3, 2019) telecompaper.com

Nepal

The Supreme Court has postponed the final hearing on the capital gains tax liability of mobile operator Ncell until 25 June, citing time constraints. The court will then issue its verdict on whether the NPR39.06 billion (USD346.2 million) bill levied by the Large Taxpayer's Office (LTO) in February 2019 is consistent with existing law. Ncell was ordered to pay the capital gains tax following Malaysian telecoms group Axiata's acquisition of an 80% stake in the mobile operator from Sweden's Telia Company in 2016. Axiata argues the LTPO failed to comply with the country's Income Tax Act for making a tax assessment.
(June 6, 2019) The Himalayan Times

The Nepal Telecommunications Authority has decided to set up IT service centers at 124 remote villages in a bid to provide integrated government services. The authority has already prepared the Information Service Centre Formation and Management Work plan. The move from the telecom authority has come a year after the government launched the ambitious Digital Nepal Framework-2018 that envisions a 'digital society' with 90 percent of the population having access to broadband services by 2020. The telecom regulatory authority plans to install four computers, printing machines and networking equipment and expand broadband facilities from those centers to wards, health centers and community schools. According to officials, the information Centre project is aligned with the government's campaign and has been launched to combat digital exclusion in 124 rural municipalities, which they say, have no access to telecommunications facilities as of date. "After studying the availability of telecommunication service throughout Nepal, we identified the local levels that are deprived of such services and have taken a step to reduce the digital divide between communities," said Purushottam Khanal, acting chairman of the Nepal Telecommunications Authority. "We are deliberating on technicalities of the project and will initiate a tender process for procurement of equipment within a month." Officials estimate that it will take around Rs90.52 million just to procure equipment to establish those centers. The authority plans to mobilize funds collected by levying telecom operators service charges amounting to 2 percent of their gross income to execute the project. Almost half of the shortlisted local levels are located in the western provinces of Karnali (26) and Sudurpashchim (28), in line with the by-laws which state that the authority must give special priority to rural communities without access to internet and with measurable presence of marginalized and economically backward denizens. As per the provisions of the Work plan, the shortlisted local levels will be liable to manage manpower, physical infrastructure to operate those centers and must provide low cost administrative services such as billing and documentation to locals through those centers. The telecom authority is also required to procure and haul equipment to the respective local levels and ensure proper set up, installation and networking facilities at the centers. "We will set up the facility and train staffers to operate the system but it will be up to the local levels to ensure utilization and maintenance of the infrastructure," said Sandip Adhikari, information officer of Nepal Telecommunications Authority. "Initially, we had planned to execute the project within this fiscal, but due to the time consuming planning process, we have extended the deadline and expect to complete the project within first four months of next fiscal year." However, officials are unclear on how they will deal with challenges associated with the project. "As many of the shortlisted villages are excluded and are without proper road connectivity, that will require us to haul equipment via the air route, making the project costly," said Khanal, "Also, there is the challenge of deputing staff at those rural villages to train local level employees as the geographical remoteness of those villages make them a less desirable work station." For instance, one of the shortlisted villages – Himali Rural Municipality in Bajura – is without a motorable road where residents regularly face hassles in hauling daily essentials, let alone tech equipment. According to Khanal, the telecom authority is holding an internal discussion to address such challenges and execute the project as efficiently as it can.
(June 2, 2019) kathmandupost.ekantipur.com

Oman

The Frequency Management Unit the Telecommunications Regulatory Authority (TRA) has drawn the attention of all licensees that is in the process of launching the new advanced Frequency Management Automated System with its new improvements. The deadline to receive applications of radio licensing requests through the current portal for radio license services will be 20 June 2019 and the existing system will be disabled on the same day after the official working hours of TRA. Applications requests through the new system shall be resumed starting from 27 June 2019. (June, 2019) tra.gov.om

Oman could see 5G technology become available during 2019 or 2020, according to industry chiefs and regulators. In the Middle East and North Africa, it is anticipated commercial 5G will account for around 60 million 5G subscriptions by the end of 2024, according to a report. Speaking to Times of Oman, Eng. Yousuf Al Balushi, TRA's Vice President for Spectrum Management, said: "The question of when people have 5G has more to do with companies and providers than with us as a regulatory authority. When it comes to regulation, we have provided all the tools that companies require in order to build their networks. " Still there are challenges which the TRA and providers have to overcome to make this possible. Al Balushi added: "The biggest challenge is Oman's terrain and spread of its population because thousands of towers need to be built to provide services to others. How do you build all of them quickly? "Building the towers needs government authorities to work together for permits, but we have been able to coordinate between the TRA and other authorities to speed this up. There's a lot of understanding between us because we know that 5G is not a technology for companies, but rather technology that develops the economy, health, and education all over the country," he added. Dr. Ali Al Hashmi, Senior Manager Network Design at Omantel, told Times of Oman, "We are keeping pace with 5G developments and continue to do so, particularly in the area of building the infrastructure." According to him, the benefits go beyond fast internet and gaming, and can completely change the way we live and interact with the world around us. Al Hashmi said: "5G will mean a quantum leap for the public and for companies such as in logistics, health, and oil and gas. We expect to see more coordination between operators and other groups. "Among this coordination is an example of people not needing to go to a clinic, but rather being able to use the internet to get their consultancy directly from their health provider, and perhaps even be able to get their medication or ambulance kit by drone. In oil and gas, their radars can be managed by robotics, which makes the job much safer for employees. 5G will also be able to provide logistics operators with the tools for higher efficiency. It may even have more uses than we as Omantel can imagine. The most important thing is that we as a company are ready for 5G," he added. Wojciech Bajda, Vice President and Head of Gulf Council Countries at Ericsson, told Times of Oman: "We do have the technology, and the service providers [in Oman] are interested because this is a new revenue stream. It is up to the industries. For example, when we talked to the seaports, we saw that we needed to spend a lot of time explaining the benefit of the technology. If the industry is convinced, this will go on very quickly. Currently, we see that as we speak to the industries, their interest grows. The readiness of these industries will set the future for 5G in Oman. "About 2019, the serious engagements are occurring where we talk to the industries along with service operators. We believe that the real-use cases in seaports, oil and gas, and mining and healthcare will be happening at the end of this year and the beginning of 2020, especially in the GCC where you have mature operators, and the TRA. In Oman, I'm sure the TRA will provide all the support required for this to happen. "As for the commercial, single person use? Currently if you go to an Etisalat shop in the UAE you can buy 5G today. It will be coming [to Oman] since the technology and terminals are out. It's not a theory anymore, this is ready, "he added. These comments came during an event on Wednesday hosted by Ericsson and the Telecoms Regulatory Authority where companies showcased the uses of 5G. During the technology event, visitors experienced a range of 5G uses from smart cities to virtual, augmented and mixed reality. The demos displayed how 5G-capabilities such as low latency and high data rates, combined with Augmented Reality (AR), can enable new and innovative real-time applications and services. This included a 5G football demo highlighting how 5G will transform gaming. In addition, a city model demo presented flexible and cost-effective solutions for businesses, charting the potential of using today's infrastructure to build tomorrow's 5G networks. Other exciting demos included the Augmented Reality Carousel, which outlines how the digital transformation of different industries will be powered by 5G and IoT using simple, intuitive yet powerful tools like AR. Commenting on the event, Said Abdullah AL Ajmi, Vice President of Operations at Omantel, said: "We are very excited to work with both TRA and Ericsson to bring these to our people which demonstrate the unlimited possibilities that 5G can offer. This is an important milestone in our journey following several successful tests of the technology and a massive upgrade of our infrastructure and transmission network to accommodate the 5G technology requirements in Oman." According to Ericsson, the speed of 5G development in GCC countries is due to companies and authorities making it easier for companies to do work in the country, which the Telecommunications Regulation Authority confirmed. An official from Ericsson told Times of Oman that although details cannot be given, the company is in talks with providers in Oman and that consumers can expect to hear good news by the end of 2019.

(June 29, 2019) timesofoman.com

Pakistan

The Pakistan Telecommunication Authority (PTA) has unveiled framework for test and development of future technologies, particularly 5G wireless networks, in the country. The framework enables the use of radio spectrum on trial basis for non-commercial purposes to carry out trials for innovative use of radio frequency spectrum, apparatus/equipment and academic purposes including but not limited to scientific research, radio concepts and new systems demonstrations. In this regard, the government of Pakistan's policy directive-based framework invites all stakeholders for participation and in subject trials. The rapid growth in mobile data traffic and consumer demand for enhanced mobile broadband experience have led to an increasing emphasis on the upcoming fifth generation of mobile technology (5G). Seen as a comprehensive wireless-access solution with the capacity to address the demands and requirements of mobile communication for IMT-2020 and beyond, it is projected that this

technology will operate in a highly heterogeneous environment and provide ubiquitous connectivity for a wide range of devices, new applications and use cases. The scope of IMT-2020 is much broader than the previous generations of mobile broadband communication systems. The ITU's work in developing the specifications for IMT-2020 in close collaboration with the whole gamut of 5G stakeholders is now well underway along with the associated spectrum management and spectrum identification aspects. IMT-2020 will be a cornerstone for all of the activities related to attaining the goals in the 2030 Agenda for Sustainable Development. This framework enables the use of radio spectrum on trial basis for noncommercial purposes to carry out trials for innovative use of radio frequency spectrum, apparatus/equipment and academic purposes including but not limited to scientific research, radio concepts and new systems demonstrations. The document contains the terms and conditions which will be complied by an entity/organization which intends to conduct trials, demonstrate systems and/or services in Pakistan-based on IMT 2020 for the purpose of demonstrating readiness for new technologies in standalone (SA) and/or non-standalone (NSA) environment including but not limited to identified use cases of EMBB (enhanced mobile broadband), URLLC (ultra-reliable and low-latency communications) and MMTC (massive machine type communications) through slicing, orchestration and management techniques, application and use case development, etc, for better spectral efficiency and improved overall user experience. The Section 4 of the government i.e. "policy directive for test and development of future technologies particularly for Fifth Generation (5G) wireless networks in Pakistan" requires the PTA to issue a framework for temporary test and development licenses/ authorizations which shall include criteria for the provision of authorization, conditions, duration, and other terms and conditions. An entity registered with the Securities and Exchange Commission of Pakistan (SECP) and/or Pakistan Engineering Council (PEC), R&D Organizations and academic institutions, devices and/or equipment manufacturers, etc will be eligible to apply for test and development authorization. The applicant will apply for authorization to the PTA in accordance with the checklist of this framework. The PTA will analyze the application and may require any clarification or additional information from the applicant in a timely manner. Once the application is complete in all aspects, the PTA may forward the same to the Frequency Allocation Board (FAB), under the Telecom Act Section 5(2) (c) read with the Section 43(5). The FAB will assign the spectrum to be used for subject trials as per the act which will become effective from the date of authorization issued by the PTA. Mere assignment of spectrum by the FAB would not give right to the applicant for use of the same until authorization is obtained from the PTA. Upon the assignment of spectrum by the FAB, the PTA will issue authorization to the applicant consistent with terms and conditions. The grant of authorization will be subject to fulfilment of all the codal formalities by the applicant. The Test & Development Authorization allows an applicant to use spectrum on non-exclusive, non-commercial basis temporarily for the purposes mentioned at 1.3 of this framework. The applicants can propose spectrum for trial purpose which could inter alia, including but not limited to the requisite spectrum blocks in 2.6 GHz, 3.6 GHz and other relevant bands amenable to millimeter wave (MMW) propagation. There is no regulatory fee associated with 'non-commercial trial permission' or the spectrum usage for this purpose. If the trial network is connected to any licensed network, the test & development authorization holder can be liable for any charges from host/operators incurred during the trial; however, users/consumers will not be charged for any services offered during the trial. The trial will last for the period of three to six months or as stated in the authorization issued by the PTA. Any request for re-issuance/extension in the period of trials must be submitted to the PTA for prior written approval. The PTA may determine a reasonable period for the extension in the trial period, taking into consideration the proposed trial set-up and request will be processed as per the regulatory and standard provisions. (June 27, 2019) brecorder.com

Pakistan Telecommunication Authority (PTA) plans to upgrade the scope of work for telecom operators under the telecommunication license framework bringing it at par with the emerging global standards and the transforming role of telecom sector at the domestic level. The telecom regulator will hire a consultant in this regard which will carry out various tasks to develop a comprehensive framework for telecom operators under the new licensing regime. PTA plans to overhaul license regime of telecom sector and will execute below tasks.

1. It will assess the existing licensing framework of the operators.
2. It will develop a licensing framework for future including license renewal.
3. It will prepare a test and development license framework that should include criteria for the provision of licenses, license conditions, the duration of the licenses, the terms and conditions of reissuing the licenses on expiry.
4. It will prepare a framework for MVNO (Mobile Virtual Network Operator) as provided in accordance with policy guidelines on mobile network operators and mobile virtual network operators considering the best international practices.

