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Interview

Eng. Nasser Bin Sulaiman Al Nasser
Group CEO
STC

THIS MONTH

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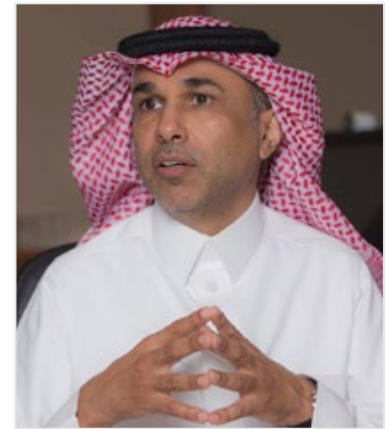
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Blockchain and Telecom Operators

Industry predictions are pointing to a fast space-occupying new technology: Blockchain. Some predict this to be an industry of its own, with a growth potential exceeding US\$1 billion over the coming few years. The inherent security features provided by this storming new technology are perhaps the best reason why its onslaught is being welcomed within the industries, including the telecoms.

Just as with any other technology, standardized and mass-scale adoption of blockchain depends on regulatory approvals, which, in turn, can only be achieved with clear understanding of the use and benefits of blockchain. In this regard, to gain a better picture of how blockchain could be useful for Telecom Operators (some of which having already started its implementation), and how Regulators can support and also use it for achieving their own objectives, it is important to emphasize on profitability issues of operators. That is, in view of decreasing revenues from voice and increasing costs due to the high band-width demands brought forth from new digital services, are real and have very real impact on future investments and business sustainability. By understanding the co-operative roles that are now required to be played by operators and regulators, and with the adoption of advanced technological means to adapt to new changes and tackle prevailing challenges, blockchain's potential for being of beneficial use can be better appreciated and realized.

With reference to SAMENA Council's membership embodiment of innovators, one of our member companies, specializing in blockchain technology, has created a solution that can directly connect mobile network operators and end-users globally on a blockchain-based marketplace, whereby operators' customers, traveling abroad, can swiftly become legitimate local customers of any foreign operator in the destination country. Without replacing their SIMs, end-users can access a roaming-free communication experience while retaining their home number. Moreover, the technology allows operators

to publish prepaid plans as smart contracts on a blockchain, which are visible to all other operators and their subscribers. When subscriber selects offer, a new smart contract is created with the subscriber's digital identity and payment transaction directly to foreign operator. This is an immensely useful application of blockchain for meeting end-user requirements with business efficiency and revenue needs of operators, as well as reduced complexities for regulators in matters of cross-border communications.

In the smart environment we are creating, blockchain implementation will be effective for addressing issues that have historically been a challenge for telecom operators in conducting third-party settlements, in timely authenticating and provisioning service contracts with their customers, and in achieving better efficiencies in cost management as well as improving processes to implement technologies, including IoT and 5G.

For the latter purpose, blockchain can enable the creation of new mechanisms for accessing new technologies and building new solutions, and for guaranteeing secure and error-free connectivity among both human and machine users. As authenticated communication is necessary to modern-day service and technology access, highest level of desired level of security may only be achievable through blockchain.

Thus as operators consider implementing blockchain in their core management systems to help reduce settlement complexities, improve cost efficiencies and processes, and to create new prospects for revenue generation, the aim should be to work closely with regulatory authorities, in order to reduce gaps in understanding and facilitate each other's adaptation to and adoption of new innovations such as blockchain. Doing so will serve the interests of both operators and regulators; an objective on which SAMENA Council holds a very special consideration in the larger interest of the industry. 🌱



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



Eng. Nasser Bin Sulaiman Al Nasser
Group CEO
STC



STC, among the first companies in the world to announce the availability of 5G services earlier in 2018, is a world-class digital leader providing innovative services and platforms to its customers and enabling the digital transformation of the MENA region. STC has the mission to deliver on Saudi Arabia's Vision 2030 goals. STC's Group CEO, Eng. Nasser Al Nasser shares his views on how Saudi Arabia's most valuable brand is preparing for the future.

STC's assets of technology infrastructure, a loyal customer base, strong brand, skilled human resource, financial strength, and leadership commitment puts us in a very strong position to be a partner of choice for government, enterprises and consumers.

Q. One of Vision 2030's main commitments is to develop telecommunication and ICT infrastructure. What is STC's role in that?

A. The Kingdom of Saudi Arabia (KSA) is embarking on an ambitious journey set by Saudi Vision 2030 where digitization will be at the heart of economic transformation. Information and Communications Technology (ICT) will be a key enabler to achieve the three key pillars of the vision: a vibrant society, a thriving economy and an ambitious nation. Digitization of Industries, businesses and society in general will be enabled by underlying technology infrastructure.

Digitization in KSA enabled by broadband infrastructure, data centers, cloud, mobility, and digital services will have significant direct contribution to GDP by generating new businesses, creating jobs and improving productivity and efficiency of value chains across industries. Digitization will develop non-oil services sector, foster Innovation and entrepreneurial culture and optimize Government spending.

STC's assets of technology infrastructure, a loyal customer base, strong brand, skilled human resource, financial strength, and leadership commitment puts us in a very strong position to be a partner of choice for government, enterprises and consumers.

We are very clear about our leading role in the development of future telecommunication and ICT infrastructure. Our DARE strategy which we can discuss in more detail, encompasses all the facets on how STC will play its national champion role not only on the infrastructure side but platforms and digital services as well. STC has already taken significant steps in this direction. Our ongoing successful implementation of National Broadband Plan (NBB), creation of USD 500mn technology fund – ST Ventures, creation of tower infrastructure company, innovation supported by InspieU program, investment in digital financial services through STC pay, IT services, cybersecurity, IoT platforms, and creation of STC Academy are evidence of our commitment.

STC is committed and well positioned to play its national champion role in achieving the KSA Vision 2030 digitization agenda and help other nations in the region to achieve their digitization objectives.

STC has set forth its vision to become a 'world-class digital leader providing innovative services and platforms to our customers and enabling the digital transformation of the MENA region'

Q. Can you elaborate more on the ambitious STC DARE strategy?

A. STC has based its new strategy on the aspirational direction set by KSA Vision 2030, strong desire by shareholders for significant growth, revolutionary changes in the telecom industry, and on the company's existing strengths and capabilities. This new three-year STC strategy, launched under the name 'DARE', will see the company pursue growth by moving into new businesses, while simultaneously protecting and growing core telecoms assets. For STC, 'DARE' is both an aspirational roadmap towards the future and an internal call to embrace change.

STC's aspiration over the next five years is to substantially grow and

diversify its portfolio. This goal will be achieved through expansion in both our geographical footprint and our portfolio of businesses. Our aim will be to selectively pursue value-creating opportunities to pioneer the digital transformation of KSA and the MENA region. STC has set forth its vision to become a **'world-class digital leader providing innovative services and platforms to our customers and enabling the digital transformation of the MENA region'**.

The ICT industry is changing rapidly and value is shifting upstream towards digital services. Across many digital segments, winner-takes-all becomes a reality. This implies that a successful player will have to do two key things 1) evolve towards a digital player 2) strengthen its capabilities across multiple if not all segments of the value chain i.e. infrastructure and connectivity, platforms, and digital services.

Explaining the four themes of DARE: 'D' in our strategy stands for digitization of internal processes, creating a data driven organization, and developing agile delivery platforms i.e. IT and Network. This will be a key enabler for rest of the strategic pillars. In addition, it will also improve productivity and deliver significant operational savings. 'A' in our strategy entails accelerating performance of our existing assets i.e. extracting more value – profitable growth - from what we already have. This includes generating new revenue streams, as well as capital and operating efficiency focus. The 'R' theme is about reinventing customer experience and a customer-first culture across everything we do. This includes improving customers' quality of experience, digitizing customer sales and other customer touchpoints, and improving brand perception. 'E' is the growth engine of our ambitious strategy and focusses on expanding both scale and scope of our business. As part of the growth pillar, STC's leadership has decided to further strengthen its position in connectivity and infrastructure space through geographical expansion and creating new businesses such as tower company. On the platform side we are investing in IoT, Cloud, Cybersecurity and other enabling platforms. On the digital services side, our focus is on media and

advertising, digital financial services, and further strengthening our position in IT services.

Our future expansions plans aim to deliver further digital learning programs to our key customers and Ministries. We will also be focusing on creating the Kingdom's first Data Visualization Cave complimented by a Data analytics development program.

Q. Earlier during 2018, we have witnessed the launch of STC academy, what is your future expansions plans for the academy?

A. Earlier in 2018, STC launched STC Academy for digital learning and training with a vision to empower human resources with required digital skills to accomplish Vision 2030 objectives. The academy will work towards bridging the skill demand and supply gap in specialized areas. such as data analytics, cyber security, digital services and others in addition to building leadership skills. Academy is partnering with leading international institutions, academics, and practitioners to ensure high quality of education and knowledge is transferred.

Initially there is more focus on delivering training programs for STC internal employees, however, we are developing programs for our external customer and partners. Internally focused programs are aligned with our DARE strategy to develop digital leaders of the future. We have collaborated with Misk foundation to deliver Nano degree course focused on Data Analytics, Coding and Cyber security. We have also delivered Cyber Craft initiative security 'boot camp' sessions for young Saudi students.

Our future expansions plans aim to deliver further digital learning programs to our key customers and Ministries. We will also be focusing on creating the Kingdom's first Data Visualization Cave complimented by

a Data analytics development program. We are also developing a Cyber Security simulation center to build cyber security resilience skills for STC staff and selected partner companies. Ultimately, our purpose is to create and strengthen digital leadership and innovation skills in the Kingdom.

The way people communicate, work and live are changing at a fast pace. Disruptive Innovations are redefining industry segments and technologies are evolving rapidly. Evolution of local players into regional and global competitors is a serious leadership challenge – and we must take it on immediately.

Q. We live in an accelerated world with many technology & digitalization demands. What is STC's plan to cope in this regard?

A. Our world is getting connected more than ever before. The way people communicate, work and live are changing at a fast pace. Disruptive Innovations are redefining industry segments and technologies are evolving rapidly. Evolution of local players into regional and global competitors is a serious leadership challenge – and we must take it on immediately. Unlocking the full potential of our vision will require comprehensive, concrete, and collaborative action from multiple stakeholders across the region.

An agile organization is critical to enable rapid and decisive response to the fast paced changes in the technology, market, and consumer demands. By agility we mean having the right organizational structure, governance and operating model, digitized processes, modular, virtualized and automated IT and network architecture, and a capable leadership and workforce. We are targeting all these areas in our DARE strategy execution so that we are well positioned to address the dynamic nature of our industry.

It is also important to realize that all this cannot be done alone by industry players. One of our major priorities is to work closely with key stakeholders including customers, Government, shareholders, policymakers, and advisory and technology partners. Today, more than ever before STC is engaging with industry players across the value chain including close competitors to find ways of working together towards a healthy ICT market. We are engaging key stakeholders at all levels of Government and industry to ensure there is a strong cohesion between government policy, regulatory framework and industry practices that will benefit consumers, society, and the wider economy.

In summary, internal readiness and collaboration with key stakeholders are necessary for us to stay ahead of the game.

Q. What strides has STC made in terms of maximizing local content and to enrich to digital experience of users?

A. The Saudi Telecom Company (STC) has signed three new agreements under Rawafed Program with Cisco, Ejada and Amwaj Factory. STC previously signed 7 agreements, bringing the total to 10. These agreements aim at building partnerships to improve the innovative environment. Additionally STC has created an business incubator called inspireU, which will help in the transfer of international knowledge and expertise to emerging projects.

The agreements focus on increasing the Saudization of leadership positions, supporting small and medium-sized enterprises and nationalizing the industry. They also aim to support innovation and enable digitization, for which local content is highly important.



5G is high on our agenda as evident from our ongoing activities and engagements. STC is well positioned to ensure that our region is among the first to reap benefits of 5G technology on commercial scale.

Q. After the success of launching the first 5G network in SA, when can Saudi enjoy the 5G experience?

A. We are proud to uphold our technology leadership position in the region by being the first to launch 5G technology. Industry players across the value chain from chipset, handset, software, and hardware manufacturers to service providers are all excited about the potential value that 5G and related ecosystem will bring to multiple industries and society in general. 5G technology will be a key enabler for industry 4.0 that promises to revolutionize value chains across the industries. Enhanced spectral efficiency, low latency, higher throughputs, and network slicing benefits of 5G technology will enable use cases across multiple industries such as manufacturing, transport and logistics, health, retail, education, security and others..

For STC there are three main considerations in our planning towards commercial 5G availability, 1) 5G technology standardization has very good progress 2) devices availability 3) commercial demand side readiness for applicable use cases. We are closely monitoring industry developments and working with our partners on the technology as

STC is committed and well positioned to play its national champion role in achieving the KSA Vision 2030 digitization agenda and help other nations in the region to achieve their digitization objectives.

well as commercial side. Technology standardization and devices availability is expected this year. It is also important for us to consider our 5G deployment strategy that balances re-use existing investments, new revenue streams, prioritization based on commercial benefits and financial returns, and competitiveness, while minimizing risk. As the devices start to become commercially available, initially we are starting to deploy fixed wireless broadband solutions including IoT use cases, followed by deploying targeted mobility coverage, scaling coverage, and then focusing on industry scale advanced IoT solutions that require low latency and high throughputs.

Technology and demand side ecosystem readiness will take some more time. However, 5G is high on our agenda as evident from our ongoing activities and engagements. STC is well positioned to ensure that our region is among the first to reap benefits of 5G technology on commercial scale.

Q. Recently STC announced the official Digital Day in the country and closed all of its branches across the Kingdom for one day. What was the idea behind this move?

A. STC is committed and well positioned to play its national champion role in achieving the KSA Vision 2030 digitization agenda and help other nations in the region to achieve their digitization objectives. Our DARE strategy encompasses all the facets on how STC will play its national champion role on not only the infrastructure side but platforms and digital services as well. STC has already taken significant steps in this direction. The adoption of the Digital Day aimed to encourage the use of digital channels, enhance performance efficiency and improve customer experience, especially after observing the high levels of customer satisfaction due to the provision of services via the digital platforms. The "Digital Day" highlights STC's commitment to play a pivotal role in enabling digital transformation in line with the Kingdom of Saudi Arabia Vision 2030 and it is the first-of-its-kind in the Kingdom. The store relies on international best practices to enrich the customer experience 24 hours a day using self-service machines. MySTC smart app is designed to meet customers'

various needs, whereas the self-service machine offers around 37 services for the fixed and mobile phones. On the other hand, the STC 900 messaging service enables the customer to receive answers for the inquiries and questions associated with his/her number in an interactive way, and gives them the option to enable the various services and packages. Furthermore the app enable the customers to orders products ,sims and devices and have them delivered to them without the need to visit the shops.

STC is currently chairing the Board of Directors of SAMENA Council, and it is our great pleasure and privilege and a matter of trust given to STC by our colleagues to be able to play a leadership role in SAMENA Council.

Q. How do you see STC's evolving role further strengthening as a participating and active member of private-sector representative bodies, such as SAMENA Council and GSMA?

A. STC is currently chairing the Board of Directors of SAMENA Council, and it is our great pleasure and privilege and a matter of trust given to STC by our colleagues to be able to play a leadership role in SAMENA Council.

Recently, GSMA, the world's largest mobile operator's organization also announced the election of Saudi Telecom Company (STC) as a member of GSMA's Board after the company won the board's election to join the top 25 mobile operators in the world. This is an important achievement for STC, as it reflects the great potential and value of STC locally, regionally and globally. It also reflects the advanced position reached by the Kingdom's telecommunications sector with the support of the Ministry of Communications and Information Technology and Communications and Information Technology Commission to achieve the targets of the national transformation plan 2020 and the Vision 2030.



Q. Other than the digital sector, what other major sectors has STC entered for providing its advanced cloud computing capabilities?

A. Part of our strategy goals is to maintain growth in building world class data centers not only in KSA but in the MENA region. Data centers will help us grow retail (enterprise and consumer) as well as wholesale business in public and private sectors. Data center hubs are like a cornerstone enabling multiple aspects of the digital transformation journey that we as STC and KSA economy is embarking on. Our platform strategy for Cloud services, IoT services, Cybersecurity, and e-Government services will be enabled by these data centers. Similarly, the digital services such as IT services, media and advertising, and digital financial services

will make use of the storage, switching, and networking capabilities that we are building in these data centers. Data centers will also support the implementation of virtualization and automation of our core networks required for deployment of IoT solutions and 5G network.

We have launched the first-of-its-kind radiography platform (Enterprise Medical Imaging) in the Kingdom, in collaboration with the Ministry of Health at King Fahd General Hospital in Madinah.

STC is providing with state-of-the-art technology to ensure the provision of excellent healthcare services to the patients. STC's involvement in the health sector is making it possible to facilitate the workflow, enable immediate reporting, archive all the data contained in the STC's

cloud database center, coordinate the healthcare services in the hospital, and reduce the cost of healthcare programs, especially with the availability of the staff management feature in the platform which allows centralized management of the human resources and medical staff.

STC is constantly building strategic partnerships to strengthen and empower the medical facilities and hospitals in the Kingdom. This partnership with the Ministry of Health and its affiliate institutions is of utmost importance, and STC is working on building and developing new technology solutions for various sectors to help implement cloud computing technology and shape the future of digital transformation in the Kingdom. [\[1\]](#)

SAMENA COUNCIL ACTIVITY

SAMENA Council Emphasizes on Spectrum Harmonization and Endorses Operators' Support to Saudi 5G Public-Policy Vision



SAMENA Telecommunications Council's recent participation in a special multi-stakeholder workshop on 5G spectrum management, organized by the Communications and Information Technology Commission of Saudi Arabia (CITC) and GSMA, and attended by the Kingdom's mobile network operators, STC, Zain and Mobily, has further articulated the need to take sustainable steps to materialize 5G; to adopt a more collaborative approach for all stakeholders; and to put into effect much-needed public-private partnerships to support 5G deployment. These critical steps will assist in ensuring that the Kingdom of Saudi Arabia, under the leadership and regulatory enablement of the CITC, leads in 5G development and mass-scale deployment in a sustainable manner, with promised benefits delivered to the Saudi citizens and to the Arab region's largest developing digital economy as a whole.

Leveraging its spectrum management knowledge base, SAMENA Council, represented by its Director of Public Policy and Regulatory Affairs, Roberto Ercole, outlined that while the business case for launching 5G in 2019 is challenging, the Council's Telecom Operator members are indeed very keen to supporting the objectives of CITC with respect to 5G deployment and assisting in the fulfillment of Saudi Vision 2030. Moreover, SAMENA Council is in a position to work closely with stakeholders to help timely realize Saudi Arabia's national vision.

SAMENA Council, in the presentation delivered by Roberto Ercole to the delegates and participants of the CITC workshop, emphasized on the need to harmonize the 2.6 GHz band and also acknowledged that Saudi Arabia has made very good progress with most of its neighboring countries to agree an all-TDD (time division duplex) band plan (3GPP

Band 41). SAMENA Council expressed its full support to such spectrum harmonization initiatives, and extends its knowledge and strategic support to further advancing spectrum planning and harmonization in the SA-ME-NA region. A similar approach, SAMENA Council believes, could assist in the harmonization of the 3.3 - 3.8 GHz band (C-band); a critical step for moving forward with 5G deployments in the region. Notably, in view of spectrum harmonization efforts underway among regulators, with private-sector industry bodies endeavoring to support such efforts, during the 24th Arab Spectrum Management Group (ASMG) meeting recently held in Jordan, chaired by TRA-UAE, with participation of 14 Arab countries, a historic consensus has been achieved that 3.3 - 3.8 GHz will be the band of choice for the early deployment of 5G IMT systems in the Arab world.

The CITC-led workshop provided an

important opportunity for GSMA, SAMENA Council and Telecom Operators, to voice their support to the public-policy mission set forth by CITC to launch 5G services in the Kingdom in 2019. The workshop also allowed SAMENA Council to share

pertinent technical, Saudi-specific spectrum management information with the participants. SAMENA Council's Chairman, Eng. Nasser Al-Nasser, and CEO & Board Member, Mr. Bocar BA, extend their gratitude to CITC Governor, HE Dr.

Abdulaziz Al-Ruwais, for the opportunity to represent Telecom Operators through a detailed technical presentation and to closely communicate with the Saudi telecom regulatory authority.

Paltel Group Joins Leading Operators to Promote its Digital Readiness as a SAMENA Council Member



SAMENA Telecommunications council has announced that Paltel Group has joined as its operator member. As the largest private-sector company in Palestine, Paltel Group is embracing the future with a new, innovative spirit, centered on providing greater quality and variety of integrated telecoms services to its subscriber base and on realizing greater operational efficiencies as well as stakeholder value. The Palestinian Group has poured heavy investments into its digital infrastructure, including on data centers, and its leading market role will prove to be critical for driving Palestine's digital transformation.

Paltel Group owns four companies: Palestine Telecommunications Company (Paltel), the leading telecommunication company in Palestine, providing the latest technology and solutions for both residential and business segments. Paltel offers a range of services such as Internet and fixed line services, business Internet services, data communications and data center services.

Palestine Cellular Communications Company (Jawwal), the first mobile operator and 3G services provider in Palestine. Hadara Technology Investment Company, the largest internet service

provider in Palestine. Reach for Communications Services Company, which is the first specialized communication center in Palestine.

With its established and industry-wide recognized aim of bridging telecoms ecosystem priorities, including on sustainable investment and highlighting digital transformation needs of the region, SAMENA Council actively advocates on behalf of its operator members and serves as a sector development partner to regional regulatory authorities. SAMENA Council, with active participation of its operator members, advocates for resolutions and highlights among government and private-sector stakeholders' issues that must be addressed to support further investment in broadband, accelerate digitization for socio-economic development, create new possibilities in stakeholder cooperation, and to realize better governance and industry performance.

New members, including both Telecom Operators and Technology Providers, join SAMENA Council for multiple reasons, including for its platforms that allow stakeholders and innovative players to generate new business opportunities as well as interact with regional public and private-sector leadership, while working toward addressing digital development matters through collaborated positions on industry issues, remedying which would positively impact the future of the digital communications industry. 📡



MEMBERS NEWS



STC Signs 3 Agreements within "Rawafed" Program to Maximize the Local Content



The Saudi Telecom Company (STC) signed three new agreements under Rawafed Program with Cisco, Ejada and Amwaj Factory. STC previously signed 7 agreements, bringing the total to 10. These agreements aim at building partnerships to improve the innovative environment of the inspireU business incubator which will help in the transfer of international knowledge and expertise to emerging projects. The agreements focus on increasing the Saudization of leadership positions, supporting small and medium-sized enterprises and nationalizing the industry. They also aim to support

innovation and enable digitization as part of STC's commitment to achieve the goals of the Kingdom's Vision 2030 which seek to maximize the local content and enable digital transformation. The agreements were signed by STC's Vice President for Procurement and Support Services Sector Eng. Emad Bin Aoudah Al Aoudah and by Region GM in Cisco, Salman Faqeeh, and by GM of Ejada Hani Al Hussein in addition to chairman of Amwaj Ahmed Al Samadi. On his part, STC's Chief Executive Officer, Eng. Naser Bin Sulaiman Al Nasser, discussed the results of Rawafed Program stating that the Program managed to

achieve a 20-40% increase in Saudization, in addition to its efforts in supporting small and medium-sized enterprises and the nationalization of the industry. He also pointed out that in 2018, STC began working on developing and expanding the manufacturing of optic fibers in addition to the implementation of several plans aimed at producing high-tech products. He also provided details about the progress being made regarding the construction of 4 innovative centers which he said will be officially opened in few weeks.

STC and LINX Partner to Launch Jeddah Internet Exchange

The London Internet Exchange (LINX) and Saudi Telecom Company have announced a strategic partnership that will see the launch of a new internet exchange in Jeddah, Saudi Arabia. The two firms will work together to launch JED-IX after striking a deal on 7 December

2018. The internet exchange serve as a neutral internet traffic exchange platform interconnecting global networks in the GCC region. LINX will offer its expertise as one of the world's largest internet exchanges to support the operation of JED-IX as it offers services to network operators and

content providers in the Gulf from a fully redundant switching platform located in an STC data center in Jeddah. John Souter, CEO of LINX, said: "JED-IX driven by LINX is a real step forward for the Internet community in Saudi and the GCC as a whole. The exchange will allow networks to

stop 'trombone' traffic to London and back again, and will help increase resilience by creating a new center for interconnection in the KSA." Kurt Erik Lindqvist, CMO of LINX announced, "The new partnership between LINX and STC forms an exciting milestone in the expansion of LINX global presence and builds on LINX's aim of 'Working for

the Good of the Internet' globally." For STC, which is Saudi's incumbent operator and one of the largest providers in the Middle East, the partnership is part of its Saudi Vision 2030, which seeks to establish the Kingdom of Saudi Arabia as a key hub for telecoms connectivity. Alan Whelan, VP of STC Wholesale, said: "STC's ambition is to

develop JED-IX into the leading internet and data hub in the MENA region. In LINX we have a global leading IX partner who will help accelerate the delivery of this ambition and create a thriving interconnection ecosystem in the Kingdom."

STC to Provide Broadband Services to 2.5m People in Remote Areas



Saudi Arabia's Ministry of Communications and IT (MCIT) has signed an agreement with Saudi Telecom Company (STC) for the implementation of the third phase of a project aiming to provide broadband access with download speeds of 10Mbps to 70% of households in remote areas by 2020. Under the deal, STC will provide broadband services to 444,076 households in more than 3,000 villages around Riyadh, Qassim, Makkah, Madinah, Al Bahah, Tabuk, Jazan, Hail, Asir, and Najran, thus extending coverage to a total of 2.5 million people. The first and second phases of the project were completed in July 2018, covering 16% of households in rural areas.



Batelco Partners with Cisco Meraki to Offer Smart Managed Wi-Fi for Enterprise

Batelco, the leading digital solutions provider in the Kingdom, has partnered with Cisco Meraki to provide Batelco's small and medium enterprise customers with a managed comprehensive WiFi solution. The smart managed WiFi solution based on the Cisco Meraki Access Point extends to enterprise customers various features, including a wide range of high speed WiFi and strong coverage, Zero Touch Provisioning (ZTP) technology, Location Analytics, business grade firewall, bandwidth control, multi-SSID Support, and application control. Furthermore, the solution includes a customized landing page and WiFi monetization feature for businesses who wish to offer a personalized and customized WiFi experience for their customers and generate revenue from their Wi-Fi networks. Enterprise smart managed WiFi is offered as a managed service that is 100% supported and controlled by Batelco

eliminating the need for enterprises to employ technical support staff and relieving them of some overhead and operating expenses. The solution however does include a subscriber portal from which customers are able to view usage reports and statistics and additionally operate and manage the device, should it be needed. Batelco Bahrain Chief Marketing Officer Abderrahmane Mounir highlighted Batelco's focus to create a dynamic ecosystem that aims to create a digital community linked to an integrated communication system, and the company's keenness to provide smart technology solutions to support entrepreneurs in the advancement of their businesses. "Batelco is continuously developing its portfolio of solutions to support the growing demand for advanced communications solutions applicable for all sectors, especially small to medium enterprises," commented Mr.



Abderrahmane Mounir
Batelco Chief Marketing Officer

Mounir. Batelco's efforts are focused on supporting the Kingdom's Economic Vision 2030, by developing and providing advanced solutions to support growth and innovation in the Kingdom.

Batelco Ready to Unveil eSim Technology

In line with its focus in delivering the latest technologies to enrich its customers' lifestyles, Batelco successfully completed the technical deployment of eSim technology and made its first eSim-equipped device call. With this deployment, Batelco took further steps to ensure all requirements are met for the delivery of the state-of-the-art technology and exceptional experience, covering all aspects including security protocols. The new service, which is set to transform the landscape in mobile technology, will deliver a host of convenient benefits for users and greatly enhance their experience. An eSim is an integrated SIM chip that is embedded

in mobile devices, enabling customers to have multiple numbers using one mobile phone without having to switch sim cards. The service will be available for customers from December 6th. Customers may visit any Batelco retail shop to activate the service. More and more devices are being launched equipped with eSIM capability such as iPhone XS, XR and Max and it is anticipated that in the near future most device manufacturers will shift to eSIM technology. Batelco, in line with its strategy to deliver the latest technologies, strives to continuously enhance its portfolio to provide customers with relevant products and services that meet their requirements



and also support the Kingdom's efforts to be at the forefront in the technology sector.



Etisalat Ranked No. 2 Among the Top Public Companies in the UAE



Etisalat ranked no. 2 on the Forbes Middle East list of the top 50 public companies in UAE based on four major criteria of total assets, net profits, market capitalisation and revenues. With its first UAE 100 ranking, Forbes Middle East (ME) recognised 100 companies that have played a key role in making the country the thriving business center that it is today. The 50 of the biggest companies are listed on the country's main stock exchanges and are some of the largest and most valuable companies in the country. Etisalat today is the 'Most Valuable Telecoms Brand' in Middle East and North Africa region by Brand Finance in recognition of the company's increase in brand value by 40 percent to \$7.7bn-higher than any other telecom brand in the region and the only telecom provider to break the \$7bn brand value mark in the region. Ahmed Bin Ali, Senior Vice President, Corporate Communications, Etisalat, said: "We are honoured to be in the UAE top ranking that recognises

Etisalat's role in the contribution to the growth and development of the country and positioning it as a business hub in the region. This was possible, as we stayed focused on the company's long-term strategy of making the digital vision a reality to drive stakeholder value. Thanks to both our supportive shareholders and loyal customers for inspiring us to set new global benchmarks and reach new business heights." Etisalat is the only telecom provider from the region to feature in the top 15 most powerful telecom brands globally and boast of an impressive AAA brand rating. On a portfolio basis, the brand value inclusive of non-branded subsidiaries (Mobily in KSA, Maroc Telecom Operations, Ufone/PTCL in Pakistan) has jumped by 25 percent to \$9.6bn. Khuloud Al Amyan, Editor-in-Chief Forbes Middle East, said: "UAE today is a preferred regional business hub with over 90 percent of the companies featuring on the Forbes Global 2000 list basing their regional

headquarters in the country. With infrastructure rivaling those from some of the most developed economies, it is also a hub for regional trade. "The first UAE 100 ranking recognised companies that have played a key role in making the

country a thriving business today. Etisalat ranked high on all four criteria playing a critical role in contributing to the progress of the country as well as setting global benchmarks in telecom and technology." Forbes Middle East screened all listed

companies in Dubai and Abu Dhabi's stock markets. Companies were ranked based on four criteria, which are mainly total assets, net profits, market capitalisation and revenues.

Etisalat Scoops Five Major Accolades

Etisalat won five prestigious awards at the 'Telecom Review Excellence Awards 2018', a prestigious award ceremony that recognizes the achievement of global telecom carriers across the region. At the 'Telecom Review Excellence Awards 2018' held in Dubai, Ali Amiri, Group Chief Carrier & Wholesale Officer, Etisalat received the 'Best Carrier Enterprise Service' award, while Dr Ahmed bin Ali, Senior Vice President, Corporate Communications, Etisalat, collected the 'Best Middle Eastern Operator' award. He said: "We are proud to have won this award as it shows Etisalat's role as a pioneer among telecom operators in the region and globally. This award is a testimony to Etisalat's excellence and achievement due to our continuous investments made in infrastructure and services portfolio to deliver best-in-class technologies and solutions to customers across all verticals. I want to take this opportunity to thank our dedicated team and partners who have contributed to this success." Etisalat was shortlisted among top telecom companies for its success in the wholesale business as the 'Best Middle East Wholesale Operator' due to its capabilities to serve as a gateway to the world for the UAE, the regional operators and customers serving as a platform for ME region's credible peering and transit hub. The 'Best Middle Eastern Operator' award recognized Etisalat as an operator that has achieved growth across its operators, shown innovation in its service portfolio and infrastructure and continuously developed its network capabilities. Daniel Ritz, CEO, PTCL Group, picked up the 'Best Asian Operator' award, Fanou Messaouden, Corporate Communications Director,



Maroc Telecom, received the 'Best African Operator' award and Khalid Alkhaja, Vice President, Network Analysis & Planning-Business, Etisalat, accepted the award for 'Best Carrier Enterprise Service' Abdeslam Ahizoune, Chairman, Maroc Telecom said: "This recognition reflects the performance of a Group which continues to strengthen its position in Africa. In all the countries where it operates, Maroc Telecom Group carries on to invest heavily to deploy its networks on all territories, and to introduce the most innovative technologies." Daniel Ritz, CEO, PTCL Group said: "It is a great pleasure accepting this award, and I am proud of PTCL's team who has made it possible for us to be recognized as Asia's Best Operator. PTCL has taken strategic initiatives for building a customer service culture in the organization, along with innovation in its network. Through its

Network Transformation Project, 100 exchanges are being upgraded across Pakistan that will positively impact the customer experience." Winners were chosen based on recognized and demonstrated capabilities in their specific sector by an independent panel of experienced industry veterans. Both operators were awarded for their efforts in driving business agility and efficiency, technological innovations and expanding business and network in their markets. The award ceremony took place during the 11th edition of the 'Telecom Review Leaders Summit'. The exclusive regional event held from 10-11 December brought together the best telecom and ICT industry leaders on one platform to debate and discuss about the future developments in the regional and global telecom industry.



Orange Egypt to Participate in Communications Projects in NAC

Orange Egypt is betting on its branches network, which is the largest among other companies with 700 outlets, in addition to improving the network to regain the leadership of the mobile market, which was lost in recent years. The company sees it as the most powerful network, according to Speedtest.net, and still works to improve the services to move to profitability. Orange Egypt expects to recover profitability again next year, as it works with a global consortium to participate in telecommunications projects in the New Administrative Capital. The company's CEO, Yasser Shaker, attributed the decline in the company's profits to the loans interest and the high rate of investment depreciation, noting that Orange has a credit facility of EGP 7bn from eight local banks, most of which are still untapped. Shaker said that the margins of profitability are under the pressure of economic difficulties to provide good service to customers, revealing that his company invested EGP 4bn in the development of its network before the end of this year. The company's losses for the third quarter of 2018 declined by 83.71% according to its published financial statements. Net losses reached EGP 269m at the end of September against EGP 1.654bn in the same period in 2017, thanks to the high cost of operation and the fuel price hikes, as well as the cost of importing equipment. He pointed out that Orange is present in 28 countries around the world, 19 of them in the Middle East and Africa, such as Egypt, Jordan, Tunisia and Morocco, adding that Orange Egypt is working under its umbrella Orange International Services and Orange Labs. He added that his company fully believes in the potential of the market and continues

its work in Egypt, as evidenced by the fact that Orange International, last December, increased the capital of its unit in Egypt by about €750m (EGP 15bn). Stéphane Richard, Chairperson of the Board of Directors of the parent group, has been selected as president of Groupe Spéciale Mobile Association (GSMA), confirming the company's global standing. He pointed out that the company is constantly seeking to develop the customer experience through over 700 stores in the country. The network is also the best in Egypt, based on data from Speedtest.net. The company won awards for that in 2017 and 2018. He pointed out that the company will play a major role in the dissemination of financial inclusion services, in cooperation with the government, out of its belief that mobiles are the fastest way to reach clients, adding that the revenues on investing in mobile money transfer (Orange Money) is still low compared to the cost. He added that Orange's strategy also seeks to focus on Smart Cities, such as the New Administrative Capital and El Gouna by providing triple play services in 16 compounds until now. Bassem Iskander, the company's Internet of Things (IoT) Director, said that the role of Orange in supporting the digital transformation of the country is to offer secure smart city management solutions, ensuring customers' privacy through technical consultation and implementation. Hisham Siblini, Chief Officer of Technology at Orange, announced the launch of over 300 new mobile stations and 1,000 4G towers, in addition to 2,000 3G service towers this year. "Improving customer experience is not only by raising the service quality. It is an integrated experience," he said, noting

that the company reaped Speedtest.net awards in 2017 and 2018 for the strength of its network, coverage, and browsing speed. He pointed out that Ookla's Internet Research index show that the average Internet speed on the Orange network is 22 MB, up by 4 MB from its nearest competitor, which recorded 18 MB. He estimated the total number of mobile stations owned by the company at 7,000 stations, 70% of which supports 4G technology services. Shaker said 40% of Egypt's population is under 18, and the company is always working to support start-ups and mobile application developers financially and technically. Furthermore, he indicated that the beginning of next year will see the company's launch of virtual landline services, to become an integrated telecommunication service provider. He pointed out that the business to business (B2B) subscriptions are where investment opportunities are. Moreover, Shaker added that the company's decision to buy any new frequency bands depends on four factors: the location, selling price, size and frequency range. Orange has several alternatives to improve service, such as increasing the number of towers, according to him. Maha Nagy, Executive Vice President of advertising at the company, spoke about the details of Orange's participation in this year's Cairo ICT Conference 2018, which includes three points, such as smart city solutions and Orange Money services. Shaker noted that Egypt has a promising opportunity to provide IT offshore services, highlighting the company's plan to increase the value-added service to customers by 20% next year.



Sudatel Academy Remains ITU Centre of Excellence

Sudatel Academy (Sudacad) has been re-selected an ITU Centre of Excellence in the priority area of ICT applications and

wireless and fixed broadband for 2019-2022, following the evaluation of a large number of submissions to the ITU. This

selection reflects recognition of Sudacad as a quality ICT training provider in this area.