Emerging Scope of Work

PTA intends to determine the method of authorization to organizations holding a broadcasting license but can offer telecommunication services to ensure equivalent treatment of alternative infrastructure providers. It will also chalk out a mechanism under which it will authorize the telecommunications licensees for the provision of broadcast media and distribution service, including the necessity of doing so given the evolving nature of TV. On behalf of PTA, a consultant will assess possibilities for separation of spectrum and operations licensing. It will also find out the requirements for deployment of public Wi-Fi metropolitan area networks. (June 24, 2019) propakistani.pk

Pakistan Telecommunication Authority (PTA) has introduced a two-step authentication process to curb the misuse of identity for mobile registration. The applicant's entered mobile number is authenticated against biometrically verified mobile number database and a one-time password (OTP) is sent via SMS to applicant's mobile number. Upon entry of OTP code, an application is transmitted to the Federal Board of Revenue (FBR). In case of a failed authentication, the application is put on hold.

The applicant will receive intimation via the system to upload a copy of their passport, CNIC & immigration stamp pictures. Upon validation, the system will transmit the request to FBR. According to official documents, under the Device Identification, Registration & Blocking System (DIRBS) a total of 357 million IMEI were registered as of January 15, 2019 and the number of non-compliant sets which were blocked after January 15 2019 stands at 9.57 million. Another 10.66 million GSMA valid IMEI were also blocked. Under the individual registration category, 986,191 devices applied under DIRBS where 656,920 devices were registered free, 33,830 registered with tax, and paid a total of Rs 74 million in taxes while 44,943 misuse cases were sent to FBR and Federal Investigation Agency (FIA). The federal cabinet has been approached with a proposal to withdraw Federal Board of Revenue (FBR) Baggage Rules exemption for mobile phones to address the misuse of travel data and for the reduction in taxes and duties on new cell phones. In line with section 9.6 of the Telecom Policy 2015, PTA has developed a system to;

i. Eliminate counterfeit, non-standard and duplicate (IMEI) devices from the networks;
i. Support FBR in curbing smuggled mobile devices;
i. Address security issues due to usage of non-standard & duplicate IMEI handset.

As part of the federal cabinet decision, all devices seen on mobile networks as of January 15, 2019 were converted to compliant legal status. Thus, a total of 357 million devices have been convened to compliant status. Non-compliant devices seen on networks after January 15, 2019 and non-tax paid devices which are not registered (after 60 days) are being blocked in phases.
(June 23, 2019) propakistani.pk

Saudi Arabia

The Ministry of Communications and Information Technology signed a memorandum of cooperation with the Japanese Ministry of Internal Affairs and Communications on Sunday. The agreement will increase cooperation between the two countries in the field of telecommunications and information technology. Saudi Arabia's Minister of Communications and Information Technology Abdullah Al-Sawaha and the Japanese Minister of Internal Affairs and Communications Masatoshi Ishida signed the agreement in the presence of a number of officials from both sides. The agreement was signed on the sidelines of the G-20 Digital Economy Ministerial Meeting in Japan, in which Al-Sawaha is participating. The ministerial meeting is seen as preparation for the G-20 Summit in Japan later this month. "The agreement focuses on several key areas of work, including the development of human capital, improving the quality of digital infrastructure, supporting the IT industry, and investing in innovation and emerging technologies," Al-Sawaha explained. He stressed that the development of human capital is the central pillar of a comprehensive development process. "This is why the ministry is keen to help young Saudis develop their skills," he said. Under the agreement, exchange visits, forums, conferences, workshops, and other activities will be organized between the two countries. Regarding the ministerial meeting, Al-Sawaha said the meeting tackled policies related to the digital economy, and the need for effective solutions to the challenges facing the global digital economy, the digital security of products and services, and the free flow of data, to achieve sustainable development objectives. He added that the meeting also discussed encouraging innovation and digital entrepreneurship, empowering emerging technologies via appropriate regulatory frameworks, and developing small and medium enterprises to generate comprehensive economic growth. The G-20, which comprises the world's most powerful economies, accounts for 80 percent of global trade, 90 percent of the world's total gross domestic product, and 66 percent of the global population. Its members are Saudi Arabia, Germany, Argentina, Australia, Brazil, Canada, South Korea, China, the US, France, India, Indonesia, Italy, Japan, Mexico, Britain, Russia, South Africa, Turkey and the EU. (June 10, 2019) arabnews.com

Saudi mobile operators provided an average download speed of 32.2 Megabytes per second in Q1 2019, a rise of 12.2 percent quarter-on-quarter (QoQ), according to the Communications and Information Technology Commission's (CITC) Meqyas quarterly report. Saudi Telecom Co. (STC) delivered the highest average performance of 38 Megabytes per second, an 8 percent QoQ increase in Q1. Zain Saudi and Mobily's performance improved by 19 percent and 18 percent QoQ to an average speed of 29.4 and 30.7 Megabytes per second, respectively. As for the quality of YouTube video streaming via mobile internet, streaming was in Full HD, with mixed performance among service providers. The 4G services provided by Mobily recorded the highest Full HD quality of Youtube video streaming of 71 percent, followed by STC and Zain Saudi at 68 percent and 52 percent, respectively. According to data compiled by Argaam, CICT launched in October 2017 Meqyas initiative to test the internet quality in the Kingdom.
(May 26, 2019) argaam.com

Sri Lanka

Sri Lanka Telecom marked a special milestone in the country's digital journey towards SMART Sri Lanka with the launch of the National Digital Roadmap under the patronage of President Maithripala Sirisena. The proposed blueprint for integrated national digitization will be presented through a comprehensive multi-faceted nexus of 16 pillars representing areas such as Smart Government, Smart Security, Smart Health, Smart Transportation and Mobility, covering all facets and processes of the nation's socio-economic, infrastructural and administrative operations. The 'Limitless You' program devised to consolidate the smooth segueing of Sri Lanka's transition and transformation as a fully digitized nation; cement Sri Lanka Telecom's primacy as the country's undisputed industry leader in the Digital Age; and nurture the maturation of employees, customers and citizens in general as sophisticated members of a highly developed and technologically advanced society. During the ceremony, the President presented awards to the persons who contributed in making the National Digital Roadmap a reality. The SLT made a contribution to the Kidney Disease Relief Fund on this occasion. Ministers Harin Fernando, Ajith P. Perera and SLT Group Chairman P.G. Kumarasinghe Sirisena, State Minister Ajith Mannapperuma and others participated in this occasion. (June 12, 2019) colombopage.com

Sudan

A Sudanese court has ordered mobile operator Zain Sudan to restore internet services, after access was cut off earlier this month when security forces dispersed protesters in central Khartoum. Abdel-Adheem Hassan, a lawyer who filed his own case against Zain Sudan over the military-ordered blackout, said that the Khartoum District Court had ordered the Kuwaiti-owned cellco to 'immediately restore internet services to the country'. Hassan said a Zain representative had told the court in response to the petition that the company had been ordered verbally by 'high authorities' to cut the internet, while an unnamed source at Zain told Reuters that the telecoms regulator had ordered the outage and demanded that they be added as a party to the case in an appeal. Sudan's military removed long-time ruler Omar al-Bashir from office in April after months of protests and unrest. Protesters have been demanding that the authorities restore internet services as one of their conditions for returning to talks on forming a transitional administration comprising both civilians and military officers. (June 25, 2019) reuters.com

United Arab Emirates

The UAE Telecommunications Regulatory Authority rolled out its first National Cybersecurity Strategy to create a legal framework that safeguards emerging technologies and the nation's critical infrastructure, as the government boosts cybersecurity investments across the Emirates. "We will identify all existing cybersecurity laws and also draft new regulations required to cope with emerging cybercrimes," said Mohammad Al Zarooni, the TRA's Director of Policies and Programmes. "A couple of potential areas that draw our immediate attention include data security and online chat protection." The new strategy includes 60 initiatives that will be executed across different sectors over the next three years, and then further evaluated. More than 3.7 million individuals in the UAE were affected by cybercrime in 2017, totaling a financial loss of close to Dh3.86 billion, according to a security insights report by cybersecurity specialist Norton. Total time per consumer lost to cybercrime was almost two days, it said. According to the TRA, besides providing a resilient cyber infrastructure, the strategy will create new opportunities in the cybersecurity sector that is currently worth Dh1.8bn in the UAE - almost 10 per cent of the entire Middle East and North Africa market. The TRA is also drafting regulations to ensure the safety of emerging technologies - including cloud computing, artificial intelligence, Internet of Things, digital signatures and blockchain. "Once ready, regulations [for emerging technologies] will be rolled out in phases, depending on the urgency and market requirements. We will ensure a balance to have a smooth nationwide implementation," said Mr. Zarooni. The TRA, which regulates the UAE's telecom sector and enables government entities in the field of "smart" transformation, has developed its strategy after consulting more than 50 relevant global publications and studying other countries' cutting-edge national programmes to incorporate best global practice in the UAE. The regulator has identified nine different sectors, including energy, telecoms, transportation, health and utilities, as "critical" and dedicated programmes will come up for their security. Critical infrastructure constitutes assets that are essential for the well-being of any nation's economy and security. "Critical infrastructure is our priority … even an outage of only couple of hours will impact thousands of people in one go," said Mr. Zarooni, adding, "There will be a unified mechanism to report and respond to minimize damage in case of any breach." As part of the strategy, the TRA will work on developing capabilities of more than 40,000

cybersecurity professionals through further training and opening new job avenues in the field of cybersecurity. (June 25, 2019) thenational.ae

Hamad Obaid Al Mansoori, TRA Director-General, has said that the launch of Microsoft cloud services in the UAE confirms the country's leading role in the ICT sector and as one of the world's leading hubs of digital transformation in all sectors. In a statement, on the launch of Microsoft cloud services in UAE, Al Mansoori said that the presence of advanced, efficient, flexible and high-performance cloud services in the region enables companies for full digital transformation, which positively affects the quality, competitiveness and efficiency of the services they provide to their customers. "The presence of cloud services in the region will also contribute to the promotion of a culture of innovation, especially for start-ups and entrepreneurs, to build globally competitive digital products and services," he added. This also creates new job opportunities in the country in the field of information technology, he went on to say. "TRA, the entity responsible for the development of the ICT sector, welcomes and encourages these investments in the UAE due to its role in making the UAE a global leader in the ICT sector," Al Mansoori concluded.
(June 22, 2019) emirates247.com

A UAE Delegation headed by Hamad Obaid Al Mansoori, the Director General of the Telecommunications Regulatory Authority (TRA), has participated in the International Telecommunication Union (ITU) Council Session for 2019, held currently in Geneva, Switzerland. The ITU Council Session 2019 is the first for the Member States elected at the Plenipotentiary Conference hosted in Dubai last October. The session activities will last unit 20 June 2019. In his speech addressed to the Council. Majed Al Mesmar, TRA Deputy Director General for the Telecommunications Section, thanked the ITU for honoring the UAE by hosting the ITU Plenipotentiary Conference in Dubai. He said: "It was a marvelous experience, during which we worked as one family, representing the meanings of a connected world, and assured that dialogue, openness and international cooperation are the keys to a more prosperous future for the people of the world. As for me and my colleagues in the UAE delegation, those days were, and will remain a shining memory that we will always cherish and pass to our other colleagues as a success story, and share its conclusions and lessons in the context of our ongoing dialogue on development, innovation and adaptation." During the Session, the delegation presented a number of suggestions for developing the working mechanisms of the Plenipotentiary Conference at its future sessions. These include encouraging intensified efforts during informal regional meetings to reach consensus in most participations, following best practices in the preparation of major conferences in various ITU sectors, in particular preparatory meetings for WRC, training of participating delegations and providing them with the necessary information on the most important topics, laws and policies of the conference. The UAE Delegation believes that such measures would have a positive impact on the management of the duration of the Conference and would lead to reducing its duration to less than three weeks. The UAE's active participation in international events in general and in the ITU in particular is part of TRA's vision to enhance the UAE's leading position in the ICT sector, and its mission to benefit from global experiences and to engage positively and effectively in shaping a global future based on sustainability, tolerance and well-being. The ITU Council, consisted of 48 elected Member States including the United Arab Emirates, is discussing in its current session a number of topics related to the ICT sector, as it serves as the Union's governing body in the interval between Plenipotentiary Conferences. Its role is to consider broad telecommunication policy issues to ensure that the Union's activities, policies and strategies fully respond to today's dynamic, rapidly changing telecommunications environment. The ITU Council also prepares a report on the policy and strategic planning of the ITU and responsible for ensuring the smooth day-to-day running of the Union, coordinating work programmes, approving budgets and controlling finances and expenditure. The Council also takes all steps to facilitate the implementation of the provisions of the ITU Constitution, the ITU Convention, the Administrative Regulations (International Telecommunications Regulations and Radio Regulations), and the decisions of Plenipotentiary Conferences and; where appropriate, the decisions of other conferences and meetings of the Union. Moreover, the UAE was elected successfully for the ITU Council membership for the fourth consecutive time, for Asia and Australasia Region, after receiving 164 votes. The election took place during the Plenipotentiary Conference hosted by the UAE in Dubai from 29 October to 16 November 2018. The UAE's fourth term as a member of the ITU Council reflects its leading position in the ICT sector globally. The UAE has a strong reputation in this field and has always been a key supporter of all sustainable development efforts around the world.
(June 12, 2019) zawya.com

REGULATORY ACTIVITIES BEYOND THE SAMENA REGION

Argentina

The National Communications Agency (ENACOM) has distributed 450MHz spectrum covering 126 new service areas across twelve provinces, as it seeks to improve rural connectivity. The locations set to benefit from this phase of the scheme have been named as: Chubut, Chaco, Catamarca, Jujuy, Mendoza, Neuquen, Rio Negro, Santa Cruz, Santiago del Estero, San Juan, Salta and Tucuman. Following the network rollouts – which will be carried out by small/medium-sized local providers – a total of 284,916 inhabitants will be able receive access to data services for the first time. In May this year the watchdog distributed 450MHz spectrum covering eleven locations in the provinces of Santiago del Estero, Tierra del Fuego, Rio Negro, Santa Fe and Santa Cruz. The spectrum awards are understood to form part of the government's Plan de Conectividad Rural (Rural Connectivity Plan).
(June 5, 2019) telegeography.com

Australia

The Australian Competition and Consumer Commission (ACCC) in the Federal Court has initiated legal proceedings against Optus over allegations that it misled consumers about the need to move to the National Broadband Network (NBN) or risk being disconnected. In a press release outlining its position, the ACCC noted that on 24 May 2018 Optus had sent an email offering its NBN-based broadband services to 138,988 of its mobile customers. In this the operator told these customers that their broadband service would be 'disconnected very soon' and encouraged them to 'make the switch, before it's too late.' The ACCC has alleged that these were false or misleading claims, arguing that, when the email was sent, Optus understood the recipients of it were already being supplied with NBN-based services by another service provider and did not have 'any reasonable basis for asserting they would be disconnected'. Commenting, ACCC Commissioner Sarah Court said: 'Moving to the NBN is an important decision for consumers, and it can also be a confusing process … The ACCC has had to take action about Optus' advertising on several previous occasions, and it is concerning that we are again having to take them to court for alleged misleading statements about this issue.' The ACCC is reportedly seeking declarations, injunctions, pecuniary penalties, compliance orders and costs.
(June 27, 2019) telegeography.com

Austria

The Ministry for Transport, Innovation and Technology (BMVIT) and the Regulatory Authority for Broadcasting & Telecoms (RTR) have launched a consultation on the allocation of spectrum in the 2300MHz and 26GHz frequency bands. The government is seeking to determine interest in and demand for the spectrum and to evaluate how much may be required by operators. Interested parties have been given until 30 August 2019 to submit comments.
(June 20, 2019) telegeography.com

Brazil

Gired, the group linked to Brazil's regulator Anatel and which is in charge of the digitization of TV channels in the country, approved the last study on the release of the 700MHz band for 4G services. The approval was in the region of Santa Cruz do Sul, Rio Grande do Sul state. Now, all main municipalities across Brazil have technical viability for operations in the band. By the end of 2018, 130mln people in Brazil lived in cities served exclusively by digital TV, following the analog signal switch-off. (June 23, 2019) bnamericas.com

Sector watchdog the National Telecommunications Agency (Anatel) has approved a plan to help expand broadband access in Brazil by coordinating investment from the public and private sectors. The programe, dubbed the Structural Plan for Telecommunications Networks (Plano Estrutural de Redes de Telecomunicacoes, PERT), would become Anatel's formal instrument for implementing policies and would serve as a reference for adjusting concessions and rebalancing obligations by operators, with an annual review process allowing the regulator to periodically adjust the goals and targets of various projects. As part of the plan, Anatel highlighted seven projects to overcome issues with the sector, focused around the expansion of three main network types – transport,

access and public – with one official quoted as saying: 'Brazil needs to overcome the challenge of connectivity, and the only possible way is to develop its network infrastructure'.

(June 14, 2019) telegeography.com

The National Telecommunications Agency Anatel has decided the allocation and regulation on the use of 2.3 GHz and 3.5GHz bands for the fifth generation mobile internet, 5G. According to Anatel, the 2.3 GHz band is essential for alignment with world systems like IMT (International Mobile Telecommunications), while the 3.5 GHz band is regarded by many as the gateway to very high-speed networks of fifth generation telecom. "The approval of these two items is an important step for the bidding process in which we have been working so that national interest is considered", emphasized Leonardo de Morais, president of Anatel, in a statement. The next step is to determine a rapporteur for the call for bids to be open for network auction next year. Later, the notice will proceed to public consultation. According to Anatel, the allocation of frequencies took into consideration blocks, arrangements, geographic distribution, and counterparts to be demanded from future successful bidders, including potential preventive and corrective measures to mitigate any harmful interference among radiocommunication systems. Telecom Italia's Brazilian subsidiary TIM has started the first 5G tests in Brazil ahead of the commercial launch of the technology in the country, the forecast for 2021. The trials on the 3.5 GHz frequency in the southern capital of Florianópolis are being carried out in partnership with Huawei and CERTI foundation, a public research and development organization. (May 26, 2019) riotimesonline.com

Canada

The Government of Canada has issued the final version of a 'policy direction' that requires the Canadian Radio-television and Telecommunications Commission (CRTC) to 'consider competition, affordability, consumer interests and innovation in all of its telecommunications decisions and demonstrate to Canadians that it has done so'. The directive aims to encourage all forms of competition and investment to bring down costs of internet and cellphone bills, as the government says that the prices Canadians pay for telecoms services continue to be high compared to other nations. Wireless data plans in Canadian regions with strong competition are 'up to 32% cheaper than the national average', according to government figures. Navdeep Bains, Minister of Innovation, Science and Economic Development, said: 'As long as Canadians pay too steep a price for their cellphone and internet bills, our government will take extraordinary means to continue driving down the prices of telecommunications services. We are also fostering a climate of investment and innovation for Canada's telecom service providers to improve the quality of services.'

(June 20, 2019) telegeography.com

The Canadian Radio-television and Telecommunications Commission (CRTC) has launched the first call for applications for its five-year CAD750 million (USD556 million) Broadband Fund, initially for projects in the Canadian territories (Yukon, Northwest Territories and Nunavut) and satellite-dependent communities. According to the CRTC, all households in the Canadian territories lack access to the regulator's 'universal service objective' standard of fixed broadband internet access – 50Mbps/10Mbps download/upload with the option of unlimited data – and 72% of major roads are not covered by 4G LTE mobile, while the digital divide is also evident in communities across the country where there is no terrestrial connectivity. Applicants with at least three years' experience deploying and operating broadband infrastructure in Canada may apply for funding for projects to build or upgrade fixed access and transport infrastructure or mobile networks, by 3 October 2019. The CRTC will announce the selected projects from the first call for applications in 2020. A second call open to all regions in Canada will be launched this autumn.

(June 4, 2019) telegeography.com

China

China has approved four operating licenses for 5G networks, setting the stage for the super-fast telecommunications system. The country's three state-owned wireless carriers and China Broadcasting Network Corp were granted licenses for full commercial deployment, according to state broadcaster CCTV. The operators, China Mobile Ltd, China Telecom Corp and China Unicom Hong Kong Ltd, have been testing the technology in several cities including Beijing and Shenzhen. Full deployment of 5G networks in a country with almost 1.6 billion wireless phone subscriptions is expected to boost local companies designing gear for applications in autonomous driving, robotics, remote surveillance and virtual reality. The faster-than-expected approvals also come as Shenzhen-based Huawei Technologies Co, the world's largest manufacturer of networking equipment, has vowed to maintain its lead in the face of a US campaign pressuring allies not to use the company's products. The battle over 5G network suppliers is part of a broader push by the Trump administration to check China's rise as a global technology powerhouse. China continues to

welcome foreign enterprises to its 5G market, Minister of Industry and Information Technology Miao Wei said, after the licenses were announced. Shares of some 5G-related companies fell in Hong Kong and Shanghai trading after the license announcement, trimming gains made earlier in the week on expectations the companies would benefit from the push for the new networks. China Tower Corp, the three major carriers' infrastructure provider, fell 3% as of 10.50am in Hong Kong, paring its advance in the past four days to 9.1%. ZTE Corp, which makes handsets and telecom gear, dropped 4.3%, trimming its four-day rally to 7.1%. Betting on the fate of the nation's next generation of telecom networks has been one of the year's hottest trades in China and Hong Kong. An index of telecom-related shares is up 20% this year, led by a 54% rally in ZTE's Shenzhen-traded stock. Beijing-based Xiaomi Corp in March said it would introduce China's first 5G phone in May or June. Huawei and ZTE, have also said they intend to offer handsets compatible with the technology this year. Introducing 5G will directly add 6.3 trillion yuan (US$912bil) to economic output and 8 million jobs by 2030, the China Academy of Information and Communications Technology estimates

(June 9, 2019) thestar.com.my

China's telecoms authority the Ministry of Industry and Information Technology (MIIT) has awarded commercial 5G licenses to the country's trio of mobile network operators (MNOs) – China Mobile, China Unicom and China Telecom – each of which is currently engaged in pre-commercial trials of the technology, as well as state-owned cable operator China Broadcasting Network (CBN. The new technology is expected to generate CNY10.6 trillion (USD1.53 trillion) worth of economic output and create more than three million jobs between 2020 and 2025, according to a report earlier this year from the China Academy of Information Communications Technology (CAICT). In a nod to ongoing diplomatic clashes over the involvement of Chinese telecom vendor Huawei in the construction of 5G networks in other countries, the MIIT said that China welcomes domestic and international enterprises to participate in the 'building, application and promotion of its 5G network and share the sector's development dividends'. Regarding the licensing of a fourth provider, China Daily quotes Wang Zhiqin, the head of China's IMT2020 (5G) Promotion Group, as saying that licensing of CBN would help accelerate the rollout of 5G infrastructure, adding: 'Granting four 5G licenses is conducive to fostering rational competition and investment in the market'. CBN was established back in 2014 as part of Beijing's 'Three Network Convergence' policy, which sought to merge telecom, television and internet services into a single network, with the company tasked with deploying cable infrastructure and unifying existing networks. In 2016 the company was awarded a basic telecom service license. In November last year the company was given permission to roll out 5G networks; the company is understood to have not been granted any additional spectrum for the systems, however, indicating that it would use its existing holdings in the 700MHz band for the purpose. The trio of MNOs, on the other hand, were granted trial 5G licenses in December 2018, including additional spectrum: China Unicom was granted use of the 3500MHz-3600MHz band, Telecom was awarded spectrum in the 3400MHz-3500MHz range and China Mobile was given access to spectrum at 2515MHz-2675MHz and 4800MHz-4900MHz.

(June 6, 2019) Xinhua News

Czech Republic

The Czech Telecommunication Office (CTU) has published the draft plan of the forthcoming auction of frequencies in the 700MHz and 3.5GHz bands, suitable for 5G services. In the 60-page document, it establishes that the call for tenders is scheduled for this autumn, while the e-auction itself should take place in January 2020. If all goes to plan the regulator hopes that frequency allocations can be granted in April, allowing the successful bidding operators to start using their frequency blocks by mid-2020 – when the 700MHz frequencies currently allotted for DVB-T broadcasts will be released. The terms and conditions of the auction are based on previously published principles, which the regulator documented over the past year in its efforts to maximize the transparency of the selection process. The CTU notes that, in order to fulfil one of the main objectives of the auction – which is to deepen competition on the electronic communications market – it is reserving a 2×10MHz block of spectrum at 700MHz for a new operator(s). Further, it will be allowed to compete for another 5MHz, but if none of the new entrants in the first auction round show interest in this reserved block, the CTU will open it up and offer it to all auction participants. Concurrently, in the 3.5GHz band the CTU says it will set 'a new spectral limit for the new operator compared to the existing operators'. Additional terms and conditions include the rule that any existing operators participating in the 700MHz band auction will assume a national roaming commitment, valid for six years, to allow any newcomer to offer their services through a competitors' network to meet other conditions (e.g. coverage requirements). One of the conditions for national roaming is that any new operator covers at least 20% of the Czech population with its 5G network. Further, the CTU – in its drive to boost competition – also confirmed the validity of the

wholesale offer commitment from the 4G auction for the bands offered. The terms of the auction further set out what the CTU terms 'development criteria that ensure that frequencies are handled efficiently'. Specifically, successful bidders will have to cover municipalities where high speed internet is not available and are currently identified as 'white spaces'. They must cover 95% of the population of all these communities within three years of the allocation. In addition, by January 2025 100% of the backbone network of railway and road corridors, and 95% of municipalities above 50,000 must be covered. Ultimately, within ten years the winning operators must cover 99% of the population and 90% of the territory of each district of the Czech Republic. Finally, the CTU sets out that only entities that are 'economically independent of each other' can participate in the auction and that the successful winners 'must fulfil this condition for the entire period of the allocation, i.e. by the middle of 2036 (700MHz band), and mid-2032 (3.5GHz band). The minimum price for individual auction blocks has been determined on the basis of an analysis of the prices achieved in the relevant European countries. Taken together, the reserve fee on all auction blocks to be sold is CZK6.3 billion (USD281.6 million).
(June 28, 2019) telegeography.com