With Participation of Sudatel Telecom Group, Africa-1 Subsea Cable Consortium concluded C&MA

After a meeting held in Dubai on the 11th Dec 2018, the Management Committee of Africa-1 Parties convened and sealed the Construction and Maintenance Agreement (C&MA). Senior executives from global carriers and other consortium members have all inked the deal. Connecting South Africa through the Eastern coast of Africa and from Pakistan through the Middle East all the way to Europe, the submarine cable system, spanning more than 20,000 Km shall be crossing Egypt to the Mediterranean Sea over two brand-new diversified routes. Africa-1 is to land in

carrier neutral PoP's in Marseille (France), Mombasa (Kenya) and Durban (South Africa), as well as in submarine cable stations in Sidi-Krir and Zaafarana in Egypt, Port Sudan in Sudan, Jeddah in Saudi Arabia, Djibouti City in Djibouti, Mogadishu in Somalia, Mombasa in Kenya, Mayotte, Mahajanga in Madagascar, Fujairah in UAE and Karachi in Pakistan. AFRICA-1 offers a unique investment model that combines the cost structure of a DLS-based service, with the flexibility to route capacity as in a conventional distance-based system. Pre-agreed, preferential cross-connection

charges are also included in the C&MA for AFRICA-1 investors. Africa-1 will leverage the latest state-of-art 200G technology and will be initially equipped to accommodate several terabits from day one. Along with comprehensive interconnection with other cable systems and full Open Access at all cable landing points, Africa-1 is attractive due to its easy accessibility and the unique design of its low latency direct express route. The multi Terabit cable system is expected to be in operation in early 2021.



Telecom Egypt and Liquid Telecom Sign MoU as Part of Egypt FDI Initiative

Telecom Egypt, Egypt's first integrated telecom operator and international connectivity provider, and Liquid Telecom, the leading pan-African telecoms group, announce the signing of a Memorandum of Understanding (MoU) whereby both parties will explore collaboration opportunities in three fields: data center deployment, financial investment in infrastructure and the development of

financial inclusion applications. Under the first track of the MoU, Telecom Egypt and Africa Data Centers, a subsidiary of Liquid Telecom, intend to start with a joint venture to build and operate new data center facilities across Egypt. Telecom Egypt is to contribute with its local expertise, telecom services and land to establish the data centers. The cooperation in the data center build-up will add significant data center

capabilities to accommodate Egypt's rapidly growing ICT sector. In addition, Telecom Egypt and Liquid Telecom will cooperate to develop a business model for the remaining two tracks. Liquid Telecom intends to invest a total of USD 400mn in Egypt on all these initiatives. The investment by Liquid Telecom is a result of the Government of Egypt's new Investment Law, which encourages Foreign Direct

Investment (FDI) into the country's telecom sector. Nik Rudnick, Group CEO Liquid Telecom, said: "Expanding the Africa Data Centre's brand into North Africa for the first time signifies our intention to be a truly pan-African data center provider. We're delighted to partner with Telecom Egypt to bring our world-class data centers services to Egypt, where we can accommodate the growing requirements of global cloud providers, carriers and enterprises." Ahmed El Beheiry, Managing Director and Chief Executive Officer, commented: "We are pleased to enter into this partnership, which will enable all stakeholders to contribute to the digital and economic growth of Egypt, Africa and the region. This project is a new addition to Telecom Egypt's growing data centers operations, which will give us, along with Africa Data Centers, a revolutionary customer experience." Egypt's distinctive geography, in the heart of the world, offers operators across the globe a preferential location with the lowest latency access to abundant international capacity and the shortest and most efficient telecom path from Africa to Europe. In addition, Telecom Egypt, with its advanced infrastructure and capabilities, has proven to be the partner-of-choice for many international telecom players over the years. Africa Data Centers brings a proven track record



of delivering leading data center services across the region and serves some of the world's largest cloud service providers, carriers and enterprises. It operates state-of-the-art data centers in major regional trade hubs such as Johannesburg, Cape Town, Nairobi and Harare, which offer a combined potential 19,000 square meters of rack space and 80 Megawatts of power. The arrival of more data center facilities and colocation services in Egypt will accommodate the country's digital

transformation strategy, helping to attract global cloud service providers to host their public cloud platforms in the country. A new world-class data center facility will be established in Cairo, with other locations to be announced in due course. The data centers in Egypt will eventually connect with Africa Data Centre's other facilities, providing customers with access to the region's evolving first pan-African network of data centers.



VIVA Kuwait wins "Advertising Creativity Award" at Arab Media Forum

VIVA, Kuwait's fastest-growing and most developed telecom operator, has been recognized with an award during the "Advertising Creativity Awards Ceremony" as first place in the category of "Most Influential Ad" for the Ramadan 2018 TV Ad at the Arab Media Forum's event. On this occasion, Mr. Andrew Hanna, CCO at VIVA said: "Reaping such accolades proves our exceptional performance and the high quality standards our professionals are providing to our customers. We endeavor at VIVA to consolidate

our leadership in the telecom market with our innovation and creativity to meet our customers' expectations and provide them with best-in-class products and services." This award reflects VIVA's core strategy to strengthen its ties to the community, as VIVA's Ramadan TVC 2018 commemorated the late legend Abdul-Hussain Abdul-Redha who made Kuwait and its people laugh and happy, and it was a tribute to the contributions he left behind in the hearts of the Kuwaitis and the people in the entire region.



Mr. Andrew Hanna, CCO at VIVA



Zain's 5G Network Set to Go Live across Strategic Sites in Kuwait

Zain Kuwait, the leading digital service provider in Kuwait announces that its huge investment in 5G has made lots of progress recently and the operator is ready to go live with the state-of-the-art service across all strategic and heavily populated areas of Kuwait. Zain will continue developing and expanding the 5G network gradually across Kuwait until the devices are available, expected during the course of 2019. The company also is awaiting approvals and spectrum allocation from the country's regulatory authorities. Once commercially launched, the 5G network will empower government entities and enterprise (B2B) digital transformation, smart city development and the fourth industrial revolution. Fifth-generation technology represents a quantum leap in the operational efficiency of Zain's

network which will make it one of the first companies in Kuwait and the region to adopt this solution to meet the ever-growing digital needs of its individual and enterprise customers. Telecom services are one of the most important sectors in accelerating economic growth and promoting trade. Existing mobile networks will not be able to satisfy the future needs of the telecommunications sector and 5G technologies will contribute to the digital transformation and prosperity of Kuwait supporting the leadership's future 2035 vision for the country and its people. The practical applications offered by 5G technologies will expand the scope of services provided by Zain Kuwait especially to the government and enterprise (B2B) sector, who will benefit enormously from high speeds, stimulating

both the economic growth of the country as well as creating boundless new business opportunities, especially in the delivery of unique products and services, smart cities, and Internet sectors. This announcement follows the MoU signed during a two-day strategy summit held in Shanghai in October 2018 between Zain and Huawei whereby the two companies discussed and assessed the expected business cases for 5G in the region, including its impact on IoT, mobility, connectivity, healthcare, government; and other essential sectors. Zain is on track to have its operations in Kuwait be the first to launch 5G commercially, maintaining its technology leadership in the quality and range of services offered to the country's community, whether it be government, enterprises or individuals.

Zain Kuwait Enters Pioneering Agreement with Zain Drone for Tower Inspection and Maintenance Services

Zain Kuwait, the leading digital service provider in Kuwait announces entering an agreement with Zain Drone to undertake inspections of its tower infrastructure. The agreement sees Zain Kuwait as one of the first operators in the MENA region to deploy drone technology to inspect and maintain its cell tower infrastructure, demonstrating the operator's drive to become a more agile and cost-efficient operator. The agreement also represents the first commercial deal for Zain Drone. The pioneering Zain Drone as-a-Service (DaaS) offering was announced at a ceremony at GITEX in Dubai in October 2018, with the business set to unlock opportunities in various industries to fast-track growth and exploit the Internet of Things (IoT) in an efficient, safer and faster way. The offering delivers state-of-the-art bespoke drone solutions and provides advanced analytics for governments and businesses. In a growing trend globally for the telecom sector, progressive mobile operators have identified the need to constantly monitor

their towers to ensure smooth and hassle-free relay of signals between devices and infrastructure to ensure a great mobile experience for customers. Drone cell tower inspection reduces costs and the time taken to detect any flaws considerably, as well as providing companies with complete details of defects through visual imagery, making it easier to develop lasting solutions for the problems that are identified. Commenting on the agreement, Zain Kuwait Chief Technology Officer, Nawaf Al Gharabally said, "Zain Kuwait is a flagship operation within the Group, and as such it is important for us to lead the way with regards to developments related to efficiency and infrastructure maintenance. Zain Group has always benefited from its broad portfolio of operations, be it from a geographic perspective or a technological one, and tying up with Zain Drone is another example of how strong synergies are being driven within the Group to significant positive effect." AbdulAziz Jawad, CEO of Zain Drone said, "We are pleased to

announce our first commercial agreement with Zain Kuwait, one of the most innovative and forward-looking telecom operators in the region. Our business case is based on providing tools to our partners that help them optimize their operations and maximize gains from the efficient running of infrastructure. Kuwait will be a great showcase market for the capabilities of Zain Drone-as-a-Service, and we look forward to winning further business in Kuwait and other markets across the region from Zain operations as well as from non-Zain affiliated organizations." Zain Drone is investing heavily to build the required capabilities in drone operations and is positioning itself to become the leading strategic partner in the fast-developing markets for unmanned data acquisition. The Zain Group enjoys solid in-house expertise in drone technology, drawing from international experts, and enjoys unparalleled knowledge of the enterprise market in Kuwait and across the region.



Accenture Expands Coding Tutorial to 15 Languages for 'Hour of Code' 2018

For the fourth consecutive year, Accenture is teaming up with Code.org to support Hour of Code, a global educational movement that reaches over 100 million students through a one-hour introduction to computer science. This year, in conjunction with Computer Science Education Week (December 3-9), Accenture is expanding its coding tutorial across 15 languages – English, Chinese, Dutch, Filipino, French, German, Greek, Hebrew, Italian, Polish, Portuguese, Slovak, Spanish, Swedish and Vietnamese – to bring coding to more students around the world through lessons in their native languages. Nearly 2,500 Accenture employees have committed to teach an hour of code at local events in their communities, helping to inspire more than 100,000 students around the world to learn coding and computer science skills. “As disruptive technologies advance and have a growing impact on society, a significant skills gap is also growing – so much so that already millions of jobs requiring STEM skills are unfilled worldwide,” said Paul Daugherty, Accenture’s Chief Technology & Innovation Officer and ‘chief coder’. “It is critical that we equip today’s students – tomorrow’s workforce – with not just these skills, but also an understanding of how they can harness creativity and innovation to improve the way the world works and lives.” Accenture is building on the success of last year’s launch of the Accenture Intelligent Space Exploration, a coding tutorial in which students discover how artificial intelligence (AI) techniques can be applied to teach a robot to explore a new planet – recognizing animals and plants, understanding a new language, and conversing with inhabitants. Approximately 110,000 individuals have participated in the tutorial since its debut. “By learning to code, kids will grow up understanding how humans and technology work together – an important first lesson in preparing for the future,” added Jill Huntley, Global Managing

Hour of Code 2018

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Director for Corporate Citizenship at Accenture. “Hour of Code is a fantastic opportunity for Accenture volunteers to help to build New Skills Now all over the world.” Accenture’s global commitment to provide more opportunities for students to learn to code supports the company’s Skills to Succeed corporate citizenship initiative, which addresses urgent workforce needs around the world – including preparing the next generation with the skills to work in the digital economy. As part of this year’s Hour of Code collaboration, Accenture employees are developing and leading engaging activities around the world aimed at inspiring students in new ways. These activities include: Marty Rodgers, Senior Managing Director and local office Managing Director for Accenture in Metro Washington, D.C., is joining Baltimore Mayor Catherine Pugh, Maryland Lt. Gov. Boyd Kevin Rutherford, and 60 community organizations to launch #thecitythatcodes – a year dedicated to STEM education in Baltimore. The program kicks off with an hour of code taught to adults by elementary school students. In Texas, Accenture is hosting 200 students at Space Center Houston, taking students out of the classroom and showing them first-

hand what a future in computer science can look like. In Mauritius, Accenture is organizing Hour of Code sessions for 100 students in its Tech Avenue Space, a first-of-its-kind training venue launched last year within the University of Mauritius. Students will also have the opportunity to engage in technology demonstrations, which demonstrate what pursuing a future in computer science can lead to. Accenture employees in India are turning Computer Science Education Week into a month-long program, with over 15 events planned throughout December. “Every student should have the opportunity to learn computer science – it provides a critical foundation for success in any 21st-century career path – not just in ‘traditional’ IT, but also creative vocations –everything from graphic design to theater production,” said Hadi Partovi, Co-Founder and CEO of Code.org. “To date, over 100 million students around the world have participated in Hour of Code. This is because organizations such as Accenture go above and beyond to advance our shared vision of equipping the youth of today with skills they’ll need in the future.”

Accenture Selected By Siemens to Run Its Business Intelligence Operations

Siemens AG has awarded Accenture (NYSE: ACN) a five-year technology and services contract to run and maintain several of its digital managed services for data analytics and business intelligence. The new project, part of a firm-wide digital and IT transformation effort at Siemens, represents a significant expansion of the ongoing collaboration between the two companies. Siemens is accelerating its digital transformation with help from Accenture's support for data analytics and business intelligence services around: The development and support of initiatives for Siemens' for data analytics and business intelligence infrastructure; The establishment of new agile ways of working in the data analytics and business intelligence space that will help drive innovation; The development of new analytics services; and

The creation of solutions and services to automate basic data analytics and business intelligence tasks through robotic process automation. Accenture will also apply its artificial intelligence capabilities to develop data analytics and business intelligence solutions and services. As part of the contract, Siemens has transferred to Accenture a skilled team of Siemens professionals responsible for the data analytics and business intelligence services of its corporate IT group. "We've selected Accenture because of the firm's renowned excellence in data analytics and business intelligence, its global delivery capability, and our longstanding, collaborative working relationship," said Dr. Helmuth Ludwig, CIO of Siemens. "We need strong partners who can help us drive our digital transformation, and I look forward to working with the Accenture teams on this

important engagement." Patrick Vollmer, a managing director at Accenture who leads its Industrial Equipment business in Austria, Switzerland, Germany and Russia, said, "We're very proud of this extension of our relationship with Siemens and about the trust that its business intelligence leadership has put in us. We're also excited to be taking over Siemens' high-performing business intelligence team, whose deep industry skills and insights will further strengthen our own BI capabilities. With their trust and help, we're in an excellent position to take Siemens BI services to the next level and improve our position around analytics and BI for German industrial companies." With this new agreement Siemens and Accenture will continue and expand their relationship around BI that has been built over the last 20 years.



BT and Deloitte Spearhead Police Digital Transformation

BT and Deloitte have been awarded the contracts to help deliver the National Enabling Programs (NEP) for policing, including the National Management Centre (NMC). Under the partnership agreement, they will work with police forces across England and Wales to help them buy and manage ICT more effectively. The delivery of new cloud-based tech to local police forces is a welcome one. It follows on from successful trials in 2017 and 2018 with a select few local police forces. Now, the program will be rolled out throughout England and Wales over the next few years. The NEP, which sees investment of £100 million, aims to revolutionize British Policing, in-line with the Policing Vision 2025. Part of the plan involves implementing the latest cloud-based tools that forces need to increase effectiveness, enhance communication and facilitate interaction with other forces, partner organizations and the public. "The NEP is a key enabling tool that will deliver a foundational change within Policing as we exploit new ICT resources in a unified way across our Forces," said

Wayne Parkes, Program Director of the NEP. "This 'joined up thinking' will facilitate a radical change in both what the police do and how the public interact with us." Stephen Mold, Northamptonshire Police and Crime Commissioner and NEP board member, added: "This program will ensure all UK police forces are using the same software within the next two years, improving public safety and the effectiveness of frontline police officer." The nationally coordinated, locally delivered service will allow local forces to maintain control of which tech they need for their team, delivered via Microsoft Azure, but taking away the responsibility of maintaining the tech from them thanks to a central National Management Centre (NMC) provided by BT. The NMC will maintain the services that are provided to ensure there are no vulnerabilities in the technology which could expose local forces to cyber-attacks. The 24/7 facility based in one of BT's existing Security Operations Centers will respond to cyber threats against the force and ensure sensitive data is safeguarded as the forces

embark on their transformation. "The need for the Police to protect digital evidence, intelligence and front-line services from cyber-attacks has never been greater," said Colm O'Neill, MD Major Business and Public Sector at BT. "So our new National Management Centre for Policing will provide them with a cyber-security center of excellence. Cybercrime is also borderless, so information sharing and greater collaboration is needed across all Forces. We will help the Police prevent and combat cyber-attacks in a more joined-up fashion while securing the network and applications that will move into the cloud - one of the biggest IT transformations Policing has ever seen." One of the key predictions of the Policing Vision 2025 is that forces will be far more digital. This digital transformation will make it easier for the public to make contact with the police wherever they are in the country, enabling them to make better use of digital intelligence and evidence and transfer all material in a digital format to the criminal justice system.



Cisco and MCIT Egypt Sign Cooperation Protocol to Stimulate Technological Innovation

Premier and Minister of Housing, Utilities and Urban Communities Mostafa Madbouly witnessed the ceremony of signing a Memorandum of Understanding (MoU) between the Ministry of Communications and Information Technology (MCIT) and Cisco, the world's leading company in IT and networking areas, to promote digital transformation and stimulate technological innovation. The MoU was signed by the Information Technology Industry Development Agency (ITIDA) Acting CEO Maha Rashad and Cisco General Manager Ayman El Gohary. The MoU is within the framework of implementing the Country Digital Acceleration Program (CDA), launched by Cisco in the Middle East and Africa two years ago, to help the countries in implementing their digital development plans. The program is implemented in Egypt in line with Egypt's Vision 2030 and focuses on the digital acceleration in implementing a number of initiatives based on Cisco's global experience in digital transformation. The Minister of Communications and Information Technology Amr Talaat stated

that, under the MoU, Cisco partakes in the implementation of MCIT strategies for building capacities and developing digital skills, particularly those related to presidential initiatives, including the IT national academy for People with Disabilities (PwDs), and the Presidential initiative "Africa Games and Digital Applications. The MoU stipulates that Cisco is to expand "Cisco Networking Academy" program in Egypt and double the number of Egyptian and African students benefiting from the program to reach approximately 20,000 in 2019, and up to 30,000 in 2020. The ICT Minister added that the MoU entails cooperation in implementing the digital integration of a number of sectors, including education and digital services, through building on the increasing use of ICTs and benefiting from the post offices network throughout Egypt, thus post offices can be main centers for citizens to receive various digital services. Cisco, under the MoU, is to implement a number of initiatives that will contribute to implementing the government's digital

agenda and work on the deployment of Internet of Things (IoT) technologies and smart city solutions in Egypt. Cisco will also support MCIT efforts in digital health areas by leveraging Cisco technologies in automating at least 40 health units. In the field of entrepreneurship and startups, Talaat stated that Cisco will cooperate with the Technology Innovation and Entrepreneurship Center (TIEC), affiliated to the Information Technology Industry Development Agency (ITIDA), to create a sustainable creative environment through providing training to local startups. This is in addition to supporting these startups to gain global expertise, reach markets and provide them with networking opportunities with international innovation support organizations. The ICT Minister said that this cooperation emphasizes MCIT commitment to implement digital transformation as soon as possible in Egypt and to promote the growth of the ICT sector in line with Egypt's vision 2030. He added that MCIT seeks to create a supportive environment to equip young creative calibers with the digital skills necessary to keep pace with technology developments and meet market future needs. Cisco program aims to accelerate the digital transformation in Egypt at all levels. The company seeks to strengthen its commitment to cooperate with Egypt in this field. Since 1999, more than 95,000 students has benefited from Cisco Networking Academy courses, and accordingly, 92% of its graduates have found employment opportunities and continued their education in the same field.



Cisco Predicts More IP Traffic in the Next Five Years than in the History of the Internet

The internet is made up of thousands of public and private networks around the world. And since it came to life in 1984, more than 4.7 zettabytes of IP traffic have flowed across it. That's the same as all the movies ever made crossing global IP networks in less than a minute. Yet the new Visual Networking Index (VNI) by Cisco predicts that is just the beginning. By 2022,

more IP traffic will cross global networks than in all prior 'internet years' combined up to the end of 2016. In other words, more traffic will be created in 2022 than in the 32 years since the internet started. Where will that traffic come from? All of us, our machines and the way we use the internet. By 2022, 60 percent of the global population will be internet users. More than

28 billion devices and connections will be online. And video will make up 82 percent of all IP traffic. "The size and complexity of the internet continues to grow in ways that many could not have imagined. Since we first started the VNI Forecast in 2005, traffic has increased 56-fold, amassing a 36 percent CAGR with more people, devices and applications accessing IP networks,"

said Jonathan Davidson, senior vice president and general manager, Service Provider Business, Cisco. "Global service providers are focused on transforming their networks to better manage and route traffic, while delivering premium experiences. Our ongoing research helps us gain and share valuable insights into technology and architectural transitions our customers must make to succeed."

Key predictions for 2022

Cisco's VNI looks at the impact that users, devices and other trends will have on global IP networks over a five-year period. From 2017 to 2022, Cisco predicts:

- Global IP traffic will more than triple
- Global IP traffic is expected to reach 396 exabytes per month by 2022, up from 122 exabytes per month in 2017. That's 4.8 zettabytes of traffic per year by 2022.
- By 2022, the busiest hour of internet traffic will be six times more active than the average. Busy hour internet traffic will grow by nearly five times (37 percent CAGR) from 2017 to 2022, reaching 7.2 petabytes [1] per second by 2022. In comparison, average internet traffic will grow by nearly four times (30 percent CAGR) over the same period to reach 1 petabyte by 2022.
- Global internet users will make up 60 percent of the world's population
- There will be 4.8 billion internet users by 2022. That's up from 3.4 billion in 2017 or 45 percent of the world's population.
- Global networked devices and connections will reach 28.5 billion
- By 2022, there will be 28.5 billion fixed and mobile personal devices and connections, up from 18 billion in 2017—

or 3.6 networked devices/connections per person, from 2.4 per person.

- More than half of all devices and connections will be machine-to-machine by 2022, up from 34 percent in 2017. That's 14.6 billion connections from smart speakers, fixtures, devices and everything else, up from 6.1 billion.
- Global broadband, Wi-Fi and mobile speeds will double or more
- Average global fixed broadband speeds will nearly double from 39.0 Mbps to 75.4 Mbps.
- Average global Wi-Fi connection speeds will more than double from 24.4 Mbps to 54.0 Mbps.
- Average global mobile connection speeds will more than triple from 8.7 Mbps to 28.5 Mbps.
- Video, gaming and multimedia will make up more than 85 percent of all traffic
- IP video traffic will quadruple by 2022. As a result, it will make up an even larger percentage of total IP traffic than before—up to 82 percent from 75 percent.
- Gaming traffic is expected to grow nine-fold from 2017 to 2022. It will represent four percent of overall IP traffic in 2022.
- Virtual and augmented reality traffic will skyrocket as more consumers and businesses use the technologies. By 2022, virtual and augmented reality traffic will reach 4.02 exabytes/month, up from 0.33 exabytes/month in 2017.

Regional IP traffic growth details (2017 – 2022)

- APAC: 173 exabytes/month by 2022, 32 percent CAGR, four-times growth
- North America: 108 exabytes/month by 2022, 21 percent CAGR, three-times growth

- Western Europe: 50 exabytes/month 2022, 22 percent CAGR, three-times growth
- Central & Eastern Europe: 25 exabytes/month by 2022, 26 percent CAGR, three-times growth
- Middle East and Africa: 21 exabytes/month by 2022, 41 percent CAGR, six-times growth
- Latin America: 19 exabytes/month by 2022, 21 percent CAGR, three-times growth

Cisco Complete VNI Forecast

- The Cisco Complete VNI™ Forecast includes global, regional, and country-level projections and trends associated with fixed and mobile networks. The full report includes additional information and analysis on IoT by industry vertical, IPv6 adoption, traffic growth by application, traffic patterns, cord cutting implications, Wi-Fi hotspots, broadband network performance and network security issues.

Cisco VNI Methodology

The Cisco VNI™ Complete Forecast for 2017 to 2022 relies upon independent analyst forecasts and real-world network usage data. Upon this foundation are layered Cisco's own estimates for global IP traffic and service adoption. A detailed methodology description is included in the complete report. Over its 13-year history, Cisco® VNI research has become a highly regarded measure of the internet's growth. National governments, network regulators, academic researchers, telecommunications companies, technology experts and industry/business press and analysts rely on the annual study to help plan for the digital future.



Eutelsat's Konnect Africa Launches in Democratic Republic of Congo

Konnect Africa, Eutelsat's African continent satellite broadband initiative, launched its satellite internet access offerings in the Democratic Republic of Congo. Konnect Africa is working with a large network of local partners specialized in various fields ranging from the distribution of telecom and television services to financial services, to help ensure widespread coverage. Internet access is now offered in six major cities of the Democratic Republic of Congo through

a network of eight resellers totaling nearly 500 stores and retail points. These offers will soon be supplemented by the arrival of a Wi-Fi hotspot service, called Konnect Wifi, which will provide broadband internet access at traffic points such as in hospitals, schools and universities, stores, etc. "In a country which constitutes one of the main African markets for internet via satellite, today we are able to offer the Congolese people powerful connectivity

solutions thanks to this technology," said Konnect Africa Chief Executive Officer (CEO) Jean-Claude Tshipama. "As a key success factor to meet the specificities of a country, we rely on world-class local partners to distribute our turnkey offers. Currently being deployed in some 20 countries in Africa, our Konnect Africa service responds to the need to develop digital inclusion on this continent."

Eutelsat and The Switch Partner to Deliver Global Satellite and Fiber Occasional Use Network

The Switch® and Eutelsat (Euronext Paris: ETL) are joining forces to provide a new, independent offer delivering an unparalleled satellite and fiber video contribution network. The partnership will provide The Switch's user community of over 800 of the world's leading content producers and distributors with the ability to transmit feeds on a minute-by-minute basis to and from large parts of the globe. Simultaneously, broadcasters and content producers within Eutelsat's satellite footprint will gain access to The Switch's extensive global fiber network, including 53 physical points-of-presence, as well as connections to U.S. tech leaders, major global broadcasters and more than 180 sports organizations, venues and rights holders. This partnership leverages the resources of three Eutelsat satellites covering



Europe, Africa and the Americas, (further satellites may be added in the future to extend the reach of the solution) with The Switch's global video transport network. Customers will be able to schedule transport to and from each region via SwitchIT™, The Switch's patented award-winning customer-control software platform. The integrating of The Switch and Eutelsat systems will enable customers to deliver their content faster, more smoothly and to more regions around the globe. "We have seen a huge increase in the demand for worldwide uplinking from our connected customers and venues," said Keith Buckley, President and CEO at The Switch. "Partnering with Eutelsat allows us to combine our shared resources to bring a seamless, flexible offering to market." "We are delighted to partner with The Switch to offer customers seeking connectivity a more efficient and cost-effective way to move content," said Michael Antonovich, CEO of Eutelsat Americas. "Having greater first-mile access to literally hundreds of additional broadcasters, venues and content producers in the U.S. and beyond greatly strengthens our position in the media landscape." Over the past year, The Switch has invested heavily in expanding its network, products, and services internationally. This includes the launch of The Switch Access™, a broadband IP connection enabling low-cost connectivity from anywhere in the world, the addition of strategic partnerships on several continents, and increasing its team to include dedicated personnel in key international locations.

Eutelsat Takes Home SSPI Better Satellite World Award for Its Support of the Crisis Connectivity Charter

The Space & Satellite Professionals International yesterday recognized the signatories to the Crisis Connectivity Charter, including Eutelsat, with the Better Satellite World Award during a ceremony in London, which annually acknowledges the contributions of the satellite industry to the global economy, safety, security, governance, development and health. The Crisis Connectivity Charter was signed in late 2015 between the Global VSAT Forum (GVF), the EMEA Satellite Operators Association (ESOA), the UN Office for Coordination of Humanitarian Aid (OCHA) and the Emergency Telecommunications Cluster (ETC) to help the humanitarian community by enhancing their access to vital satellite-based communications when local networks are affected, destroyed or overloaded following disasters. It entered into its operational phase in May of this year through the signature of contribution agreements with the United Nations World Food Program (WFP), on behalf of the ETC. In the context of the Charter, Eutelsat has committed pre-allocated bandwidth on four of its satellites across the globe, complemented on the ground by ready-to-deploy satellite kits, enabling emergency telecommunications services to be deployed in Europe, Africa, the Middle East and the Americas within 24 hours of a crisis. Simon Gray, Vice President of Humanitarian Affairs of Eutelsat, commented on the award: "We are honored to be receiving this award as a signatory of the

Crisis Connectivity Charter. The resilience and quick deployment of satellite solutions place our industry in a unique position to support relief efforts and we are proud to be the first industrial sector to be undertaking such a unified effort to standardize disaster response on a global scale."





Facebook Committed to Pakistan's Digital Empowerment

Facebook Vice President of Public Policy for the Asia Pacific Region Simon Milner has said the social media platform wants to help create social and economic impact that will empower Pakistan to thrive and embrace today's digital world. Facebook recently launched an initiative in Pakistan 'SheMeansBusiness' in partnership with the Universal Service Fund of Ministry of Information and Technology and Punjab Information Technology Board (PITB), which allows women to start businesses from home. Under the program, 20,000 women entrepreneurs across 150 women empowerment centers in Pakistan would be trained in collaboration with the Universal Service Fund Company (USFCo). "Nadia, one of our SheMeansBusiness partners, has empowered over 150,000 women entrepreneurs in her community who have started an online business using Facebook Pages," he said. Milner, currently visiting Pakistan, said in an interview with The News that Facebook would continue to provide a place where people express themselves freely and safely, and help

small businesses and developers across Pakistan thrive and grow. "We launched our blood donation product in Pakistan earlier this year because we want to make safe blood more accessible in Pakistan to all licensed blood banks and hospitals," Milner informed. "We have an ongoing partnership with SBTP (Safe Blood Authority) to train blood banks on how to find volunteer donors through Facebook. Since the launch in March this year, more than 1 million donors have signed up for donating blood in Pakistan." Further, Facebook partnered with Telenor Pakistan in early 2017 to train students and schools in digital literacy and online safety. "Our partnership with Idea Cronon Ka (ICK) gave community leaders in Pakistan a national platform to share their stories and vision. Each community leader will receive a grant of up to \$20,000 (Rs240,000)," Milner said. Facebook also launched Community Leadership Circles in Pakistan, a global program that gives community leaders the opportunity to come together to share best practices, participate in trainings and

workshops, support one another, and meet in person on an ongoing basis, he added. According to Pakistan Telecommunication Authority (PTA) data, only 29 percent Pakistanis were online. Facebook wanted to bring more people online to address the digital divide in Pakistan, Simon said adding that Facebook was working with telcos partners to help innovate and explore new ways to connect rural communities that don't enjoy 4G and broadband coverage. Simon said that Facebook also focused on innovation and helping grow the number of tech startups in Pakistan. "Our Facebook Developer Circles has a thriving community of 7,800 developer community members across Islamabad, Lahore, Sahiwal, Gujrat, and Faisalabad," he added. These communities come together regularly to collaborate on the latest tools and technology that helps drive innovation and business, the vice president of Public Policy for the Asia Pacific Region concluded.



Google is Spending \$1 Billion to Build a Massive New Campus in New York

Days after Apple announced a major expansion to its operations in the U.S. – including a new \$1 billion campus in Austin – fellow tech giant Google has announced that it too will invest \$1 billion as it sets up a new campus at Hudson Square in New York. Google already has 7,000 staff located in New York, and this strategy is

aimed at doubling that headcount over the next 10 years. Hudson Square will be a 1.7 million-square-foot campus that'll serve as "the primary location" for Google's Global Business Organization. Google expects two Hudson Square buildings to be operational for staff by 2020, with a building on 550 Washington Street coming online two years later. That's in addition to Manhattan's Chelsea Market, which it bought for \$2.4 billion in March, and additional space at Pier 57, which it is planning to take. All this adds up to a major hiring push outside of the Bay Area. "Our investment in New York is a huge part of our commitment to grow and invest in U.S. facilities, offices and jobs. In fact, we're growing faster outside the Bay Area than within it, and this year opened new offices and data centers in locations like Detroit, Boulder, Los Angeles, Tennessee and Alabama," wrote Google CFO Ruth Porat. Google and Apple's commitments come after Amazon announced that New York would be the location for its much-anticipated "HQ2" following a long search that pulled in authorities from cities and states across the U.S.

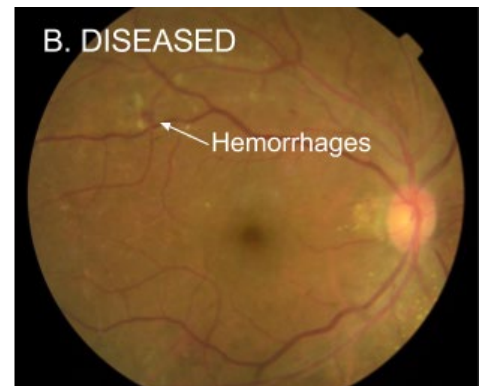


Google Launches Thai AI Project to Screen for Diabetic Eye Disease

Google has launched an artificial intelligence program in Thailand to screen for a diabetic eye disease which causes permanent blindness. The eye screening program in Thailand follows a similar Google program in India and highlights a push by big tech companies to show the social benefits of new AI technologies. "As a society, we have a responsibility to use AI in the best possible way," Kent Walker, the company's Senior Vice President for Global Affairs, said in speech at a Google event in Bangkok on Thursday. The event also highlighted other social benefits of Google's AI projects, such as stopping illegal fishing in Indonesia. Google's Thailand diabetes program was announced in partnership with a Thai state-run Rajavithi Hospital. This followed a joint-study which found the AI program to have an accuracy rate of 95 percent when it comes to disease detection, compared with 74 percent from opticians or eye doctors. The program analyses patients'

eye screen results to assess if they are at a risk of vision loss, which will enable them to have preemptive treatment. Thailand is one of the world's most important sugar producers and high sugar consumption is common amongst its 69 million population. The Thai government has been campaigning against behavior that can lead to diabetes and has made the diabetic eye screening one of the country's national health indicators since 2015. Thailand has only around 1,400 eye doctors for its 5

million diabetic patients, who are all at risk of the vision loss, Paisan Ruamviboonsuk, Rajavithi Hospital's assistant director, told reporters. Paisan said the program is intended to achieve a nationwide eye screening rate of 60 percent, which is also the Thai government's target. In October, Google said it would grant about \$25 million globally next year to humanitarian and environmental projects seeking to use AI for good.



Google Leans Heavily on SDN for Reliability, Velocity and Availability of its Network

Google would not be Google if not for software-defined networking, according to a keynote address at ONF Connect by Google Fellow Amin Vahdat. Google is an operator member of ONF, and earlier this year Google put its Stratum code into open source with ONF. Stratum is part of ONF's Unified, Programmable and Automated Network (UPAN) Exemplar Platform, which is working on the next generation of SDN for ONF's membership. "Open source software-defined networking: Why did it win? Actually when we started, and when I started in this field, maybe the motivation was, 'Wow, these boxes that we buy from vendors are expensive and we can replace them with cheaper boxes,'" Vahdat said. "That was certainly an easy motivation to say we're going to move from these big expensive boxes to white boxes, and the network will become cheaper. "Actually, in retrospect, that's not why SDN won. I think that the number one reason we have this SDN is it allows us to balance availability with velocity." Vahdat said that Google is constantly increasing the capacity of its

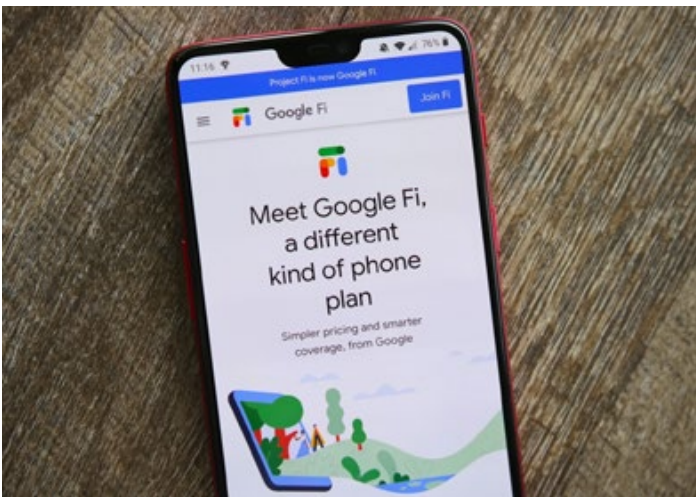
network, probably along the same scale as the entire internet when it was 2 or 3 years old. "It is the pace at which we have to move and then making sure that we can maintain that pace while maintaining the availability for infrastructure," he said. "It's very challenging. It's probably what we spend most of our time on. "I would argue that without SDN, it would not be possible to do that. It's not about can we go buy cheaper boxes for our network? We couldn't buy the network that delivers this capability of going at this rate while maintaining our availability for enterprise. As you might imagine, it has a huge amount of value for us. The availability to be able to maintain that balance is probably the number one reason why we would have to do SDN, and why it's entrenched." Vahdat said that Google has hundreds of thousands of switching elements across its network, and it's introducing new network elements "24/7, every day of the year." Any one of the new elements could cause Google's network to crash, but Google makes sure they're safe through

emulation and verification by putting them into a copy of its network that's running on the side. For Google, it's all about the velocity of improving the network on the fly while balancing that with availability so that end users don't feel any hiccups with the upgrades or new network elements. "How do we have essentially a copy of our network deployments running in software on the side, so that we can test whatever we're planning on making for the network actually does what we expect? Without SDN, I would once again argue that that's just something that's not possible," he said. "We need to be able to iterate to Google a software architecture essentially every week. We have to be able to do this every week, every single week across our network, and be able to deploy it globally. Without SDN, this would not be possible. "What I want to emphasize here is it's not about the fact that the boxes are cheaper. We're glad about that, but it's all the other benefits that are really why SDN is so entrenched for us."

Google expands its Project Fi Wireless Service to iPhones and Most Android Devices

Google LLC is moving to grow its role in the telecommunications market. The search giant today expanded the availability of Project Fi, the wireless service it launched in 2015, to iPhones and the “majority” of Android devices. The company also renamed the service to Google Fi in another sign that its telecommunications operation is starting to shed its experimental status. Google Fi, which was previously only available on the search giant's Nexus and Pixel phones along with a small handful of third party handsets, is what's known as a mobile virtual network operator. MVNOs are not powered their own dedicated infrastructure but

rather run on existing carrier networks. In Google's case, it relies on T-Mobile USA Inc., Sprint Corp. and United States Cellular Corp. to provide connectivity for users. This distributed backbone lets Google Fi dynamically switch users between carriers based on signal strength. The service's biggest draw, however, is its competitive pricing: Google charges \$20 a month for an unlimited phone line and \$10 per gigabyte of data with a \$60 cap. Any additional bandwidth consumer by the user is free. Google Fi's generous data rates, plus the fact that the service doesn't require a long-term plan, will be the main appeal for users who couldn't sign up until today's expansion. That's because the dynamic carrier switching feature is still limited to the handful of devices that were supported before. The same is also true for many of the other advanced features in Google Fi, including its automatic spam blocking function. Google explained that handset makers have to specifically build their devices for the service in order to make these capabilities accessible to users. Now that Google Fi is open to most of the mobile ecosystem, the number of fully supported devices can likely be expected to increase. The wireless service is one element of Google's broad, cross-industry effort to take on a bigger role in consumers' lives. A key component of that plan is Google Assistant, which the company is actively working to extend into more areas. Google recently teamed up with iRobot Corp. on an initiative intended to boost the virtual assistant's capabilities using location data from the latter firm's popular robotic vacuum cleaners.



Huawei and Intel Achieve World's First 2.6GHz 5G Interoperability Testing Under SA

Intel and Huawei announced that they have successfully completed 2.6GHz 5G NR Interoperability and Development Testing (IoDT) based on the 3GPP

Release 15 global standard September version. The IoDT test is the world's first 2.6GHz 5G interoperability test under SA network and is a key milestone towards

accelerating the maturity of the 2.6GHz 5G NR ecosystem With Intel's 5G Mobile Trial Platform (MTP) and Huawei's latest 5G NR (New Radio) base station supporting the 2.6GHz with 160MHz bandwidth, the two companies jointly completed the IoDT and successfully enabled the first call under SA network. The successful completion of this IoDT test not only marks the end-to-end successful interoperability of 5G in the 2.6G band, but also lays a foundation for large-scale commercial launch. It will promote the development and maturity of the 5G end-to-end industry in the 2.6G band. In the future, Intel and Huawei will continue to carry out more test and commercial verification, and promote the rapid maturity of the ecosystem, laying a solid foundation for the future 5G commercialization.



Huawei Announces Securing 25 5G Commercial Contracts, Ranking Number One Among All ICT Equipment Providers



Preparing for the Future, Huawei to invest an initial special budget of \$2 billion US dollars in the next 5 years to comprehensively improve software engineering capabilities.

Huawei Rotating Chairman Ken Hu held a press conference with leading global media at the company's new campus in Dongguan on Tuesday, December 18. The journalists visited R&D labs showcasing materials and thermal management technologies developed for 5G equipment, as well as an independent cybersecurity lab.

Hu delivered strong messages of confidence in Huawei's business growth and prospects, citing the trust of hundreds of network operators, nearly half of the world's Fortune 500 companies, and hundreds of millions of consumers. Huawei's 2018 revenue, he said, was expected to exceed US\$100 billion.

He also directly addressed recent allegations against Huawei, stating that it is best to let facts speak for themselves, while emphasizing repeatedly that the company's security record was clean. Hu noted that there have been no serious cybersecurity incidents in 30 years.

On 5G, Hu mentioned that Huawei has secured 25 commercial contracts, ranking number one among all ICT equipment providers, having already shipped more than 10,000 base stations to markets around the world. Almost all network customers have indicated they want

Huawei, which is currently the market leader with the best equipment and will remain so for at least the next 12 to 18 months, for faster and more cost-effective upgrades to 5G. Some security concerns based on the technology for 5G were very legitimate, noted Hu, but able to be clarified or mitigated through collaboration with operators and governments.

"Rare cases" have arisen where some countries are using 5G issues as an excuse for groundless speculation based on "ideological or geopolitical considerations". Security concerns disingenuously raised as excuses to block market competition would slow adoption of new technology, increase costs for network deployment, and raise prices for consumers. If Huawei were allowed to compete in the US for 5G deployment from 2017 to 2020, around US\$20 billion of capital expenditure in wireless infrastructure would be saved, according to some economists.

Hu emphasized that Security is Huawei's highest priority and it overarches everything. Hu was open to a question about building cyber security evaluation centers in places such as the US and Australia, pointing to similar centers in the UK, Canada, and Germany that are designed to directly identify, address, and mitigate concerns. Huawei has subjected itself to the strictest reviews and screening by regulators and customers, while expressing understanding of legitimate

concerns that some stakeholders might have. However, no evidence indicates that Huawei equipment poses a security threat. Regarding often-quoted concerns over Chinese law, the Ministry of Foreign Affairs in China had formally clarified that no law requires companies to install mandatory backdoors. Huawei remains open to concerns about its openness, transparency, and independence as well as dialogue. Any proof or evidence could be shared with telecom operators, if not to Huawei or the public at large.

"We will continue to increase our investment on security and security related technologies. In our most recent board meeting, we decided on a companywide transformation program to improve our software engineering capabilities. The company will invest an initial special budget of \$2 billion US dollars in the next five years to comprehensively improve our software engineering capabilities so our products will be better prepared for the future world" Hu added.

In the press conference, some journalists asked about Huawei's CFO, Ms. Meng Wanzhou. Hu said he was unable to comment due to legal processes underway, but he did express that business operations were not being impacted by this event. Executive travel plans were not impacted, and Huawei remains very confident about its trade compliance system, which has been running since 2007. The company has confidence in the fairness and independence of the judicial systems in Canada and the US.

Hu described the company's recent achievements as exciting, and recalled his almost 30-year history with Huawei during which its people, culture and management had grown. "This is journey of transformation that has helped us grow up from an unknown vendor to the 5G leader". He also recognized that Huawei still faces challenges, thanking the media for interest in dialogue and appealing to employees, customers, and stakeholders.

As a closing statement, He mentioned a Chinese saying which means "the road ahead is long and hard, but we will keep moving and reach the destination, because we have already embarked on this journey".

Huawei Cloud Officially Launches Blockchain Service for Users around the World

Huawei Cloud officially launched its Blockchain Service (BCS) for global use on November 15, 2018, after launching it for commercial use in China on October 10th this year. Now available on the international HUAWEI CLOUD website, the service helps global enterprises and developers create, deploy, and manage blockchain applications quickly and at minimal cost on HUAWEI CLOUD. Its global launch lays the foundations for a distributed global blockchain platform. Blockchain features decentralization, tamper resistance, and traceability, and builds trust between transaction participants. As such, blockchain generates value when used in enterprise applications in specific industry scenarios. Enterprises in various industries are currently exploring the applications of blockchain, but deploying a blockchain on a cloud is no mean feat. Indeed, developers need to have a thorough understanding of blockchain technologies. Deployment is also time-consuming. As early as 2016, Huawei joined Hyperledger, the most influential open source project in the blockchain field, hosted by the Linux Foundation. For its continuous technical and code

contributions in two sub-projects, Fabric and STL, Huawei has been recognized as a key Hyperledger maintainer. Huawei is also the only maintainer from Asia in these sub-projects. BCS is a cloud service that capitalizes on the advantages of HUAWEI CLOUD's container and security technologies, among others. It is easy to use, efficient, and universally applicable, and can be used in data applications, the Internet of Things (IoT), finance, and other fields. The scenarios it can be used in cover data transactions, identity authentication, proof of information (such as real estate and education), remote healthcare, food source tracing, the Internet of Vehicles (IoV), and IoT device management. It offers substantial assistance for establishing a technological ecosystem and digitally transforming industries. HUAWEI CLOUD is now focused on developing its blockchain platform to offer technical support for enterprises that develop blockchain applications and solutions.

BCS has the following advantages:

Open and easy to use

Built-in compliance with Hyperledger Fabric 1.1 and Kubernetes, featuring a simple configuration, deployment in

minutes, and automatic multi-angle E2E O&M

Flexible and efficient

Multiple efficient consensus algorithms (5,000+ TPS) and flexible switching, dynamic joining or quitting of multi-role nodes and members, and container-based physical resource management

Cost-effective

Lower development and deployment costs, pay-per-use convenience, reduced O&M costs with unified management, and auto scaling and upgrade/rollback on demand

Robust security and privacy protections

Complete management and isolation of users, keys, and permissions; multi-layer encryption and privacy assurance; fully demonstrated cyber security infrastructure HUAWEI CLOUD BCS is dedicated to providing enterprises with a solid foundation for innovation and development, working with enterprises to build a better world. Using BCS, a company can establish a blockchain system perfectly suited to its own business in just 5 to 10 minutes. Welcome to the official HUAWEI CLOUD website for service trials and consultancy.

Huawei and HKT Offer Hong Kong's First 5G All-Fiber Shared Indoor Digital Network on New Mass Transit Railway Line

Huawei and HKT are building Hong Kong's first all-fiber mobile network architecture on an Mass Transit Railway (MTR) line which uses an innovative Digital Indoor System (DIS) to enable multiple operators sharing the network to provide ubiquitous high-quality mobile broadband (MBB) service to their customers. This network infrastructure has the capability to evolve into future-oriented 5G networks without the need for additional cabling. The DIS is deployed on the Shatin to Central Link (SCL) which is a new metro line of Mass Transit Railway under construction. The Central station is an important hub in the Golden Bay Area of Victoria Harbor. Connecting Hong Kong Island and the New Territories, this 17-kilometer line has a total of 10 train stations. The indoor network for the SCL is constructed by HKT as the lead operator



and will be shared by all mobile operators in Hong Kong. This shared indoor network is based on Huawei's LampSite Sharing solution, which allows multiple operators to share a common indoor network where radio headends of high, medium, and small power specifications can be co-deployed. The major advantage of the network is its all-fiber DIS solution, which allows network upgrade to 5G using 3.5 GHz frequency band without the need for additional cabling. Unlike traditional Distributed Antenna System (DAS) solutions that depend on passive coaxial cables, this solution allows the cables to be decoupled from frequency bands, radio access technologies,

and multi-antenna technologies while delivering a huge capacity. As both 4G and 5G networks can be deployed based on the same architecture and using the same site locations, this solution allows a more flexible and smooth transition to a 5G indoor network. Dr. Henry Wong, Head of Strategic Wireless Technology and Core Networks of HKT Engineering, said, "We are committed to providing users with high speed MMB service and wide network coverage for the best possible user experience. Large public venues and locations such as metro stations and lines, shopping malls, airport, etc. demand a large capacity to meet the diversified service requirements, creating the need for

onward evolution into 5G for technological and economic reasons. Huawei's digital network sharing solution perfectly meets such requirements in many ways." Mr. Ritchie Peng, President of Huawei Small Cell Product Line, said, "We are happy to open a new chapter of all-fiber architecture with HKT. Indoor places vary a lot and have diverse requirements, requiring differentiated solutions. The rapid MBB development also requires operators to focus on 5G in their network construction. Huawei is always a good advocate and exerciser of indoor digitalization. We are dedicated to offering more competitive indoor digital solutions to help our partners maximize the value of their networks."

Huawei First Releases the LTE 4T6S 2.0 Solution for Higher Network Capacity



At the Global Mobile Broadband Forum 2018, Huawei released the industry-leading LTE 4T6S 2.0. The solution uses four innovative technologies, including next-generation ultra-wideband multi-beam antennas, high-power dual-band 4T4R RRUs, performance optimization algorithms for overlapping areas, and an intelligent planning tool. With 4T6S 2.0, network capacity is enhanced on multiple frequency bands. The introduction of performance optimization algorithms improves user experience in overlapping areas by more than 10% while the overall site planning efficiency is also greatly increased. In addition, this solution has the added advantage of supporting FDD and TDD co-site and co-antenna deployment, playing a large part in building effective and simple sites. The solution uses Huawei patented cutting-edge antenna array technology, further suppressing inter-beam interference. An adaptive feedback system enables optimal multi-band performance on 1.8–2.6 GHz. A revolutionary series of antenna

products are provided to integrate low-frequency ports and simplify sites, meeting deployment requirements across diverse scenarios. With its newly introduced contemporary design, the efficiency and capability of RRU power amplifiers are greatly increased. Using high-power dual-band 4T4R RRUs, 4T6S 2.0 can be deployed on both 1.8 GHz and 2.1 GHz frequency bands, improving network coverage and user experience. With the wideband integrated power amplifier technology, software configuration can be used to enable power sharing between different bands and RATs. Efficient power utilization can further improve user experience at the cell edge by 5% to 20%. When multiple sectors are used, beams will overlap. Huawei uses innovative features such as inter-sector joint scheduling optimization and multi-band coordinated scheduling optimization for base stations to select the most suitable time-frequency resource allocation mode. This enhances the performance in overlapping areas and improves user experience by 10%. The coordinated scheduling optimization algorithms allow 4T6S sites to achieve maximum levels of performance. The 4T6S solution provides the highest capacity gains when traffic is evenly distributed among sectors. In order to ensure a more intelligent and efficient optimization of sector azimuths and traffic distribution, Huawei develops an intelligent planning tool. The tool supports a quick batch selection of sites that are suitable for deploying 4T6S. It also provides azimuth optimization advice using intelligent algorithms to achieve the best performance. These combined efforts help to significantly increase overall site planning efficiency. Chen Chuanfei, President of Huawei LTE FDD Product Line, said, "4T6S is one of the most important innovative technologies for LTE capacity evolution. It can help improve network capacity and enable 4x4 MIMO to provide high user experienced data rates. 4T6S 2.0 has achieved a series of industry-leading technological breakthroughs in key fields, enabling better performance, more applicable scenarios, and easier deployment. Through a series of innovative solutions, it is our sincere hope that we can help operators build high-quality networks with superior capacity and user experience, maximize spectrum value, and promote continuous development."



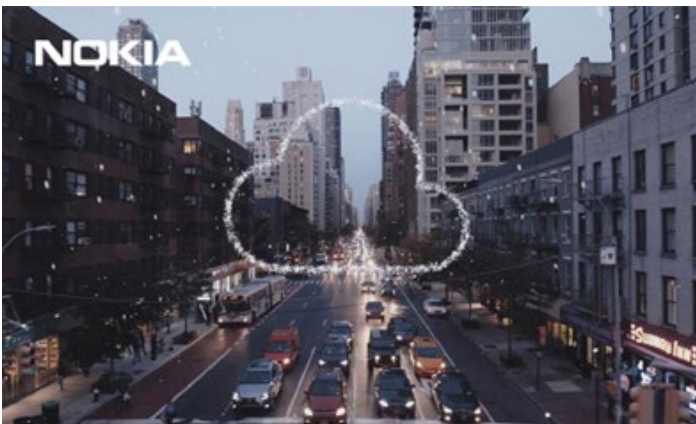
Nokia Proclaims 5G As A Risk Worth Taking

Nokia VP of networks marketing and communications Phil Twist (pictured) urged operators in Europe to take a leap of faith on 5G and rollout before a certain business model was in place to ensure they grab a position in the fourth industrial revolution. Noting the status of progress across the world, Twist said many of the operators in Europe were taking a more pragmatic approach in comparison to those in the US and China. He noted every operator needs to make a choice which could determine their future success: "Are they going to wait for a business case for 5G before they invest, are they only going to invest when they have to because they run out of capacity and have to use 5G," he said. "Are they going to take a leap of faith and build a 5G network and go and find the new opportunities?" Twist noted the fact 5G will empower far more industrial and consumer use cases than previous generations meant the choice more pressing. "We need operators to be brave, we need to address the new market opportunities," he added. "5G will not fly if it is just connectivity: the value is in the additional functionalities and additional features and performance 5G brings to different use cases. This



connectivity with intelligence is an enabler for the fourth industrial revolution. Nokia forecasts the fourth industrial revolution could add \$12 trillion to global economic activity, which operators will be able to grab a significant segment of.

Nokia and Telenor Group to Deploy AirGile Cloud-Native Core Solution to Transform Mobile Network Operations in Scandinavia



Nokia and Telenor Group are to deploy a cloud-native core solution based on Nokia AirGile technology, including the AirFrame data center and Cloud Packet Core, in Denmark, Sweden and Norway. The deployment will enhance performance and reliability and drive mobile broadband service agility as Telenor prepares for the introduction of 5G. The cloud-native core solution will deliver new flexibilities and capabilities in automation, enabling Telenor's networks to instantly adapt and scale services to meet the changing demands of people and connected things. The ability to quickly onboard virtualized network functions across a cloud-based infrastructure will reduce time-to-market for new services. With the introduction of 5G, the solution will enable network slicing, allowing Telenor to further expand its service offerings to meet the

ever-growing and diverse demands of people and industries. Nokia will deliver an AirGile cloud-native core and deploy its AirFrame data center and Cloud Packet Core solutions, including its Cloud Mobility Manager and Cloud Mobile Gateway, Nuage Networks SDN technologies, the CloudBand Management and Orchestration Software and third-party security solutions. Leveraging Nokia's open approach to architecture and collaboration, Telenor will be able to take advantage of a rich ecosystem of Nokia and third-party applications. Nokia will provide its services expertise and use its Cloud Collaboration Hubs to optimize the deployment and support network operations. This agreement follows Nokia's earlier successful deployment of a cloud-native core solution for Telenor's operations in Thailand, Malaysia, Myanmar, Bangladesh and Pakistan. Morten Karlsen Sørby, EVP and head of Telenor Group's Scandinavia cluster, said: "The transition to 5G will be driven by use-cases, allowing us to meet the needs of existing and new markets with innovative services. We are pleased to leverage Nokia's technology and services capabilities to help us transform our cloud networks in our Scandinavian markets and provide us with new efficiencies and capabilities as we make that journey." Hilary Mine, Head of Nordics, Baltics and Benelux for Nokia said: "Nokia is able to draw on its extensive network and services expertise to deliver a cloud-native core network that will allow Telenor to speed service delivery and take advantage of new efficiencies in terms of scaling services and expanding capacity to meet demand. The Nokia cloud-native core will provide a solid foundation as Telenor evolves toward 5G."

Nokia's Threat Intelligence Report 2019 Warns on the Fast-Growing and Evolving Threat of Malicious Software Targeting Internet of Things (IoT) Devices



The use of malicious software to attack IoT devices like smart home security monitoring systems is rising substantially and growing more sophisticated as cyber criminals take advantage of lax security, Nokia's Threat Intelligence Report 2019 warned. Driven by financial and other nefarious purposes, IoT botnet activity accounted for 78% of malware detection events in communication service provider (CSP) networks in 2018, according to the report, which is based on data aggregated from monitoring network traffic this year on more than 150 million devices globally where Nokia's NetGuard Endpoint Security product is deployed. That is up sharply from 33% in 2016, when IoT botnets were first seen in meaningful numbers. A botnet is a system of computers that can be infected with malicious software and controlled by a single computer for doing things like stealing bank account information and shuttering web sites. "Cyber criminals are switching gears from the traditional computer and smartphone ecosystems and now targeting the growing number of vulnerable IoT devices that are being deployed. You have thousands of IoT

device manufacturers wanting to move product fast to market and, unfortunately, security is often an afterthought," said Kevin McNamee, director of Nokia's Threat Intelligence Lab and lead author of the report. In 2018, IoT bots made up 16% of infected devices in CSP networks, up significantly from the 3.5% observed in 2017. As an indicator of the rising threat, the report found that malware-infected crypto-coin mining is expanding from high-end servers with specialized processors to IoT devices as well as smartphones and web browsers. Crypto-coin mining is generally the process by which crypto currency transactions are verified and added to blockchain technology systems. Industry analysts widely expect IoT device adoption to accelerate with 5G. The high bandwidth, large-scale and ultra-low latency capabilities of 5G greatly facilitate connecting billions of things to the internet, including smart home security monitoring systems, vehicles, drones and medical devices. But, as the Threat Intelligence report's findings underscore, lagging security protection of many current IoT devices and increasing technical sophistication are giving cyber criminals broader scope for successfully launching IoT device attacks. "Cyber criminals have increasingly smart tools to scan for and to quickly exploit vulnerable devices, and they have new tools for spreading their malware and bypassing firewalls. If a vulnerable device is deployed on the internet, it will be exploited in a matter of minutes," McNamee said. Also explaining some of the rise in IoT device malware infection rates is the fact that attacks on mobile and fixed networks in 2018 decreased from previous years. This is a result not only of cyber criminals looking further afield for softer targets, like IoT devices, but of better-protected networks, platforms and mobile devices that are designed and built with security in mind. The Nokia NetGuard security suite provides protection against a wide variety of bots and malware. The suite aggregates, analyses and correlates security data from a variety of sources, including endpoint detection software, to help security teams control risks and costs and to improve decision making. The NetGuard Endpoint Security software includes an IoT behavioral anomaly detection component that is capable of constantly tracking devices against security threats. The individual traffic profiles of any device, including an IoT device, are machine-learned automatically by the Endpoint system; any anomalies detected triggers immediate trouble-shooting against threats.

Nokia, Oppo Ink Patent License Deal

Nokia agreed a multi-year patent license deal with Chinese device maker Oppo. Maria Varsellona, Nokia chief legal officer and president of Nokia Technologies, said in a statement the agreement with "one of the leaders in the smartphone industry"

validates the Finland-headquartered company's "global licensing program". Nokia said the terms of the agreement are confidential. The company signed a similar multi-year deal with Huawei in December 2017. In August, Nokia released

a statement indicating it expects to charge smartphone vendors €3 per device to license its standard essential patents for 5G New Radio (NR). Device makers plan to launch 5G phones early in 2019.

Nokia and Qualcomm Complete 5G NR mmWave and Sub-6 GHz Over-the-Air (OTA) Interoperability Test Calls in Preparation for Commercial 5G Deployments in Early 2019

Nokia and Qualcomm announced that they have successfully achieved over-the-air (OTA) 5G NR data calls in both the mmWave and sub-6 GHz spectrum bands. Compliant with the global 3GPP 5G NR Release 15 specification in NSA (Non-Standalone) mode, the interoperability testing milestones were completed at Nokia's 5G center of excellence in Oulu, Finland using commercially available Nokia AirScale base stations and a mobile smartphone form-factor test device powered by the Qualcomm® Snapdragon™ X50 5G modem and antenna

modules with integrated RF transceiver, RF front-end and antenna elements. The testing achievements between the two companies are a continuation of their commitment to interoperability and OTA testing for the deployment of commercial 5G services in 2019. In February 2018, Nokia and Qualcomm Technologies first completed key 3GPP-compliant 5G NR interoperability testing in the 3.5 GHz and 28 GHz spectrum bands using a commercially available Nokia AirScale base station and device prototypes from Qualcomm Technologies. The OTA calls

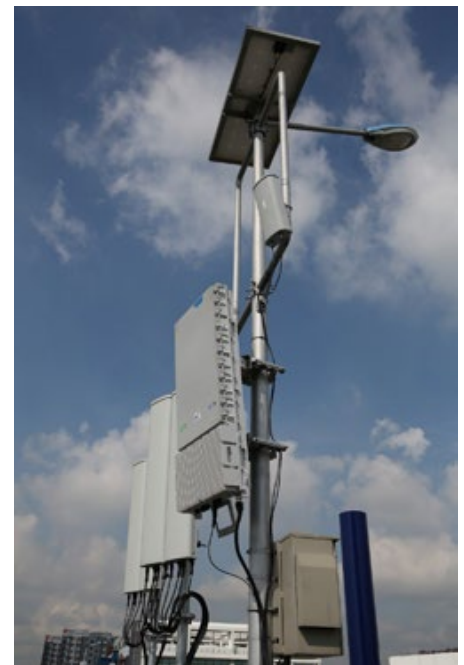
are key steps in enabling customers in the 5G ecosystem to launch commercial networks and mobile devices from early 2019 onwards, in the United States, Korea, Europe, Australia, Japan and China. "These successful data calls are a significant step in making 5G a commercial reality in early 2019, and this milestone with Nokia will help enable 5G network deployments across various operators and regions around the world," said Durga Malladi, senior vice president and general manager, 4G/5G, Qualcomm Technologies, Inc. "We will continue to work together to ensure end users have access to the technologies needed to experience transformative 5G experiences." "These key milestone tests with Qualcomm Technologies show the flexibility and capabilities of our AirScale radio access technology to deliver on the promise of commercial 5G," said Tommi Uitto, president of mobile networks, Nokia. "We continue to collaborate with Qualcomm Technologies to ensure our customers can unleash the power of their commercial 5G networks, to support the many new and diverse applications that will meet the demands of people and connected things, as they begin to launch commercial services in early 2019."

Unleash the power of
5G commercial networks

Nokia, StarHub Claim a First with 5G New Radio Pilot in Singapore

Nokia and StarHub have completed the first outdoor pilot of 5G New Radio on the 3.5GHz frequency band in Singapore, demonstrating 'industrial and consumer applications to staff, industry partners and enterprise customers over 'live' Nokia 5G cells and core network technology at StarHub's headquarters' in the city-state. In a press release today (27 November), the pair confirmed that the live pilot showcased third-party devices and the capabilities of a 5G non-standalone network architecture (Nokia 5G radio technology interworking with StarHub's 4G core network) to deliver the speeds, capacity and latency required to support

enhanced mobile broadband services. Under the trials, Nokia deployed its AirScale Radio Access technology with 5G New Radio 3GPP-compliant software and the Nokia AirFrame data center solution, the release read. Operating at 3.5GHz, the pilot network also demonstrated Massive MIMO with beamforming and virtual reality user equipment, with Nokia Services also on board to provide project and technical management, and installation services.



Nokia Lands €250M Loan to Boost 5G R&D

Nokia secured a €250 million loan from the Nordic Investment Bank (NIB), which the vendor will use to finance research and development on 5G related activities in Europe over the next two years. The agreement with NIB follows a similar €500 million loan arrangement between Nokia and the European Investment Bank in August, also earmarked to support its 5G efforts in Europe. Nokia said in a statement the loan from NIB will finance its 5G activities between 2018 and 2020, with a focus on “developing new 5G-related end-to-end product offerings for different business areas”. The company said its 5G R&D program also focuses heavily on the implementation of IoT, with work being done to ensure a range of different devices, for example home appliances, vehicles and other electronics, are able to exchange data wirelessly. Kristian Pullola, CFO at Nokia said NIB shares its “view of the revolutionary nature of 5G”. “This financing will further support 5G research and development in Europe and it bolsters the momentum we have already seen this year as the era of 5G begins,” he added. Indeed, the pressure is on European vendors to make strides in 5G, in light of competition from China-based Huawei. Neil McRae, MD and chief architect at BT said last month at Huawei’s Mobile Broadband Forum that the Chinese vendor was the “world’s one true 5G supplier” and rivals needed to catch up.

Developed countries in Europe are expected to launch commercial 5G networks in 2019, just behind the US and Asian powerhouses Japan, China and South Korea, where operators claimed to have turned on the world’s first commercial 5G services based on 3GPP standards on 1 December.

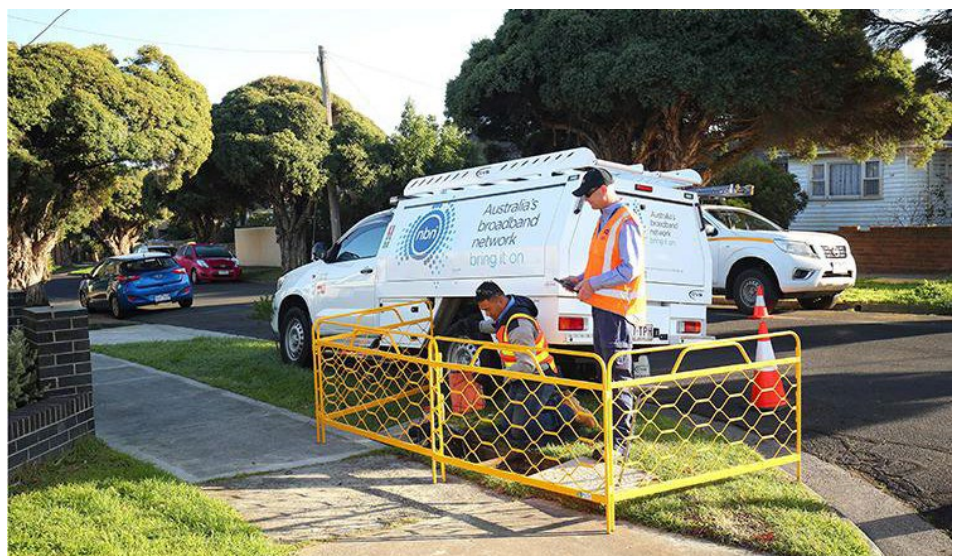


Nokia Deploys First G.fast-Capable DPUs for NBN Co

Finnish vendor Nokia and NBN Co, the company rolling out Australia’s National Broadband Network (NBN), claim to have ‘reached another significant milestone in their partnership’, in confirming the deployment of the first G.fast-capable Distribution Point Units (DPUs) onto the NBN. In a press release regarding the development, Nokia noted that G.fast technology has been deployed to support the cost-effective evolution of NBN Co’s fiber-to-the-distribution-point (FttDp) network (which the latter refers to as its ‘fiber-to-the-curb [FTTC] infrastructure). Nokia claims to have developed a DPU solution uniquely designed for Australian conditions and NBN Co’s requirements, with it saying the dual-mode units deployed are currently delivering services in VDSL2-mode, but provide the operator the ability to remote activate 212MHz G.fast when it chooses to launch higher bandwidth services. It has been claimed that NBN Co will be the first operator in the world to deliver 212MHz G.fast via in-ground DPUs, which will be typically located around 40 meters from customer premises, and by using 212MHz spectrum

the telco will reportedly be able to effectively double the capacity of G.fast and achieve close to 2Gbps aggregate upstream and downstream speeds. Commenting on the matter, Peter Ryan, Chief Network Engineering Officer at NBN Co, said: ‘Nokia is a long-standing strategic partner for [NBN Co] and has played a key role helping [us] meet our deployment goals and understand our

options for network evolution. I am very pleased that we are taking this next step together on our journey of delivering cutting-edge technology to Australians with our first deployment of G.fast copper acceleration technology onto the ... FTTC network. Having this technology in the ground today gives us additional flexibility to meet end-user demand as it evolves.’



Nokia Announces 2018 Bell Labs Prize Winners

Nokia announced the top three winners of its fifth annual Bell Labs Prize, an international competition for innovators with ideas that will significantly 'change the game' in the field of information and communications technologies by a factor of 10. The winners collectively earned \$175,000 in cash prizes and are given the unique opportunity to collaborate with Nokia Bell Labs researchers to help realize their vision.

This year's Bell Labs Prize winners are:

First Place: Samory Kpotufe, currently an Assistant Professor at Princeton, and joining Columbia University next month, won the First Prize and \$100,000 for his pioneering work on the critically important field of 'transfer learning' in machine learning that answers the question of how and when can learning from one machine learning tool, be applied to another; this is a question that lies at the heart of all machine learning - is each model a 'one off' or can the learnings be applied to other scenarios, and if so when? Samory has answered this question with a breakthrough



theory that provides a quantitative answer.

Second Place: Aydin Babakhani of UCLA won Second Prize and \$50,000 for his work on novel terahertz devices that can produce and receive a broad spectrum of Terahertz radiation at low cost and tiny form factor, opening the door to the imaging of our world in profoundly new ways.

Third Place: A team comprised of Benjamin Zaidel of Bar-Ilan University and Shlomo Shamai of Technion Institute of Technology, won Third Prize and \$25,000, for their pioneering work on a practically implementable optimal air interface solution for connecting millions of IoT devices over radio network resources that is extremely close to the theoretical performance limit and cost-optimized.

Marcus Weldon, President of Nokia Bell Labs and CTO of Nokia, said, "The Bell Labs prize is a unique opportunity for innovators to collaborate with Bell Labs researchers to invent the future and solve the critical problems confronting humanity. This year's collection of proposals elevated the competition to new levels, reflecting the ever-increasing role that technology has in improving nearly every facet of our lives. The top three projects were extremely close in the final judging, but Samory is a well-deserved winner of the 2018 Bell Labs Prize as his research in transfer learning takes the much-vaunted field of machine learning and puts it on a much firmer foundation for the future. The team here at Bell Labs looks forward to collaborating with all top three winners to help realize the full potential of their research ideas, in the coming years." This year's Bell Labs prize competition attracted more than 250 proposals from around the world. Proposals were reviewed by Nokia Bell Labs researchers and evaluated based on three criteria, including whether the idea has a "10X innovation potential" to change the world; the proposal's technical merit; and the overall feasibility of the proposed idea.

Nokia and China Mobile Research Institute Launch Industry-First Commercially Ready 5G Hybrid Indoor Radio Solution

Nokia and China Mobile Research Institute today launched the industry's first hybrid indoor radio solution with location services to meet 5G connectivity demands inside busy large buildings such as business campuses and shopping malls. The jointly developed 5G hybrid distributed indoor system is aimed at lowering operators' deployment costs. Research conducted by China's Ministry of Industry and Information Technology (MIIT) shows that consumption of 70% of 5G business applications will take place indoors, with high-value customers likely to spend 80% of their working hours in an indoor environment. As a result, indoor coverage has become a key area for operators to

develop new 5G services. China Mobile has long utilized distributed access systems (DAS) for 4G indoor coverage and wanted a solution that would meet the demands of 5G while reducing costs as it introduces innovative new services. Nokia and China Mobile jointly developed the industry-first 5G low-cost hybrid distributed indoor system to meet these challenges. This active smart indoor coverage system leverages the Nokia 5G Pico RRH system together with passive DAS antennas and Bluetooth Low Energy (BLE) technology. With fewer active elements to deploy compared to Pico systems, the solution reduces deployment costs to the levels associated with traditional passive-only

DAS systems, while delivering greater capacity than DAS. The ability to leverage both active and passive indoor distribution technologies enables the delivery of intelligent operations and maintenance services, making it easier to monitor, locate and correct any disconnected elements. The new services enabled include weak coverage analysis, indoor positioning, traffic flow analysis, easy expansion and elastic scalability. In a shopping mall, the location services can enable functions such as remote security monitoring and the ability to send shoppers information about busy locations to avoid congestion. Additionally, the integration of third-party services such as geofencing and hot-

spot identification will enable retailers to send coupons and store information to customers in a mall who have opted in to the service. Nokia and China Mobile Research Institute are showcasing the innovative system at the 6th China Mobile Global Partners Conference from December 6 to 8. During 2019, the companies plan to conduct an interactive live demo which will showcase how the monitoring capabilities of the solution can be used to deliver operational efficiencies. Zhang

Xinwang, Senior Researcher at China Mobile Research Institute, said: "China Mobile is committed to delivering the best user experience for mobile applications empowered by innovative technologies. Our collaborations with Nokia Shanghai Bell, along with the innovations jointly achieved, will help us maintain the leading position in 5G coverage and capacity while effectively lowering implementation costs." Chang Jiang, Chief Technology Officer of Customer Operations at Nokia

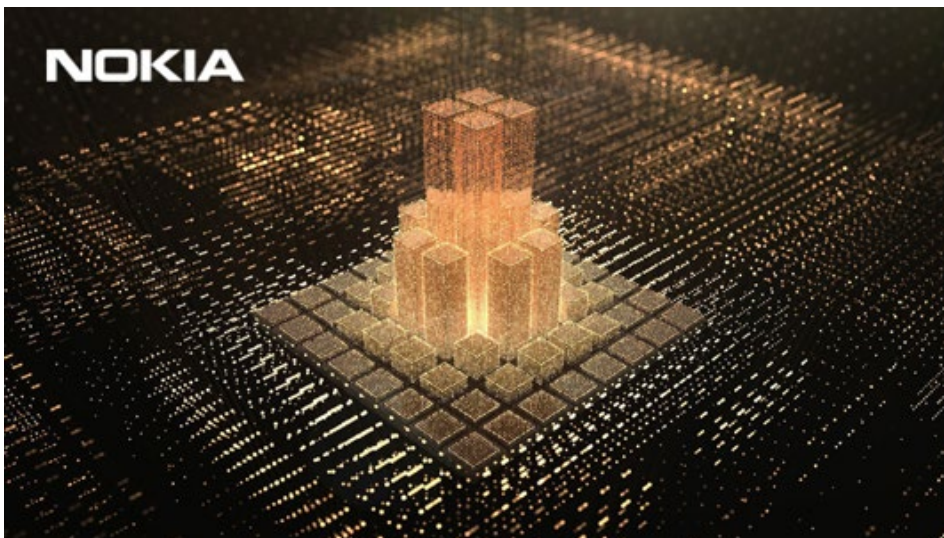
Shanghai Bell, said: "Nokia is committed to working closely with China Mobile as a long-term technology partner, and the launch of the innovative hybrid system is a strong testament to our work. As a leader in 5G, Nokia will continue to build on its technology momentum to help China Mobile evolve its network to meet its business and consumer customers' increasing demands in the 5G world."