Ethiopia

Following reports last week that Ethiopia's parliament is preparing to approve a law which would allow for the liberalization of the telecoms sector, Reuters has now revealed that plans are afoot for the country to license two new operators by the end of the year. Citing 'three people with direct knowledge of the process', the news agency said that Ethiopia's government is aiming to award licenses to 'multinational mobile companies' by end-2019. Specifically, as per the state's plans – which have yet to be formally announced – a bidding process for the two concessions is expected to get underway in September, ahead of the award of concessions in December. It is understood that Ethiopia's government would then expect winning bidders to begin operations in 2020, with services to initially be offered over Ethio Telecom's infrastructure. Government officials are said to have examined a number of options for opening up the market, including the sale of a minority stake in incumbent telecoms provider Ethio Telecom. However, with it claimed that Prime Minister Abiy Ahmed is keen to deliver quickly on reform pledges, it is believed that the decision to move ahead with issuing new concessions has been made as the Ethio Telecom stake sale looks likely to be a lengthy process. Commenting on the plans, Ethiopia's State Minister of Finance Eyob Tekalign Tolina was cited as confirming that the government hopes to launch the bidding process for new concessions in September, though he declined to flesh out the market reform plans. 'By this time next year, we hope that many Ethiopians will be using different SIM cards,' the minister noted, adding: 'We are operating on a very aggressive timeline.' Meanwhile, Reuters also noted that a new telecoms regulator is expected to be established to oversee the issuing of the new licenses. To that end, a law to create the new as yet unnamed agency, is understood to have been debated in parliament late last week. (June 17, 2019) reuter.com

South Africa-based wireless carrier has identified Ethiopia as a potential new market amid rumors that the nation is keen to open its telecoms market to private investors. Bloomberg cites the group's Chief Executive Rob Shuter as saying: 'There are a few large markets that are under-penetrated and where there is scope for a number one or number two operator, like Ethiopia,' and that MTN would obviously like to 'participate, in some way'. If realized, the move would dovetail with MTN Group's strategy to focus on African markets where it can become a major player, or where the potential exists to exploit mobile banking and other data services opportunities. Shuter has looked to pull MTN out of countries that do not fit these criteria (e.g. Cyprus and Botswana). 'We have about one third of our capital in assets that we've identified as not long-term strategic,' the CEO stated. In June 2018 Ethiopian Prime Minister Abiy Ahmed revealed plans to open its state-run telecoms monopoly Ethio Telecom to private domestic and foreign investment. At the time, the EPRDF coalition backed its own calls for necessary economic reforms in the country to sustain rapid growth and boost its exports. 'While majority stakes will be held by the state, shares in Ethio Telecom … will be sold to both domestic and foreign investors,' it confirmed. Hot on the heels of the development, MTN Group said it was excited by the potential opening up of the Ethiopian market, while another South Africa-based company, Vodacom Group – itself majority owned by the UK's Vodafone Group – said: 'Vodacom has said on many occasions that Ethiopia is an attractive market so it follows that there would be interest. Naturally this is dependent on what might become available and if it fits within our investment parameters.'
(June 3, 2019) bloomberg.com

France

French telecoms regulator Arcep has set a deadline of 31 December 2022 for the award of spectrum in the 1.5GHz band (1427MHz-1517MHz) for 5G use. The watchdog said that the band is currently used for point-to-point links for the collection of public and professional mobile networks and by the Ministries of the Interior and Defence. The goal set at European level is to make it available for mobile networks by 2023. In view of the evolution of mobile networks to 5G, three bands are considered in metropolitan France: the 3.5 GHz and 26 GHz bands, identified as pioneer bands for the provision of 5G, and the so-called L band (1.5GHz). (June 14, 2019) telegeography.com

Germany

After 52 days and 497 rounds of bidding, Germany's Federal Network Agency (FNA, known locally as the Bundesnetzagentur or BNetzA) has announced the conclusion of its multi-band 5G spectrum auction, raising a total of EUR6.5 billion (USD7.3 billion). Four companies – Telekom Deutschland, Telefonica Deutschland, Vodafone Germany and Drillisch Netz – participated in the auction, which began on 19 March and saw a total of 420MHz of spectrum sold off, comprising 2×60MHz of paired spectrum in the 1920MHz-1980MHz/2110MHz-2170MHz range (divided into 2×5MHz blocks) and 300MHz of unpaired spectrum in the 3400MHz-3700MHz range (blocks of 10MHz). Telekom Deutschland was the highest bidder, paying EUR851.5 million for 2×20MHz of 2100MHz spectrum and EUR1.3 billion for 90MHz of 3.6GHz frequencies, followed by UK-owned Vodafone, which acquired 2×20MHz of 2100MHz spectrum for EUR806.5 million and 90MHz of 3.6GHz frequencies for EUR1.1 billion. Telefonica Deutschland bid EUR381.1 million for 2×10MHz (2100MHz) and EUR1.04 billion for 70MHz (3.6GHz) and lastly newcomer Drillisch Netz, which is wholly owned by 1&1 Drillisch, spent EUR334.9 million on 2×10MHz of 2100MHz spectrum and EUR735.2 million on 50MHz of 3.6GHz frequencies. The coverage obligations for the licence winners include a requirement to supply speeds of a minimum of 100Mbps to at least 98% of households in each state by the end of 2022, as well as all federal highways, and the major roads and railways. By the end of 2024, 5G spectrum holders will be obliged to provide speeds of 100Mbps to all other main roads, while covering the smaller roads, railways, seaports and the main waterways with data rates of at least 50Mbps. Furthermore, each operator will have to set up 1,000 5G base stations by the end of 2022, in addition to 500 base stations in 'white spot' unserved rural areas. For newcomers, less stringent coverage requirements apply. (June 13, 2019) telegeography.com

The Federal Network Agency (FNA, known locally as the Bundesnetzagentur or BNetzA) has increased the minimum bid size with a view to bringing the ongoing 5G mobile spectrum auction to an end. Reuters cites the regulator as saying that the increase has been imposed on the 3.5GHz band bidding. The auction began on 19 March and total bids placed by the four participants – Telekom Deutschland, Telefonica Deutschland, Vodafone Germany and Drillisch Netz – have reached EUR6.37 billion (USD716.9 million) after 481 rounds. Overall, 420MHz of spectrum is being sold off, comprising 2×60MHz of paired spectrum in the 1920MHz-1980MHz/2110MHz-2170MHz range (divided into 2×5MHz blocks) and 300MHz of unpaired spectrum in the 3400MHz-3700MHz range (blocks of 10MHz).

(June 7, 2019) telegeography.com

Greece

Telecoms regulator, the Hellenic Telecommunications & Post Commission (Ethniki Epitropi Tilepikoinonion kai Tachydromeion, EETT), has taken a significant step towards its planned auction of 5G mobile spectrum. It has called for applications for a tender to find a contractor to help manage the award process, with bids for the EUR160,000 (USD181,000) contract invited until 12 July. The watchdog is looking to award 2×30MHz in the 700MHz band, 65MHz in the 1500MHz range, 2×15 plus 2×45MHz in the 2100MHz band, 280MHz at 3.6GHz and 2,500MHz in the 24GHz-28GHz range. While some frequencies will be sold via auction, others will be offered for free. Greece is currently home to three mobile network operators (MNOs), Cosmote, Vodafone and Wind. (June 13, 2019) telegeography.com

The government is planning to install a network of 3,000 free public Wi-Fi hotspots beginning next year. A report from Wi-Fi Now says the EUR14.8 million (USD16.7 million) rollout is being managed by Greece's Ministry of Digital Policy, Telecommunications & Information and financed by the European Structural and Investment Fund (ESIF) and European Regional Development Fund (ERDF). Locations covered by the free Wi-Fi service will include parks, squares, pedestrian areas, educational facilities, health centers and public transport.

(June 13, 2019) telegeography.com

Hong Kong

The Office of the Communications Authority (OFCA) has launched a subsidy scheme to encourage fixed network operators to roll out fiber infrastructure to villages in remote areas of the territory. The project covers 235 villages across nine districts in the New Territories and outlying islands (namely North, Sai Kung, Tai Po, Sha Tin, Yuen Long, Tuen Mun, Tsuen Wan, Kwai Tsing and Islands). The scheme will also subsidies the rollout of three submarine cables connecting Lamma Island to Hong Kong Island, Cheung Chau to Lantau Island, and Peng Chau to Lantau Island. These 235 villages are grouped under six projects, with operators being invited to participate in tenders to win the rollout contracts. Financial incentives will be on offer for each of the six projects. Successful bidders will be expected to open up at least half the capacity on the new fiber networks to rival firms in order to encourage competition. The local fixed broadband sector is served by firms such as HKT, HKBN, HGC and i-Cable.

(June 11, 2019) telegeography.com

Hungary

Hungarian telecoms regulator the National Media & Infocommunications Authority (NMHH) has published its draft plan for a multi-band 5G spectrum license auction scheduled for autumn 2019, proposing a total starting bid value of HUF84.5 billion (USD293.3 million). The following spectrum is up for grabs in the auction:

- 2×25MHz in the 700MHz band (708MHz-733MHz/763MHz-788MHz); in five 2×5MHz blocks; starting bid per block HUF5 billion
- 2×15MHz in the 2100MHz band (1965MHz-1980MHz/2155MHz–2170MHz); in three 2×5MHz blocks; starting bid per block HUF4 billion
- 1×15MHz in the 2600MHz band (2600MHz-2615MHz); in one 15MHz TDD block; starting bid HUF1 billion
- 1×310MHz in the 3600MHz band (3490MHz-3800MHz); in 31 10MHz TDD blocks; starting bid per block HUF1.5 billion.

Licenses in the 3600MHz, 2100MHz and 2600MHz bands have immediate validity (aiming to support pilot 3.5GHz 5G launches by end-2019 and capacity increases for existing mobile networks) but 700MHz concessions are valid from September 2020 (due to the 700MHz band's current usage by TV broadcasting). All licenses expire on 6 September 2034, extendable by five years without tender. The NMHH holds an in-person auction consultation on 3 July, with all comments on its draft plan expected by 8 July to enable it to finalise the plan 'by the end of autumn'. The watchdog notes that the auction meets the obligations of the European Electronic Communications Code (Article 54) stipulating facilitation of 5G deployment in the 3400MHz-3800MHz band by end-2020, and also Decision 2017/899 of the European Parliament/ Council (May 2017) obliging EU member states to put measures in place by 30 June 2020 to support the launch of wireless broadband services in the 694MHz-790MHz band. In a separate announcement this week, Hungarian Minister of Innovation and Technology Laszlo Palkovics told the 5G Coalition plenary session and conference in Budapest that the government must play an active role in the construction of 5G networks. The 5G Coalition – established in 2017 by government institutions, companies, business chambers, universities and professional and civic organizations – is expected to finalize its 5G strategy for official adoption next month; the appointment of a government commissioner to coordinate 5G developments is one of the key policy proposals. According to the Minister, the first pilot 5G services should launch in Q3 2019, whilst 'high capacity services' using the 26GHz band are expected to be available from 2020 (including commercial 5G launches in industrial facilities – with dedicated frequencies reserved for industrial companies and institutions including universities, potentially in the 26GHz and 2300MHz bands). Palkovics added that by 2025 all major cities and major transport routes in Hungary will be covered by 5G. via Hungary's 26GHz spectrum auction in April 2012, 15-year licenses were won by Magyar Telekom, Vodafone, Telenor, GTS Hungary (now part of Magyar Telekom), and subsequently MVM Net (after a transfer of part of another company's spectrum).

(June 20, 2019) telegeography.com

India

The Telecom Regulatory Authority of India (TRAI) may have its hands tied regarding the lowering of penalties to be issued to two mobile providers. The Economic Times cites unnamed TRAI officials as saying that it may be powerless to comply with a recent request from the Digital Communications Commission (DCC) to reconsider the value of fines to be imposed on Vodafone Idea and Bharti Airtel for failing to provide sufficient points of interconnection (PoI) to sector newcomer Reliance Jio Infocomm (Jio) when it launched in September 2016. The official explained that whilst it agreed that 'penalties should be commensurate with the violation' there was no mechanism to determining 'what penalty should be imposed for what violation of license condition'. They went on to note that the TRAI had made a recommendation to the Department of Telecommunications (DoT) in the past to grade penalties, but the ministry had not picked up the

proposal. Earlier this month the DCC approved plans from the TRAI to impose fines totaling INR30.5 billion (USD441 million) on the pair: at the time of the infraction, Vodafone comprised Vodafone India and Idea Cellular, both of which were recommended fines. The DCC approved the plan to impose a fine, but asked the TRAI to reconsider the value of the penalty to take into account the sector's financial stress. Another TRAI official was quoted as saying, however, that the regulator did not have the power to determine the level of financial stress on the industry, saying: 'Audit and accounts of service providers done by DoT, and the TRAI Act don't allow us to assess the health of the sector.' (June 28, 2019) telegeography.com