Nokia Powers 200G Optical Service on Telecom Egypt's Delta Backbone Network

Nokia announced that Telecom Egypt has adopted Nokia's Photonic Service Engine (PSE) technology to double backbone capacity on its Delta Region DWDM backbone network. Commercial deployment of the new high-speed service started in June and represents the first 200G long distance, single carrier transmission service in Africa. With growth in demand for mobile video and ultra-broadband services, Telecom Egypt worked closely with its partner Nokia to upgrade its current Nokia 1830 PSS backbone network. The network capacity increase

brings higher-rate broadband services to fixed customers, as well as higher data rates for LTE mobile subscribers. Upgrading its existing Nokia PSS 1830 switches with Nokia's PSE technology enables Telecom Egypt to double its capacity while reducing operating costs. Telecom Egypt is upgrading its backbone network using the Nokia 500G DWDM Muxponder, a programmable card that provides wavelength capacities from 50G to 250G per line port. Based on Nokia's Photonic Service Engine (PSE) coherent digital signal processor, this

programmability will allow Telecom Egypt to provision and tune the wavelength capacity per optical route to ensure that its network is operated at peak performance, capacity and lowest cost-per-gigabit. Ahmed El-Beheiry, Managing Director and Chief Executive Officer for Telecom Egypt, said: "Doubling capacity on our existing backbone allows us to offer high-speed broadband and LTE services in addition to 100GE services for mobile operators, while reducing costs. As our long-term partner, we are confident that Nokia's proven optical network technology will help us maintain our leadership position in offering the latest and best-in-class technology solutions to our customers." Amr El-Leithy, head of the MEA Market for Nokia, said: "We are proud to be part of this groundbreaking agreement for the continent. We have a longstanding partnership with Telecom Egypt and are pleased to see the growth in demand for both their broadband and LTE services. This is exactly what we had in mind when we designed the 1830 PSS platform. Its flexibility and easy upgradability will allow them to proactively manage the data explosion and develop new revenue streams - all the while improving the experience for their customers."





Viu Clinches Win-Win Deal with Thailand's Leading Content Provider Workpoint

Viu, a leading pan-regional OTT video service from PCCW Media Group, has signed a content agreement with Workpoint, one of Thailand's foremost entertainment content providers, enabling Viu viewers to enjoy more than 1,500 episodes of dramas and variety shows from Workpoint's 2019 content portfolio. Viu's first content deal in Thailand was clinched earlier this year with GMM25, one of the country's largest entertainment companies, in a move to introduce a repertoire of premium content relevant to Thailand's online video audience. The collaboration with Workpoint offers further proof of Viu's pledge to provide a wide variety of local content. Workpoint produces a broad selection of light entertainment content such as variety, quiz and reality shows, and ranks among Thailand's top three digital TV channels[^]. Classic examples of Workpoint's production prowess include quiz shows Fan pun tae (Super Fan) and Lightning quiz, variety show Way tee thong way tee ter (Golden Clues), singing contests mic thongkum 5 (The Vocalist Season

5) and Mic on Debt off. The company's social media platform is also regarded as being among the best in the country. Ms. Helen Sou, Senior Vice President, Digital Media of PCCW Media Group, said, "Viu is committed to offering a wealth of content to customers in Asia, where the average daily video viewing time per Viu viewer is 108 minutes. Meanwhile, Asians spend an average of 186 minutes per day watching online videos. This means on average Viu is providing viewers with 60% of their daily video consumption*. Collaborating with Workpoint enables us to continue expanding our variety of offerings to meet the constantly-changing tastes of our viewers." Mr. Chalakorn Panyashom, Chief Operating Officer of Workpoint Group, said, "This collaboration will expand the audience for Workpoint and Viu alike. As one of Thailand's biggest entertainment content providers, Workpoint has been producing many kinds of shows, while Viu presides over an extensive and highly-engaged customer base. So being partners means we can win even more viewers for



both companies. Above all, the greatest beneficiary is the audience, because our collaboration will provide viewers with a greater variety of content." Viu will also offer Thai viewers the latest and award-winning variety shows such as The Mask Singer, which was nominated for this year's International Emmy Awards scheme in the "Non-Script Entertainment" category. Meanwhile, Fan Pan Thae (Super Fan) was nominated for the "Best Non-Scripted Entertainment" title in the International Emmy Awards 2017 and "Best Game or Quiz Programme" in the Asian Television Awards 2017.

PCCW Global and PRISC Join Forces to Develop Smart City Applications and Technologies Aimed at Serving Major Projects around the World

PCCW Global, the international operating division of HKT, Hong Kong's premier telecommunications service provider, signed a Memorandum of Understanding with the Hang Seng University of Hong Kong's Policy Research Institute of Global Supply Chain (PRISC). The two signatories will collaborate in conducting high-level

academic research covering the Guangdong-Hong Kong-Macau Greater Bay Area, focusing on major projects involving smart city applications and infrastructure, as well as technologies such as the Internet of Things (IoT), big data and cloud computing. PCCW Global and PRISC will carry out research in areas including dissemination

of information combined with predictive and big data analytics, involving the application of emerging technologies such as artificial intelligence (AI), machine learning and blockchain, all to meet business demands globally. In a related development, PCCW Global and the Administration Committee of Hengqin New District recently signed a collaborative agreement to explore the prospect of building and operating AI training facilities, as well as demonstration and operation centers, in Hengqin in the Greater Bay Area. PCCW Global and PRISC intend to build a research and training center at Hengqin to facilitate high-level research, while combining academic thinking with the wealth of technological and commercial know-how held by a truly global telecommunications provider. The move is aimed to facilitate the next wave of smart city applications and technologies



to meet the needs of both the Greater Bay Area as well as major projects around the world. Smart city applications involve the exchange of data and connection of citizens in one environment via sustainable

enabling technologies exemplified by the IoT and cloud computing. The best smart cities have distinguished themselves by harnessing technology to improve the quality of life for their citizens. The collab-

oration project will be overseen by PRISC's Dr. George Ho (Principal Investigator), together with Dr. Collin Wong and Dr. Jack Wu at the School of Decision Sciences.



SES Successfully Placed Euro 400 Million Multi-Tranche Schuldschein Loan

SES S.A., the world's leading satellite operator, has completed the syndication of Schuldschein Loans for a total amount of EUR 400 million, comprising a EUR 150 million 5.5-year floating tranche at Euribor 6 months plus 0.80% and a EUR 250 million 7-year fixed rate tranche with a coupon of 1.71%. SES is rated Baa2/BBB- (both with stable outlook). The Schuldschein loan was upsized from the initially marketed

size and was placed with several European and Asian institutions. The proceeds will support SES' general corporate purposes and the refinancing of existing debt maturities which include a USD 500 million 144A bond with a coupon of 2.5% and a final maturity date of 25 March 2019. Andrew Browne, Chief Financial Officer of SES, commented: "We are pleased to have secured this financing at very attractive

terms and expanding our investor base while extending our debt maturity profile, where we now have no further senior debt maturities to be financed until early 2020." BNP Paribas, ING Bank, Landesbank Baden-Württemberg and Landesbank Hessen-Thüringen acted as joint arrangers of this Schuldschein transaction.



Tech Mahindra Sets Up Video Integration and Engineering Unit

Tech Mahindra Ltd., a leading provider of digital transformation, consulting and business re-engineering services and solutions, announced setting up a new 'Video Integration and Engineering' (VIE) business unit to leverage cutting edge technology and solutions to cater to the heavy demand of video services in the 5G ecosystem. According to Industry reports, video will account for 90 per cent of all 5G traffic mainly on account of mobile video and Over The Top (OTT) streaming services. 5G is expected to grow the global mobile media market over cellular networks from \$170bn in 2018 to \$420bn in 2028 (\$124bn in the US), a CAGR of 9.8% over 10 years. Consumer spend for video, music, and games on mobile will nearly double by 2028 to reach almost \$150bn globally (\$29bn in the US). With this investment, Tech Mahindra aims to address the growing demand for content across new age media to deliver an immersive customer experience. With the establishment of the new VIE platform, Tech Mahindra aims to improve its strategic position with several video distribution companies

in the United States of America. This will help Tech Mahindra in exploring emerging technologies to offer cutting-edge video solutions in the 5G market space. CP Gurnani, Managing Director & Chief Executive Officer, Tech Mahindra, said, "The 5G revolution will unlock unprecedented opportunities in every industry vertical. The strategic establishment of a Video Integration and Engineering (VIE) platform - will help us increase our expertise in developing niche applications and services as well as cater to the exponentially growing digital video services market. The Video Engineering platform is in line with Tech Mahindra's strategy to implement TechMNxt - the Global program designed by pre-empting and anticipating our customer's evolving and dynamic needs." Manish Vyas, President, Communications, Media & Entertainment Business, and the CEO, Network Services, said, "As part of our TechMNxt charter focusing on next gen technologies like 5G - Network of the Future, we plan to enhance our expertise in Video Integration and Engineering to amplify our digital solution offering by enabling production,

integration and distribution of video content over next gen networks. Our endeavor is to speed up the digital transformation of video for our clients and help reduce the costs and open up other revenue generation avenues for our clients and partners." Tech Mahindra also announced the induction of Mr. Naveen Kadiyala as the Global Head of the newly established 'Video Integration and Engineering' (VIE). Naveen Kadiyala, Global Head, Cable & Video, Tech Mahindra, said, "I feel extremely honoured to have been given the opportunity to head the VIE unit and to lead Tech Mahindra's journey in the Cable and Video Integration space. I hope that my earlier experience as the CEO of Nuovo Solutions will help me in this new role and enable Tech Mahindra to produce innovative digital video products and services to meet the ever growing and changing market needs." As part of the TechMNxt charter, Tech Mahindra has a deep focus on 5G technology and is currently engaged with multiple service providers globally on their network transformation journey.

Tech Mahindra, Cisco Open Digital Technology Experience Center

Tech Mahindra has now launched a digital experience center in the Bangalore in collaboration with the network gear maker Cisco Systems Inc. The center will showcase the latest innovative technologies which is available for the digitization in sectors like the retail, smart cities and manufacturing, the company revealed in a statement. "This facility will showcase some of the most innovative solutions that can solve some of the biggest challenges faced by our customers. We will expand reach into these emerging areas

and tap into bigger opportunities," said Sameer Garde, president of Cisco India and Saarc (South Asian Association for Regional Cooperation). The center will also demonstrate the various use cases such as the yard tracking and asset visibility, incident management smart parking, waste management, city surveillance, smart lighting, city Wi-Fi, warehouse task collection, machine connectivity, and city Wi-Fi. Tech Mahindra revealed that the center would also go to create a simulated environment of the solution to

showcase the capabilities in operations and implementation. It also added that the overall integration, using the latest technology and creating solutions will add up value to their customers. CP Gurnani, chief executive and managing director at Tech Mahindra, said, "This command-and-control setup integrates with Cisco platforms on Kinetics for Cities like smart lighting, environment monitoring, and waste management, and also on Kinetics of Industries like manufacturing and warehousing solutions."

2018 A Year of Recognition for Tech Mahindra



Tech Mahindra, a leading provider of digital transformation, consulting and business re-engineering services and solutions, has announced some of the many accolades won in 2018. The Forbes Digital 100 list, which ranks the top 100 public companies that are shaping the digital economy, placed Tech Mahindra at # 15 - the top non-US company in its 2018 listings. Tech Mahindra continues to retain its position in the

Forbes Asia 50 list joined last year, was recognized as a Leader in the Dow Jones Sustainability Indices 2018 for the fourth consecutive year and won the CEO World Awards® 2018 for leading organization-wide re-skilling initiatives. In the last quarter of 2018, Tech Mahindra MD & CEO, CP Gurnani, won a Gold in CEO World Awards® 2018 for leading organization-wide re-skilling initiatives. Tech Mahindra also won the Bronze Award for "excellence in the Information Technology sector". Mr. Gurnani was honored for his ambitious initiative aimed at re-skilling and up-skilling of over 112,000 Tech Mahindra employees to ensure that they have the requisite skills and knowledge to remain competitive in an ever-evolving information technology and digital market space. "I would like to thank the CEO World Awards® for acknowledging Tech Mahindra and its leadership's initiatives towards re-skilling and up-skilling our employees across the globe. At Tech Mahindra, re-skilling is core to our strategy; today's disruptive business landscape demands for our talents to be future ready and it is our prime responsibility that the right tools and innovative pathways are facilitated for them. This recognition motivates us to continue investing in empowering our workforce to stay relevant in the digital future", CP Gurnani, MD & CEO, Tech Mahindra added. More than 90 percent of Tech Mahindra's technical employees have undergone training in digital familiarization and primary digital skills. In addition, more than 60 percent of these employees have undergone advanced training on digital competencies and the company is geared up to re-skill another 50,000 employees for present and future requirements.



Viva Bahrain Asks TRA to Revoke Menatelecom Licenses



Bahrain-based cellular operator Viva has asked the Telecommunications Regulatory Authority (TRA) to revoke a number of licenses currently held by its fixed line subsidiary Mena Telecom (Menatelecom). The concessions in question are as follows: an Individual License for International Telecommunications Services; a Class License for Value Added Services; a Class License for Internet Services; an Individual License for National Fixed

Services; and an Individual License for International Telecommunications Facilities. According to TeleGeography's GlobalComms Database, Viva Bahrain acquired 100% of Menatelecom from Kuwait Finance House in January 2018, with a view to leveraging the new company's fixed broadband capabilities. The operational side of the merger was completed on 1 June 2018, and the ISP is now billed as 'Menatelecom – powered by Viva Bahrain'.



Yahsat, Hughes Enter Joint Satellite Broadband Venture

Yahsat and Hughes are entering into a joint venture to provide commercial Ka-band satellite broadband services across Africa, the Middle East, and southwest Asia. This new venture combines Hughes global expertise in broadband satellite networks and services with Yahsat's unique position as a provider of satellite broadband solutions across these regions. Hughes will purchase a minority interest in the venture. The agreement to form the joint venture was announced in September 2018, during the World Satellite Business Week Conference held in Paris, and was subject to regulatory and other approvals that have now been obtained. The newly formed company is bringing services to market as "YahClick, powered by Hughes," and is now operational. The new venture will continue to provide unserved and underserved communities with reliable, high-speed Internet services operating over Yahsat's Al Yah 2 (AY2) and Al Yah 3 (AY3) Ka-band satellites, and leveraging the capabilities of the Hughes Jupiter System, designed for large scale High



Throughput Satellites (HTS). Hughes will also supply its Operating and Business Support System (OSS/BSS) solutions for network operations and management. Initially, the venture will focus on "direct-to-premise services" to homes and small-

to medium-sized enterprises, and to community centers and schools that are served under local government programs across these regions.

Yahsat Starts Satellite Broadband Service in Brazil

Yahsat officially launched its Ka-band satellite broadband service in Brazil in November 2018. The arrival of Yahsat in Brazil will assist in addressing the country's shortage of reliable Internet connectivity that traditionally relies on terrestrial Internet connectivity. Yahsat's presence in Brazil across 234 municipalities marks a significant milestone in the company's international expansion strategy. By bringing previously unavailable high-performance satellite broadband service to several areas of Brazil, Yahsat is delivering on its vision to provide dependable means of global connectivity to underserved communities. Yahsat's expansion into Brazil comes on the back of the launch,

as well as commercial readiness of, Yahsat's third satellite, Al Yah 3, earlier this year. The Emirati-engineered and built Al Yah 3 satellite covers over 95 per cent of Brazil's population across more than 5,000 municipalities. Backed by Al Yah 3, Yahsat will also offer economic, high data rate backhaul links for Internet service providers (ISPs) and telecommunications operators, in addition to broadband satellite internet service. "Yahsat's arrival in Brazil marks a significant step in our company's global commercial expansion plans, which have been in progress for the past seven years since the expansion of our satellite fleet was first proposed," commented Masood M. Sharif Mahmood,

Chief Executive Officer at Yahsat. Yahsat has been laying the foundation for modern broadband connectivity since 2012. As the 6th largest satellite operator in the world, in terms of revenue, the Emirati company has delivered innovative satellite broadband products and services from the UAE to several regions across Asia, the Middle East, and Africa. With Yahsat's operational readiness in Brazil, the satellite operator expects to see a significant expansion in its international coverage area. This is a significant milestone in Yahsat's growth as an influential global company in the satellite communications sector.



Zain KSA Signs Agreement with Saudi Kingdom's Finance and Telecom Authorities



Bader Al-Kharafi, Zain Group Vice-Chairman and CEO and Vice-Chairman of Zain Saudi Arabia

Zain Saudi Arabia (Zain KSA) has signed an agreement with the Kingdom's Ministry of Finance (MOF), Ministry of Communications and Information Technology (MCIT), and Communications & Information Technology Commission (CITC) to consolidate the annual royalty fee for commercial service, reducing the tariff from 15% to 10% of net revenues retrospectively, commencing 1 January, 2018. The expected financial impact of applying the unified annual royalty fees from 1 January, 2018 to 30 September,

2018 will result in a decrease of fees amounting to SAR 220 million (USD 59 million), which will be reflected positively in the next financial results announced by Zain KSA. The reduction in annual royalty fees will positively impact the company's financial results going forward. Additionally, the agreement includes the settlement of disputed amounts related to the payment of annual royalty fees by Zain KSA to the CITC for the nine-year period between 2009 and 2017, under the condition that Zain further invests in expanding its infrastructure in addition to other conditions over the next three years. The expected financial impact of this settlement is expected to reach SAR 1.7 billion (USD 453 million) over the next three years. Expressing his appreciation to the Custodian of the Two Holy Mosques, King Salman bin Abdulaziz Al Saud and to His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, the Crown Prince, Vice-President of the Council of Ministers and Minister of Defense, Bader Al-Kharafi, Zain Vice-Chairman and Group CEO, and Zain Saudi Arabia Vice-Chairman said, "We are extremely grateful for the Saudi government's visionary wisdom and support of the ICT sector through

a constructive partnership with the Kingdom's telecom operators. Such support further increases the attractiveness of the Kingdom's economy, contributing to its ongoing prosperity." Al-Kharafi continued, "We acknowledge and appreciate the efforts of the Kingdom's MOF, MCIT and CITC to overcome any obstacles facing the sector and their keenness to implement the goals that serve the aspirations of the Kingdom's Vision 2030, given ICT is one of vision's most important pillars. Linking our settlement agreement on the primary condition to further investment in infrastructure is an insightful move by the Kingdom's authorities as it enables us to develop in a higher quality network and service for the benefit of the digital-savvy Saudi community." Al-Kharafi said, "The agreement announced today is a significant milestone in Zain KSA's turnaround journey, given the positive impact this will have on the financial results this year and beyond. This development will further boost Zain KSA's liquidity position as it will result in the reduction of financial obligations the company faces, and this will in turn allow the company to utilize that additional liquidity to continue the expansion and development

of its 4G and 5G network and fiber (FTTH) expansion to meet the growing demand for broadband in the Kingdom." Numerous positive developments in recent times have created an air of confidence for the future prosperity of Zain KSA. "The management team at Zain KSA is working tirelessly to implement the Board's strategy to improve the company's financial performance in order to create greater shareholder value through innovation, product development and improved customer service," Al-Kharafi concluded. This latest agreement reached by Zain KSA comes on the back of several other beneficial milestones for the mobile operator. In October 2016, the Kingdom's CITC extended Zain KSA's mobile license for an additional 15 years to total approximately 40 years, which will expire in 2047. This license extension has an annual amortization benefit of

SAR 433 million (USD 115 million) on the company's financials. At the same time, the CITC migrated Zain KSA to a unified telecommunications license that supports both service and technology neutrality, allowing the company to provide all telecommunication services. Zain KSA also announced in November 2018 that its Board of Directors had approved the offer from IHS Holding Limited for the sale and leaseback of its telecom towers for approximately SAR 2.43 billion (USD 648 million). This offer is subject to final approvals and conditions by the concerned authorities. Once completed, this step will create shareholder value as it reduces debt obligations, unlocks capital and resources, and allows Zain KSA to focus on core operations. With respect to recent financial performances, Zain KSA recorded its best-ever quarterly results since inception, for

the three months ending 30 September, 2018, with several key financial indicators showing record growth levels, reflecting the success of the operator's turnaround strategy. Key performance indicators for Q3 2018 included revenues of SAR 1.952 billion, up 8%; EBITDA of SAR 728 million, up 15%; and net profit of SAR 48 million, up from SAR 3 million, all compared to same period a year earlier. Furthermore, during Q3 2018, Zain KSA made an early voluntary payment of SAR 600 million towards its Murabaha financing agreement, reflecting the company's solid cashflow generation. This year's improved performance by Zain KSA and this significant historic milestone announced today was achieved as the company celebrates a decade of commercial operation of mobile voice and data services in the Kingdom.

Zain Saudi Arabia Agrees to Sell and Lease Back its Telecom Tower Network to IHS Holdings for Circa US\$ 648 Million

Zain Group announces that the board of directors of Zain Saudi Arabia (Zain KSA) has approved an offer to sell and lease back the passive physical infrastructure of its mobile tower portfolio to IHS Holding Limited (IHS) for circa SAR 2.43 billion (USD 648 million). IHS is the largest independent tower operator in Europe, Middle East and Africa by tower count and the third largest independent multinational tower company globally. Zain KSA has more than 8,100 mobile telecommunication towers located in prime and strategic locations across the Kingdom. Under the terms of the agreement, Zain KSA is selling only its passive, physical infrastructure to IHS and will retain its intelligent software, technology and intellectual property with respect to managing its network. The agreement also involves a lease back period of 15 years, with a 5-year renewal option and building of an additional 1500 towers over next 6 years. This offer for Zain KSA' tower portfolio is a consolidatory move as it comes after Zain Kuwait entered into an agreement also with IHS Holding that will create the first independent tower operator of scale in the region. The transaction is subject to a final binding agreement being entered into between the parties which will include an approval requirement from the Kingdom's

Communications and Information Technology Commission (CITC), as well as approval from the lenders. Commenting on this important development, Bader Al Kharafi, Zain Vice-Chairman and Group CEO; and Vice-Chairman of Zain Saudi Arabia said, "The sale of Zain KSA's impressive tower network is a highly positive move, as it creates shareholder value by helping the company reduce its debt position, as the proceeds will be used to reduce the company's Murabaha facility. Both the Zain Saudi Arabia board of directors and Zain Group executive management are confident that we have chosen the right partners in IHS, a company that possesses high caliber expertise with sound operational experience in diverse markets." Al Kharafi continued, "We recognize and appreciate the efforts made by the Kingdom's CITC in keeping abreast with global trends in the telecommunications sector by offering licenses to provide wholesale services for Tower infrastructure, thereby reducing capital expenditure challenges on telecom operators and raising the efficiency of mobile networks. These efforts by the CITC that complements our deal with IHS, enhances Zain KSA's mission of playing its contributory role to achieving the Kingdom's 2020 National

Transformation Program and the 2030 Economic Vision ambitions." Al Kharafi concluded, "Zain KSA has implemented a transformation program in the Kingdom for some time now, advancing its efforts to become a digital lifestyle provider. The deal unlocks capital and resources, allowing the operator to focus on its core operations and further invest in and deliver the latest ICT technologies to meet the ever-increasing demand for reliable broadband access and data consumption. It also provides Zain KSA additional impetus to focus on the delivery of more data monetization initiatives and customer enhancing services to offer customers the best data experience in the Kingdom." This value creating agreement with IHS coincides with the celebrations of Zain KSA's tenth anniversary of commercial operation in the Kingdom and comes on the back of the impressive third quarter 2018 results achieved by the company, its best-ever quarterly results since its establishment. The progress achieved by Zain KSA in implementing the company's transformation strategy, saw the company recently make an early voluntary payment of SAR 600 million for its Murabaha financing agreement, portraying the company's solid cashflow generation. 📌

ARTICLE

What are the Blockchain Opportunities in Telecom?

The technological hype is keeping everybody on their toes, business professionals and entrepreneurs keeps talking about multiple technology trends and continuously trying to bring it to our realities and transform their businesses and our lives. The blockchain is certainly one of those trends and in fact, one of the most talked about recently with some of its promoters expecting it to be the upcoming technological paradigm shift after the internet.

Blockchain provides numerous functionalities to its users but the key ones are the decentralization, immutability, security, and transparency. Those functionalities carry on the potential to disrupt the current business models in most of the industries by removing intermediaries, increasing efficiency and open up new opportunities to generate revenues.

Blockchain technology is essentially a database that runs an application to validate and share the new entries that usually contains transactions with all the database nodes. The technology is a digital representation of the traditional ledger that stores a sequence of transactions which are linked by using the Cryptography function. Blockchain provides numerous functionalities to its users but the key ones are the decentralization, immutability, security, and transparency. Those functionalities carry on the potential to disrupt the current business models in most of the industries by removing intermediaries, increasing efficiency and open up new opportunities to generate revenues. Theoretically, blockchain can help businesses in different industries to enhance both sides of the profitability equation by increasing revenues and reducing costs.

The blockchain database can be implemented in three access modes, either permission-less / public Blockchain where anyone can participate and execute transactions such like bitcoin. Or, as a private Blockchain where participants need to be invited and authenticated by authorized nodes, and the last access mode which is called the hyper Blockchain and somehow combines the first two access modes.



Mustafa Abdelmalik Mohamed
Strategy and Digital Senior Manager
Espresso Telecom Group



A recent survey that targeted 3,000 C-suite participants from different industries and conducted by the IBM Institute for business value (IBV) in 2017 had pointed out a growing appetite among the telecom leaders toward blockchain.

Telecom, as industry, is not an exception to the blockchain transformation. With telecom players are increasingly uncertain about their future after living a substantial disruption in the last few years due to the introduction of the smartphones and emergence of the OTT (Over the Top) players in addition to the other market influencers such like the intense competition, economies instability, politics, and regulations with the combination of all these factors is creating a clear impact on the telecom industry growth and profitability. So the need to adopt new technologies and business models to enhance revenues and reduce costs can't be bigger than nowadays. But, how can Blockchain helps telecom operators to do so?

The extent to which blockchain may impact telecoms remains to be seen in the future however adopting blockchain by telecom operators is a reality now with some of them pursuing number of initiatives individually or on a consortium basis. A recent survey that targeted 3,000 C-suite participants from different industries and conducted by the IBM Institute for business value (IBV) in 2017 had pointed out a growing appetite among the telecom leaders toward blockchain. Among the 3,000 leaders, 174 were representing the telecom industry and 41% of them believed that blockchain could support their enterprise strategies while 36% of them are already taking actions and actively engaged in Blockchain activities. Finally, 46% of those who are already active in the Blockchain space did invest in implementing new business models and use cases based on the technology.

The blockchain is promising benefits to the telecom operators but the most obvious and realistic one seems to be the inter-carrier settlement and roaming services. In this case, telecom operators can use the smart contract which is one of the widely known blockchain applications. A smart contract is a digital and secured contract that verify and enforce the contract terms between two or more participants. Telecom operators can build a joint private blockchain network to implement a smart roaming agreement between the HPLMN (Home Public Land Mobile Network) and the VPLMN (Visited Public Land Mobile Network) networks through. Once a roaming transaction is performed then the VPLMN will broadcast the transaction CDR (Call Detail Record) in blockchain to trigger the smart contract that contains the roaming agreement terms which will calculate the transaction charges and the HPLMN will immediately have access to the transaction information to bill the subscriber and perform the inter-carrier settlement online rather than the current manual and offline process. This scenario is expected to reduce losses from roaming fraud cases significantly and improve the customer experience by minimizing the bill shock possibility. Telecom operators can also continue doing roaming together without an intermediary settlement entity which is known as a data clearinghouse (DCH) resulting in a considerable cost saving.

Building on the same business model, telecom operators within the same blockchain network can launch any service that needs seamless inter-carrier settlement process such as remittances services including traditional top-up and mobile money transfer in a secure, efficient and scalable network.

The pursuit of the inter-carrier services based on blockchain is close to being realized by a leading and global blockchain consortium of telecom operators which was announced on September 2017 and called The Carrier Blockchain Study Group (CBSG). The consortium involves some of the big telecom operators globally such like SoftBank, Turkcell, Zain, Etisalat, and other telecom operators as well as blockchain technology companies.

Other use cases can be implemented to streamline many of the complex telecom's internal operations including the billing and services provisioning, eSIM provisioning, network management and supply chain management. Recently, the Japanese telecom giant Nippon Telegraph and Telephone (NTT) announced the effort to implement a new contract agreement system based on blockchain technology to simplify and decentralize the contracting process with various stakeholders.

The blockchain is promising benefits to the telecom operators but the most obvious and realistic one seems to be the inter-carrier settlement and roaming services.

IoT (Internet of Things) is another strong use case for blockchain. IoT is increasingly driving the demand to connect devices at a large scale with the sensors of those devices are exchanging sensitive and critical data about the customer's applications and operations, which is forcing the importance of deploying a high data security measurements. The data security is becoming a very costly element of the IoT ecosystem as well as a very integral part of its success. The promising security features of blockchain makes technology a great platform to manage a secure peer-to-peer network with a high degree of self-management.

A telecom operator-led deployment of IoT platform can use the functionalities of blockchain technology such as the decentralization to speed up the transactions within IoT application and avoid the single point of failure in

The promising security features of blockchain makes technology a great platform to manage a secure peer-to-peer network with a high degree of self-management.

the centralized deployment, increase the transparency on the state of the network and increase the trust among the stakeholders such like the device manufacturers, platform vendors, operators and users as well. As of now, two major alliances have been formulated to address the intersection of blockchain and IoT which are IOTA Foundation (announced on 2016) and Trusted Alliance (announced on 2017) with the involvement of some of the key IT players such as Microsoft and Cisco but with a noticeable absence from

The telecom operator can build a blockchain platform to create a digital identity for customers when they sign up for their service, the digital identity will use the Cryptography functionality in blockchain which provides authentication services based on the public/private digital key concept. By providing such a service, telecom operators can create a new revenue stream by placing agreements with the various physical and digital service providers.

the telecom operators.

On digital revenues side, telecom operators can leverage the customer's data and trust that they have to provide digital identity-as-a-service. Currently, every service provider whether physical or digital requires proof of identity of the person intending to use the service. The mechanisms to prove the identity varies from showing a physical proof to signing up online, create usernames/passwords and provide personal information. Some of the OTT players such like Google and Facebook are already providing a similar service through their SSO (Single Sign-On) functionality.

Telecom operators can provide a similar service with a key difference that placed them in a better position which is the more trust that they have due to their direct relationship with customers. The telecom operator can build a blockchain platform to create a digital identity for customers when they sign up for their service, the digital identity will use the Cryptography functionality in blockchain which provides authentication services based on the public/private digital key concept. By providing such a service, telecom operators can create a new revenue stream by placing agreements with the various physical and digital service providers.

Of course, metalizing the above-mentioned use cases alongside other potential use cases of the blockchain technology in telecom are facing few challenges.

First and foremost is the fact that the blockchain is a new evolving technology and still far from a finished article. As often happened, people attitude toward new technologies is conservative which impact the pace of adopting it. Telecom operators, in particular, are usually hesitant toward big scale of innovation and technology adoption that might require considerable investment in time and money. Regulations are the second major barrier for blockchain adoption, which is the case associated with any innovation that provides wider access to data, the inter-carrier settlement can be a straightforward example to demonstrate the impact of the regulations on accelerating or decelerating the deployments.

Nonetheless, the hype and potential associated with blockchain technology and its use cases within the telecom landscape worth to be seriously explored. Telecom operators should seek involvement in blockchain communities through partnerships or consortium models which are becoming increasingly available. Such involvement will increase the familiarity with the technology and its use cases as well as clarity on the steps required to implement the proof of concepts to demonstrate the previously discussed benefits. More importantly, telecom operators need to show a better attitude toward the risk of investing in new technology which yet again could be a major pullback factor in the pursuit of the digital era.

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REGIONAL NEWS

UAE e-Commerce Sector Set to Top US\$27 Billion

The value of e-commerce in the UAE is expected to reach Dh100 billion (\$27.2 billion) by 2020, which is double the figure for 2016, said a media report, citing a recent study by the World Economic Forum. The UAE will account for 40 percent of total e-commerce in the Middle East by 2020, and its e-commerce sector will be supported by its decision to join the Trade Facilitation Agreement in 2017, reported Emirates news agency Wam. The agreement is one of the key achievements of the World Trade Organization (WTO) which aims to improve international customs clearance and release, reduce transaction costs, and increase transparency in international trade procedures. On a local level, the UAE's growing stature in the digital economy sector is a priority of the government, and there is ongoing coordination between relevant ministries, including the Ministry of Economy, and private sector

institutions to establish a federal e-commerce platform. The UAE has accomplished significant achievements during its transition to a digital economy over the past five years, the report added. These accomplishments have helped to reinforce the competitiveness of the UAE's national economy, according to indexes published by international organizations, including the World Economic Forum, which ranked the UAE as the leading Arab and regional e-commerce center in 2017. The country is expected to further reinforce its position in the digital economy over the next two years, supported by factors that include developments to e-commerce, improvements to the information technology infrastructure, the increased spread of Internet services, the use of smartphones and the expansion of electronic payment systems, as well as significant government support for digital transformation.



H.E. Sultan bin Saeed Al Mansoori
Minister of Economy in the UAE

Saudi Trio Reaches an Agreement with Government on Royalty Fees



Saudi Telecom Company (STC), Etihad Etisalat (Mobily) and Zain Saudi Arabia have reached an agreement with the Ministry of Finance, the Ministry of Communications and IT (MCIT) and the Communications and Information Technology Commission (CITC) on royalty fees, with the trio agreeing to pay 10% of annual net revenues from telecom services retrospectively from 1 January 2018. Previously, the telecom providers were paying 15% of net

revenues from mobile services, 10% (fixed line services) and 8% (data services). In return, the providers have agreed to increase investment in the kingdom's telecoms infrastructure over the three years to 2020, including in technologies such as 5G. The three telecoms companies have also reached an agreement with the government to settle all old disputes in connection to government royalties up to the end of 2017.

New Internet Access Provider to Enter Tunisia

In the first quarter of 2019, another internet access provider will join the Tunisian market. BEE, a joint venture formed by Tunisian and foreign investors, will initially offer ADSL and VDSL services before extending its services to other branches like the FTTH, IPTV and telephony, the new company's operations manager Karim Labidi informed. According to the

manager, the project is administratively and technically ready for launch. A network of sales points is actually being installed in the country to be as close to clients as possible to meet their needs. BEE is counting on proximity and competitive prices to quickly gain a spot in the competitive market. According to the last stats for the national telecommunications

agency, Tunisia's internet market is currently shared by five private access providers and some public operators. The market had 9,802,768 subscribers and, the fixed line segment was dominated by Tunisie Telecom while the mobile was dominated by Orange Tunisie.

Arab League Makes Progress on Unified Digital Economy Strategy



The Arab Digital Economy Strategy, launched in Abu Dhabi on Sunday with all 22 Arab League members in attendance, will be reviewed one last time before it is finalized in March. The initiative, supported by the UAE Government and sponsored by Sheikh Mohamed bin Zayed, Crown Prince of Abu Dhabi and Deputy Commander of the UAE Armed Forces, aims to establish digital inclusion and alignment on legislative and technological infrastructure across the Arab League. The head of the review committee and industry experts said there are still challenges to overcome before all member states are able to work together to achieve common goals. "Each country is at a different stage of development ... this is in terms of economics, digital transformation and capacity within the government. You cannot just force the

strategy on any country," Richard Kerby, head of the review committee of the Arab Digital Economy Strategy, told The National. "There needs to be a framework that allows all 22 countries to move up and that is the most challenging part. Another challenge is that each country has to develop its own strategy within the framework of the regional strategy." The review committee was set up in August and the first draft of the strategy was for recommendations in early November. The committee will receive a new draft of the strategy this month to provide further recommendations. The plan, which was drafted by Cairo University, is almost in its final stages, said Mr. Kerby, adding that "it just needs some minor fine-tuning. It is expected that it will be presented before the head of states during Arab League's

meeting in March next year." Atef Helmy, former communications and IT minister of Egypt, said that digital numbers are quite impressive in the Middle East and North Africa region but that "there is a negative side as well". He said having more Arabic digital content should be the top priority of all stakeholders in the league. "The Arab world is one of the richest regions when it comes to history but we have less than 2 per cent of Arabic digital content ... this huge gap will have [an adverse] impact on the future," said Mr Helmy.

Digital business adoption is also low in the region.

"In one of the digitally-advanced nations like the UAE, SMEs online presence is only 18 per cent. In Saudi Arabia and Egypt, it is only 15 and 7 per cent, respectively," Mr Helmy said. According to figures by the United Nations, the Arab League trails behind Europe, Asia and the Americas in terms of its e-government development index, which is a composite indicator that consists of three metrics: online services, telecommunications and human capital. "E-government penetration in the Middle East is very low at 6 per cent," said Mr. Helmy. Stakeholders also demand for more sophisticated training and development initiatives. "Preparing people for digital transformation at the institutional level is very important. There needs to be lot of training and development and [still] many institutions are using conventional techniques," said Tarek Amer, governor of the Egyptian central bank.

China and Pakistan to Establish Technology Transfer Center

Chinese International Technology Transfer Center (CITTC) is joining hands with National University of Science and

Technology (NUST) to establish its a technology transfer center for Pakistan. The China Pakistan Technology Transfer

Center (CPTTC) will be established in NUST according to the MOU signed by NUST and CITTC officials in Beijing. CITTC was established by the Chinese Ministry of Science to facilitate and assist in the transfer of technology between China and the rest of the world. It offers matchmaking events, training, seminars, conferences, incubation for start-ups, concrete project collaboration and much more to different tech companies looking to enter the Chinese market. It also provides a B2B online system which can connect potential partners with thousands of Chinese companies who have logged requests in the system, facilitating people from all around the world to find Chinese licensee, buyer, investor, distributor or joint research partner. CPTTC will work as a local branch of CITTC to increase cooperation between China and Pakistan in the information technology sector. This will allow tech companies of both countries to improve their trade relations with each other while also gaining access to the market of their neighboring country.



Algerian Mobile Operator Djazzy Added 1 Million Customers This Year

Algerian mobile telecoms operator Djazzy has added 1 million customers this year and plans to further invest to offer more online payment services, its CEO said. Djazzy, or Optimum TelecomAlgerie, will have 16 million subscribers by the end of 2018, up from 15 million a year ago and including seven million smart phones users, Matthieu Galvani told Reuters in an interview conducted on Wednesday. Djazzy is Algeria's No. 2 mobile operator, behind state-owned Mobilis, and also competes with Qatar's Ooredoo. It is owned by Egypt's Global Telecom Holding (GTH), in which Dutch-based Veon, formerly known as VimpelCom, has a 57.7 percent stake. Galvani declined to give a forecast for next year, saying only the potential was huge as the government was planning to make more online payment services available. Some government bodies and even banks in Algeria still use the fax to communicate with the world. Online payments are very limited and such services require special central bank approval. However, authorities plan to expand the network as part of efforts to boost private investment and lower the country's dependency on oil and gas revenues. To tap into this nascent market Djazzy will invest more after spending 30 billion dinars (\$253 million) in the past two years to become an online business platform, Galvani said, declining to give a figure. "The potential of (Algeria's population of around) 40 million people once it goes digital is huge, so we need to be ready, hundreds of thousands of

jobs will be created," he said. Other shareholders in Djazzy are a state-owned fund called FNI with 51 percent and CEVITAL, a local private company, which owns 3.3 percent. The rate of penetration of smartphones in Algeria is around 40 percent now, according to official figures, much lower than in other Arab countries. The rate for mobile phones is 111 percent. Algeria has the slowest fixed internet speed connection in the world at 3.5 megabits per second (mbps), compared to world leader Singapore with 161.2 mbps, according to 2018 Digital yearbook. Mobile connections are faster at 7.4 mpbs but even then only seven other countries offer slower services, according to Digital yearbook.



Artificial Intelligence Experts Meet in Morocco

The challenges and opportunities for developing the use of artificial intelligence in Africa are being discussed by experts at the inaugural Forum on Artificial Intelligence in Africa, hosted by UNESCO. The two day conference at the Mohamed IV University Polytechnic in Benguérir features keynote speakers who will attempt to convince participants of the pros and cons of developing artificial intelligence. The technology combines elements of computer science, psychology, cognitive science, mathematics and philosophy. From automated driving to healthcare, artificial intelligence has become more prominent in our daily lives, but it's not a new concept. Just like mobile technology helped African countries to bypass infrastructural woes in the banking and

communication sectors, advocates of AI are hoping this latest wave of technological development will help develop education, health care and even protect the continent's wildlife. "Governments need to integrate this new technology into their public policies," Firmin Edouard Matoko, head of UNESCO's Priority Africa program told RFI's Rosie Collyer in this interview: AI involves developing computer programmes or algorithms to complete tasks which would otherwise require human intelligence. And there have been varying forms of machine learning for decades. Drones are already being used to deliver health care products in Rwanda and to track poachers in Niger. Both are private initiatives. The majority of the Forum participants are from governments and regional bodies.

UNESCO aims to bring governments up to speed on the potential benefits and dangers of AI. One of the biggest obstacles to developing AI in the education sector is that teachers are increasingly less technological literate than their students, even at a tertiary level. "Students across the continent are managing to obtain degrees online (from overseas) that are not recognized by their governments," Matoko explains. Experts are also concerned by the digital divide between the northern and southern hemisphere. AI is already being used widely by both governments and the private sector in developed countries, while African countries find themselves playing catch up, for now.

MTN Launches LTE in Syria

MTN Group is understood to have launched 4G LTE services in war-torn Syria. Based on a Facebook post, dated 22 October, it appears that the South Africa-based group has entered the country's 4G sector. The announcement notes that customers lacking 4G-capable SIM cards are able to exchange their existing SIM cards at MTN service centers. The new network promises to triple the speeds available over the cellco's existing 3G networks. Previously, in summer 2017, sole cellular rival SyriaTel



launched its own LTE product, under the 'Super Surf' brand. The service, which provides peak data rates up to 150Mbps,

using the 1800MHz band, was unveiled at the 59th Damascus International Fair in August 2017.

TRA Issues New WhatsApp Warning in UAE



The UAE Telecommunications Regulatory Authority (TRA) has issued an advisory that subscribers to the popular app risk getting their accounts hacked through a

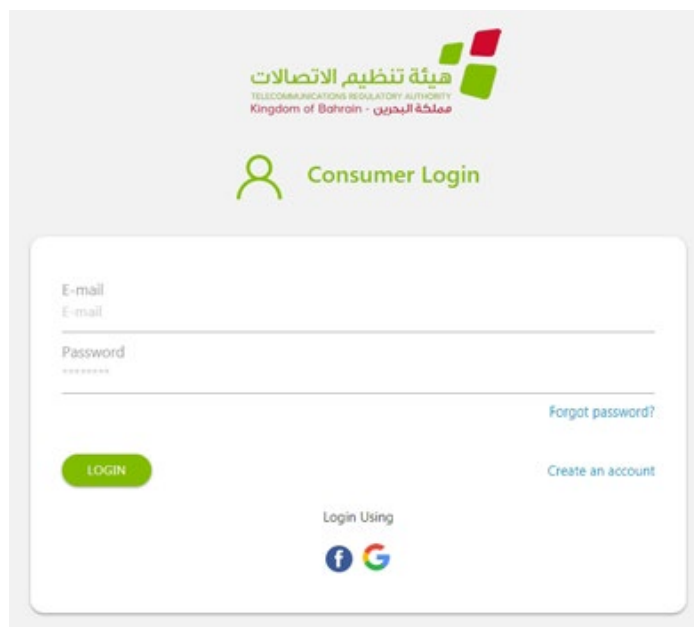
code verification message purportedly sent by WhatsApp. The fake message looks similar to the standard authentication text sent out to a new user when registering on the messaging platform. However, it tricks a user into clicking malicious links to validate the device. "Your WhatsApp code: 842-047. You can also tap on this link to verify your phone...", the message reads. The user is then asked to enter the mobile phone number and a six-digit code. Once the code is sent, the user is given the option to tap on another link to complete the verification process. "Beware

of this message, it may result in hacking your WhatsApp account," the telecom regulatory authority warned on Twitter. Security experts had earlier advised users to be wary of opening attached files and links in messages as they can be harmful and enable hackers to access their account, read their message history and see their photos. If hackers do happen to gain control over your account, here are some steps to follow, as advised by the TRA:

Bahrain TRA Launches New System for Management of Consumer Complaints and Inquiries

The Telecommunication Regulatory Authority (TRA) has launched an integrated complaint and inquiry management system in order to maintain effective communication between TRA, consumers and the telecommunications service providers. The system includes a consumer portal where consumers can easily log in and submit details of their complaint and supporting documents. The system also provides faster options for registration via email (Gmail) or Facebook account, as all complaint and inquiry processes are managed through this portal besides the atomized connection between TRA and the services providers. "This new system complements the series of consumer support initiatives, which enables them to submit a request for dispute resolution in the event that the service provider fails to provide the consumer with the appropriate solution. This is in line with the Consumer Dispute Regulation which is enforced this year. The system also enables consumers to provide their views on the resolutions provided by the service provider." Said TRA's Acting General Director Sh. Nasser bin Mohamed Al Khalifa. TRA's Acting Manager of Consumer Affairs Mrs. Amna Alghatam said "One of TRA's priorities is to expand communications channels and enhance the quality of services provided to consumers. This new system is a translation of the TRA's strategic objectives aimed at enabling consumers to continuously and effectively communicate with TRA." TRA also held several training workshops for the service providers to explain the advantages of the new system. The workshops focused on the updated dispute submission mechanism, the new features of monitoring responses and updates according to specified period. TRA urges

all consumers to pursue its ongoing awareness campaigns and directly communicate with TRA through its Consumer Call Center: 81188 for more information and inquiries about the request for dispute resolution process. TRA also urges consumers to view the Consumer Dispute Regulation to be aware of the procedures for the submission of a dispute settlement request and to benefit from this vital and effective system for submitting complaints and inquiries through the TRA's website.



Pakistan Launches Initiative to Promote Artificial Intelligence, Blockchain and Cloud Education

The President of Pakistan, has launched an initiative to help promote education, research and business opportunities in Artificial Intelligence, Blockchain, and Cloud-based computing. According to its description, PIAIC will be an interdisciplinary hub for mass education, research, and business in artificial intelligence (AI), data science, cloud computing, edge computing, blockchain and internet of things (IoT) related fields. As AI and computing

reshape our world, PIAIC intends to help make sure that Pakistan plays its part in this fourth industrial revolution. PIAIC aims is to transform education, research, and business in Pakistan. Currently, PIAIC is offering three distinct programs:

- Artificial Intelligence
- Cloud Native
- Blockchain

This initiative is backed by Iqra University, Pana Cloud, PSX, and Saylani Welfare.

This seems like a much needed initiative to promote the education of these emerging and growing technologies. The curriculum also seems up to date with modern practices and with the backing of prominent figures from educational, financial and IT sector background, this initiative does have potential to be a positive indicator for ICT development in Pakistan.

Digital Economy Fuels, Facilitates and Works as a Catalyst in the Knowledge Economy



Today there is a symbiotic relation between 'Knowledge' and 'Digital' economies, the digital economy is fueling, facilitating and working as a catalyst in the knowledge economy umbrella. There is a gradual shift to create new opportunities and redefine human capital, said Dr Ahmed Bin Ali, Senior Vice President, Corporate Communication, Etisalat Group at the Knowledge Summit in Dubai. The fifth annual 'Knowledge Summit' is organized by Mohammed bin Rashid Al Maktoum Knowledge Foundation (MBRF) taking place on 5-6 December, 2018. The event's theme this year is focused on 'Youth and the Future of the Knowledge Economy' reflecting the critical role this sector

plays in the public sector and to build a sustainable knowledge economy. The summit is also focused on the 'UAE Vision 2021' to build a competitive economy that supports innovation and creativity and implementing the objectives of the UAE National Agenda for the Youth. Bin Ali led the discussion 'Digital Economy and Knowledge Economy: Rivalry or Alliance?'. The discussion focused on the shift of the in the country from traditional economies to a more diversified economy focusing on technology and services. UAE has established itself in the knowledge economy creating a competitive edge at all levels. The UAE today has set a benchmark in innovation, technology, infrastructure

and network taking a lead in establishing a digital economy. UAE continues its leadership in Fiber to the Home penetration among all its global counterparts. With a strong vision of the leaders and the government of UAE, the country is in the top 10 countries in ICT ranking as one of the top countries in e-government and online services, highlighted Bin Ali. Etisalat continuous investments on this front over the years have led to major achievements like the 3G network coverage reaching 99.98% while 4G LTE covering 98.98%. "There is a symbiotic relation between Knowledge and Digital Economies, the Digital economy fueling, facilitating, and working as a catalyst in the Knowledge economy umbrella. The UAE has set a benchmark for the early adoption of advanced new technology, with Expo 2020 Dubai becoming the first major customer in the MEASA region to access 5G services, through its partnership with Etisalat. Our aim and strategy is focused on 'Driving the Digital Future to Empower Societies' to create new opportunities and redefine the human capital in the Knowledge economy," said Bin Ali at the panel discussion. The other speakers at the panel discussion included Dr Simon Galpin, Managing Director, Bahrain Economic Development Board and Sarfaraz Alam, Chairman of TEXPO Group of Companies and moderated by Tom Goodwin, EVP of Innovation at Zenith Media.

PTCL and SCO to Roll Out Fiber in FATA

Pakistan Telecommunications Company Limited (PTCL) and the Special Communications Organization (SCO) have partnered to deploy 600km of fiber-optic infrastructure in the Federally Administered Tribal Areas (FATA), ProPakistani reports. The deployment is being conducted under the government's universal service program and is intended to facilitate the provision of basic telephony and data services in the impoverished and war-torn border region. The two companies were reportedly selected for the rollout due to their 'vast experience of working in difficult conditions'.



Turkey to Provide Cyber Security to Pakistan

The IDEAS 2018 witnessed the inking of a document of understanding (DoU) between Pakistan and Turkey for effective countering of the rising cybersecurity threat. The DoU was signed between the Air University Islamabad and Turkey's Savunma Teknolojileri Muhendislik (STM) at a conference 'Self-reliance through Research and Development' organized by the Pakistan Air Force (PAF) on the third day of the IDEAS 2018 at the Karachi Expo Centre. As part of the agreement, Roket AS, an establishment of the Turkish Armed Force Foundation, is expected to assist Pakistan with air-to-air, ground-to-ground and anti-tank UMTAS and OMTAS missile technology. The Turkish delegation under the Presidency of the Defence Industries of Turkey presented more than 25 private enterprises and defence export organizations. "Evolution of threats over a period of time, combined with dangers of hybrid and asymmetric warfare, has

made innovation cardinal to the rapidly changing defence needs, which can only be met via investment in research and development," according to the speakers at the conference. The speakers included Sri Lankan Air Force Air Commodore Udeni Rajapaksa, Chief of Systems Department of the Turkish Air Force Brigadier General Jamal Balicki, Chief of the Air Staff of the Nigerian Air Force Air Marshal Sadique Baba Abubakr and PAF's distinguished top cadre officers. They highlighted the evolution of the air defence capabilities of their respective countries, primarily through cost-effective solutions to aerial defence system. They stressed the need for research and cost-effective innovation to combat newer threats. They noted that self-reliance and optimisation of local defence capabilities is the need of the hour, but maximization of defence competencies is impeded by limited research funding in case of developing

countries like Pakistan. The speakers also iterated Pakistan's need to enhance its production capacity by partnering with the private sector and letting the local industry partners capitalize on defence production. In his address on the occasion, Air Commodore Rashid Habib of the PAF shed light on the 'Pride of Pakistan' – the JF-17 thunder fighter aircraft which Pakistan manufactures in collaboration with China. He informed the audience that more than 100 JF-17 jets had been added to the Pakistan fleet, and a dual-seat model of the aircraft was also expected to become operational in 2019. It was also announced that the National Aerospace Science and Technology Park (NASTP), under PAF's command, would serve as a special economic zone in pursuance of Pakistan's Vision 2025. The seminar concluded with a keynote address by Deputy Chief of Air Staff Air Marshal Shahid Akhtar HI (M). "Today, air space power has evolved into a source of commonly-recognised strength. The nature of threat has evolved into traditional and non-traditional. Forums like these [IDEAS] afford us the opportunity to combat these threats together," said Air Marshal Akhtar. At the conference, memoranda of understanding (MoUs) were signed among exhibitor countries. Turkish and Chinese delegations as well as arms manufacturers, traders and exporters enjoyed notable presence at the event. They signed MoUs with countries like Poland and Italy. The China National Aerospace Technology Import and Export Corporation under the country's State Administration for Science, Technology and Industry for National Defence showcased a range of land, sea and air defence systems with more than 30 to 40 per cent of range of new equipment and armed technology. Three Russian enterprises were represented under the parent body of Rosoboronexport showcase, a part of the Rostec State Corporation.



Tower Sector Forecast to Endure More Pain

Consolidation in India's telecoms sector is taking a heavy toll on tower companies in the country, which have seen co-locations drop sharply and revenue plummet, even as new towers are added, results from three tower companies showed. The mobile market will soon have just five players (including state-run BSNL and MSNL which are both small, together representing less than 10 per cent of connections), down from ten about a year ago. Fewer players of course means fewer tenants at each site. Analyst company Crisil estimates rentals per tower in India will decrease by between 7 per cent and 9 per cent in fiscal 2019 (ending 30 March). The company told The Economic Times operating margins of the tower sector are expected to fall 4.5 percentage points in fiscal 2019 and 3 points in fiscal 2020. Bharti Infratel's calendar Q3 numbers demonstrate the extent of the decline: while the number of towers inched up 1.7 per cent year-on-year to 39,950, co-locations dropped 17.2 per cent to about 78,000. The sharing factor per site fell to 1.96 at end-September from 2.41 a year earlier. The sharing revenue per tower declined 5.2 per cent each month to INR82,621 (\$1,177) at end-September. The company's net profit in Q3 fell 5.2 per cent to INR6 billion. Akhil Gupta, chairman of Bharti Infratel, said in its earning statement with the mergers complete, "the uncertainties in this respect are broadly addressed", noting the country's telecoms industry is now embarking on the next phase of rollouts. He added: "We remain confident of India's long-term growth potential for telecoms sector driven by rising data demand...This would necessitate rapid network rollouts." The country's largest tower company, Indus Towers – a venture between Bharti Airtel, Vodafone India and Idea Cellular (now Vodafone Idea) – was hit even harder in Q3, with co-locations down 23.3 per cent year-on-year to 229,960. The sharing factor dropped to 1.84 from 2.43, and revenue per

tower fell 9.4 per cent to INR72,477. It added just 1,160 towers from the previous year to end September with 124,230. And the tower sector hasn't yet felt the full impact of the Vodafone Idea merger, which closed in late August. The company recently said it is targeting full integration of Vodafone India and Idea Cellular in fiscal 2021 (ending 31 March). American Tower Corp (ATC), with 74,600 towers in India, said in its Q3 earnings release its operational and financial results were impacted by churn driven by carrier consolidation and expects churn to "occur at varying rates over the next several years". The loss of Tata Teleservice, which was acquired with Bharti Airtel, reduced monthly tenant billings by about \$10 million. But like Bharti Infratel, ATC is bullish in the longer term about the future and estimates more than 1 million cell site leases to be needed for 4G coverage and capacity, up from a baseline of 600,000 to 700,000 after the most recent consolidation.



Sri Lanka's e-Commerce Segment Records 34% Growth

Visa International, says that Sri Lanka's digital payment landscape has been registering a tremendous growth, due to more and more consumers choosing to shop on line and engage in e-commerce. According to Anthony Watson, Country Manager for Sri Lanka and the Maldives – Visa International, Sri Lanka has seen the e-commerce segment expand with a growth of 34% for year on year, as at July 2018. This is mainly due to consumers wanting to adapt new technology and gaining a wider acceptance of digital payments; consumer confidence in the security of on line payments is also growing, Watson said adding that visa understands and is responsive to changing consumer

behavior on line. While digital payments have grown, embracing of new technology in face to face transactions has also become relevant for consumers as they seek faster, easier and more convenient forms of payments. "Which is one of the key reasons why contactless cards have been well received by consumers who have experienced the convenience first hand," he said. All over the world, contactless cards are changing the financial environment, helping consumers go cashless; as the name suggests, contactless payment cards let users make payments with a mere tap at the PoS terminal. In India, the Finance Ministry recently came out with a directive advising

banks to issue Near-Field Communication (NFC)-enabled contactless credit and debit cards. Despite the Government's push on digital payments for a cashless India, the country remains highly cash dependent. In Australia, researchers at the Reserve Bank of Australia found that around one-third of all PoS transactions were conducted using contactless cards in 2016, which is a 300 percent jump from 2013. Today, nearly 94 percent of transactions are contactless in Australia. In order to make way for the widespread adoption of contactless cards in Sri Lanka, payment card providers like Visa are also swiftly upgrading their infrastructure, thereby increasing the touch points that accept such technologies.

GCC Smartphone Market Shows First Signs of Growth for Over a Year

IDC's latest Quarterly Mobile Phone Tracker for Q3 2018 shows that shipments of smartphones to the countries of the Gulf Cooperation Council (GCC) increased for the first time since Q1 2017. While the smartphone market's growth to 4 million units in Q3 2018 represents a modest 1.1% increase quarter on quarter (QoQ), it is a significant sign of stabilization for a market that has suffered five consecutive quarters of declines. Feature phones continued to grow from strength to strength in Q3 2018, with shipments to the GCC increasing 6.7% QoQ to reach 1.9 million units. This meant the overall GCC mobile phone market saw a combined total of 5.9 million units shipped in Q3 2018, up 2.9% on the previous quarter, with Saudi Arabia, Qatar, and Kuwait responsible for driving the market's growth. Saudi Arabia was the region's top-performing market in Q3 2018, with overall mobile phone shipments increasing 8.4% QoQ. "It seems the negative effects of Saudization and dependent taxes on the Kingdom's mobile phone space are losing momentum and the market is beginning to settle down again," says Kafil Merchant, a research analyst at IDC. "Additionally, new regulations requiring phones to carry IECEE certification have helped boost official shipments at the expense of gray market imports, while restrictions on the Kingdom's 2G network have seen an influx of cheaper 3G and 4G smartphones to fill the gap." Despite facing import sanctions, Qatar's mobile phone market recorded

its first quarter of growth for a year, with overall shipments increasing 8.0% QoQ in Q3 2018. Feature phones were the prime drivers of this growth, with shipments increasing 30.3%, while smartphone shipments were up 3.1% over the same period. Kuwait's overall mobile phone market saw growth of 2.6% in Q3 2018. The rest of the region was characterized by declines in Q3 2018, with overall mobile phone shipments for the quarter down 4.2% in Bahrain, 4.3% in Oman, and 7.3% in the UAE. "The UAE mobile phone market is being hampered by an overall lack of disposable income and job security in the country, with the effects being felt across almost every sector," says Nabila Popal, a senior research manager at IDC. "Even events like GITEX Shopper that traditionally help boost electronics sales failed to have a significant impact." In terms of the

smartphone vendor landscape, Samsung maintained its lead in Q3 2018 with 31.2% share of the GCC market, despite suffering a 3.0% QoQ decline in shipments. Apple and Huawei followed with respective shares of 25.0% and 18.7%. "While many of the leading brands are taking a hit in unit terms, this is largely a strategic move as they are now focusing more on increasing their profitability and the race for volume share is over," says Popal. "As such, vendors are pushing models that are going to add to their bottom lines, which has led to growth in the mid to high segment and an increase in the average selling prices of new flagship devices." Looking at 2018 as a whole, IDC expects the overall GCC mobile market to see a single-digit decline year on year, with growth returning again in 2019. 📱





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ARTICLE

Blockchain Disruption in the Telecoms Industry

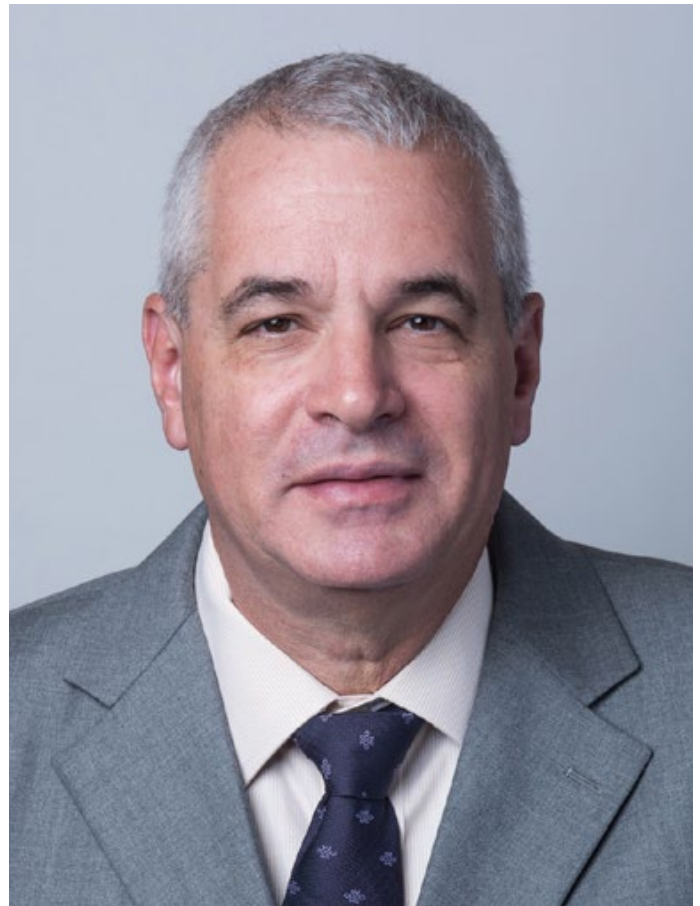
Forget the cryptocurrency hype - There is a strong business case for blockchain to revolutionise some aspects of the telecoms industry

Mention it and the the odds are that ideas associated with "cryptocurrency" or "Bitcoin" will tend to leap to mind. But in reality, blockchain, or the more generic term Distributed Ledger Technology (DLT), has been in use for roughly a decade and is proving useful in far more diverse situations and industries than just the often overhyped cryptocurrency scenarios - including the telecoms sector.

Blockchain utilises more than one complete data source which is spread across connected computers, or multiple "nodes". Distributed management requires that the logic of managing the integrity of the information within each node and across all nodes must be embedded into the ledger itself, rather than be managed by a central entity that then just stores the information in the ledger.

So what is blockchain, anyway?

The fundamental difference between DLT or blockchain and a traditional database relates to how the data is stored, verified and shared. All data in a traditional database is stored and managed in a central location. Think as an example of a standard Google Sheets spreadsheet. In this case, you are the central owner of the data in the spreadsheet that is hosted by Google. You may keep this data to yourself or share it. You may update the data on the spreadsheet yourself, or you may allow others to update that data through your sharing settings. But regardless of how often you share the spreadsheet or to whom you allow to edit it, there is still only one single centralised spreadsheet into which the data is stored.



Shahar Steiff

AVP New Technologies
PCCW Global

PCCW Global

By contrast, blockchain utilises more than one complete data source which is spread across connected computers, or multiple "nodes". Distributed management requires that the logic of managing the integrity of the information within each node and across all nodes must be embedded into the ledger itself, rather than be managed by a central entity that then just stores the information in the ledger.

While traditional centralised management of data may be a good, fast and efficient fit for many scenarios, there are certain cases where blockchain offers features that may be of benefit - including in the telecoms industry.

In this Google Sheets scenario, you don't own or control a centralised spreadsheet. Rather, all transactions recorded in one Google sheet are mirrored across two, three or even thousands of identical independent Google Sheets. Adding a transaction to any one of those Google sheets will result in that transaction being replicated across all independent Google Sheets or "nodes".

While traditional centralised management of data may be a good, fast and efficient fit for many scenarios, there are certain cases where blockchain offers features that may

be of benefit - including in the telecoms industry.

Consider number porting as an example where blockchain can offer benefits over a traditional centralised database.

Today it's quite common for a mobile subscriber to have switched from their original operator to a second or even a third operator - while still keeping the telephone number that they were originally allocated. If their number is 054-123-4567 (where 054 represents the dialing prefix of the original operator) the whole number is required to be ported to the new operator.

When someone dials that number, the 054 prefix automatically routes to the original service provider. The original service provider needs to somehow verify whether that number is still on their network before routing it to the correct new service provider, typically for at least some cost.

For efficiency, it makes sense for all operators to keep a database of ported numbers so that when one of their subscribers dials 054-123-4567, they will route the call directly to the new operator. But how is such a database managed and kept up-to-date?

One option would be to use a traditional database, managed centrally. But hold on - who will manage that database? Which operator? Or should a neutral third party be used? Who will pay the cost of operating and administering this database?

The fact of the matter is that today each mobile operator pays a monthly check to one of several third-party companies that manage and administer such databases. In return, the mobile operator is able to query that database prior to routing each call. If the dialled number is found to be ported - the operator is able to route the call to the correct operator.

However, if we were to use blockchain as a number porting database technology, then each mobile operator would be able to run their own identical "node" of a distributed ported number database. Within a set of pre-defined rules, each operator would have access to update the blockchain with the ported numbers on its network. Through the automatic replication of data across all nodes, this information, as well as information updates from other mobile operators reflecting the ported numbers on their respective networks, would rapidly be available at each blockchain instance on each mobile operator's own systems.

Blockchain has the ability to remove the complexity of information management in such scenarios where the data is no longer managed by a specific entity at a specific hierarchical level, but is now able to be managed by everyone and located everywhere.

The end result would not be different than using a centralised database, except that the information would now be available locally and would not require a monthly check to be paid to any third-party database operator.

This example demonstrates two major benefits for the use of blockchain: Disintermediation and Decentralisation.

Disintermediation yields simplification and possible cost reductions, while decentralisation fits well in situations where entities operate in an equal-level playing field (such as mobile operators that



simultaneously compete and cooperate with each other).

Blockchain has the ability to remove the complexity of information management in such scenarios where the data is no longer managed by a specific entity at a specific hierarchical level, but is now able to be managed by everyone and located everywhere.

Of course, any advantages blockchain technology has to offer hinges on the effective security, data integrity and fraud prevention of the information contained across different independent nodes. To handle these subjects in any depth requires far more extensive comment than is available in this article. However, in general, blockchain technologies do have effective mechanisms to identify fraudulent transactions and to ensure the integrity of stored information.

Overall, rather than having to put your faith in the hands of a third party and having to trust their numbers completely without any transparency or visibility, with blockchain technology all involved parties have the ability to manage their own node and use trusted transactions that ensure the integrity of the information that is generated and consumed.

Of course, using blockchain for number porting in the telecoms sector is just one example where the technology has the ability to yield significant cost-saving and efficiency benefits. The number porting example could easily ignite your own imagination to identify other areas in the industry where blockchain could be of benefit.

In another example, PCCW Global and two other partners successfully demonstrated a proof of concept that makes use

of blockchain technology, artificial intelligence and machine learning, with the potential to disrupt the international wholesale voice minute settlement process and dramatically reduce inter-carrier dispute settlement times.

PCCW Global and two other partners successfully demonstrated a proof of concept that makes use of blockchain technology, artificial intelligence and machine learning, with the potential to disrupt the international wholesale voice minute settlement process and dramatically reduce inter-carrier dispute settlement times.

The initiative demonstrated a significant reduction in the time and effort required to identify discrepancies, resolve disputes and generate undisputed invoices for financial settlements - analysing and settling a whole month's worth of wholesale voice traffic between two major European carriers within less than 4 minutes.

Put into perspective, this process is currently performed manually and typically requires 6-weeks of work from as many as 30 employees at each operator to complete!

Another example could be the maintenance of a global repository of network resources through a distributed catalog. This blockchain database could be used to speed up the process of inquiry, ordering, maintaining, invoicing and settlement of


network resources, including connectivity, compute and storage, on-demand across two or more telecom carriers' networks.

In October, 2018, PCCW Global worked with seven carriers and two technology partners to demonstrate the ability to perform an inquiry, quote and an order across a chain of multiple interconnected telcos - all within less than one minute. In addition, the proof of concept demonstrated the ability to invoice, reconcile SLAs and settle, including financial transactions, across the same chain of multiple carriers, within less than two minutes. Both of these processes typically take weeks of work using manual processes.

If you feel there is a pattern here – you are right!

Being a distributed and non-hierarchical ledger, blockchain is a good fit for wholesale telecom scenarios where the carriers operate in a distributed and non-hierarchical business environment. But it doesn't end there.

While wholesale is an effective use case, blockchain is also effective in almost any telecom-related supply-chain, even when the ultimate beneficiary is an individual subscriber and the supply chain includes operators, cloud, application developers, on-line stores, POS and banks. Blockchains allows all stakeholders to be linked together to ensure trusted transactions take place and information is correctly stored and retrieved by all parties.

So while cryptocurrencies like Bitcoin steal the daily headlines, it's the more workaday practical implications of blockchain technologies that are impacting other industries, including telecommunications. 

SATELLITE NEWS

Comtech Telecommunications Corp. Secures \$2.5 Million Order from Middle East Telecom Service Provider

Comtech Telecommunications Corp. announced today, that during the second quarter of fiscal 2019, its Enterprise Technologies group, which is part of Comtech's Commercial Solutions segment, has received a \$2.5 million order for various location platforms and location-based services (LBS) applications with a top-tier telecommunications service provider based in Saudi Arabia. The location platforms will enable the service provider to actively and passively

locate subscribers within 2G, 3G and 4G networks with the most accurate location technologies available. Additionally, the service provider will have access to a suite of value-added LBS applications including geo-location messages, emergency alerting and asset tracking. "The Middle East and Africa are two of the fastest-growing mobile markets in the world. As they become more connected, value-added services such as wireless alerts, mobile advertising and device tracking

are becoming increasingly important to operators in the region," said Fred Kornberg, President and Chief Executive Officer of Comtech Telecommunications Corp. "This agreement is one of many that will further expand Comtech's footprint in the Middle East as a trusted and global provider of highly accurate and secure location-based services for mobile and wireless technologies."

U.S. Air Force Academy and Texas A&M University leverage Zero-G's Weightless Lab Ahead of SpaceX Launch

Zero Gravity Corporation's Weightless Lab served as a valuable testing ground for the United States Air Force Academy (USAFA), supported in part by Texas A&M University (TAMU) Construction Science Department, as they evaluated the FalconSAT-X on a zero-gravity flight that took place on Nov. 13. The parabolic flight experiments raise readiness levels for launches such as the Dec. 3rd FalconSAT-6 with SpaceX. ZERO-G Weightless Lab provides a unique opportunity allowing researchers to conduct hands-on testing at a level matching NASA's rigorous standards and procedures. On the research flight, students and cadets worked side by side to evaluate the in-flight motion performance of solar panels attached to FalconSAT-X, the next satellite to be built by USAFA which is currently in the conceptual design phase. G-FORCE ONE®, ZERO-G's specially modified Boeing 727, provides a unique platform for student groups, universities, commercial companies and more to test research and equipment bound for the International Space Station and beyond. By using a parabolic flight pattern to produce 30-second periods of microgravity, including Martian and Lunar gravities, ZERO-G gives researchers the



opportunity to conduct hands-on testing and collect data in-person. The special lab conditions allowed researchers to easily observe experiment outcomes without interference from friction or other disturbances. Though each research group worked on independent experiments, they collaborated in post-run data collection. Dr. Patrick Suermann, TAMU Construction Science Department Head and USAFA Alum, flew with the USAFA students as they deployed the tests during a series of 25 parabolic arcs offered during the flight. In addition to recording the general performance of the deployment and retraction of the solar panels attached to their test satellite, team members were able to observe the motion and vibration induced by moving the panels. On each run, the team would

initiate the panels to either open or close depending on the sequence. Cadet Connor Brazinski organized the USAFA efforts and led the team during the onboard research mission. Of their ZERO-G flight, Cadet Brazinski shared, "It's fantastic seeing everyone's hard work come to fruition on this flight. Our teams are very excited to examine the data and bring the results into the light." "As one of the last steps before sending experiments into orbit, the information collected from the groups who do research with us is vital for the future of space exploration," said Terese Brewster, President and COO of ZERO-G. "We are proud to uphold standards and practices that are integral to their research and are happy to provide a place to observe space-bound technology."

Comtech Telecommunications Corp. Receives \$1.7 Million Order From a Texas County Association

Comtech Telecommunications Corp. announced today, that during its second quarter of fiscal 2019, its Safety & Security Technologies group, which is part of Comtech's Commercial Solutions segment, received an order totaling \$1.7 million to deliver Next Generation 911 services for an association of counties in the State of Texas. Under this order, Comtech will continue to provide critical Next Generation 911 services to these counties, which Comtech has been supporting under contract since 2011, providing trunking, ESInet, and i3 Next Generation 911 applications and services. "We are honored that these counties have extended our relationship and selected us to perform this critical work for their

citizens," said Fred Kornberg, President and Chief Executive Officer of Comtech Telecommunications Corp. "This extension is a testament to the quality of our market-

leading solutions, and we are proud of our industry leadership in providing innovative Next Generation Core Services to states and counties across the country."