Sector watchdog the Telecom Regulatory Authority of India (TRAI) has published a consultation document seeking input on the proposed allocation of 700MHz spectrum to Indian Railways (IR) for an LTE-based network for passenger safety and security services. The Department of Telecommunications (DoT) passed on the Ministry of Railway's proposal to the TRAI in February this year, requesting the regulator's recommendations on the administrative allocation of spectrum to IR, the appropriate frequency band, amount of spectrum and price. At present, a 2×1.6MHz block of spectrum in the 900MHz band has been assigned to the government-run firm for its GSM-Railway (GSM-R) network, but IR wants to upgrade the system to create an 'ultra-high-speed wireless corridor' along its network that would cater to current and future data and voice needs for train-ground and train-train communications. To that end, the company has requested a 2×15MHz block of 700MHz frequencies, starting with at least. Further, as the spectrum would not be for commercial use but for public safety services, it has argued that it should be allocated free of cost. In its reference to the TRAI, however, the DoT noted that 2×10MHz in the 700MHz has already been reserved or the Defence Ministry, whilst the remaining 2×35MHz should be auctioned for 4G and 5G services. In its place, the DoT suggesting issuing spectrum in the 450MHz-470MHz range but IR has argued that the band was unsuitable for its needs. The TRAI is accepting comments on the consultation paper until 22 July 2019. (June 25, 2019) telegeography.com

The Digital Communications Commission (DCC) has approved plans to impose fines on Bharti Airtel and Vodafone Idea for denying newcomer Reliance Jio Infocomm (Jio) sufficient points of interconnection (PoI) when the cellco launched in September 2016. A senior official was quoted as saying, however, that the DCC 'has decided to send the recommendation once again to the telecom regulator, to reconsider the amount of penalty since the sector is under financial distresses. The Telecom Regulatory Authority of India (TRAI) had previously recommended fines of INR500 million (USD7.15 million) per licence area, equating to a total of INR30.5 billion between the cellcos: INR10.5 billion each for Airtel and Vodafone plus INR9.5 billion for Idea Cellular, though Vodafone and Idea have since merged. According the official, the DCC felt that imposing the maximum penalty on the telcos was 'very harsh' and the fine could be reduced to INR50 million or INR5 million per circle. Responding the development, an unnamed executive from one of the affected cellcos was quoted as saying that the fines would not be enforced by the courts: 'Two clear points would help our case in court. One, PoIs need to be provided within 90 days of being asked for – they were provided in less than 45 days. Two, quality of service needs to be checked by monitoring a network for 30 days, while the TRAI fined us by monitoring services for one day.'
(June 18, 2019) The Economic Times

Sector watchdog the Telecom Regulatory Authority of India (TRAI) has pushed back the deadline for implementing the most recent mobile number portability (MNP) rules from 13 June to 30 September. The TRAI amended MNP rules in December 2018, reducing the processing time for porting requests within a telecom circle to two working days from four. In April this year, however, the regulator received requests for an extension to the timeline from several stakeholders, citing 'various reasons including significant changes in their network and IT elements'. (June 13, 2019) telegeography.com

The Department of Telecommunications (DoT) has stepped up its efforts to reclaim spectrum from bankrupt cellco Aircel, demanding that the firm return its airwaves on the basis that the DoT is owed dues from the defunct provider. The Economic Times writes that the company's lenders are hoping to hand off Aircel's assets, including the spectrum to UV Asset Reconstruction, but the government has challenged the move, claiming that 'spectrum is not an asset of any company' and 'is only granted for permissive usage and not an asset to be occupied'. The DoT's legal counsel Anil Singh was quoted as saying at a National Company Law Tribunal (NCLT) hearing that 'We have large sums to be recovered and they continue to use our services without any payments. They are getting all the benefits while the dues are getting added. The licenses are controlled by us and you do not own or purchase spectrum'. The development follows a move earlier this week from the DoT to block the sale or transfer of frequencies by defunct cellcos such as Aircel, potentially hamstringing the bankruptcy resolution processes for Aircel and Reliance Communications (RCOM). Arguing against the DoT, a representative for Aircel's resolution professional explained: 'Spectrum is an intangible asset for the service provider. This is the single asset we have and without this, the corporate insolvency process will fall through.' The counsel went on to tell the bankruptcy court that its spectrum rights were worth between INR110 billion and INR200

billion (USD1.6 billion and USD2.9 billion) and, with the exception of the rights covering the Tamil Nadu circle, were not due to expire until 2026. Aircel's representative went on to stress that the withdrawal of the spectrum would send the company straight into liquidation.
(June 11, 2019) telegeography.com

India's new telecom minister Ravi Shankar Prasad has confirmed that the planned spectrum auction would take place within the current calendar year. The official also stated that 5G trials would begin within the next 100 days, and listed the revival of struggling state-owned telcos Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL) amongst his top priorities. Regarding the spectrum sale, the tender is expected to see more than 8,200MHz of frequencies made available across the 700MHz, 800MHz, 1800MHz, 2300MHz, 2500MHz and 3400MHz-3600MHz ranges including 4G and 5G-compatible airwaves. However, with the exception of newcomer Reliance Jio Infocomm (Jio), the nation's cellcos have been critical of the proposed pricing for the spectrum, with senior officials from Vodafone Idea and Bharti Airtel both describing the cost of 5G frequencies as 'exorbitant'.
(June 4, 2019) The Economic Times

Kosovo

The Regulatory Authority for Post and Electronic Communications (ARKEP) has opened a public consultation on plans to renew the 900MHz and 1800MHz spectrum licenses of Kosovo Telecom – which offers mobile services under the 'Vala' banner – and Slovenian-owned full-service provider IPKO. Both telcos have frequency rights due to expire next month, with another batch expiring in March 2022. The regulator has proposed a one-off fee for the renewal of the airwaves for 15 years, outlining the pricing methodology and justification in the document. The duo may request a renewal period anywhere in the region of ten to 20 years but are encouraged to harmonies their licenses to expire at the same time. Similarly, the operators may opt not to renew the full amount that they currently hold. ARKEP notes that it will not impose additional coverage obligations but will require that the cellcos do not reduce their network footprint or degrade service quality. The regulator added that it would also consider adjusting the current spectrum allotments, if requested. Stakeholders have until 22 June to submit their suggestion, comments and remarks on the proposal.
(June 11, 2019) telegeography.com

Liberia

The government of Liberia has launched a new platform, called "GovNet", which is geared towards improving efficiency of government ministries, agencies and commissions in public service delivery. GovNet is a platform which aimed at improving the government's service performance and brings government closer to citizens by enhancing its internet and computer technology capability. The Minister of Posts and Telecommunications Cllr. Cooper Kruah, in remarks during the launch of the GovNet platform at the weekend said the platform is a secured and dedicated wide area network that connects government ministries, agencies, and commissions for minimal cost and information sharing. "The creation of GovNet will enhance tax revenue and improved tax administration, enhance budget management and expenditure through the effective use of the IFMIS database, and support the National Biometric Registry among others," he said. "In addition, the coming of GovNet will help to save the government of over USD$400,000 annually due to the affordability of the platform." Kruah added GovNet will also help the government to integrate and interface the Integrated Financial Management Information System (IFMIS) system with key Public Financial Management (PFM) databases that include the current project management modules, budget management among others. The ministry's achievement, according to Kruah is part of Pillar 5.3.1 & 4 of the Pro-Poor Agenda which among other things points to E-governance and ICT to improve business processes and productivity which states that: "ICT will be mainstreamed through the expansion of e-governance services and automation of processes to minimize human inputs". Giving an overview of GovNet, the Managing Director of LIBTELCO, Richmond Tobii, the government arm for ICT policy implementation said, "GovNet facilitates secure and reliable communications between government ministries, agencies and commissions and enables the sharing of existing and further government software applicaTobii." Tobii stated that GovNet which is a centralized e-service platform will address government ICT challenges by providing various government ministries, agencies and commissions with cost-effective access to information technology infrastructure, technologies and expertise enabling them to eliminate the redundant tasks and cost associated with individual e-service hosting. The launch of the government program which was held at the Monrovia City Hall, brought together several stakeholders including Dr. Anthony Chan, Mission Director of USAID, BlueCrest University College President, Dr. Gajendra Singh, and head of Digital-Liberia.
(June 19, 2019) blueprint.ng

Myanmar

The Post and Telecommunications Department (PTD) has launched a second round of public consultation on its IMT and 5G spectrum roadmap, incorporating feedback from its initial consultation papers. Under the regulator's revised plan, PTD will hold a multi-band spectrum auction early next year, with spectrum in the 700MHz and 1500MHz ranges to be made available in 2021 and 2022, respectively. Next year's sale would comprise four lots, two of which would include 70MHz blocks of 2600MHz airwaves whilst the other two would feature a combination of 2300MHz and 3500MHz spectrum. The plan would allow any of the winners to immediately deploy 4G or 5G services, the PTD explained. The watchdog added, though, that it was wary of the lack of flexibility in the plan, expressing concern that the cellcos might not be able to afford the quantity of spectrum. As potential solutions, the PTD suggested it could allow operators to pay for the airwaves over a longer period, or it could initially offer a smaller amount of spectrum, with the remainder reserved for a period for the winners to purchase a later date. Unsold spectrum after that date could then be reallocated. Regarding the 700MHz band, the regulator explained that it wanted to allow the equipment ecosystem for the band to develop further, highlighting other upcoming launches in that band elsewhere in the region. A slight delay, the PTD added, would allow operators time to decide whether to use the band for 5G coverage, rather than 4G. Further ahead, the regulator noted that by 2023 the 850MHz and 900MHz bands would be re-planned prior to the expiry of E-GSM licenses and the switch-off of legacy CDMA systems. The PTD also invited input on demand for spectrum in the 600MHz and 4.8GHz ranges. The deadline for comments on the draft roadmap is 12 July.

(June 26, 2019) telegeography.com

The Netherlands

The government published its long-delayed mobile policy white paper (Nota Mobiele Communicatie), confirming plans for a 700MHz/1400MHz/2100MHz 5G spectrum license auction 'at the end of 2019/beginning of 2020', followed by a 3.5GHz 5G auction scheduled for 'end of 2021/beginning of 2022'. State Secretary for Economic Affairs Mona Keijzer presented the policy, which ensures that at least three network operators will be issued 5G licenses carrying strict geographical coverage requirements and minimum mobile data speed stipulations. To ensure sufficient competition, an individual bidder may receive a maximum of 40% of total available frequencies, taking into account current licensed spectrum held by mobile incumbents KPN, VodafoneZiggo and the recently merged T-Mobile/Tele2 Netherlands. The policy says that mobile coverage must reach '98% of the surface area of every Dutch municipality'. Within this requirement, standards have been set for minimum mobile data speed 'on the outer edges of a mobile network': minimum requirements for these 'worst points' will be set at 8Mbps by 2022 and 10Mbps in 2026. The government says that these requirements will mean an average mobile internet speed of above 100Mbps, and maximum speed close to a network antenna of above 2Gbps. Regarding the 3.5GHz auction plan, the State Secretary noted that this portion will leave room for permits for 'local, company-specific applications' alongside the major national mobile providers. Uncertainty still surrounds the 3.5GHz band, however, due to its current usage by the satellite traffic interception station in Burum (Friesland province) – operated by the Joint Sigint Cyber Unit (JSCU) of the General Intelligence & Security Service (AIVD) and Dutch Military Intelligence & Security Service (MIVD) – preventing reallocation of 3.5GHz frequencies in northern Netherlands (all areas above an imaginary line between Amsterdam and Zwolle). The government's latest announcement says that it will 'provide more clarity about the solution' for the 3.5GHz issue later this year, prior to a consultation on the 700MHz/1400MHz/2100MHz auction scheme. TeleGeography notes that proposals have been floated to relocate the Dutch JSCU satellite facility to another European country. A related security task force report is due to be delivered to the government soon.

(June 12, 2019) telegeography.com

The Ministry of Finance is understood to have requested additional time to research the economic impact of 5G in the country. The Ministry says this is required to set the right prices for the spectrum. The government was due to publish its mobile communications policy whitepaper, including plans on spectrum auctions. The 5G auction was originally expected to take place in early 2018 but has faced multiple delays since then. More recently, the spectrum auction was expected to be complete by the end of this year or early 2020 but that now looks unlikely too. The Netherlands has not yet auctioned any 5G spectrum – Dutch operators are also waiting for a 3.5GHz spectrum auction, which is now looking likely in to take place at the end of 2021 or the beginning of 2022 the economic research and analysis which the Ministry of Finance is insisting upon is expected to take at least three months.

(June 3, 2019) mobileeurope.co.uk

New Zealand

Communications Minister Kris Faafoi is keen to establish a framework for iwi radio spectrum allocations that can be applied beyond the upcoming 3.5GHz band auction, reports New Zealand Herald. Mr. Faafoi told the parliamentary select committee on economic development, science and innovation that the iwi – New Zealand's indigenous Maori population – believes there was a lack of engagement during previous spectrum allocations, and that he is exploring a potential framework 'so we don't have to reinvent the wheel every time we come to spectrum allocation'. The Minister has held an initial meeting with iwi stakeholders to explore a mutually beneficial solution and assured the committee that the discussions would not slow the allocation process. Whereas Spark, the country's second largest cellco by subscribers, is keen to press ahead with the release of 5G spectrum in order to have a network up and running by July 2020, the New Zealand Maori Council advocates a slower process following its failure to receive a special allocation in 2013's 4G auction. The Maori were previously granted the right to buy 3G spectrum at a discounted price in 2000, which effectively enabled Two Degrees Mobile, New Zealand's third largest mobile operator, to enter the market. (June 28, 2019) telegeography.com

The Ministry of Business, Innovation and Employment (MBIE) has released the exposure draft of the Telecommunications (Fiber Regulatory Settings) Regulations 2019. The draft regulations prescribe the type of regulation applying to each regulated fiber service provider as well as the description of the Fiber Fixed Line Access Services (FFLAS) subject to regulation. The new framework aims to provide a stable and predictable regulatory environment to further encourage network investment and innovation, prevent excessive profits arising from monopoly services and more generally ensure that consumers have access to quality services at affordable prices. Stakeholders are invited to submit their views on the proposed content by 3 July 2019.

(June 7, 2019) telegeography.com

Nigeria

MTN Nigeria, the country's largest mobile operator by subscribers, has announced the launch of an LTE-A network in the cities of Lagos, Abuja and Port Harcourt. The new service, which is marketed as '4G+', utilizes spectrum in the 800MHz and 2600MHz bands to enable maximum download speeds of 200Mbps. MTN says customers can expect much higher download and upload speeds, a more consistent connection and improved indoor coverage. The Nigerian Communications Commission (NCC) finally approved the transfer of CDMA network operator Visafone's 800MHz spectrum license to MTN in April, following a public inquiry into the transaction. The approval has enabled the market leader to expand and enhance its 4G LTE services across the country.

(June 26, 2019) telegeography.com

Norway

The National Communications Authority (Nkom) has said that, following fixed line incumbent Telenor Norge's January 2019 announcement to migrate its entire user base off its copper network by 2023, it is now considering whether changes are needed to regulations governing the domestic broadband market. In a press release, the Nkom said that it anticipates Telenor's closure of its copper network to be of great to significance to many alternative operators currently providing broadband services over it. Moreover, with the regulator having made a decision in December 2018 regarding Market 3a (wholesale local access provided at a fixed location) and Market 3b (wholesale central access provided at a fixed location for mass-market products), it noted that these rulings had been made before it was aware of Telenor's long-term plan. As such, it said it now believes there is a need to consider whether parts of the existing regulation require revision. To that end, the Nkom said it had posed Telenor a number of questions, with these including a request for further information on how the transition from copper to newer technologies will be undertaken, and how this will impact alternative service providers which offer connectivity over Telenor's infrastructure. According to the regulator, once it has received all requested information from Telenor, it will release any proposed changes to the existing broadband regulations for public consultation, ahead of them being adopted.

(June 12, 2019) telegeography.com

The National Communications Authority (Nkom) has announced that the sale of spectrum in the 700MHz and 2100MHz bands has come to a successful close just days after the process got underway. In a press release the regulator revealed that three companies secured new spectrum in the auction, those being the nation's three incumbent mobile network operators – Telenor Norge, Telia Norge and ice. Telenor and Telia each laid claim to a 2×10MHz block of spectrum in the 700MHz band, while ice successfully bid for a 2×10MHz block in the 700MHz band and 2×15MHz in the 2100MHz band. In terms of the prices paid, with the auction raising a total of NOK735.057 million (USD84.5 million) for state coffers, the Nkom said

that ice will pay a combined NOK337.176 million for its new frequencies. Meanwhile, Telia and Telenor will pay NOK217.881 million and NOK180.000 million, respectively. In the latter part of the auction process, winning bidders were offered the option of obtaining a discount of up to NOK40 million for their spectrum in return for agreeing to certain coverage obligations. As a result, it has also been confirmed that Telia will be obliged to cover 'selected railway lines', while Telenor will be required to cover 'European roads and the coastal road from Mo i Rana to Bodo'. Commenting on the sale process, Nkom Director Elisabeth Aarsaether was cited as saying: 'The award is important to meet the objective to facilitate better competition in the mobile market, improved mobile coverage along main roads and railways, and early rollout of 5G in Norway.'

(June 6, 2019) telegeography.com

The National Communications Authority (Nkom) will continue to regulate mobile market leader Telenor Norge in the wholesale sector for Market 15 (access and call origination on mobile networks), it confirmed via a press release. The regulator confirmed that having considered whether both Telenor and Telia Norge held significant market power (SMP) in the sector, it ultimately decided that the SMP designation would only be applied to Telenor. While it noted that Telia has grown its influence as a result of acquisitions in the wireless arena, the Nkom claimed that the conditions for collective dominance set out in EU guidelines had not been fulfilled for the coming regulatory period. Meanwhile, with regards to the country's third mobile operator – ice – the Nkom confirmed it that Telenor will continue to be obligated to provide national roaming to the smaller player, as it continues to build out its own infrastructure. As per the draft decision, the Nkom also confirmed that it will revise the methodology for its margin squeeze tests, which are carried out every six months; these tests will now use a model based on an operator with a 3% market share, down from 5% previously, with the change being made to better reflect the actual status of the country's MVNOs. Feedback on the Nkom's plans is being accepted until 28 June, and the watchdog has said that once it reviews all submissions its plans to submit an updated draft decision to the EFTA Surveillance Authority (ESA) for assessment. Once the ESA has given its feedback, the Nkom will issue a final decision, which it expects to be made in the fourth quarter of 2019.

(June 5, 2019) telegeography.com

The National Communications Authority (Nkom) has confirmed that its 'first 5G auction', comprising spectrum in the 700MHz and 2100MHz bands, has gotten underway, in line with previously announced plans. In total, the regulator is offering 2×30MHz in the 700MHz band and 2×15MHz in the 2.1GHz band, with the frequencies auctioned off to be useable from 1 November 2019. Notably, for the first time in one of the country's spectrum sales, winning bidders will be allowed to postpone payment of parts of their final bids; should they choose to do so, in return operators would be required to make investments equal to NOK250 million (USD29 million) in improving coverage over a two-year period. Commenting at the start of the sale process, John-Eivind Velure, Nkom's Director of Spectrum Department, said: 'The 700MHz band can provide better coverage and capacity in mobile networks, and one of the key objectives of the award is obtaining better mobile coverage along main motorways and railways.'

(June 4, 2019) telegeography.com

Peru

The Peruvian government has published new regulations allowing spectrum license holders to lease access to the frequencies to other licensed service providers. Supreme Decree No. 015-2019-MTC establishes the procedure, conditions and requirements for the leasing of spectrum, with the goal of promoting efficient spectrum use, increasing coverage and service quality and promoting competition. For the purposes of the spectrum holding limit, the rules specify that leased spectrum is considered as 'held' by the leasee and, as such, a provider cannot exceed the maximum threshold by leasing additional airwaves from a competitor. The lessor must also still continue to provide the same services, at the same or better quality levels, within its coverage area. Other terms set by the decree included the various obligations of the lessor and lessee, the duration and renewal terms for the lease, and the conditions under which the agreement may be terminated.

(May 30, 2019) telegeography.com

Philippines

The Philippines' Department of ICT has published the rules and regulations for the new common tower provider regime with the goal of building or converting at least 2,500 common towers across the nation. The rules will pave the way for deployments in properties owned by the departments, other government agencies, and hard-to-access areas identified by the market's mobile operators. With the rules, the DICT has committed to streamline the issue of licenses for the deployment of telecommunications equipment in towers not built by the independent tower companies participating in the scheme. They also seek to

encourage voluntary sharing of towers by incumbent mobile operators by offering incentives in the form of allowing companies to build passive infrastructure in government properties, and to enable operators to offer, transfer and convey existing tower resources to tower sharing entities. Independent tower companies participating in the scheme will need to be at least 20% owned or in a consortium with companies with at least five years of experience constructing, owning, operating and/or maintaining towers. They must also be wholly independent of mobile operators to ensure they offer non-discriminatory access, and have reached agreements with the DICT and secured the required permits. The DICT said that to date 22 tower companies have signed memoranda of understanding with the department over the common tower initiative. "This is the starting point of more comprehensive policy for our initiative on passive infrastructure sharing. This will help tower firms to acquaint themselves in our telco industry," DICT Acting Secretary Eliseo M. Rio Jr. said.
(May 27, 2019) telecomasia.net

Portugal

The government will present a national strategy for 5G fifth-generation mobile network in September. Alberto Souto de Miranda the Deputy State Secretary for Communications said: "I have the great pleasure to announce that, in September, I will promote a national conference for the 5G strategy to be announced, based on realistic possibilities of what the country needs," he said. Souto de Miranda was speaking during the launch of an optical fiber infrastructure project that was carried out by Altice Portugal and presented at the company's data center in Covilhã, in the district of Castelo Branco in central Portugal. He also highlighted the importance of these investments and that the government was committed to supporting all initiatives that have the aim to make broadband internet "a reality and for it to reach the country's most unlikely places." Stressing the importance of the investment made by Altice Portugal, Souto de Miranda said the authorities counted on the company for the "new challenges" that are presented with the implementation of a "new mobile generation, with speeds up to a hundred times faster, with latencies 50 times lower and with a capacity to connect one hundred times more objects." Regarding the country's national strategy for 5G, he said the country was carrying out a trip throughout the "technological country, the university country and the business country" to understand what is needed, since the government wants a plan that corresponds to the "needs of the country, the expectations of operators and their possibilities."
(May 26, 2019) theportugalnews.com

Romania

The National Authority for Management and Regulation in Communications (ANCOM) has finalized the conditions and procedure for radio spectrum allocation in the 700MHz, 800MHz, 1500MHz, 2600MHz and 3400MHz-3800MHz frequency bands. The regulator expects to complete the tendering procedure for the available spectrum by 31 October and award 5G licenses in December, enabling the winning operators to use part of the spectrum from 1 January 2020. ANCOM will propose the amendment of the National Table of Radio Frequency Allocation before 15 August in order to examine ways to reallocate the 700MHz frequency band, which is currently assigned to broadcast services. The regulator will make available 2×30MHz and 1×15MHz blocks in the 700MHz band, 2×5MHz blocks in the 800MHz range, 1×40MHz block in the 1500MHz band, 2×40MHz blocks in the 2600MHz band, and 90MHz (short term) and 400MHz (longer term) of spectrum in the 3400MHz-3800MHz range. The rights to use the spectrum in the 700MHz and 1500MHz bands will have a 15-year validity beginning on 1 January 2021 for the 700MHz band and 1 January 2020 for the 1500MHz band. Licenses for the spectrum to be auctioned in the 800MHz and 2600MHz bands will be granted for a ten-year validity period, with options for aligning the expiry date with existing rights in those bands up to 5 April 2029. Telekom Romania Mobile Communications, Orange and Vodafone have rights of use in the 800MHz band until 5 April 2029, while Telekom Romania, Orange, Vodafone and RCS&RDS have rights to use frequencies in the 2600MHz band until the same date. For spectrum allocation, ANCOM will apply a competitive selection procedure similar to that organized in 2012, which requires each interested operator to submit an initial bid indicating the number of blocks it wants to acquire in each of the available bands. These initial bids will enable the regulator to assess demand for spectrum in the different bands. The auction's starting prices for each frequency block, set according to the frequency allocation procedure for the concerned bands, will be determined from the minimum fees set in accordance with the rules in force for the licensing of frequencies in the concerned bands.
(June 11, 2019) telegeography.com

Singapore

Singapore's telecoms industry regulator the Info-communications Media Development Authority (IMDA), working with the National Research Foundation, has ring-fenced SGD40 million (USD29.5 million) to develop an open and inclusive '5G Innovation Ecosystem' in the city-state. IMDA says the new ecosystem should support the development of 5G technology trials for enterprise use-cases, creating a series of new open testbeds, and R&D in 5G technology. In the press release, IMDA confirmed its intention to 'explore clusters such as maritime operations, urban mobility, smart estates, Industry 4.0, consumer applications and government applications,' noting that these areas have been identified as having potential for 'export globally, reinforcing Singapore's goal to be a global front-runner in impactful 5G use-cases'. Going forward, the watchdog plans to work with leading players from the industry and offer funding support, 5G trial licenses and technical input to facilitate the development of innovative 5G applications, services, and sustainable 5G enterprise use-cases. IMDA pointed out that Singapore-based enterprises can apply for 5G funding from now until May 2020. (June 27, 2019) telegeography.com

The independent telecoms watchdog the Info-communications Media Development Authority (IMDA) has opened a public consultation seeking feedback over spectrum allocation for enterprise and public mobile use in the city-state. It is understood that the discussion will revolve around a number of key topics, chief of which is the assignment of dedicated spectrum in the 800MHz and 1900MHz bands to enterprise users 'in order to serve growing demand for enterprise data services'. Meanwhile, IMDA seeks feedback on allocating the 2100MHz frequency band – until now set aside for just 3G – for both 3G and 4G mobile services. As part of the process, the watchdog will canvass industry opinion on how each of these spectrum bands will be assigned, including the auction mechanism, mindful that Singapore wants to optimize its 'scarce spectrum resources' for the Singapore public at large. 'While these three spectrum bands are not globally identified as forerunners of spectrum for 5G, it is important for industry players to take them into consideration as they plan their network resources and investments holistically,' said IMDA deputy chief executive and director-general (telecoms & post), Aileen Chia. Earlier this month IMDA also called on interested telcos to submit detailed proposals on their 5G deployment plans, suggesting that by 2020 at least two networks will be rolled out in the city-state. The regulator intends to assign 5G-suitable spectrum to 'two winning submissions' through a Call For Proposal (CFP) regulatory instrument, rather than conducting an auction of spectrum, with telcos' proposals assessed instead on the quality of their deployment schedules. It is understood that these include hitting 50% 5G network coverage by 2023, an agreement to allow MVNOs to access the new network to provide resell services and fulfilling the watchdog's financial capability requirements to support the rollout. IMDA plans to allocate spectrum in the 3.5GHz, 26GHz and 28GHz bands for 5G in the initial tranche of spectrum allocation to telcos. This will be sufficient for at least two nationwide 5G networks, the authority confirmed. IMDA is openly backing the deployment of standalone 5G networks in the country, which will be capable of delivering a full suite of enterprise 5G capabilities, including network slicing and low latency connections for Internet of Things (IoT) applications.
(May 28, 2019) telegeography.com