Celestia Wins Major ESA Contract for UK



Harwell based Celestia Technologies Group UK Ltd (CTG UK) has signed an €8m contract with the European Space Agency (ESA) for the development of the next generation of Gateway ground stations. The three-year program will create a fully electronic scanning (eScan) ground station, capable of tracking and communicating simultaneously with multi satellites. Initial development activity will be focused on developing a product to provide Control and Gateway services for the new wave of mega satellite constellations in Ka-Band. The aim is to use eScan antennas instead of multiple mechanically steered dishes, so delivering benefits in space and maintenance costs. Domenico Mignolo, Head of the ESA

Ground Segment Technologies & Products Section says, "ESA is delighted to support the development of this challenging gateway station under the ARTES CC program." José Alonso, Chairman of the Celestia Technologies Group says, "This major project is a component of our wider UK investment and growth plans designed to address the technical challenges of providing extremely capable ground-based architecture to maximize the space-based investment. "With the backing of our successful and innovative European Group companies, and the supportive UK space environment, we see eScan as an exciting catalyst that will establish deep roots in the UK," he says. With the trend for earth observation operators to fly increasing numbers of smaller satellites in their fleets, and connectivity focused satellite operators launching satellite constellations in their hundreds, the control (TTC) and the gateway functionality of the ground-based stations has become increasingly critical. The commercial opportunities created by this development activity are wide-ranging. The eScan gateway concept is applicable to any frequency band and is capable of efficiently and cost effectively providing Gateway and satellite TTC services. The

contract has been part funded by the UK Space Agency. Dr. Craig Brown, Innovation Lead for Space at Innovate UK and the UK's Delegate to the ESA ARTES program says, "CTG UK, with their eScan project, represents an excellent contribution to the UK's strategy of supporting innovative and disruptive satellite ground segment technologies, improving access to space for new markets and applications. I'm very pleased to support the growth of this exciting company in the UK via the ESA ARTES program.' Rudd, Head of Telecommunications Strategy at the UK Space Agency, adds, "This project underlines the UK's support to innovation in the revolution of space services and capabilities. The UK Space Agency is committed to helping make space more affordable and will continue the drive to make space a key component of the UK's future communications infrastructure. Through the government's modern Industrial Strategy, we are encouraging high-tech British businesses to pursue commercial opportunities to ensure the UK thrives in the commercial space age." The eScan development is set to create an initial 20 new jobs. The €8m ESA contract is part of a total €19m project.

Maxar's SSL Awarded Contract to Provide GEO SmallSat for Mobile Broadband Company

SSL, a Maxar Technologies company, and a leading provider of innovative satellites and spacecraft systems, announced a contract award to manufacture a small geostationary (GEO) satellite for Ovzon, a company located in the U.S. and Sweden dedicated to meeting the demand for increased mobile broadband connectivity in underserved regions. Ovzon selected the mid-size SSL-500 platform for its first satellite, which brings the benefits of SSL's proven technology and performance combined with a lower-cost form factor. The contract is conditional on Ovzon raising financing. "Our focus on growth opportunities for medium and small-size satellites is building momentum,"

said Dario Zamarian, group president of SSL. "This collaboration with Ovzon demonstrates the demand for a new class of communication satellite, and SSL is very well positioned in this market." "Ovzon selected SSL to manufacture our first satellite because of the company's market leading position and its commitment to innovation, reliability, and agility," said Per Wahlberg, chief executive officer of Ovzon. "This satellite will enable us to provide extremely versatile mobile broadband capabilities to customers on highly mobile platforms, such as small aircraft, vehicles, and UAVs." SSL is leveraging its long history of technology innovation in both communications and Earth

observation markets by providing cost-effective, high-capacity solutions. The satellite, called Ovzon-3, provides Ovzon's customers with better performance, expanded coverage and faster data rates than competitive solutions. The next-generation satellite provided by SSL will advance communications in remote areas with extremely versatile mobile broadband capabilities. Ovzon previously announced that the satellite will launch aboard SpaceX's Falcon Heavy. To maximize its usable capacity, the satellite will include a flexible payload based on a customer furnished processor integrated into the SSL architecture.

DISH and HISPASAT Join Together to Connect Mexico with ON, a New High-Quality Satellite Internet Access Service

HISPASAT, the Spanish satellite-based telecommunications operator, and DISH, the online telecommunications and content distribution services company, have joined forces to offer a new high-quality broadband satellite service to Mexico through ON Internet. The new service will be focused on the residential and corporate market, in order to extend Internet access to broader parts of the country. Both companies made the announcement to the media during an informative breakfast held today in Mexico City, with the participation of the CEO of DISH México, José Luis Woodhouse; the Internet Division Director, Lorenzo Orozco, and ON's Director of Wireless Internet and Marketing, Santiago Ennis. HISPASAT was represented by the Business Director, Ignacio Sanchis. The joint goal of both companies is to provide high-quality Internet access service to Mexican residents, thus helping to bridge the digital divide and promote the development of connectivity in Mexico. Connectivity today is essential for the economic and social development in any community. Thanks to their extensive coverage, high capacity and fast roll-out, satellites are the best technological



solution to bring Internet access beyond where land-based networks reach. DISH México and HISPASAT announced their partnership today to open up a solution that expands Internet coverage in Mexico through a simple and accessible roll-out. Santiago Ennis, Director of Wireless Internet and Marketing in ON noted that "this agreement with Hispasat will allow Dish Mexico to expand its commercial Internet opportunities through the ON Satellite Network throughout Mexico, offering the possibility to digitally connect different sectors of the populations in remote and difficult to access areas using satellites. This service will benefit many

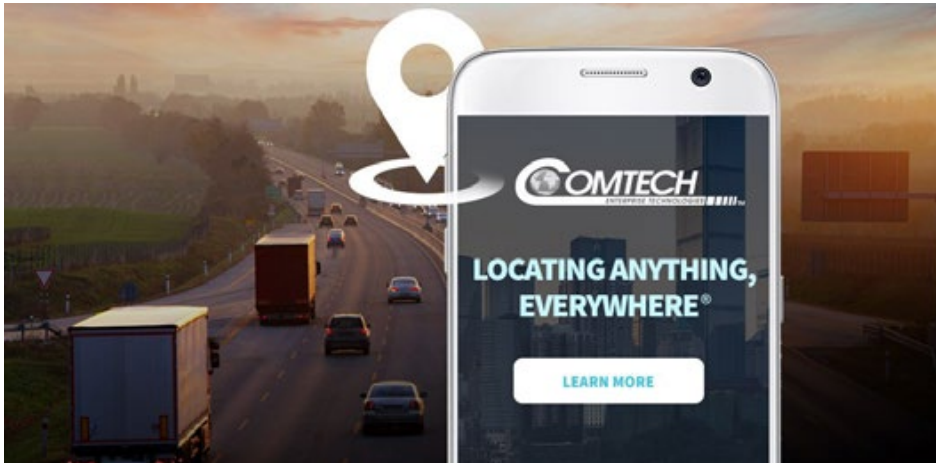
people and companies." For his part, Ignacio Sanchis, Business Director of HISPASAT, stated that "HISPASAT is proud to collaborate together with DISH to bring the Internet to the parts of Mexico without Internet connection, or with a very poor quality connection. For us, satellites have a very important function: they make the most cutting-edge technology available to people and open the doors to the digital world to Mexican citizens. This will allow them to benefit from the opportunities that the Information Society offers. We couldn't imagine a better partner for this task than DISH, a highly regarded company with a strong presence throughout the country."

Comtech Telecommunications Corp. Receives \$3.6 Million Renewal from Fortune 500 Company for Advanced Location Platform

Comtech Telecommunications Corp. announced today, that during its second quarter of fiscal 2019, its Enterprise Technologies group, which is part

of Comtech's Commercial Solutions segment, has received a two-year renewal agreement worth \$3.6 million for use of its Location-Based Services (LBS)

platform for a Fortune 500 company doing business in the telecom industry. Comtech's location technology allows authorized users to locate and track mobile devices and monitor specific areas of interest. The LBS platform can be used to support a wide variety of use cases including location accuracy testing, public safety, network optimization and big data analytics. "We are happy to extend this contract for another two years, providing continued access to accurate and secure location-based services for a number of mobile applications," said Fred Kornberg, President and Chief Executive Officer of Comtech Telecommunications Corp. "This customer is a highly valued industry partner and we look forward to continuing our long and fruitful collaboration."



BTRC Yet to Finalize Satellite Landing Rights Guidelines

Bangladesh Telecommunication Regulatory Commission is yet to finalize guidelines on satellite landing rights even after four years of taking an initiative. Satellite landing rights are a legal permission for using satellite signal in a country. Under the permission, satellite companies are supposed to comply with certain rules and regulations of that country along with payment of fees and charges to authorities concerned. At present, satellite companies which are providing services to Bangladeshi entities including television channels do not require any such permission from the regulatory body due to absence of rules. Bangabandhu Satellite-1, the lone satellite of Bangladesh that was launched on May 11 this year, will have to take landing rights from the authorities concerned in the countries where it would provide services. The initiative of the government regarding guidelines formulation has remained limited to formation of a committee and restructuring of the committee. BTRC formed the committee in March, 2013. Initially the committee was comprised

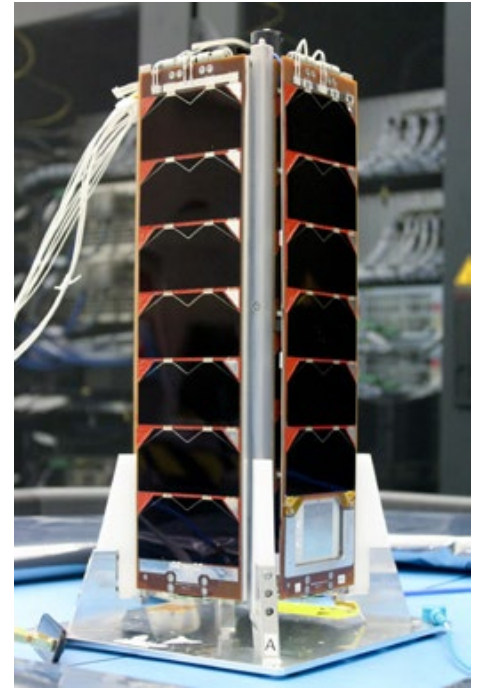
of eight members including BTRC commissioner and Director General, and Satellite Project Director. The telecom regulator, however, reconstituted it in 2017 by increasing the number of the committee members to 10 and replacing two members of the committee. BTRC again at a recent commission meeting decided to reconstruct the committee by increasing the number of committee members to 11. Bangladesh Communication Satellite Company Limited Chairman Shajhahan Mahmood told New Age, 'Having guidelines on satellite landing rights is a vital factor for a country like Bangladesh as we have already launched our first satellite.' 'We would request the government to formulate guidelines in this regard immediately as foreign satellite companies are entering Bangladesh freely,' said Mahmood, also the immediate past chairman of BTRC. Formulation of guidelines would allow the government to regulate the sector more effectively along with earning revenue in the form of fees and charges against the issuance of satellite landing

rights to foreign entities, he said. As a satellite operating entity, BCSCCL requires regulatory permission like satellite landing rights from the regulatory authorities of a country where Bangabandhu Satellite-1 would provide services, he said. Without getting regulatory approval, Bangabandhu Satellite-1 would not be able to provide services in the countries where its footprint is comparatively strong, Mahmood said. Besides bringing satellite entities under regulatory framework, ensuring level playing field for the Bangladeshi television channels by imposing landing rights on the foreign TV channels was among other reasons for taking the initiative of guidelines formulation. Foreign companies would require regulatory approval for entering Bangladesh along with payment of fees once the guidelines are finalized. Asked about the delay in finalizing guidelines on satellite landing rights, acting BTRC chairman Md Jahurul Haque told New Age that he had no idea about the matter.

SSTL Confirms Successful Launch of VESTA

Surrey Satellite Technology Ltd (SSTL) has confirmed the successful launch of VESTA, a 3U nanosatellite technology demonstration mission that will test a new two-way VHF Data Exchange System (VDES) payload developed by Honeywell for the exactEARTH advanced maritime satellite constellation. The 4kg satellite has 3-axis pointing capability, an SEU tolerant on-board computer, VxWorks operating system and also flies a Commercial-Off-The-Shelf (COTS) VHF deployable antenna system developed by Innovative Solutions in Space for the VDES transceiver. VESTA will be operated in orbit by SSTL, with the payload data being downlinked directly in S-Band to Goonhilly Earth Station. The development of VESTA was co-funded by the UK Space Agency through its National Space Technology Program (NSTP) which stimulates the growth and development of the UK space sector through investing in technology development. The project was led by Honeywell. Dr. Graham Turnock, Chief Executive, UK Space Agency said: "There are still areas of the Earth where communication remains difficult, none more so than out at sea. Satellites can bridge this gap, however testing new technology is risky and expensive. That's why the UK Space Agency is helping to fund promising UK technologies like VESTA as part of the government's Industrial Strategy, to kick start innovation and growth, while delivering safety at sea

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and jobs back home." SSTL previously designed and supplied the exactView-1 satellite platform, launched in 2012, which forms part of the ExactEARTH AIS constellation used by ships and traffic to monitor ship movements through busy shipping channels and harbors and to provide information on global shipping movements.

SSL to Build 1st GEO Satellite for Ovzon



Ovzon signed a contract with SSL, a Maxar Technologies company, for the manufacturing of the company's first Geostationary Orbit (GEO) satellite. The total investment for the satellite (Ovzon-3) including manufacturing, launch, financing and insurance is estimated to approximately \$165.6 million (SEK 1.5

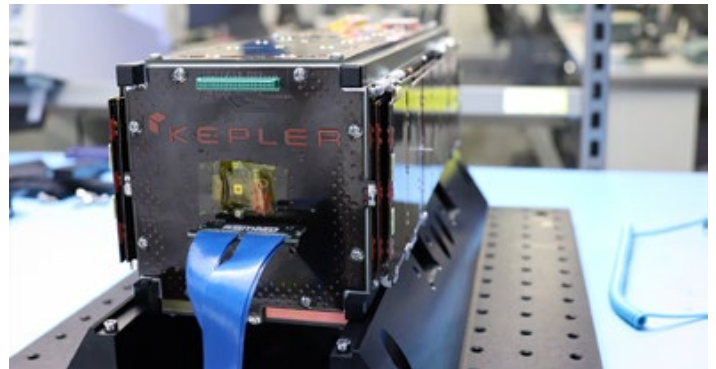
billion). The satellite features a central On-Board Processor (OBP), developed by Ovzon and already being manufactured by a third party, tied to high performance steerable beams. With the new satellite, Ovzon aims to significantly increase the performance and coverage area of its existing service. The satellite is expected

to be completed in 2021 and the launch period with SpaceX has been adjusted accordingly. "We are very pleased to be able to announce the signed satellite manufacturing contract with SSL. In addition to the significantly increased performance and coverage areas, the satellite will also enable new functionality such as single hop communication between very small terminals and will be a powerful future-proof tool to meet challenging communications requirements. We now continue to strive to further revolutionize mobile broadband via satellite by offering the highest bandwidth through the smallest terminals," said Ovzon Chief Executive Officer (CEO) Per Wahlberg.

Kepler's Next Wideband Satellite Reaches Orbit on the Indian Polar Satellite Launch Vehicle

Kepler Communications successfully launched their second wideband satellite to low-Earth orbit (LEO) on the Indian Polar Satellite Launch Vehicle (PSLV) C43 mission that lifted off from the Satish Dhawan Space Centre in Sriharikota, India. Kepler's latest satellite within the company's network will be used to deliver service to early customers. The first satellite was launched in January 2018. Both satellites carry a Ku-band payload onboard that is used for wideband connectivity. The third satellite will launch in 2019 and will provide narrowband connectivity for the Internet of Things (IoT) devices. Mina Mitry, CEO of Kepler, says of the launch "This is an exciting month for Kepler! Following our recent FCC approval, the successful launch of our next satellite marks an important milestone for the team to deliver our network on schedule. This is but the start of our upcoming and regular launch cadence. We continue to increase network capacity, and deliver a more persistent, reliable, service to our customers every step along the way." The lessons learned from almost a year of operating the first satellite were incorporated into the development of the second to improve the reliability. Kepler has already demonstrated a capability to deliver upwards of 40 Mbps to 60cm diameter VSAT (Very Small Aperture Terminal) and over 300 Mbps to Kepler's 3.4m gateway in Inuvik, Canada. Kepler also became the first company to use a wideband LEO satellite to acquire, track, and communicate with an electronically-steered antenna when Kepler and Phasor performed their collaborative demonstration. As Kepler builds out the capabilities on their satellite infrastructure, the company is also adding capacity on their ground segment. In addition to their gateway deployed in Inuvik, Canada, Kepler has also recently deployed ground stations on Svalbard and in New Zealand. As new ground stations and

gateways are added, Kepler is able to increase the reliability of their communication service and decrease the latency of customer data delivery. CASE was built in collaboration with AAC Clyde, and Bright Ascension Ltd. The satellite payload is Kepler's proprietary software defined radio and antenna that uses Enclustra and AHA (of Comtech EF) components. The Kepler ground support network was built in collaboration with Comtech EF Data, Kongsberg Satellite Services, and Innovative Solutions in Space. The satellite was launched by Antrix Corporation Ltd, a wholly owned Government of India company, with the support of ISED, Canada for licensing. Kepler's ultimate goal is to deliver in-space connectivity to address the data need from space faring assets, and support the future space economy. However, Kepler's network currently focuses on delivering wideband and narrowband connectivity. With this launch on the back of receiving FCC market access authorization and the announcement of Kepler's 16M USD Series A round of financing, the company is well poised to take a leadership role in LEO communications.



SpaceX Halts U.S. Satellite Launch for National Security Mission

Elon Musk's SpaceX halted Tuesday's launch of a long-delayed navigation satellite for the U.S. military, postponing for at least a day the space transportation company's first designated national security mission for the United States. The Dragon crew capsule sits in the SpaceX hangar at Launch Complex 39-A, where the space ship and Falcon 9 booster rocket are being prepared for a January 2019 launch at Cape Canaveral, Florida, U.S. December 18, 2018. REUTERS/Steve Nesius

SpaceX's Falcon 9 rocket, carrying a roughly \$500 million global positioning system (GPS) satellite built by Lockheed Martin Corp (LMT.N), was due to take off from Florida's Cape Canaveral shortly after 9:30 a.m. local time (1730 GMT),

but was stopped minutes before takeoff. "This abort was triggered by the onboard Falcon 9 flight computer," a SpaceX official narrating the launch sequence said, adding that SpaceX would attempt the launch on Wednesday morning. SpaceX later tweeted that the Falcon 9 and payload remain healthy and cited an "out of family" reading on the rocket's first stage sensors for the delay. U.S. Vice President Mike Pence, who traveled to Florida to watch the launch, announced afterward that President Donald Trump would direct the Pentagon to establish a Combatant Command to oversee America's activities in space. The Space Command, the 11th such Combatant Command in the U.S. military, comes as the United States seeks to grow

its military footprint in space. A successful launch would be a significant victory for Musk, a billionaire entrepreneur who spent years trying to break into the market for lucrative military space launches, long dominated by Lockheed and Boeing Co (BA.N). SpaceX sued the U.S. Air Force in 2014 in protest over the military's award of a multibillion-dollar, non-compete contract for 36 rocket launches to United Launch Alliance, a partnership of Boeing and Lockheed. SpaceX dropped the lawsuit in 2015 after the Air Force agreed to open up competition, according to SpaceX's website. The next year, SpaceX won an \$83 million Air Force contract to launch the GPS III satellite, which will have a lifespan of 15 years, Air Force

spokesman William Russell said by phone. Tuesday's launch was to be the first of 32 satellites in production by Lockheed under contracts worth a combined \$12.6 billion for the Air Force's GPS III program, Lockheed spokesman Chip Eschenfelder said. "Once fully operational, this latest generation of GPS satellites will bring new capabilities to users, including three times

greater accuracy and up to eight times the anti-jamming capabilities," said Russell. The GPS satellite launch was originally scheduled for 2014 but has been hobbled by production delays, the Air Force said. The next GPS III satellite will launch in mid-2019, Eschenfelder said, while subsequent satellites undergo testing in the company's Colorado processing facility. The launch

marks SpaceX's first so-called National Security Space mission as defined by the U.S. military, SpaceX said. In 2017, the Hawthorne, California-based company launched payloads for the Department of Defense that were not designated as a National Security Space missions.

Local TV Channels Using Bangabandhu-1 Satellite

Seven private television stations and three channels of state-run Bangladesh Television have started airing programmes using Bangabandhu-1, the country's first communication satellite. The stations are BTV World, Sangsad Bangladesh Television and BTV Chattogram and private channels Somoy TV, DBC News, Independent TV, NTV, Ekattor TV, Bijoy TV and Boishaki TV. State-run Bangladesh Betar is also using the satellite. The channels are currently using the Bangabandhu satellite for free and will start paying for the service from March next year. They currently have contracts with satellite Apstar and their cancellation require notifications three months in advance. "We will start earning from next month," said Shahjahan Mahmood, chairman of Bangladesh Communication Satellite Company Ltd (BCSCL). In September, BTV ran live coverage of South Asian Football Federation Championship via the satellite. Some television channels also carried out test transmissions. Each television station in Bangladesh uses four to six megahertz of bandwidth and spends \$20,000 a month on an average for satellite connectivity. If all of them take the service from Bangabandhu-1, the BCSCL will be able to earn \$10 million annually, enough to make its business viable. Currently, there are 34 television channels in Bangladesh which are shelling out \$14 million per year to use satellites from other countries. "Television channels take per MHz bandwidth at \$4,000 and we will offer them a better price with attractive discounts for additional bandwidth consumption," said Mahmood. According to the initial plan, Bangabandhu-1 could reach break-even within seven years. But Mahmood said it could be done ever earlier than that. Mahmood said TV channels

incurred some costs to run their uplink and downlink stations. The BCSCL will allow new television stations to run the service from a single point, helping to save Tk 5 crore. Fifteen more television channels are set to begin commercial operations in the country. The satellite was launched in May this year under a project costing Tk 2,765.66 crore, allowing Bangladesh to enter the elite space club of 57 nations who have sent satellites into orbit. The BCSCL has also signed a deal with the country's first direct-to-home company RealVU, which is testing programmes aired by 48 local and international channels through Bangabandhu-1. "We are very close to finalising deals with a few companies from the Philippines as well as place where our satellite has a strong footprint," said Mahmood. He said the BCSCL's international consultant Thaicom, a renowned satellite company of Thailand currently active in about 20 countries, was working intensively and some new business deals would be on the table within a short time. "We have lots of challenges in formulating the process of running the satellite company as it is a

very new kind of technology and business to us. It also took time to get the key of the satellite." On November 9, the BCSCL took over control of the satellite from its manufacturer Thales Alenia Space. To help the company run smoothly and take decisions faster, the government has formed a high-powered committee headed by the principal secretary to the Prime Minister's Office. The committee includes five senior secretaries, the chairman of the Bangladesh Telecommunication Regulatory Commission (BTRC) and the BCSCL chairman. Besides, the telecom regulator has already made it mandatory for new television channels to take bandwidth from the state-owned satellite to ensure optimum use of Bangabandhu-1's capacity. "If the BCSCL fails to provide the bandwidth they need, only then can they avail services from other satellites," said Md Jahurul Haque, acting chairman of the BTRC. The BCSCL has penned preliminary agreements with some government offices and will ink deals with two VSAT companies soon to provide uninterrupted connectivity to banks. 





Nokia 5G Future X

Unleashing the
potential of 5G

NOKIA

ARTICLE

Software Enabling 5G

Software key to realizing 5G capabilities

We at Nokia believe that we are in front of one of the biggest upsidest in the whole telco industry in a long time, thanks to the digitalization trend and IOT. IOT will add a massive amount of new connections; and the digitalization trend creates a growing demand for a multitude of diverse connections including use cases with high bandwidth, low latency and ultrahigh reliability. 5G is the ideal solution to respond to this demand, however 5G is much more than simply a new Radio Access Network (RAN) generation. It comes with sophisticated software that affects all parts of the network, including, how service providers operate the network and how they offer profitable and compelling services. It is a whole new business system that enables service providers to respond to the massive demand fueled by the Internet of Things (IoT) and digitalization trend in a profitable way.

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5G requires a tight connection between network, operations and business with all the systems and processes working together to deliver and monetize the 5G use cases for consumers and enterprises. Software is the key for realizing 5G capabilities in an efficient way. Technical capabilities such as dynamic slicing of mobile networks and a service-based architecture to enable multiple and diverse use case requirements based on agile, flexible and real-time digital fabric are critical for telcos to maximize and exploit 5G capabilities.



Folke Rosengard

Head of Business Development
Nokia Software

NOKIA

Network providers must have a strong digital fabric that's built on applications with five key characteristics:

- 1. Intelligent:** Analytics and machine learning in everything are critical to manage an ever-growing volume of data. Great experiences are the ones that are personal, contextual and fast. These rely on the ability to augment human intelligence with machine learning and analytics. They use the data to provide a 360-degree view of the experience and decide what actions will produce the best outcomes.
- 2. Automated:** Manual processes are too slow to handle the big data explosion. As such, intelligence workflows and bots should push automation to extremes to ensure we can drive insights to action with efficiency and speed using closed-loop fundamentals.
- 3. Secure:** With more of our lives online, customers must know they can trust their providers to handle their data. The new digital fabric must include security in its foundation to provide customers with the highest level of protection in the digital world.
- 4. Cloud-native:** To respond with agility at a better cost point, software needs to be built for the cloud, from both the technological and consumption-model perspectives.
- 5. Open:** It's unlikely that service providers will rely solely on one infrastructure vendor or partner, one revenue-sharing relationship or service. Applications must be multi-vendor, open and lightweight - and the complexity of the network must be removed or abstracted.

5G will enable a range of new use cases with a variety of specific requirements. To support each use case in an optimal way, security capabilities will need to be more flexible. For example, security mechanisms used for ultra-low latency, mission-critical applications may not be suitable for massive IoT deployments where devices are inexpensive sensors that have a very limited energy budget and transmit data only occasionally. Another driver for 5G security is the changing ecosystem. LTE networks are dominated

by large monolithic deployments—each controlled by a single network operator that owns the network infrastructure while also providing all network services. In contrast, 5G networks may be deployed by a number of specialized stakeholders providing end-user 5G network services.

Software is the key for realizing 5G capabilities in an efficient way. Technical capabilities such as dynamic slicing of mobile networks and a service-based architecture to enable multiple and diverse use case requirements based on agile, flexible and real-time digital fabric are critical for telcos to maximize and exploit 5G capabilities.

We believe "Cloud Native software" is a fundamental principle for software for the 5G era. There are many benefits of cloud native software for telcos, including more efficient use of cloud resources, operational simplicity and horizontal scalability. Proven by massive scale companies such as Google, Twitter and Netflix over years of use, horizontal scaling or adding more containerized applications within a cluster, enables providers to provision the processing capacity they need to process data quickly.


Managing and reducing the complexity, while keeping operation costs under control, can only be achieved through injecting intelligence and automation into the transformation process. As 5G extends beyond radio technologies, deep into the cloud, across mobile and transport layers, it will be paramount to combine data from RAN and non-RAN sources and introduce machine learning-enabled automation to create algorithms for use cases that operate across all these data sources.

Today, automation is popping up almost everywhere in the network, and "closed

loops" are considered silver bullets for killing complexity. A recent study by Nokia Bell Labs concluded that closed-loop automation can only work in combination with a new architecture and – even more important – an implementation master plan. The full benefit of automation can only be realized if it's done in concert. Small benefits can be – and are being – realized with tactical, domain-specific automations, but those benefits can only be maximized if harmonized and orchestrated across all domains.

As non-telco companies digitalize their own product offerings, new opportunities will emerge for telcos and service providers. With the new network characteristics of 5G and cloud resources sitting close to customers, these companies will be in a position to offer capabilities no IT cloud service provider can match.

Software helps communication service providers to reinvent themselves as digital service providers. A key in this transformation is to recognize the need for far greater agility with frictionless business and operational adaptability. In other words, digital service providers need to act in and capitalize on windows of digital time. To operate in digital time, service providers need a holistic and real-time view of what's happening with business and operations to determine the next best action to take – this applies for all areas of operations from marketing to product management, customer experience management, network and service operations, care and monetization.

Nokia Software takes a holistic, data-driven approach to connect domains, derive insights and trigger and automate actions in the moments that matter by providing 360-degree understanding of a customers' experience, services and networks. We call this ability to connect domains, derive insights, trigger and automate actions in the moments that matter 'connected intelligence'. Connected intelligence brings together customer experience, operations and networks. 

WHOLESALE NEWS

EC Lauds Impact of Roaming Regulations



Use of voice and data services by consumers outside of their home markets soared following the removal of roaming charges within the European Union, the European Commission (EC) revealed in

a report. In the 18 months since the introduction of legislation banning roaming surcharges in the economic area on 15 June 2017, the EC said the use of mobile data by roamers had increased by a multiple of five, while voice minutes had doubled. The EC also credits the policy with helping increase 4G coverage across the region. In a statement, it said EU-wide 4G coverage had increased from 85.6 per cent in December 2016 to 90.8 per cent by the end of December 2017. Mobile operators, the commission added, had "largely abided" by the new rules, adding this was a "result of vigilant monitoring from national regulators and the commission". EC Commissioner for Digital Economy and Society Mariya Gabriel (pictured) commented: "Today we can see the tangible benefits following the abolition of roaming charges in the EU." "The good news is that Europe is now a reality for people using their mobile phones freely when travelling abroad. I am grateful to operators who manage to turn demands for more data and voice calls into new opportunities."

EU Mobile Data Roaming Traffic Shows five-Fold Increase After RLAH Implemented

Mobile data roaming usage in EU has increased five-fold since the 'roam like at home' regulation was passed at the end

of May 2017, according to a report from the European Commission. The number of phone calls made while roaming roughly

doubled over the same period.

U Mobile Extends 3G Roaming Deal with Maxis

Malaysian cellco U Mobile has announced the extension of its 3G RAN sharing agreement with rival Maxis, which covers the 'limited areas' of the country where the former does not have its own infrastructure. Confirming the development via press release, Maxis noted that over the past 18 months it has undertaken 'an aggressive

network replacement exercise across Malaysia', with this now in its final phase. Explaining the decision to extend its deal with Maxis – with the new agreement valid until the end of June 2019 – U Mobile said this would 'ensure the transition to its very own newly built network is seamless for customers'.



BIPT Confirms New Fixed Termination Rate from January 2019

Telecoms regulator the Belgian Institute for Postal Services and Telecommunications (BIPT) has confirmed the new fixed termination rate (FTR) that will come into

effect from 1 January 2019. BIPT said that it used the LRIC model recommended by the EU for calculating the new FTR. From 1 January 2019 the rate will be set

at EUR0.00116 (USD0.00804) per minute, down from the current FTR of EUR0.00709.

Iranian Cellcos Introduce Nationwide Roaming

Iranian mobile network operators (MNOs) MTN Irancell and Mobile Communications Company of Iran (MCI) have implemented a nationwide roaming deal which allows them to extend their respective network coverage in rural areas. A report from The Financial Tribune says that while the two companies have overlapping footprints in most urban areas, there are many rural regions where only one network is present. The agreement follows an initiative by the Ministry of ICT to encourage the introduction of national roaming.



French Regulator Arcep Publishes Price Ceilings for Wholesale VGAST Services in B2B Market

Arcep has published a decision on the price ceilings applicable to wholesale VGAST services in the B2B market for the 2019-2020 period. The monthly charges are set at EUR 12.32 and EUR 18.57 for analogue and digital services respectively, unchanged since the last decision issued

in 2016. Among the other charges, the regulator said that from 2020, the price ceiling for VGAST call origination charges to the subscriber's switch will no longer be regulated as long as Orange fulfils its obligations. This price ceiling is set at EUR 0.005923 per minute for 2019.



PTA to Begin Lowering MTRs from Start of Next Year



The Pakistan Telecommunication Authority (PTA) is set to belatedly reduce the mobile termination rate (MTR) to PKR0.7 (USD0.0052) per minute over the next two years, Dawn reports. The PTA had conducted a review of MTRs in late 2017, following which it set out plans to lower the MTR to PKR0.8 from 1 December 2017

and to PKR0.7 from 1 December 2018 but the measures were not implemented at the time. The PTA's study included a benchmarking analysis that compared Pakistan's MTR regime to those of seven other countries – India, Bangladesh, Sri Lanka, Thailand, Malaysia, Australia and the UK – using mean and median purchasing power parity (PPP)-adjusted MTRs and found that Pakistan's fees were 110% higher than the mean benchmark and 198% higher than the median. Based on the benchmarking analysis, the PTA proposed an MTR of between PKR0.30 and PKR0.43. An alternative comparison with the same countries that took into

consideration relative ARPUs across the different markets suggested an even lower rate of PKR0.179 to PKR0.190. As an interim measure, the PTA set out the glidepath to lower MTRs to PKR0.7 by 1 December 2018, with plans to conduct a full cost-based study at a later date. Implementation of the rate was reportedly delayed by opposition from market leader Jazz, however, and the regulator is now planning to lower the rate from its current level of PKR0.9 – which came into effect in 2010 – to PKR0.8 from 1 January 2019 and to PKR0.7 from 1 January 2020. 📌

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ARTICLE

Fibre is King

The unquestionable winner in the race for bandwidth



Bader Al Zeidi

General Manager Network Planning &
Technology
Oman Broadband



A common misconception is that 5G networks will offer Gbit/s services in the way that FTTH networks offer Gbit/s services today. Many users connecting wireless devices networks incorrectly assume 5G means the end of FTTH. However, this is completely untrue. In fact, fibre will emerge as the unquestionable winner in the race for bandwidth. Instead of rendering Fibre Optic Cable (FOC) obsolete, 5G will drive demand for fibre, whilst strengthening the business case for FTTH networks.

A single optical fibre is capable of carrying 1 Petabit/s (10¹⁵ bit/s) on a single wavelength. With the advent of DWDM technology this can be increased by a factor of 96, by allowing 96 different wavelengths to be multiplexed into a single fibre. Light carried by an optical fibre typically has a wavelength of 1.5 um, or a frequency about 20 Petahertz (20 x 10¹⁵ Hz). As bandwidth carried depends on the frequency of the carrier, fibre can ultimately carry bandwidths of about 1 Petabit/s: far higher than 5G.

5G will operate in two frequency bands - Sub6GHz and mmW – promising fiber-like speeds to be offered to each customer. However, this bandwidth is shared, so available bandwidth decreases as the number of users increases. Therefore, if mobile operators don't offer sufficient cell site density, they will need to install more resources, shared among a relatively small number of users that otherwise won't be able to get high data rates from their mobile terminals.

5G will make high bandwidth available to its customers, in the order of Gbit/s: from 1 to 1G (10⁹ bit/s) depending on the frequency band that 5G operates. However, a single optical fibre is capable of carrying 1 Petabit/s (10¹⁵ bit/s) on a single wavelength. With the advent of DWDM technology this can be increased by a factor of 96, by allowing 96 different wavelengths to be multiplexed into a single fibre. Light carried by an optical

fibre typically has a wavelength of 1.5 μm , or a frequency about 20 Petahertz (20×10^{15} Hz). As bandwidth carried depends on the frequency of the carrier, fibre can ultimately carry bandwidths of about 1 Petabit/s: far higher than 5G.

Over the past 30 years, fixed bandwidth demand has doubled every 18 months and there is no indication this trend is about to change (see figure 1). We are confident that the demand for bandwidth at home will continue to increase. Another driver for fibre growth is the need for an optical fibre connection to each 5G base station—a process called 'backhauling'. Fibre is the preferred transmission medium for 5G, and will be able to carry whatever bandwidth 5G and future evolutions of the mobile technologies might require. Most 5G base stations will be located in populated areas within zones covered by FTTH, strengthening the business case for FTTH: 5G backhaul services can be offered from the same FTTH infrastructure at limited additional cost. In addition to higher broadband speeds,

5G will also boost Fixed Wireless Everywhere, ideal for currently underserved areas such as rural regions where fibre deployment is currently seen as too costly. Regardless of operators' preferred business cases, cell sites densely


populated or rural areas will generate large amounts of data that need to be backhauled, and optical fiber is always the preferred medium for this.

On the other hand, as an important share of all base stations will be located in populated areas, where fixed FTTH service is also required, there will be a great synergy between 5G and FTTH. Considering the fact that the greatest proportion of the cost of deploying optical fiber is in the civil works part, it makes sense to dig a trench once to simultaneously provision for both fixed and mobile networks in that area: so-called 'structural convergence'. A converged network approach allows technology synergies, whilst strengthening the business case for fibre.