South Korea

The Ministry of Science and ICT (MSIT) has confirmed that, just over two months after all three of the country's mobile network operators (MNOs) began offering 5G technology on a commercial basis, the number of customers signed up to the next generation service has now topped one million. The total marks a significant increase from the ministry's last monthly breakdown, which confirmed that as at end-April 2019 KT Corp was serving 104,696 5G subscribers, with SK Telecom and LG Uplus having signed up 95,265 and 71,725, respectively. Meanwhile, in its latest press release regarding the state of 5G in the country, the MSIT also noted that, while the number of 5G base stations countrywide had increased to 61,246, coverage for 5G connectivity remained restricted to the nation's large cities and other locations with a high population density. Looking ahead, the ministry also said that MNOs are expected to begin installing signal relay nodes at airports, train stations, major shopping centers and exhibition halls starting next week.
(June 12, 2019) telegeography.com

Spain

The Spanish government has approved the disbursement of EUR150 million (USD170.5 million) in funding to aid in the country's planned digital terrestrial television (DTT) migration process. As per an announcement by the Ministry of Economy and Enterprise (Ministerio de Economia y Empresa, MINECO), homeowners will be able to receive between EUR104.30 and EUR677.95 in order to adjust their antennas and acquire new TV equipment – depending on the existing installation. The new DTT plan will see broadcasters release the current 694MHz-790MHz band for use by 5G services. They will move to the 470MHz-694MHz band ahead of 30 June 2020, thus complying with the timetable established by the EU. The so-called 'second digital dividend band' – following the prior distribution of 800MHz spectrum across Europe – forms part of the government's 'Plan Nacional 5G'. (June 27, 2019) telegeography.com

Sweden

The Post and Telecom Agency (Post & Telestyrelsen, PTS) has opened a further consultation into the terms of its auction of 2.3GHz and 3.5GHz spectrum, which is planned for March 2020. The latest review follows a public consultation which was held in February/ March this year. The regulator is looking to offer up to 15 national blocks of at least 20MHz in the 3400MHz-3720MHz range, plus up to eight nationwide licenses at 2.3GHz, offering at least 10MHz of spectrum each. The PTS also plans to reserve 80MHz of frequencies between 3720MHz and 3800MHz for local and regional licenses. The auction rules will enable three operators to acquire at least 80MHz of spectrum each in the 3.5GHz band, which the PTS says will encourage competition. The latest consultation is open to comments until 8 July.(June 4, 2019) telegeography.com

Swedish Communications Regulator PTS said it expects the 28 GHz, 32 GHz and 38 GHz bands to remain in use for fixed radio for at least ten years. A number of bands currently used for radio have been identified at international level as potential 5G frequencies in the future, it said, but this is some way ahead and is not definite. PTS is considering new exemptions from the requirement to have permits for short-range devices (SRD) in several bands under its revised spectrum plan, too. PTS said a number of frequency bands are under consideration for allocation in the coming years. Allocation of the 1.5 GHz band has been pushed back to 2020 or later. The 2.3 GHz and 3.5 GHz bands are due to be allocated in the first quarter of 2020 at the latest. Assignation of the 2.6 GHz and 26 GHz bands are expected during 2020. Spectrum allocation or designation for new applications will be discussed at the ITU World Radio Conference in November 2019 and PTS said it will be involved in this work, adapting changes relevant for Sweden. There will also be harmonization decisions by the EU Commission.
(May 29, 2019) telecompaper.com

Thailand

The telecom regulator will publish the first two regulatory drafts governing Internet of Things (IoT) devices by the end of the year, laying down guidelines for massive machine-to-machine connectivity across industrial sectors. The National Broadcasting and Telecommunications Commission (NBTC) set up a committee to work on two out of the five categories of regulatory frameworks for IoT-connected devices. According to NBTC Deputy Secretary General Korkij Danchaivichit, there are five categories for initial regulatory conditions: numbering and identification; spectrum and technical standards; permissions related to radio communications and competition; security and privacy; and data arrangement structure and data interoperability. The regulations are in preparation for the expected boom in machine-to-machine connectivity, especially after 2020 when 5G wireless broadband launches commercially in some global markets. Mr. Korkij said the details of numbering usage for IoT connectivity are likely to involve a 15-digit system in compliance with the practical standards of the International Telecommunication Union. The category of IoT numbering and identification will include standardized numbering fees, a way to register use and number portability, as well as to identify methods of IoT usage such as via IP address. Security and privacy, as well as data arrangement structure and data interoperability, are critical issues for IoT regulation, Mr. Korkij said. Customer data should be clearly defined in the future, separating general data that could be used for optimal public benefit from what should be strictly protected as personal data. "General data, such as the amount or duration of a customer's mobile data usage each day, could be used to improve efficiency in some public services such as transport designation and management," Mr. Korkij said. An NBTC subcommittee is working in parallel on the development of the Personal Data Protection Act (PDPA). The agency wants to see uniformity in customers' data arrangement structures among telecom operators in the future, as it would make the data more easily accessible by the government "for the public's benefit", Mr. Korkij said. "Each operator has its own arrangement system for how it stores customer

data," he said. "The issue will become more complex once the number of connected devices explodes in the future." For the spectrum and technical standards of IoT usage, Mr. Korkij said the NBTC approved 920-925MHz as the unlicensed spectrum range for IoT connectivity last year. The move was to initiate a spectrum standard setting for machine-to-machine connectivity. Interested companies have applied to the NBTC for operating permission under the telecom license Type 3 regime to provide IoT devices and services in the market, for which the commission has yet to complete regulations for the overall IoT platform. Type 3 governs telecom operators that lack their own network and rent from others to provide service. There are a good number of organizations and startup businesses worldwide working on improved IoT applications. This uptick is leading to a turning point in adoption of the technology, as consumers and businesses begin to appreciate the importance of the network. The 920-925MHz frequency range is part of the ISM (industrial, scientific and medical) radio band specified for general use between various applications. In practice, the frequency range is widely shared among RFID tags, short-range devices and low-power devices. "The NBTC will gradually issue a series of IoT regulatory drafts before 5G tech is adopted commercially in the country to serve massive connectivity demands in the near future," Mr. Korkij said. The NBTC's IoT committee is chaired by Secretary General Takorn Tantasith, along with 19 other members including representatives from the Digital Economy and Society Ministry and telecom operators. The NBTC has appointed five subcommittees to work with relevant parties to create proper regulatory conditions for each critical category. (June 26, 2019) bangkokpost.com

Thailand's three mobile operators signed up for a long-delayed 700MHz spectrum auction, despite earlier expressing reluctance to bid due to the high reserve price. AIS, True Move and DTAC said in separate stock market filings that they submitted applications to the regulator. Last month, the three companies applied to participate in a program extending their 900MHz license payment terms, but didn't commit to participating in the 700MHz auction schedule despite new terms which required them to do so. The National Broadcasting and Telecommunications Commission (NBTC) delayed the planned 700MHz auction multiple times due to a lack of interest from operators. All three have complained about the THB17.6 billion ($562 million) reserve price, which they say is high by international standards. Three 2x10MHz blocks are up for sale: the licenses will be valid for 15 years starting from 1 October 2020. In a statement, DTAC CEO Alexandra Reich said the company believes the "investment will provide significant benefits to all stakeholders as the 700MHz spectrum can be used for 5G". The additional blocks will bring DTAC's "total bandwidth up to 130MHz (including 2300MHz in partnership with TOT)." However, despite its potential for 5G, Reich noted the NBTC is yet to develop a clear roadmap for high- and low-band spectrum. "Thailand is moving towards a full digital society, in which the readiness of 5G is a key element. Therefore, a clear spectrum roadmap is critical to the industry because it helps us create effective long-term investment plans to build infrastructure that can help boost the country's economy," she explained. True Move said it applied for 700MHz spectrum to "maintain a leading position in mobile business service and restructure the payment schedule for the 900MHz frequency spectrum licenses". (June 19, 2019) mobileworldlive.com

Uganda

The Uganda Communications Commission (UCC) has switched on 22 3G base stations under the third phase of its Rural Communications Development Fund (RCDF) project, which is focusing on improving connectivity in unserved and underserved areas of the country. The Fund contributed UGX3.04 billion (USD800,000) to deploy new base stations or upgrade existing 2G sites to 3G capability. The deployment work was carried out by MTN Uganda.
(June 3, 2019) telegeography.com

United Kingdom

Ofcom has opened a new consultation, which asks for industry feedback on their approach to modelling the costs of building "full fiber" networks across the United Kingdom (i.e. those used to support mobile 5G services, business connectivity or FTTH broadband for homes etc.). At present the Government has committed to deliver ultrafast Gigabit capable "full fiber" (FTTP) broadband ISP connections to 10 million UK premises by 2022, then 15 million by 2025 and there's also an aspiration for "nationwide" coverage by 2033 (here). Various operators are supporting this target with their own commercial and state aid supported efforts (See our 'Summary of Full Fiber Plans'). However there remains a question mark over how much it's likely to cost – given modern deployment methods, future market/rule changes and existing network coverage – to bring such a network to the entire country. For example, the Future Telecoms Infrastructure Review

suggested that tackling the final 10% of predominantly rural premises may require "additional funding" (state aid) of around £3-5bn to support commercial investment (i.e. it's disproportionately expensive due to the smaller and often sparse communities involved). Admittedly this assumes that commercial operators would even be willing to help plug the gap (i.e. when we finally reach that stage in a fair few years time), which is by no means certain. The difficulty of agreeing Fibre-to-the-Premises (FTTP) contracts for such areas has recently been highlighted in Wales (here) and may also be contributing to delays in the award of Scotland's contract (here). Past a certain point it takes a huge subsidy to move forward and this in turn raises questions about value for money. The new consultation includes a useful illustration, which provides outputs from the "bottom-up model" that Ofcom could use. This indicates that the capital expenditure needed, per premises, to do FTTP for the first c.20 million UK premises is under £500, but above that point it quickly rises to nearly £2,500. The above figures may actually be quite conservative, although as ever such things depend on the business model and approach to deployment. For example, it's often more expensive for a heavily regulated commercial operator like Openreach to do FTTP than it is for a social focused (community / volunteer supported) provider like B4RN. This can of course vary by area (e.g. B4RN's "soft dig" focus on farms/fields would find urban builds more difficult). Openreach aims to reach 4 million premises by March 2021 with FTTP and there's an ambition for 15 million by around 2025. After that they also have an aspiration to reach "the majority of the UK, if the right conditions to invest are in place." Current build costs are around £300 – £400 per premises passed and OR believes that it can "pass around 50% of UK premises within this range of costs" (roughly in keeping with Ofcom's chart). Suffice to say that the regulator has decided that it's now "increasingly important" for them to "understand the costs of deploying fiber networks to support our future regulatory decisions," which is something they probably should have said a decade ago. This will help to inform their plan to regulate the wholesale fixed telecoms markets for residential and business services together from 2021 (they'll consult on this in December 2019). The new consultation is thus more focused upon how they design the model, rather than the costs (the latter depends upon feedback). Ofcom would like to receive views and comments on the issues raised in their document, by 5pm on 2nd August 2019. (June 24, 2019) ispreview.co.uk

The national telecoms regulator, Ofcom, has confirmed the final details for how the new 10Mbps+ (1Mbps upload) Universal Service Obligation (USO) for broadband – to be supplied by ISPs BT and KCOM – will be delivered and work once it's introduced from 20th March 2020. At present it's anticipated that fixed line "superfast broadband" (24Mbps+) ISP networks should be available to around 98% of premises across the United Kingdom by the end of 2020 (currently 96%+), which means that the focus of the government's new USO will primarily be on helping to cater for those in the final 2%; estimated to be somewhere around 620,000 UK premises today but this number is continuing to fall (England 434K premises, N. Ireland 39.5K, Scotland 99K and Wales 47K). The final 2% will thus reflect remote rural areas and possibly a few disadvantaged urban ones (Summary of the USO). However, the USO is NOT an automatic upgrade, which means it will give people the "legal right" to "request" a 10Mbps+ connection from a supporting ISP but such "premises will not be eligible for a USO connection if they are included in a publicly funded broadband rollout plan within the next 12 months." In addition, you might have to wait awhile before the ISP gets around to installing it. Ofcom states the "maximum time that consumers should have to wait to receive a connection is one year from the request date" (the regulator does expect ISPs to be quicker than this, provided it doesn't result in disproportionate costs being incurred – details below). Otherwise the USO itself, as currently designed, is as follows. Furthermore the obligation will be funded by industry (e.g. ISPs), have a cost threshold of £3,400 (i.e. you may have to help pay for it if the cost per property goes above this or forget the USO and go with Satellite) and support a form of demand aggregation (i.e. multiple properties could be used to bring the cost down by considering take-up). On that last point, Ofcom states that where network infrastructure can be shared, build costs should also be shared between premises to determine whether the cost of provision to an individual premises would fall below £3,400. Using the regulator's own example, if a cabinet served 100 premises and the cost of deploying FTTC was £100K, an assumed take-up of 70% would mean that the cost of upgrading that cabinet would be just £1,429 for each premise (note: other technologies, such as FTTP and 4G, could also be used). At the time of the last update Ofcom proposed setting a 70% forecast take-up for the purposes of calculating the cost of provision of a USO connection (Broadband Deliver UK has shown that similar FTTC deployments are already reaching or exceeding c.50% take-up and BT is forecasting 61%), although the regulator initially felt as if 80% was a better long-term view (i.e. they chose 70% as the middle ground). Ofcom's analysis of the £3,400 threshold suggested that it could enable coverage for up to 99.8% per cent of UK premises. Lindsey Fussell, Ofcom's Consumer Group Director, said: "As more of our daily lives move online, bringing better broadband to people and businesses is crucial. From next year, this new broadband safety net will give everyone a legal right to request a decent connection –

whether you live in a city or a hamlet. This will be vital for people who are struggling to get the broadband they need." Jeremy Wright, DCMS Secretary of State, said: "As part of our commitment to building a Britain that works for everyone, we're giving every home and business the legal right to get a decent connection. I welcome Ofcom's announcement today and look forward to seeing BT and KCOM connecting customers from March next year. We've already brought superfast broadband to 96% of the UK and are pushing forward with delivering a nationwide full-fibre network by 2033, prioritizing rural locations first." Naturally the government has left the final technical challenges up to Ofcom. Among other things the regulator has had to decide A) who will supply it, B) what broadband technologies can be used to deliver it and C) precisely how the industry will support the necessary Universal Service Fund (USF) to pay for it all (cost-sharing mechanism). Previous estimates from Ofcom and the BSG have noted that the 10Mbps USO could cost anything from around £200m and all the way up to £1bn (here), depending upon its design. Similarly BT's now rejected voluntary proposal for delivering the USO put the cost at around £450m – £600m. Suffice to say that's a lot of money and ultimately we could all end up helping to foot the bill. Another challenge has existed in terms of supplier choice. Last year Ofcom said that five ISPs had expressed an interest in becoming a USP, including Broadway Partners, BT (Openreach), Hyper optic, KCOM (Hull-only) and Quickline. After further work the regulator decided that only BT, KCOM and Hyper optic satisfied all of their criteria, but the latter then withdrew (here). Ofcom is now in the same position as they had with their original USO, with BT proposed as the USP for the whole of the UK (excluding the Hull Area) and KCOM covering Hull. We should point out that KCOM has now deployed FTTP (plus a tiny bit of FTTC) across their entire network area and so delivering the USP won't be much of a problem. Meanwhile BT (EE) has previously said that they intend to use a mix of Fibre-to-the-Premises (FTTP) and Fibre-to-the-Cabinet (FTTC) to meet part of the USO, which in some areas could be challenging for them within the stated time-scales. However both they and Ofcom now agree that fixed wireless (FWA) 4G can do the bulk of this. BT further estimates that 110,000 premises will be difficult to reach and costly to serve (i.e. not eligible for a USO service unless consumers contribute to fund part of the roll out cost [above the £3,400 cost threshold set out in the legislation). In those cases they point to their co-funded Community Fibre Partnerships (CFP) scheme. Philip Jansen, CEO of BT, said: "BT is very pleased to have been chosen by Ofcom to deliver the Government's promise to connect the UK. It's great news that the majority of homes and businesses in rural areas can choose a fixed wireless service from EE to solve the problem of slow broadband and get speeds way faster than 10Mbps. Through Openreach we are now extending our fibre broadband network to reach an additional 40,000 premises within the USO area for whom FWA is not the answer. We'll continue to drive discussions with Ofcom, Government and industry to explore alternative options to connect up every property in the country and ensure no-one is left behind." Other ISPs have largely rejected any notion of taking on such a significant legal and financial burden (here). We will keep a close eye on all this and Ofcom will also be reviewing progress. As above, we're particularly concerned about the potential for a rush of early requests to swamp existing resources and there's also the issue of awareness (i.e. people may not even be aware of the 'what, where and how' of making a USO request). We are currently in the process of reading the final document in detail in order to pick out any interesting bits and may update again later. (June 9, 2019) ispreview.co.uk

United States

Following the recent conclusion of the Federal Communications Commission's (FCC's) millimeter wave (mmWave) spectrum auctions, Auction 101 (28GHz) and Auction 102 (24GHz), a number of participating bidders have confirmed their acquisitions and explained how the spectrum will be put to use. Paying USD982.5 million in Auction 102, AT&T says it was the winning bidder for spectrum licenses covering more than 98% of the US population. The company won spectrum in 383 Partial Economic Areas (PEAs) for a nationwide average of 254MHz. All of the licenses won were in the upper 500MHz portion of the 24GHz band, which it says will give it stronger nationwide coverage and additional spectrum depth and capacity in large markets where demand is often greatest. In the country's top ten markets, AT&T won nearly 286MHz on average, including 300MHz in eight of those markets. AT&T will use the spectrum to bolster its mobile 5G strategy and plans to reach parts of 29 cities by the end of 2019. US Cellular, meanwhile, purchased licenses covering 98% of its subscribers for a total of USD256.0 million. In Auction 101, the company spent USD129.4 million on 408 licenses covering 60% of its subscriber base with at least 425MHz of mmWave spectrum. In Auction 102, the company spent USD126.6 million, acquiring 282 licenses covering 93% of its subscribers. Kenneth R. Meyers, US Cellular president and CEO, explained: 'Our 5G network strategy envisions the use of a variety of spectrum bands over time. Our initial 5G deployment will be on our 600MHz spectrum to provide enhanced broadband speed and capacity over our entire footprint with the expectation that we

will be able to augment it with mid- and high-band spectrum over time as the technology and use cases continue to evolve.' Finally, Windstream agreed to pay a total of USD26.6 million for blocks of spectrum in 14 states covering more than five million households, including approximately two million households in locations where it is the incumbent local exchange carrier (ILEC). Jeff Small, president of Windstream's Kinetic business segment, commented: 'Windstream is committed to bringing best-in-class internet to rural communities, many in thinly populated areas, across our Kinetic footprint. We're using a variety of methods to accomplish that goal, including software enhancements, fiber expansion, fixed wireless and now 5G wireless technology.' (June 20, 2019) telegeography.com

The FCC has adopted a notice of proposed rulemaking (NPRM) that could result in the commission adopting an overall cap on the Universal Service Fund (USF) program. That program is comprised of four separate sub-programs – high-cost (broadband/voice), Lifeline (low-income), E-Rate (schools and libraries) and rural healthcare. Each program already has a cap, but the commission notes in the NPRM that an overall USF cap would "explicitly link the expenditures in multiple USF programs," thereby promoting "a robust debate on the relative effectiveness of the programs." Not every FCC commissioner agrees with that assessment, however. Two of the five commissioners – Jessica Rosenworcel and Geoffrey Starks – dissented. Starks argued in a statement that "the proposal would pit deserving beneficiaries – anchor institutions, students, patients and Americans who lack broadband – against one another in a fight for Universal Service funds." Disbursements for three of the four USF programs – Lifeline, rural healthcare and E-rate — for 2018 were considerably lower than the program's cap. Disbursements for the high-cost broadband program exceeded the program cap – a situation that was able to occur because excess funding collected for that program for previous years was kept in reserve. Commissioner Michael O'Rielly has been arguing for an overall cap for the USF for some time, and he has hinted that if the demand on the high-cost program exceeds the budget for that program, the difference might be made up by decreasing funding for other portions of the program. This issue could become a bigger concern moving forward, as the FCC pursues its goal of making broadband available to all Americans at a time when concerns have risen that the commission has underestimated the scope of that task. In his comments about the NPRM, O'Rielly noted that the proposed budget of $11.4 billion is more than $3 billion above current program disbursements and would be indexed to keep pace with inflation. He also singled out the Lifeline program as "the only one of the USF sub-programs that lacks a self-enforcing cap" – an issue that was particularly contentious at the time the cap was adopted. The USF programs are funded by providers of long-distance voice service as a percentage of their revenues. Providers pass those costs on to consumers through a line charge on their bills. That approach has become increasingly impractical as long-distance voice revenues have declined at the same time that the goals of the USF program have expanded to include covering some of the costs of providing broadband as well as voice service. While some people have argued that the solution would be to collect money from carriers as a percentage of both voice and broadband revenues, O'Rielly argued that this approach would essentially be a "sin tax" on broadband service. I don't buy that argument, as the implication is that voice service already is subject to a "sin tax." The real concern, it seems to me, is that entities opposing the inclusion of broadband revenues in the USF contribution base are well organized and would mount a strong campaign against that move. It might be easier politically to grab any additional funding needed for broadband from other portions of the USF program. Opponents of that approach are beginning to voice their protests, however, potentially setting the stage for the next USF funding battle if the new NPRM ultimately results in the proposed policy change. (June 3, 2019) telecompetitor.com

AT&T, Verizon and T-Mobile walked away with the lion's share of the millimeter-wave (mmWave) spectrum licenses up for auction. The news is noteworthy considering this is the FCC's first-ever auction of mmWave spectrum licenses -- spectrum that many expect to form the basis for the nation's high-speed 5G networks. The FCC has released the identities of the bidders of its two 5G auctions on Monday afternoon. The mmWave licenses represent one element in operators' overall strategies; to compete in 5G, carriers need to have just the right combo of coverage, network reliability and great devices. These auctions are all about carriers buying the real estate for their coverage. The FCC held two mmWave auctions this year, one right after the other, and released the results for both event. The first auction -- Auction 101 of 28GHz spectrum -- offered licenses in select areas around the country and generated around $700 million in total winning bids. The section auction -- Auction 102 of 24GHz licenses -- offered licenses across the country, including in most major cities, and generated a total of around $2 billion in winning bids. AT&T led the way with total bids of $982 million in the 24GHz auction, buying 49% of all the available licenses, while Verizon spent the most in the 28GHz spectrum auction with total bids of $506 million for the spectrum. Verizon won 72% of all the available 28GHz licenses. T-Mobile was the second-place bidder in the 24GHz auction with $803 million in total bids, giving the company 40% of all the available

licenses. Meanwhile, T-Mobile spent $39 million on the 28GHz auction. And US Cellular -- a regional wireless network operator with around 6 million customers -- won second place in the 28GHz auction with a total of $129 million in bids, close to its fourth place finish in the 24GHz auction. (June 3, 2019) lightreading.com

Zimbabwe

Zimbabwean cellular operators Econet Wireless and NetOne have signed a long-awaited network sharing agreement which will see them sharing their respective infrastructure. A previous sticking point in negotiations had been Econet's unwillingness to share its larger network with NetOne, which has a far smaller footprint, unless it was suitably compensated. The exact terms of the deal have not been released. Econet CEO Douglas Mboweni said: 'We are happy to have signed this agreement, something we have wanted to do [for] a very long time. We consider this to be a very fair arrangement and believe it represents a giant step in our collective endeavor to bring connectivity and ICT services to all Zimbabweans.' Meanwhile, NetOne's CEO Lazarus Muchenje commented: 'This agreement allows NetOne and Econet to optimize the utilization of scarce foreign currency as it eliminates the duplication of infrastructure.' (May 28, 2019) TechZim

Telecommunications service providers announced new tariffs effective April 1 in response to rising costs following the removal of the 1:1 US dollar and bond note parity in February, which saw the local currency weaken. The National Consumer Rights Association (Nacora) filed a complaint with the Postal and Regulatory Authority of Zimbabwe (Potraz) following the tariff increases, but the regulator's director-general Gift Machengete said they had to strike a balance between operator viability and consumer welfare. In its petition, Nacora had requested Potraz to consider adopting time-framed international best practices with regards to unused data rollover, transferability of data like airtime and ending default-out-of-bundle browsing. "The authority will continuously review all tariffs for telecommunication services in line with cost movements and other market dynamics as usage traffic," Machengete said in response to Nacora, in a letter dated May 14. "This is aimed at balancing operator viability and service affordability using the cost-based criteria in line with international best practice and not simply benchmarking on what other countries are doing." "The authority will work towards having all operators putting in place mechanisms to ensure consumers are protected from bill shocks." On the issue of transferability of data just like airtime, and also ensuring that unused data does not expire but rolls over, Machengete said: "However, we need to clarify that our intervention on data transfer for discounted optional data bundles is very limited as these are not basic services. "On our part as the regulator, we will consult operators on facilitating data rollover," Potraz said. In April, Machengete told the Parliamentary Portfolio Committee on Information Communication Technology that total operating costs had increased by 23,1% from $657,4 million in 2017 to $809,01 million in 2018, considering salaries, rentals, fuel and other expenses. Mobile network operators told the same parliamentary committee that local tariffs were still way below the cost of delivering services despite a recent hike. (May 27, 2019) nehandaradio.com

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