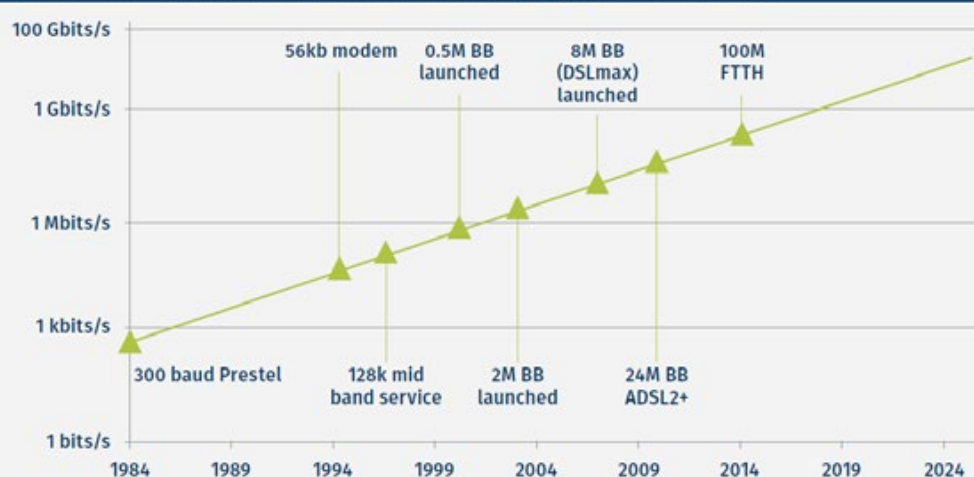
Fibre is the cornerstone of the next generation network. In 2017, Lowell McAdam, CEO & Chairman Verizon USA, announced a major fibre purchasing agreement with Corning, in preparation for 5G services as well as FTTH network expansion. In Oman, a national broadband network is being rolled out in support of the Sultanate's National Broadband Strategy. Government-owned Oman Broadband focused on the deployment of a passive fibre network infrastructure, providing equal and open access to telecommunication service providers (wholesale) and owners

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and operators of private networks (retail), enabling end users to efficiently leverage high-speed fibre in Oman. Main service providers Omantel, Ooredoo and Awast can sell high-speed internet services offered over these fibre connections. In turn, Oman Broadband will be able to provide fibre connections to 4 and 5G base stations located in these populated areas. The fibre footprint is being extended across Oman, while potential for more 5G mobile base stations is being added. The company is also building long-haul fibre services as part of a national backbone network to interconnect major population centres. Oman Broadband is also extending its reach into rural areas, to offer broadband services to more remote, less populous regions.

In short: 5G will only materialize in its true sense with the availability of fibre backhaul. Telecom operators need to gear up for more fibre to support the evolution to 5G. 

The law of internet bandwidth: demand has doubled every 18 months since 1984



Data based on UK market Source: P W France 2016

Mr. Bader Al Zeidi is the General Manager of Network Planning & Technology in Oman Broadband Company. He has a total of 16 years of work experience in the ICT domain. Mr. Al Zeidi, is also a board member in the FTTH MENA council and also the chairman of the regulatory and policy committee within the council. He had written few white paper/articles that were published in an internationally recognized conferences in the domain of FTTH network design and rollout.

TECHNOLOGY NEWS

Wi-Fi, 5G Will Be Complementary: Wi-Fi Alliance

The Wi-Fi Alliance wants everyone to know: Wi-Fi 6 and 5G are complementary technologies, both contributing their strengths to expand the power of the overall wireless connectivity fabric. That's one of the key takeaways in the Wi-Fi Alliance's new white paper, Next generation Wi-Fi: The future of connectivity. The paper comes after the 3GPP standards group said it's working on a version of 5G specifically for unlicensed spectrum, aka the same spectrum that Wi-Fi uses. Asked if the Wi-Fi Alliance is concerned about that development, the organization said Wi-Fi delivers connectivity where it's needed most while still making the most efficient use of unlicensed spectrum. "Wi-Fi and 5G will be complementary, but Wi-Fi is the only technology that delivers the unique blend of characteristics which have enabled Wi-Fi to be the success story that it remains today," the Wi-Fi Alliance said in a statement provided to FierceWireless. "One of Wi-Fi's greatest strengths is its

ability to deliver affordable performance—combining high performance and equipment affordability which has played a major role in establishing the ubiquity and dominance of Wi-Fi. This affordable performance, coupled with other inherent strengths outlined in our new whitepaper, makes Wi-Fi best suited to address a broad range of connectivity scenarios." According to the alliance, its members are actively participating in standardization efforts both within IEEE and 3GPP. "Wi-Fi continues to add a richer set of capabilities that broaden deployment scenarios," said Edgar Figueroa, president and CEO of the Wi-Fi Alliance, in a press release. "Excitement around new technologies will come and go, and meanwhile, Wi-Fi maintains its strong track record and commitment to core competencies that will continue to deliver mission critical connectivity and to carry the bulk of the world's data traffic." Wi-Fi already supports high-resolution video streaming, Wi-Fi

calling, smart home monitoring, hotspot access, automation of citywide services, residential AR/VR applications and seamless roaming. Wi-Fi 6, or 802.11ax, will bring a new level of Wi-Fi capacity and performance, and enhancements to WiGig in the 60 GHz millimeter wave band will deliver faster speeds and longer ranges. The 2.4 GHz band is pretty much saturated and the 5 GHz is getting more crowded, which is why so many in the Wi-Fi community are excited about the prospects of the 6 GHz band. In October, the FCC unanimously agreed on a proposal to make up to 1200 megahertz of spectrum available for use by unlicensed devices in the 6 GHz band (5.925-7.125 GHz). As spotted by Wi-Fi Now, the Notice of Proposed Rule Making was just published in the Federal Register, kicking off a public comment period. Comments are due on or before Feb. 15, 2019, with reply comments due on or before March 18, 2019.

San Marino Now Fully Covered By 5G

Telecom Italia (TIM) says its subsidiary in San Marino has deployed 5G technology to cover the entire territory of the tiny republic. Working with Nokia, TIM San Marino (TIM SM) has rolled out 3GPP Release 15 5G equipment to more than 99% of the population and geographical area of the republic, making it the first state in Europe to boast full 5G coverage. The network consists of eight macro sites operating in the 3.5GHz and 26GHz bands, while 5G small cells are also being installed to improve the signal in areas of greater demand. All of the sites are equipped with Massive MIMO technology, TIM says, while Nokia's end-to-end solution provides for the virtualization of all the mobile network components, including radio access. TIM and Nokia are using the San Marino network as a test bed for future 5G equipment and services.



Korea Operators Turn on Commercial 5G Networks

SK Telecom (SKT), KT and LG Uplus simultaneously turned on their 5G networks at midnight on 1 December, launching what they claim are the world's first commercial 5G services based on 3GPP standards. But the services have limited coverage and are initially only available for businesses using mobile routers, with the operators planning to target consumers with nationwide coverage in March as 5G handsets become available. SKT said its 5G network now covers the main areas of 13 cities and counties, including Seoul and four cities in Gyeonggi-do. The first call over SKT's commercial 5G network was made by CEO Park Jung-ho in Bundang, Gyeonggi-do to manager Park Sook-hee in Myeongdong using a Samsung 5G smartphone prototype. LG Uplus Vice Chairman Ha Hyun-hwoi made the first video call on its 5G network from a notebook PC connected to a Samsung 5G router in Daejeon Technical Centre to an office in Seoul. The operator said it installed 4,100 5G base stations and plans to roll out more than 7,000 by end-December,

with coverage expanding to 85 cities. KT didn't make an announcement, but Yonhap News Agency said it launched 5G service in parts of Seoul and the surrounding area. The company is recovering from a recent fire in a cable tunnel in Seoul, which caused a network blackout. Korea's Ministry of Science and ICT in July pushed for the operators to collaborate to "avoid

excessive competition" and ensure the country is the first to launch the next-generation technology. Since then, they have worked towards a joint commercial 5G launch. The country was one of the first to auction 5G spectrum, raising KRW3.61 trillion (\$3.2 billion) in a sale of 3.5GHz and 28GHz airways in June.



Telefonica Germany Opens Berlin 5G Cluster

Telefónica Germany has launched its "Early 5G Innovation Cluster" in central Berlin and is planning to test Industry 4.0 and enhance mobile broadband use cases in the coming months. The cluster spans five Nokia sites across the operator's network in Berlin-Friedrichshain. The sites use the Finnish vendor's 5G Airscale radio and Wavence Microwave technology, and will aggregate five carrier for download and two carriers for upload. The German opco said it wished to test 5G technology under real-life conditions and work with partners on specific use cases. It highlighted microwave technology's potential to provide backhaul for dense 4.5G, 4.9G

and 5G networks, by linking small cells to fiber access points. Cayetano Carbajo Martín, CTO of Telefónica Germany: "With our joint Innovation Cluster in Berlin we push the further development of 5G forward together. Nokia's portfolio will enable testing the newest technology to keep moving forward fast with 5G in our network." Detlev Otto, customer team head for Telefónica Germany at Nokia: "The 'Early 5G Innovation Cluster' with Telefónica Germany is an important item on our joint innovation agenda. The insights we will gain from this cluster, located in a dense urban environment, are going to help both companies in preparing for 5G

roll-outs and developing new services for Telefónica's subscribers." Earlier this year both companies signed a Memorandum of Understanding aimed at testing next generation network solutions. They previously held trials under lab conditions, hitting data rates of 2GBps with dual band technology by using Nokia's microwave solution, as well as carrier aggregation through the vendor's AirScale hardware. Telefónica Germany is in the midst of merging its E-Plus and O2 networks after buying the former in late 2014. In its latest update in June, it said it has upgraded tens of thousands of sites and is activating more than 100 new LTE sites per week.

Fixed-Wireless Dominates in First 5G Services Over 4G Replacement

The first 5G mobile service has been launched in the US by AT&T. However, the first 5G smartphones won't be available

until 2019. Fixed-wireless 5G, using the mobile network as a replacement for fixed broadband, appears to be attracting more

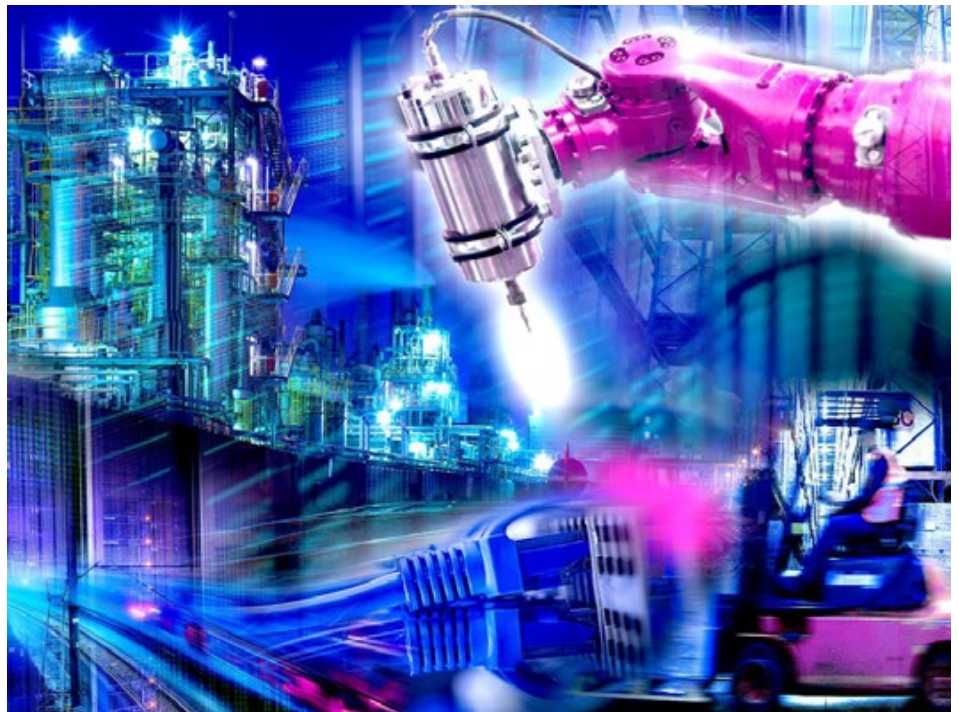
attention from operators in the initial service launches and trials.

DT to Build the 5G Factory of the Future

Production and logistics processes are increasingly being digitalized and automated. Industry 4.0 is the name given to this transformational trend in manufacturing industry. Deutsche Telekom is now further expanding its contribution and expertise in the Industry 4.0 context through its membership of the Center Connected Industry (CCI) to co-create with partners on new solutions for the factory of the future. The CCI comprises of scientific institutions and industrial companies of many sizes and branches. Membership is linked to the commitment of each partner to contribute resources to the community. Connectivity, starting with LTE and evolving to 5G, will be a key enabler to support industrial use cases and customers' needs. For this purpose, Deutsche Telekom will build a dual slice campus network combining public and private LTE at the RWTH Aachen site. The campus network will provide indoor coverage to the factory buildings, as well as outdoor coverage on the CCI site. The collaboration in the CCI will focus on the identification and development of new solutions and applications with the potential to increase productivity in customers' industrial environment. Based on the use case requirements and specifications of customers, solution prototypes will be jointly tested and implemented in the private campus environment until they are ready for production. For this, the production environment of the customer can be simulated, thus enabling the

efficient transfer of new solutions into the customers operations. "For a more flexible manufacturing capability in the smart factory of tomorrow, our industrial customers demand secure, reliable, high performance network solutions tailored to their specific needs," says Alex Jinsung Choi, Senior Vice President Strategy & Technology Innovation, Deutsche Telekom. "We look forward to a close cooperation with our partners in the CCI to research and co-create solutions, based on Deutsche Telekom's dual slice Campus Network technology, to enable digital and

automated operations." "We are pleased to welcome Deutsche Telekom as a member of the Center Connected Industry. The appropriate use of modern communication networks such as LTE and especially 5G will be a major competitive advantage for the data-driven, connected economy in the future. Together, we will not only explore the potentials of mobile industrial applications, but also make them tangible and usable in real pilots," says Christian Maasem, Director Center Connected Industry.



5G Will Reach 1.5 Billion Subscriptions by 2024: Report

5G networks are the next generation of mobile internet connectivity, offering faster speeds and more reliable connections on smartphones and other devices than ever before. 5G is expected to reach more than 40 percent global population coverage and 1.5 billion subscriptions for enhanced mobile broadband by the end of 2024. This will make 5G the fastest generation of cellular technology to be rolled out on

a global scale. The latest mobility report from Ericsson, a telecommunications giant, has revealed that 5G will be available to 1.5 billion people by the end of 2024. Key drivers for 5G deployment include increased network capacity, lower cost per gigabyte and new use case requirements. The report also projects that mobile data consumption will exceed 21 GB per month by 2024, almost four times the

consumption in 2018. The report reveals that the 5G subscriptions will directly impact the use of gadgets making up the IoT devices. Thus, with the advent of 5G networks, there will be a significant increase in the market for IoT devices. The market will grow exactly five times from 2018 to 2023, reaching 3.5 billion units, claims the report.

Small Cell Forum Promotes New Standards to Foster Open RAN, Avoid Fragmentation

Add yet another group to the chorus calling for open RAN standards. This time, it's the Small Cell Forum (SCF) that's calling for the cellular industry to adopt open air interface and networking standards to avoid fragmentation and ensure interoperability of equipment. Importantly, however, the SCF is addressing something that is central to the 5G architecture: small cells, which are moving from the periphery of the network to the heart of the network. As SCF puts it: "Densification absolutely requires an open ecosystem to make deployment of large numbers of cells cost-effective. These interfaces are the enabler of the innovation and price competition that comes when operators can select equipment from many suppliers." The group previously explained its positioning,

but this week, during a plenary meeting in Santa Clara, California, it put out a new call for the industry to prevent fragmentation. Of course, the move to open interfaces has been more advanced in the small cell layer than the macro network. The forum points out that several suppliers already offer architectures in which a number of small cells are clustered around a centralized, virtualized controller. But here's the problem, as explained by SCF's Tech Group Lead, Prabhakar Chitrapu, via email: "Split RAN/SC architectures have multiple (7 to be specific) options, as identified by 3GPP. Of these, 3GPP has focused on Option-2 (RLC-PDCP) and ORAN on Option-7.2 (PHY-PHY). Option-6 (PHY-MAC) is not being addressed by any of these organizations. SCF seeks to fill this gap." Furthermore,

Chitrapu said, PHY-MAC interface is important for the industry, because it is an interface that has been highly successful and implemented in the 4G world, where it is called FAPI and nFAPI. "It is therefore considered very important that we extend these interface specifications for 5G, as 5G-FAPI and 5G-nFAPI," Chitrapu said. According to Chitrapu, the difference between FAPI (functional application platform interface) and nFAPI (network FAPI)—also applicable for their 5G counterparts 5G-FAPI & 5G-nFAPI—is as follows: FAPI helps equipment vendors to mix PHY & MAC Software from different suppliers via this open FAPI interface. So, FAPI is an "internal" interface. On the other hand, nFAPI is a "network" interface and is between a Distributed Unit (DU) and Centralized Unit (CU) of a Split RAN/SC network solution. An open specification of this interface (nFAPI) will help network architects by allowing them to mix DU & CU from different vendors. The SCF acknowledged in a blog post last month that there's a risk there will be too many competing interfaces and work that was supposed to end fragmentation will actually contribute to it. The Telecom Infra Project (TIP) and the ORAN Alliance are two well-known efforts that are underway to build an open radio access system, and SCF says it has an extensive partnership program that includes several open RAN efforts, including ORAN and TIP. It's possible that efforts will converge, but in the meantime, SCF figures 3GPP standardization is the best way to ensure the end result is fully harmonized.



Qualcomm Unveils First 5G Smartphone Processor; First Devices Expected in H1 2019

Qualcomm has unveiled its first processor for 5G smartphones, the Snapdragon 855 Mobile Platform. In addition to multi-gigabit broadband speeds with the 5G modem, the device upgrades again the on-device AI, extended reality and camera

opportunities and supports new features such as advanced gaming and in-display fingerprint readers. Samsung said it will use the platform to launch its first 5G devices in the first half of 2019.




Qualcomm Introduces New IoT LTE Modem

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processor



Integrated
GNSS



Hardened
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Qualcomm Technologies has unveiled its new Qualcomm 9205 LTE modem, purpose-built for IoT applications such as asset trackers, health monitors, security

systems, smart city sensors and smart meters, as well as a range of wearable trackers. Quectel is the first global provider scheduled to provide mobile modules

based on the new modem. Gemalto and Telit will also launch products based on the new modem in 2019.



EU Report Marks Progress on 5G Action Plan with 114 Trials Underway

There were 114 operator 5G trials underway in the EU as of mid-September, according to a 5G Observatory by iDate for the European Commission. The report

details the progress in developing the next-generation mobile networks, two years since the EU launched its 5G action plan. [📄](#)

BLOCKCHAIN

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ARTICLE

Blockchain-based Platform and its Opportunities for Telecom Operators



Alexander Yakovenko

Project Director
Bublestone



The use of blockchain technology becomes increasingly widespread as people across multiple industries seem to be finding ways to leverage the power of the blockchain for applications that provide solutions to real-world problems. Blockchain technology is needed wherever there is a question of mistrust between the parties and traditional solutions revolving around the implementation of a central authority to assure trust seems to be ineffective. The parties want to establish rules of interaction that exclude any intermediators and ensure that these rules will be strictly followed.

Blockchain technology is needed wherever there is a question of mistrust between the parties and traditional solutions revolving around the implementation of a central authority to assure trust seems to be ineffective. The parties want to establish rules of interaction that exclude any intermediators and ensure that these rules will be strictly followed.

This blockchain-based trustless environment promises substantial benefits to many industries. The world of telecom is no exception.

Roaming is obsolete

International roaming requires prohibitive expenses for telecoms and subscribers all over the world. Collaboration between mobile operators from different countries to make roaming possible involves huge expenditures on infrastructure support. In fact, the provision of services to a network subscriber in another network requires complex interactions between various pieces of the providers' equipment.

How exactly can telecommunication companies benefit from blockchain?

Thanks to blockchain technology, operators can fundamentally redefine the roaming rules and significantly reduce costs on technical, commercial and legal levels. Now even the smallest mobile operators can get access to the global telecommunication services market and provide services at the same level as large operators. Large operators, in turn, can expand their client bases.

Blockchain implementation into the telecom industry means building a decentralized ecosystem that allows mobile network operators, and service providers to interact securely and directly. Within this system mobile operators' interactions are conducted through smart contracts – computer protocols that allow the performance of credible, trackable and irreversible transactions without any third parties.

Bubbletone platform

Blockchain implementation into the telecom industry means building a decentralized ecosystem that allows mobile network operators, and service providers to interact securely and directly. Within this system mobile operators'

interactions are conducted through smart contracts – computer protocols that allow the performance of credible, trackable and irreversible transactions without any third parties. This is exactly what Bubbletone is working on.

The Bubbletone team is building a platform based on a Graphene blockchain core. Developed specifically for the telecommunication industry, the system is focused on professional market players, such as mobile operators, software developers, content and other service providers, and represents a global marketplace where participants can offer and purchase services, as well as resell them to their own clients, i.e. interact directly, without any intermediaries. Incorporation of participants into the platform doesn't require any hardware customization or advanced integration processes.

Operators can interact with each other as equal partners. All settlements between operators are greatly simplified, made using SDR tokens, which are tied to a basket of five currencies, and performed instantly.

PoC

Bubbletone has been conducting a proof of concept (PoC) with mobile operators worldwide. PoC is a demonstration, the purpose of which is to verify that the concept has the potential for real-world application.


Implementation of PoC is a complex process. For the main use cases, which are the most claimed by operators, PoC can be described in the following simplified way: a

video demonstration that shows how the platform works; provision of two SIM cards with an embedded Multi-account SIM applet to the operator; providing access to two testing nodes for the operator on Bubbletone's servers; conduction of tests, including publishing offers on the blockchain platform and filling out necessary data in the web account; and downloading of mobile profiles onto SIM cards and checking out their registration in the network of the operator; deployment of two testing nodes on the operator's servers and conduction of tests.

If the PoC is completed successfully, Bubbletone and the operator launch a pilot project. The use cases that are being developed by the Bubbletone team can be used as a basis of this project as these use cases are the most claimed by mobile operators. However, the project is also focused on any operators' specific requirements so any other use cases can be implemented. The Bubbletone use cases available here: https://wiki.blockchaintele.com/index.php/Use_cases

Disruption is coming

Blockchain technology has a real potential to disrupt the telecom industry and leave expensive roaming agreements behind. Moreover, the technology is ready for use.

We invite all those mobile operators and service providers who want to bring significant changes to the industry and are interested in seeing evidence of the blockchain capability to participate in PoC. More information available at <https://blockchaintele.com/>. 

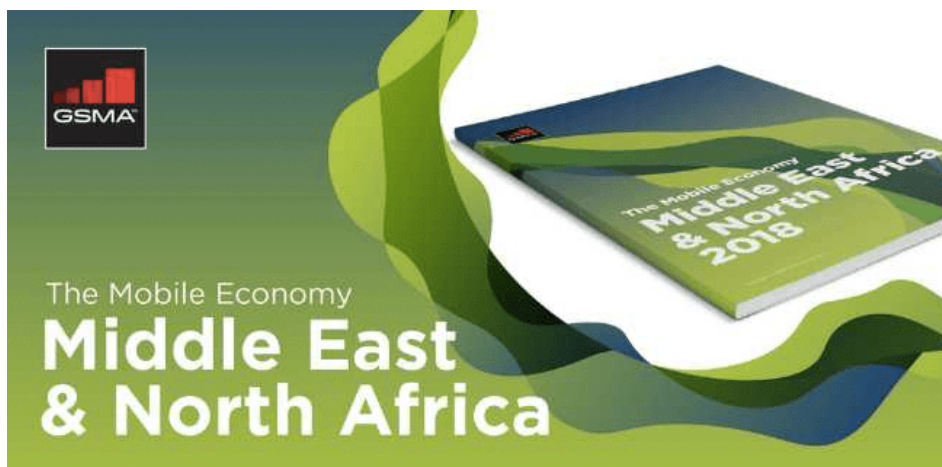
REGULATORY NEWS

Mobile Operators across Middle East Set for Global 5G Leadership

The Gulf Cooperation Council (GCC) Arab States are set to be global leaders in the deployment of 5G networks, with all six markets expected to launch 5G mobile services in the next two years, according to two new reports released today at Mobile 360 Series – MENA. The reports from GSMA Intelligence – ‘The Mobile Economy: Middle East and North Africa 2018 2’ and ‘5G in MENA: GCC operators set for global leadership’ – highlight that pioneering mobile operators in the GCC Arab States are expected to launch 5G networks commercially from 2019, driving innovative new services across the region and spurring future growth. By 2025, 5G will account for 16 per cent of total connections in these markets. “Backed by proactive government support, mobile operators, particularly in the GCC Arab States, have been quick to establish the foundations for global leadership in the deployment of 5G technology, moving rapidly from trials to early commercialization,” said John Giusti, Chief Regulatory Officer, GSMA. “While we are encouraged by their progress to date, it is imperative that the region’s governments create a regulatory environment that allows 5G to flourish, including releasing sufficient spectrum, so that businesses and citizens can fully enjoy the innovative new services that 5G will deliver, as well as the resulting socio-

economic benefits.” The reports encourage policymakers to establish spectrum roadmaps that commit to releasing sufficient quantities of spectrum across all frequency ranges to enable operators to meet coverage and capacity. They further note that governments should implement taxation policies that could improve affordability and boost digital inclusion, and adopt an approach to license renewals that enables operators to make long-term investment decisions rather than maximizing government revenue. There are currently 381 million unique mobile subscribers (Q2 2018) across the MENA region, accounting for 64 per cent of the population.³ However, it is a diverse region in terms of market maturity, encompassing the advanced GCC Arab States, where 77 per cent of the population on average are mobile subscribers, alongside other North African countries such as Comoros, Djibouti and Somalia, where subscriber penetration is below 30 per cent.⁴ Between 2017 and 2025, the MENA region as a whole will see the fastest subscriber growth rate of any region except Sub-Saharan Africa, growing to reach 459 million or 69 per cent of the population. The number of smartphone connections across MENA stands at 332 million as of Q2 2018, accounting for just over 50 per cent of total connections in the region.

This is expected to continue growing at an average annual rate of 8 per cent to reach 587 million smartphone connections by 2025, or just under three-quarters of total connections across the MENA region. The UAE remains a global leader in terms of smartphone adoption, second only to Singapore, with smartphones accounting for 85 per cent of total connections. High mobile broadband usage and smartphone adoption has also resulted in more people across the region using data services such as IP messaging and using their mobile phones to watch online video. The reports highlight how operators will offer enhanced mobile broadband services in early 5G deployments, while applications and services for enterprises will be introduced later. There will be significant opportunities for operators across new consumer-oriented services such as immersive reality, eSports and enhanced in-venue digital entertainment at stadiums and music venues, for example. Further, video consumption on mobile devices will evolve to include newer augmented reality and virtual reality applications that will make content even more immersive and data intensive. In 2017, the mobile industry contributed approximately \$165 billion to the MENA region’s economy, equivalent to 4 per cent of GDP. This contribution is expected to increase to over \$200 billion by 2022 as countries in the region benefit from improvements in productivity and efficiency brought about by increased take-up of mobile services. The mobile ecosystem also supported more than 1 million jobs in 2017, which includes workers directly employed in the ecosystem and jobs indirectly supported by the economic activity generated by the sector. Further, the mobile industry made a substantial contribution to the funding of the public sector, with more than \$17 billion raised in 2017 in the form of general taxation.



Spectrum Move Tipped to Speed 5G in Arab Nations

The Arab Spectrum Management Group pledged to release the entire 3.4GHz to 3.8GHz spectrum range for mobile broadband services across the 22 countries it represents, a move hailed for helping accelerate 5G rollout. In addition to the

common allocation across the region, the 3.3GHz to 3.4GHz range will be used for mobile broadband services in areas where the bands aren't currently being used by other parties. The policy was praised by mobile industry group the GSMA for help-

ing "Arab Nations make the right moves for 5G leadership". Arab Spectrum Management Group Chairman Tariq Al Awadhi said: "The 3GHz spectrum range is one of the first resources to be used by 5G all over the world. This will be an important backbone for next-generation services in Arab countries, allowing them to continue to play a leading role in developing 5G." GSMA head of spectrum Brett Tarnutzer added: "Taking the right steps to support the timely release of spectrum will ensure that Arab nations will be amongst the first in the world to offer 5G services." The Arab Spectrum Management Group represents the 22 states commonly referred to as the Arab nations. Several of these countries are already making huge strides towards 5G with early rollout already claimed by operators in the UAE, Saudi Arabia and Qatar during May. Within the next two years all six members of the Gulf Cooperation Council are expected to have 5G services available, a GSMA study released last month forecast.



Ofcom Begins Consulting on Plans to Offer 700MHz, 3.6GHz-3.8GHz Spectrum

The UK's telecoms industry watchdog Ofcom has announced the launch of a consultation in which it is seeking views on its proposals for the award of spectrum in the 700MHz and 3.6GHz-3.8GHz bands. In terms of the key plans, the regulator has said it is preparing to offer up a total of 200MHz of spectrum, split across the 700MHz band (80MHz) and 3.6GHz-3.8GHz band (120MHz). With Ofcom having said it is aiming to have concluded an auction by 'spring 2020', it noted that it expects 700MHz frequencies to be available for mobile use by June 2020, and while it said 3.6GHz-3.8GHz should also be useable by that same date, it noted that 'some

localized constraints may remain in place until the end of 2022'. Meanwhile, in terms of Ofcom's other key proposals, the watchdog intends to: conduct an auction to award national licenses for spectrum in the aforementioned bands; offer discounts on auction prices for any two bidders committing to substantial coverage obligations; use a combinatorial clock auction format; implement a cap of 416MHz (37% of the total) on the cumulative spectrum for mobile services held by any winner in the auction; and consider potential options to facilitate rearrangement of fragmented holdings of spectrum in the 3.4GHz-3.8GHz band.

Ofcom
making communications work
for everyone

Award of the 700 MHz and 3.6-3.8 GHz spectrum bands

CONSULTATION:
Publication Date: 18 December 2018
Closing Date for Responses: 12 March 2019

3GPP Approves Work Item to Bring 5G NR into Unlicensed Spectrum

3GPP agreed at its meeting in Sorrento, Italy, this past week to start a work item dubbed NR-U, which will define how 5G New Radio is introduced in unlicensed spectrum. The work item covers five scenarios with functionalities such as Carrier Aggregation (within one eNodeB), dual connectivity (across two eNodeBs), LTE anchor in licensed spectrum, 5G NR anchor in licensed spectrum, uplink only in licensed spectrum, downlink only in unlicensed spectrum as well as standalone operation, explains Lorenzo Casaccia, vice president of Technical Standards at Qualcomm Europe, in this blog. It's the standalone operation that is particularly interesting. "To me, it was exciting because

it's really the first time for 3GPP ... to start the project to define a 3GPP technology" that uses unlicensed spectrum, he told FierceWirelessTech. Operators still prefer licensed spectrum because it gives them more control over the quality of their services, but unlicensed is increasingly becoming a part of the operators' spectrum toolbox. Operators report big speed boosts after introducing LAA, a 3GPP Release 13 technology that uses carrier aggregation in the downlink to combine LTE in unlicensed spectrum (5 GHz) with LTE in licensed spectrum. Casaccia suggests that the ability to operate 5G NR standalone in unlicensed spectrum could lead to local private 5G networks

dedicated for a specific application such as industrial IoT or mobile broadband for enterprises, or it could provide an avenue for service providers, like cable operators and ISPs or neutral host service providers in public venues such as sports stadiums and malls. But it's also about enabling new use cases that have yet to be envisioned. "I don't know all the opportunities" that are possible, he said. "I see it more as an enabler to bring cellular into future opportunities that I don't know about." Of course, 5G in unlicensed spectrum will still need to coexist with Wi-Fi and the Wi-Fi community no doubt will be watching this development closely. But given that the same companies in 3GPP are also involved in efforts like the MulteFire Alliance, which spearheaded the introduction of LTE in unlicensed spectrum without requiring an anchor in licensed spectrum, a lot of the lessons learned should transfer to the 5G work. The NR-U work item that was just approved by 3GPP supports both the existing 5 GHz unlicensed band as well as the new "greenfield" 6 GHz unlicensed band, according to Casaccia. The FCC in October advanced moves to make up to 1200 megahertz of spectrum available for use by unlicensed devices in the 6 GHz band (5.925-7.125 GHz), and the agency just granted (PDF) Qualcomm the authority to perform 6 GHz building attenuation measurements in support of the pending FCC rulemaking.



Telia, Tele2, Telenor Secure 700MHz Spectrum

Sweden completed the first stage of an auction of 700MHz spectrum, raising SEK2.8 billion (\$310 million), with Telia and a joint venture of Tele2 and Telenor emerging as the winning bidders. In a statement, the country's Post and Telecom Authority (PTS) said stage one has now concluded after 46 bidding rounds. Stage two of the process, will decide Telia's and joint venture Net4Mobility's placement in the band. Hutchison-owned Hi3G Access, which also participated in the auction, failed to win any frequencies. The company had earlier filed a legal appeal against the auction terms. A total of 40MHz has been

assigned, with Telia winning one licence covering 2x10MHz, for a total of SEK1.4 billion. Net4Mobility secured two licences of 2x5MHz priced at SEK720 million each. PTS had set a reserve price of SEK50 million per 5MHz. In a joint statement, Tele2 and Telenor confirmed that on the back of securing the spectrum, it signed a complementary agreement for a joint nationwide 5G rollout scheduled to begin in 2019. The refreshed partnership means its shared mobile network will be expanded by more than 50 per cent, resulting in "thousands of new base stations across Sweden" for its existing 4G network and

future 5G plans. It said it will publish a detailed plan early in 2019. Net4Mobility was formed by the two operators in 2009. Telia said in its own announcement it will also use the spectrum for 5G and to connect parts of the country that are underserved. "The frequency that we have acquired is connected to a coverage obligation and we will continue to aim at having Sweden's by far best quality and coverage. It also gives Telia the possibility to position ourselves with nationwide 5G services," said Anders Olsson, CEO of Telia Sweden.

DoT Rejects RCOM Spectrum Sale

India's Department of Telecommunications (DoT) has rejected the planned sale of spectrum rights by Reliance Communications (RCOM) to Reliance Jio Infocomm (Jio) after the latter requested reassurances that it would not be held liable for spectrum dues, the Economic Times reports. The transaction was negotiated in late 2017 and is central to RCOM's plan to pay dues of INR5.5 billion (USD77.8 million) to equipment manufacturer Ericsson. However, legal difficulties and disagreements with the DoT have delayed the sale, resulting in RCOM missing several deadlines for its payment to the Swedish vendor, the final deadline for which had been set at 15 December 2018 with the

threat of insolvency proceedings in case of non-payment. The main sticking point for the DoT has been the submission of bank guarantees to cover the spectrum usage charge (SUC) of INR29.5 billion, with cash-strapped RCOM unable to provide guarantees for that amount. The DoT was instructed last week by the Supreme Court to accept a corporate guarantee of INR14 billion along with real estate assets from an RCOM subsidiary in lieu of the bank guarantee. DoT accepted the ruling, but said paperwork had prevented it from complying with the order prior to RCOM's 15 December deadline. On Friday (14 December), though, Jio had submitted a letter to the DoT seeking assurances that

it would not be held liable for RCOM's past dues related to spectrum. The current regulations for spectrum trading stipulate that the buyer is, indeed, liable for dues that had not been recovered from the seller and as such, the DoT said it could not approve the transaction with the conditions stipulated by Jio. A senior DoT official was quoted as saying: 'The trading rules clearly say DoT can ask either the operators or any one of them to pay the dues. Since Jio has imposed conditions, we cannot accept it [the deal] as it goes against the guidelines. Now the ball is in their court. They have to decide and come back to us. Till then, this deal is off the table'.

ACCC Begins Consulting on Access Conditions for Telstra's Regulated Fixed Line Services

A public inquiry into making final access determinations (FADs) for Telstra's six fixed line services and for wholesale ADSL

has been launched by the Australian Competition and Consumer Commission (ACCC). In a press release regarding

the matter, the regulator said this initial consultation was seeking submissions on issues concerning the next FAD, saying it hopes to hear from stakeholders about a range of factors that can influence the cost of providing the fixed line services. In addition, the ACCC has said it intends to explore whether existing FAD prices should be continued, while it will also consider the structure and term of this arrangement. Responses are sought by 25 January 2019, following which the regulator aims to release a more detailed consultation and position paper in February 2019, to which submissions will be due by 31 March 2019. Commenting, ACCC commissioner Roger Featherston was cited as saying: 'Our inquiry will consider the terms and conditions that should be covered in the FAD, including the prices for the services and non-price terms and conditions of access.'



Berec to Update Net Neutrality Guidelines for Zero-Rating Cases

The EU's net neutrality regulation and the guidelines to regulators issued by Berec are working well, according to an

evaluation by Berec, the assembly of national telecom regulators in the EU. However, the regulators agreed that more

clarification is needed in certain areas, such as zero rating, and updated guidance will be issued in 2019.

ACCC Raises Concerns over Vodafone-TPG deal

Having taken an initial look at the proposed merger between domestic telcos Vodafone Australia and TPG Telecom, the Australian Competition and Consumer Commission (ACCC) has expressed preliminary competition concerns over its potential impact on both the mobile and broadband markets. In summary, the ACCC has published its statement of issues which sets out its concerns and specifically highlighted the possible impact of the deal on TPG's activities in the mobile arena and Vodafone's efforts in the fixed broadband market. With TPG currently building out its own mobile infrastructure, ACCC chairman Rod Sims noted: 'Our preliminary view is that TPG is currently on track to become the fourth mobile network operator in Australia, and as such it's likely to be an aggressive competitor ... We therefore have preliminary concerns that removing TPG as a new independent competitor with its own network, in what is a concentrated market for mobile services, would be likely to result in a substantial lessening of competition.' According to the ACCC's initial assessment, should TPG remain separate from Vodafone it would likely need to adopt an aggressive pricing strategy for its mobile services, whereas if the tie-up moves ahead it would not have 'the incentive to operate in the same way', with competition in the mobile market reduced as a result. Meanwhile, the watchdog has said it plans to closely examine the impact of removing Vodafone as a competitor in the fixed broadband market, with Mr. Sims noting: 'Although

Vodafone is currently a relatively minor player in fixed broadband, we consider it may become an increasingly effective competitor because of its high level of brand recognition and existing retail mobile customer base.' The ACCC now plans to consider the longer-term impact of the proposed merger – given the likelihood of increased take-up of mobile broadband services in place of fixed home broadband services in the future – and as such, it has invited submissions from interested parties on its statement of issues. With a deadline of 18 January 2019 set for feedback, the regulator expects to issue a final decision regarding the proposed merger on 28 March 2019.



EU Communication Rule Overhaul Gets Final Clearance

The European Council gave final sign-off on the EU's new Electronic Communications Code, which imposes price caps, tougher security procedures and spectrum allocation rules the council stated will enhance 5G deployment. Its clearance was the final hurdle to implementing the new code, which will become legally valid from 20 December with operators given set

timescales to comply to specific elements. All three EU legislative bodies cleared the code despite protests from industry groups and criticism about a number of measures. Among the measures imposed are minimum spectrum license awards of 20 years in EU countries; legislation to ensure "universal internet access"; new rules around emergency service calls; and

international call caps within the EU of €0.19 per minute and €0.06 per text message. New rules also apply to companies previously outside of communications legislation, but providing services over the internet including messaging services Skype and Facebook brand WhatsApp. To reflect the new rules, the remit for EU regulator BEREC has been updated. In a tweet, European Commission VP for the Digital Single Market Andrus Ansip (pictured) said: "These new rules respond to the needs of today and tomorrow, and create an investment and competition-friendly environment which will lay the groundwork for 5G across Europe." The Electronic Communications Code has been in the pipeline since 2016 and has attracted a number of criticisms during the legislative process, notably for the minimum length of spectrum awards and the amount of power given to regulators. In June, the GSMA described the proposed legislation as a "political compromise" which could "hinder networks in Europe."



EU Ministers Fail to Break Digital Tax Deadlock

European Union finance ministers failed to agree a tax on digital revenues, despite a last minute Franco-German plan to salvage the proposal by narrowing its focus to companies like Google (GOOGL.O) and Facebook (FB.O). The European Union's executive arm proposed a 3 percent tax on big digital firms' online revenues in March, alleging the companies funneled profit through states with the lowest tax rates. The tax requires the support of all 28 EU states, including small, low-tax countries like Ireland which have benefited by allowing multinationals to book profits there on digital sales to customers elsewhere in the European Union. The setback is a blow to French President Emmanuel Macron, as his government had invested considerable political capital in the tax. It is also seen in Paris as a useful example of joint European action before EU parliament elections next year. In the original European Commission proposal, the tax was intended to be a temporary "quick fix" until a broader solution could be found among OECD members. But this was opposed by Ireland and some Nordic countries, leading French and German finance ministers to focus solely on online advertising revenues instead. While this met with misgivings and outright opposition from at least four

other ministers at a meeting in Brussels, they agreed to keep talking, said Austrian Finance Minister Hartwig Loeger, whose country holds the rotating EU presidency. A broader turnover tax on firms with significant digital revenues in Europe would have hit companies such as Apple (AAPL.O) and Amazon (AMZN.O) harder, but the Franco-German proposal would not cover data sales and online marketplaces. "I continue to have strong principled concerns about this policy direction," Irish Finance Minister Paschal Donohoe told his EU counterparts in a debate on the tax. U.S. lawmaker Kevin Brady, chairman of the tax-writing Ways and Means Committee in the House of Representatives, welcomed the failure of the proposal, calling the tax a "revenue grab" aimed at an industry dominated by American firms. "Rather than pursuing measures like this that would result in double taxation," he said, "countries should continue working together through the OECD framework on the important global dialogue regarding the digital economy." Companies with big online advertising operations like Google and Facebook would be most affected by the Franco-German proposal as they make up the majority of the market in Europe. Under this proposal, the tax would

not come into force until January 2021, and only if no international solution has been found. Paris and Berlin proposed that it expire by 2025 in a move aimed at appeasing concerns that it may become permanent. The Austrian presidency has been trying to reach a deal on the tax by the end of the year, while the Franco-German proposal calls for a deal by March. "Don't expect us to solve the challenge of a generation in a couple weeks or months," French Finance Minister Bruno Le Maire said, adding the Franco-German proposal could still yield a deal. German Finance Minister Olaf Scholz said tax receipts generate by the proposed Franco-German tax would be small, noting a similar tax planned by Britain was expected to raise around 500 million pounds (\$641 million).



Thailand to Introduce IoT Regulations Next Year

Thailand's National Broadcasting and Telecommunications Commission (NBTC) plans to introduce a series of regulations governing the Internet of Things next year, ahead of the commercial arrival of 5G. Earlier this year, the regulator established a committee to draft a regulatory framework for IoT and connected devices,

the Bangkok Post reported. This committee has been exploring initial regulatory conditions across five categories, covering numbering and identification, spectrum and technical standards, transmission and competition permissions, security and privacy, as well as data collection and interoperability. But the report noted that the design of the regulation will depend on the final shape of the planned Personal Data Protection Law, which will be used to determine what kind of data can be collected and used for the purpose of furthering the public interest. The NBTC board recently approved the use of IoT devices in the 400-MHz spectrum range, specifically for smart meter connectivity in the utilities sector. Last year, the regulator also assigned the 920-MHz to 925-MHz spectrum range for unlicensed IoT connectivity. In terms of numbering, an NBTC committee recently agreed in principle to use a 15-digit numbering scheme, in line with standards developed by the ITU. Regulations governing numbering and identification will cover numbering fees, registration for usage, number portability and other related matters, the report states.



TRAI Weighs-In On New Minimum Recharge Plans

The Telecom Regulatory Authority of India (TRAI) is taking measures to protect customers after receiving complaints regarding Bharti Airtel and Vodafone Idea's plans to remove low activity users from their networks, the Economic Times reports, citing letters sent by the regulator to the two cellcos. In a bid to increase ARPU's by removing subscribers that generate little to no revenue, the two cellcos have introduced minimum recharge pre-paid packs which block outgoing calls after 30 days – and incoming calls after 45 – even if the subscriber still has credit on their account. As such, the plans require customers to top-up regularly or lose their credit, either increasing the revenue generated by these users or removing them from their networks. According to the paper, the minimum recharge packs target

customers that maintain the minimum balance on their pre-paid account so that they can receive calls but do not make outgoing calls. In its notice, the TRAI explained that it had received a 'large number of complaints regarding SMS being received by [customers] to mandatorily recharge their pre-paid accounts in order to continue to avail services, even though their pre-paid accounts have sufficient balance'. After a meeting with the operators the TRAI is now reviewing their inputs and has instructed the duo in the meantime to inform subscribers in a clear and transparent manner the data on which the validity of their existing plan would expire. Airtel and Vodafone Idea were also instructed to inform customers how they could opt for available plans, including the minimum recharge plan, using their

available balance. In addition, the watchdog instructed the pair not to disconnect SIMs of users with a balance equal or greater than the minimum recharge amount. Responding to a query from the Economic Times, a Vodafone Idea spokesperson commented on the new plans: 'Catering to the evolving market dynamics, Vodafone Idea has radically simplified its pre-paid plans to enhance customer convenience. These new integrated pre-paid plans, available in a range of price points, offer bundled talk-time and tariff, making them easier to understand and use. These plans have been rolled out across all circles and we are actively communicating with customers, informing them of the changes and helping them avail these new plans.'

Bangladesh Based Robi Returns to Profitability

Robi bounced back to profitability in the third quarter of the year after seven straight quarters of losses, helped by the sell-off of its 20 percent stakes in the telecom infrastructure provider edotco Bangladesh. Between the months of July and September, the mobile operator, which is Bangladesh's second biggest, logged in a net profit of Tk 310 crore. This is the first quarter in which Robi was in the green after its industry-shaping merger with Airtel in November 2016. Robi sold 20 percent of its shares in edotco Bangladesh to Axiata Group for about \$120 million, the payment for which was received in September. The one-off payment dragged Robi to

profitability. Robi's operating losses have come down after their service level has increased following the merger, he added. The operator's service revenue increased 9.1 percent year-on-year, according to the financial report of Axiata Group, its parent company. During the quarter, Robi's gross revenue was Tk 1,751.85 crore, 25 percent of which came from the data segment. The data revenue soared 31 percent, thanks in part to the roll-out of 4G service in February. Robi has 4.68 crore active mobile connections, 40 percent of which are using smartphones. More than 60 percent use data. During the quarter Robi's earnings before interest, tax, depreciation and

amortization also increased 31.1 percent to Tk 468.80 crore thanks to the windfall from edotco stake sell-off. The EBITDA growth was driven by lower material cost and reduction in the interconnect charges from the second week of August. The regulator has also introduced a unified floor rate regime under which the floor rates applicable to on-net and off-net voice tariffs were unified at Tk 0.45. This gave a boost to the average revenue per user, which rose to Tk 122 per month during the quarter from Tk 117 in the previous quarter.

Telecel Struggling with License Fee Repayments

Zimbabwean mobile operator Telecel is reportedly struggling to keep up with the repayments on its USD137.5 million license renewal fee, which it is paying in instalments until December 2020. A report from TechnoMag says that it owes USD25 million after missing the repayments which were due at end-2017 and in June 2018. The report suggests that the Zimbabwe

government, which owns 60% of Telecel, could use the situation to dilute the 40% interest held by co-owner Empowerment Corporation. The government is known to be seeking full control of Telecel so that it can then be sold off to a new investor. License renewal fees for Zimbabwe's three cellcos were due in 2013. Privately-owned Econet Wireless is thought to have paid the

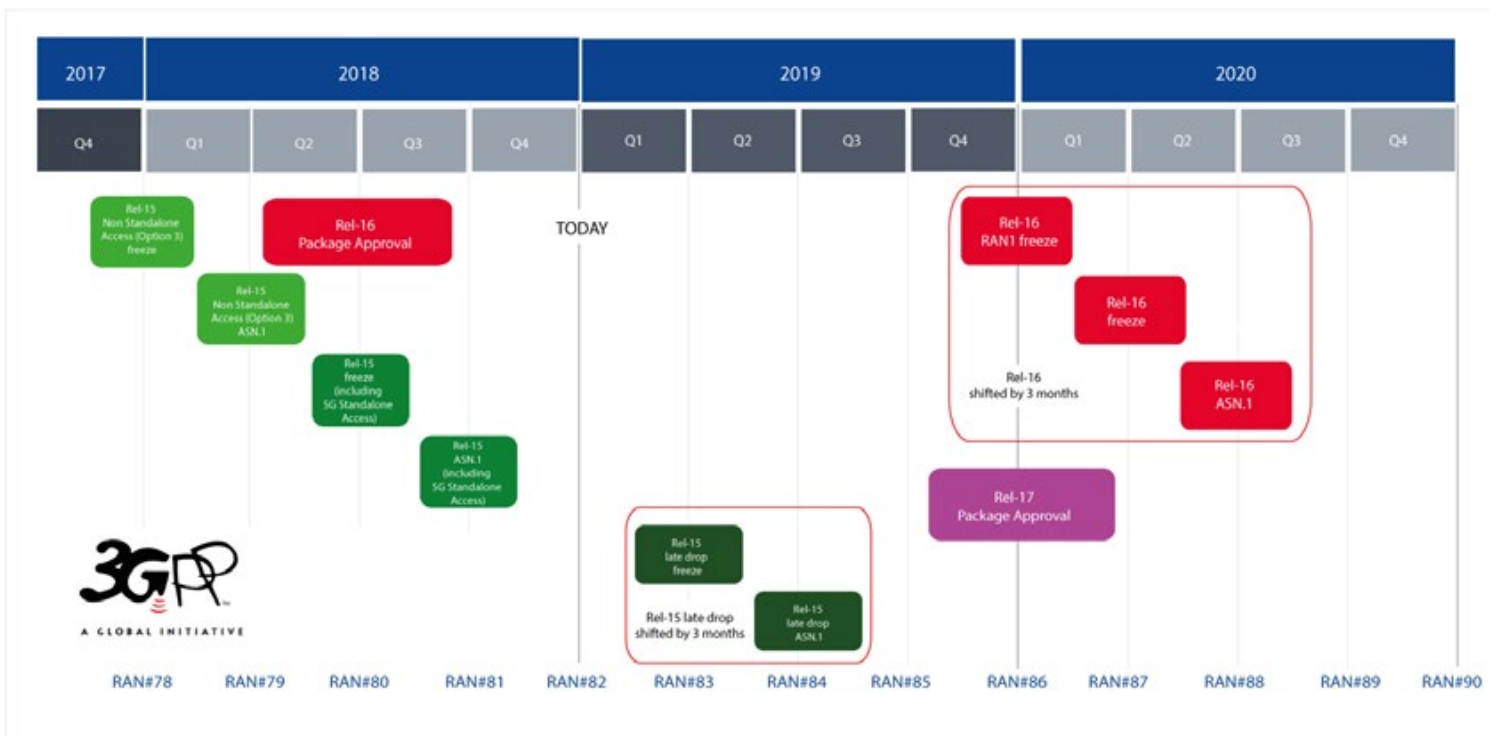
USD137.5 million in full, while both state-backed operators, Telecel and NetOne, were offered instalment plans. Telecel now controls less than 10% of the overall mobile market in subscriber terms, with its customer base falling steadily over the past few years.

3GPP Decides to Delay Release 16 by 3 Months

In what could be construed as a “surprise, no surprise,” 3GPP has decided to delay Release 16 by three months, so it’s now due for a freeze in March 2020 rather than December 2019. It’s a surprise—one commentator described as a “mini-bombshell”—because, well, it’s unexpected. But it’s also not surprising given the amount of work that has been going on in 3GPP with Release 15 and the sheer volume of change requests (CRs) falling on vendors’ doorsteps. 3GPP held its Plenary #82 meeting in Sorrento, Italy, this past week and toward the end of the meeting, Nokia’s Balazs Berternyi made the announcement that the Release 15 “functional freeze” will be delayed by three months, now due in March 2019, according to Peter Clemons, chief designer at Quixoticity Index, who posted it on LinkedIn. With 3GPP’s three-month cycle, that puts Release 16 back three months as well. “There’s a lot of sympathy in the room for all parties due to the massive work overload during R15, so hopefully lessons

will be learned & a better approach found for R16,” Clemons wrote. A similar vibe was observed by analysts at Signals Research Group (SRG). “Given the tremendous workload which the RAN working groups faced with Release 15 and the issues that arose from trying to complete the tremendous workload in a short amount of time, there was very little controversy or debate with the new schedule,” SRG wrote in its Signals Flash note. “The only debate pertained to how this delay will impact the ITU-R submission for IMT-2020 status. There doesn’t appear to be any real concern among the 3GPP delegates since there is belief the IMT-2020 schedule is somewhat arbitrary and open to change.” It’s also worth noting that the delay is not going to affect the first 5G commercial rollouts planned for early 2019. 3GPP completed the Option 3 architecture option, known as the non-standalone (NSA) version, in December 2017, which was six months earlier than originally planned. In June, 3GPP completed the standalone (SA)

version, which does not rely on LTE for the core. The delay is related to Options 4 and 7, which involves transitioning to the 5G core. Most early movers are doing NSA and not interested in doing SA until at least early 2020, according to SRG, which says operators don’t really need Options 4 and 7 until at least late 2019. Meanwhile, vendors are going to be busy implementing the many CRs that 3GPP just approved at its December meeting. The CRs basically address bugs not previously identified and reflect additional inconsistencies and unfinished items since the September meeting. SRG says there are also important enhancements that operators still want introduced into Release 15 and they require their own set of CRs, but SRG also noted that 3GPP made all the critical decisions that have hardware implications a long time ago and that’s why vendors were promoting 5G capable solutions even when 5G was far from finished. 📺





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a fully connected, intelligent world

A SNAPSHOT OF REGULATORY ACTIVITIES IN SAMENA REGION



First four day electronic-payment expo was held with collaboration of ATRA. The expo was organized in Kabul as per planned work of ATRA and further governmental and private banks, telecom and internet companies, telecom sector national tradesmen and service providers exhibited their products, devices, technologies and equipment in the expo. Engineer Ata Mohammad Yari spoke on behalf of ATRA and said, "e-payment has a significant role for transparency and expansion of economic activities of all

governmental and private sectors and service provision and also provides opportunity for the country to step towards stable economy". ATRA senior officials, government high ranking officials, local and foreign guests and a large number of media representatives participated the expo. It is worth mentioning that the expo would be open for the countrymen for four days to closely collect information on technology and e-payment service providing companies in the country. (December 19, 2018) atra.gov.af

Afghanistan



The Telecommunications Regulatory Authority (TRA) has published its latest Market Indicators Reports in the Kingdom of Bahrain, which measure the performance and development of the telecommunications sector. The reports include the Market Indicators in the Kingdom of Bahrain, the Arab Price Benchmarking Study and the Residential Market Survey. According to these reports, the Kingdom's telecommunications sector witnesses continuous competition and achievements in providing diverse and high-quality telecommunications services to residential and business users. The 2018 Arab Price Benchmarking Study stated that mobile services prices have fallen by up to 27% between 2017 and 2018 and up to 54% between 2013 and 2018. Fixed broadband prices have also fallen by up to 7% between 2017 and 2018 and up to 82% between 2013 and 2018. The decline in prices has resulted in providing telecommunications services to a large segment of citizens and residents in the Kingdom. This has increased the penetration rates of telecommunications services in Bahrain which have become among the highest rates globally. Bahrain is ranked 10th globally in mobile penetration rate (158.4%), 5th globally in mobile broadband penetration rate (147.3%) and 3rd globally for the percentage of internet users by (98%), according to the Global Competitiveness Report published by the World Economic Forum in October 2018. The decline in prices, has resulted in subscribers migrating to higher internet speeds. According to the reports, in 2017, 84% of fixed broadband subscribers were provided with internet speeds equal to or more than 10 Mbps compared with only 10% in 2013. Moreover, the use of internet data has also doubled seven times between 2013 and 2018. According to the latest Telecommunications Market Survey in the Kingdom of Bahrain, 83% of respondents

are satisfied with their overall mobile services in 2017 and 85% are satisfied with their overall broadband services in 2017. With regard to the telecommunications revenues, the decline in telecommunications services prices has significantly increased the number of subscriptions and the volume of usage, thus maintaining the sector's annual revenue at its level. According to the 2017 data, the telecommunications services revenue reached BD 426 million. Moreover, operators continue to invest in this sector to provide the latest technologies and best services as the investment volume reached BD 45 million in 2017, which indicates continuous investment and competition in this sector. "As part of its duties and powers, TRA exerts significant efforts to protect the interests of subscribers and promote an effective and sustainable competition between the operators. It also supports the execution of the Government's policy to maintain the Kingdom's position among the developed countries regionally and internationally in the main ICT indicators. This will highly recognize the Kingdom's economy as an economy capable of adapting to future changes." said TRA Acting General Director Sh. Nasser Bin Mohamed Al Khalifa. "TRA will continue to monitor and evaluate the performance and developments of the telecommunications sector and take the necessary measures to boost and develop it as it is an essential sector for the growth and development of other economic sectors to achieve the objectives of the Kingdom's Economic Vision 2030." Sh. Nasser added. (December 10, 2018) tra.org.bh

Bahrain

The Telecommunication Regulatory Authority (TRA) represented by its Cyber Security Directorate took part in the Regional Cybersecurity Week 2018 for the Arab Region organized by

the Communication and Information Technology Regulatory Authority of Kuwait (CITRA) from 21 – 25 October in Kuwait in cooperation with the International Telecommunications Union (ITU)'s Arab Regional Office and the Arab Regional Cybersecurity Centre (ARCC). During the Regional Cybersecurity Week, TRA was nominated to represent the Arab Region within the ITU-T Study Group 17 for Cyber Security which was mainly attended by delegates and representatives from Member States, Sector Members and Associates to the Study Group 17 in the region. TRA also participated in the 7th Regional Cybersecurity Summit that aims to address the best preventive strategies to counteract cyber threats and the 6th Regional Cyber Drill that aims to enhance communication and capacity building and boost emergency readiness and response to cyber threats and/or attacks. ITU-T Study Group 17 coordinates security-related work across all ITU-T Study Groups. Often working in cooperation with other standards development organizations and various ICT industry consortia, SG17 deals with a broad range of standardization issues. "The need and significance of Cybersecurity has become extremely essential and critical worldwide. TRA's participation in such cyber security-related events promotes the Kingdom of Bahrain's collaborative works towards global ICT security standards which conforms to the best practices of developing countries in the implementation of security standards." said TRA's Director of Technical and Operations Mr. Mohamed Alnoaimi. "We were able

to exchange information, ideas, solutions, and emerging practices that could improve cybersecurity posture, identify current priority areas in cybersecurity in Bahrain, explore and highlight new opportunities and controls within the security sector that enhance information security field." Mr. Alnoaimi added.

(December 4, 2018) tra.org.bh

Telecommunications Regulatory Authority (TRA) was announced winner of the "Excellence in HR – Employer of the Year" at the 2018 Future Workplace Awards. The Future Workplace Awards recognize the outstanding achievements of individuals, departments, teams or an organization that have contributed to the growth and development of the Middle East HR Industry. Sh. Mohamed Bin Salman Al Khalifa, TRA Director of Finance, IT & HR commented on the award stating "The TRA prides itself on its emphasis on career development and training. This award, which we are honored to receive, is further evidence of the TRA's commitment to its staff and what continues to make TRA an employer of choice." He further added "I would especially like to extend my thanks to the Human Resources team at TRA who have worked hard to see the initiatives through successfully and enabled TRA to develop a solid career development and training program, which focuses on the continued growth of its young cadres. TRA values fostering tomorrow's leaders and will continue to give its cadres the tools and knowledge to excel." (November 28, 2018) tra.org.bh



Bangladesh

Bangladesh Telecommunication Regulatory Commission on Thursday floated international tender for the installation of Telecom Monitoring System that would allow the telecom regulator to monitor live the mobile phone operators' service quality and revenue-related data. The tender was floated after the commission approved a proposal in this connection in November this year. The tender winning entity would be liable for designing and developing a complete monitoring system that would allow the commission to oversee network, voice and data traffic, call detail record, subscriber and services of the mobile phone operators. Integrating revenue reporting process and automated audit system in the proposed system in line with BTRC regulations would be included in the TMS along with development, deployment, acquisition and installation of required software and hardware to implement the proposed system. Bid winner would ensure the scalability of the system for future expansion aimed to incorporate all telecom operators. One year operation and two years maintenance of the system along with training of BTRC officials for efficient use of the system will be among other responsibilities of the entity. The offer of the commission also mentioned that two-stage tendering method would be following in awarding the job. To install such a system, the BTRC has already issued a directive to all the mobile phone operators to facilitate setting up of the monitoring system. It asked the operators to provide all required data to the online monitoring system. Besides, the commission instructed the operators to provide connectivity

to all required data and network nodes, including all types of call detail record, event data records and transaction detail record, intelligent network interconnection, recharging gateway, service nodes, mobile network portability gateway, HLR dump, provisioning gateway for subscribers, NodeB, RNC, eNodeB and value-added service usage logs. The mobile phone operators were also asked to provide connectivity with all types of price plan configurations dump, rated CDR, itemized bills, billing records and account balance dump. (December 22, 2018) newagebd.net

Bangladesh Telecommunication Regulatory Commission has allowed four internet protocol telephony service providers (IPTSP) to launch mobile phone application-based calling service amid concern about misuse of the service for international call termination. BTRC gave the entities the permission to run the service at a recent commission meeting with its acting chairman Md Jahurul Haque in the chair. The IPTSP operators which got approval for launching app-based calling service are: BDCOM Online Limited, Amber IT Limited, MetroNet Bangladesh and Link3 Technology Limited. Another IPTSP operator, Inter Cloud, has already launched its app-based calling service 'Brilliant Connect' upon receiving permission from the telecom regulator. Engineering and operation department of the commission in its observation said that allowing the IPTSP operators to launch app-based calling service would create scope for entering incoming international calls as on-net calls instead of traditional

calls through international gateway operators. Generation of such calls would affect the government's revenue earnings from the incoming international calls. In the context of rapidly falling international incoming calls, allowing the IPTSP operators to run the service might lead to further fall in the volume of such calls. As per the BTRC's statistics, the volume of incoming international phone calls was 383.23 crore minutes with a daily average of 12.36 crore minutes in May, 2015. The call volume, however, dropped to around 102 crore minutes in November this year with a daily average of 3.4 crore minutes. Mentioning about the security gap in identifying a customer, BTRC's E&O department also said that the IPTSP operators would use phone numbers of the customers as their identification, which would not be enough for identifying customers. In line with the commission's earlier stance regarding Inter Cloud's Brilliant, BDCOM Online Limited, Amber IT Limited, MetroNet Bangladesh and Link3 Technology Limited were allowed to run app-based calling service subject to compliance with 14 conditions. The conditions include the entities will have to submit Tk 5 crore in security deposit and any or full amount could be encashed by the commission if any violation of licensing conditions by the entities is detected by the commission. Besides, the operators will have to ensure that none can misuse the technology

in generating local or international calls by using virtual private network to dodge revenue of the government or any other entities. International call termination must be completed through IGW operators and ICX operators. Besides, the operators will have to take prior approval from the commission for offering any value-added service to their subscribers. (December 17, 2018) newagebd.net

The total number of Bangladesh's mobile phone subscribers reached over 156 million at the end of October 2018 with addition of 11.35 million new users in the first 10 months of this year, statistics of the country's telecom regulator showed recently. According to data from the Bangladesh Telecommunication Regulatory Commission (BTRC), the number of subscribers in the country reached 156.469 million in October. Bangladesh has four mobile companies, three of which are foreign-backed cellphone operators. The number of subscribers of the mobile operators, Grameenphone, Robi Axiata, Banglalink and state-run Teletalk stood at 72.005 million, 47.162 million, 33.809 million and 3.493 million respectively at the end of October, BTRC data showed. According to the statistics of the country's telecom regulator, the number of Bangladesh's mobile phone subscribers was 145.114 million at the end of last year. (December 11, 2018) en.ce.cn



Egypt

President Abdel Fatah al-Sisi delivered a speech at the High-Level Forum Africa-Europe in Vienna highlighting that the continent has achieved positive sustainable development rates over the past decade despite harsh conditions. "Yet, we haven't reached our targeted rates because of the difficult conditions in some African states, and the ascendance of terror groups, and foreign intervention," the President added. "We need to eliminate fear of the future felt by our youth. Digital transition and information technology are crucial to create the ecosystem necessary to attract investment and to boost creativity," the President affirmed. The President said that he aspires to build a fiber optic network that connects Europe and Africa. President Sisi stated that 60 percent of the African population whose size is 1.2 billion are below the age of 15, and that 12 million Africans enter the labor market annually. The President said that Egypt has developed a plan to raise awareness on digital transition. He added that the state is digitizing civil services, and municipal management. That is in addition to creating a digital platform to exchange governmental data (G2G) as part of a bigger project to achieve e-governance. The President said that Egypt has launched an initiative to manufacture electronics, and digitize cultural content. The country also established the National Academy for Information and Communication Technology for People with Special Needs. "Egypt has always been proud to belong to Africa," the President said highlighting that Egypt houses African Technology Innovation Lab (UNTIL) launched by the United Nations in July. It is located in the Technology Innovation and Entrepreneurship Center (TIEC) in Smart Village. The President

said that the project would improve the abilities of African technology researchers, and equip them to face international challenges, and meet the sustainable development goals of the UN 2030 Agenda and Africa 2063 Agenda. The President also shed light on African Initiative for Gaming and Digital Applications launched by Egypt to train 10,000 African youths over three years, and support the establishment of 100 companies in that field in Egypt and Africa. "Last month, we hosted the 11th edition of Cairo ICT 2018 Exhibition where public and private establishments met," President Sisi said. "Digitalization is a main goal on Africa 2063 Agenda since it is pivotal to develop an infrastructure that would connect the continent's countries together," the president added highlighting that the role of the telecom sector is essential to accomplish that goal. The president said that Africa needs an electronic network for education, and distance learning. "We need to create a generation that would lead digital transition, and be able to deal with cybersecurity and Artificial Intelligence," President Sisi stressed. The President added that it is important to facilitate insurance through regional and international entities, and that cooperation is needed in the sectors of ICT (Information and Communication Technology), renewable energy, and transport to facilitate the movement of goods and services within the continent. The president urged concerted efforts to face challenges embodied in climate change, global warming, and decreasing emissions saying that digital solutions may come up with creative solutions for those challenges. President Sisi concluded saying the bases for cooperation must be mutual respect, and equality. (December 19, 2018) egypttoday.com

Acting Executive President of the National Telecom Regulatory Authority (NTRA) Mustafa Abdel Wahed predicted that the 5G frequencies would be assigned to telecom operators in Egypt by the beginning of 2020. NTRA is currently studying economic and technical aspects of the new technology in accordance with the requirements and international standards, Abdel Wahed told a session on “telecom operators’ readiness to apply the

5G technology” within the Cairo International Exhibition and Conference on Information and Telecommunication Technology (Cairo ICT 2018). For his part, Minister of Communications and Information Technology Amr Talaat said the information structure is available to all citizens without discrimination, as well as to all state sectors to facilitate services.

(November 26, 2018) egypttoday.com



Jordan

In an explanation of the recent media coverage of the TRA's intention to license two new telecommunications companies in 2019, the TRA confirms that the companies mentioned will not provide mobile services. One of the licenses allows the company to install fiber optic cables while the second license allows the provision of security and Internet connectivity services with high capacities and multiple options. The Chairman of the Board of Commissioners, Eng. Ghazi Jabour, confirmed that the TRA has received an application for an individual license for the installation of fiber optic cables, which will enable the Company to provide public telecommunications services using scarce resources and will strengthen the Kingdom's position in supporting and providing Internet capacity services through fiber optic cables to countries Which contributes to the development of the capabilities of local telecommunications networks, which is directly reflected on the strengthening of the role of the Kingdom at the regional level in the export and transmission of digital capacities. Dr. Jabour pointed out that the second license is for obtaining a general class communication license to provide high-speed security and Internet connectivity services, which will ensure the availability of multiple options to participate in the network infrastructure of the licensed companies of the Authority. These services will provide various technical solutions in terms of technology and quality including It meets the different requirements of the business sectors and keeps abreast of the technological developments in the world, in addition to its added value to the national economy, expansion of the main sectors in the Kingdom, creating a new investment environment and creating new job opportunities. Contribute to speed up the process of digital transformation and upgrading new services in the Jordanian market. In order to create a regulatory environment for the introduction of modern services and technologies in support of small and medium enterprises, and where a number of investors have expressed interest in providing Internet services (IoT) in the Kingdom, the JABOR is currently studying and preparing Regulatory framework for licensing Internet service things. (December 19, 2018) trc.gov.jo

Oman, Sudan, Tunisia, Algeria, Libya, Iraq, Bahrain, Saudi Arabia and the United Arab Emirates, Kuwait, Qatar and Jordan with the participation of representatives from regional groups concerned with Spectrum Management, the Technical Secretariat of the Arab Ministers of Communications and Information Council, a representative of the International Telecommunication Union, the

General Secretariat of the Gulf Cooperation Council, In addition to the International Association of Mobile Operators (GSMA) and a representative of the European Broadcasting Union, and 30 companies including manufacturers, service providers and satellite communications management companies. The meeting aims to allow the Arab administrations to coordinate on all matters related to spectrum management, to negotiate and to develop joint Arab proposals for the agenda items of the next World Radiocommunication Conference (WRC) to be held every four years, as well as to assess the progress made in the studies on agenda items World Radiocommunication Conferences and the preparation of joint contributions to ITU-R meetings. In his speech at the opening ceremony, the Chairman of the Board of Commissioners of the Telecommunications Regulatory Authority (TRA), Dr. Ghazi Jabour, stressed that the meetings of this specialized team are of great importance because the defense of interests Despite the different priorities between countries and blocs, there are common and common factors common to countries in terms of their view of spectrum management, the most important of which is the right of each country to manage the spectrum in a way that is compatible with its national interests and sees fit So as not to interfere with uses in neighboring countries; and the regulations and regulations of the International Telecommunication Union constitute a reference in the allocation, coordination and compatibility of frequency uses internationally. Tariq Al-Awadhi, Chairman of the Arab Working Group on Frequency Spectrum, said that the Group is ahead of two important events in the preparatory meeting for WRC-2019 scheduled for February in Geneva as well as the World Radiocommunication Conference to be hosted by the Republic of Egypt Arab Summit in November 2019. The importance of this meeting is therefore to prepare for the 2019 conference by studying the agenda items of the next conference, discussing all its details and reaching unified Arab positions on these items. The representative of the Technical Secretariat of the Council of Arab Ministers of Communications and Information Dr. Reham said in her speech thanks to the efforts made by the members of the team over the past three years, and noted that as the World WRC-19 approaches, the real test of this effort is approaching the head of the team, And all the members of the team to follow up the different study groups in the radio sector and to determine the Arab position regarding each agenda item of the conference. It is worth mentioning that the “Arab Working Group on Frequency Spectrum” was established in 2001

by a decision of the Council of Arab Ministers of Communications and Information at the Arab University to strengthen cooperation in the field of spectrum management through the participation and exchange of views on Radiocommunication developments



The Communications and Information Technology Regulatory Authority of Kuwait confirmed the importance of adopting artificial intelligence and cloud computing techniques within government entities to contribute to the achievement of the vision's objectives (New Kuwait 2035). This came in a speech to the head of the Information Technology Sector at the Communications and Information Technology Regulatory Authority Mohammed Al-Tura, during a workshop organized by the Authority on the acceleration of digitization within the governmental entities within the country in cooperation with Microsoft Kuwait. Al-Tura said that digital transformation can be achieved only when governments abandon traditional processes and follow innovative ways of bringing people, data and processes into a single platform, pointing out that technology alone cannot change an entire model to overcome existing challenges. He added: "Our mission in the Authority is to accelerate digital transformation as quickly as possible by undertaking such initiatives and activities that will reinforce our progress towards this goal." He explained that the workshop dealt with the best various practices and the use of artificial intelligence technologies supported by smart cloud to enable government entities to take decisions and strengthen government processes. General Director Charles Nahhas of (Microsoft-Kuwait) stressed in his speech the need for government entities to continue to adopt cloud computing to be at the forefront by harnessing the power of technology to support the vision of (New Kuwait 2035) as the cornerstone of the overall government strategy. In his speech, Nahhas said it was interesting to see the digital transformation taking place in Kuwait as well as the synergy between government entities in adopting artificial intelligence and cloud computing to drive economic growth & improve citizen services. (December 19, 2018) citra.gov.kw

The Communication and Information Technology Regulatory Authority of Kuwait, confirmed the importance of integrating modern technologies into the work of the public and private sectors, thus contributing to the achievement New Kuwait's vision of 2035. This came in a speech by the Vice President Khaled Al-Kandari during the Regional Forum for Standardization and the ITU Forum on the Internet of thing (IoT), Smart Cities and Big Data, organized by The Communication and Information Technology Regulatory Authority of Kuwait in cooperation with the International Telecommunication Union (ITU). Vice President Mr. Khaled Al- Kandari stated that " This effectiveness coincides with ITU's 50th anniversary of the establishment of Regional Regional standardization teams, which is a testament to the importance of regional standards teams in issuing standards and technical standards and keeping abreast of technological

worldwide, Issues related to frequency management at the Arab level and World Radiocommunication Conferences.

(December 11, 2018) trc.gov.jo

Kuwait

development." He added that "75% of SMEs in Kuwait do not have websites and only about 20 percent of companies deal with cloud computing, which sets the public and private sectors before major challenges to become a digital economy-based society." "Today we are witnessing the Fourth Industrial Revolution, which is based on digital transformation techniques, which has become a major engine of creativity and innovation that is contributing to the renaissance of countries through the development of all public services, particularly education and health." Mr. Al Kandari explained. Mr. Al- Kandari said. "That the growth and increased use of technology means that we need to get up and running quickly to keep pace with the latest services and global developments in these areas" , adding " that one of our primary tasks is to optimize and regulate the telecommunications and information technology market to be based on positive competition." He said that the positive competition is based on developing and working to provide distinguished and modern services through a fast, secure and reliable telecommunications network. The establishment of the digital infrastructure and its optimal utilization in the field of innovation, development of the telecommunications sector, information technology, the development of appropriate regulatory policies to encourage investment and make Kuwait a gateway to communications and information technology in the region. He pointed out that the positive competition is also based on the use of open and large data to stimulate the growth of innovative services which will be translated through the successful solutions to reach an agreement on the appropriate recommendations to accelerate the pace of standardization in line with the pace of technological development. (December 17, 2018) citra.gov.kw

The Chairman of Kuwait's Communication and Information Technology Regulatory Authority (CITRA), Eng. Salem Al-Othainah, announced the launching of the first phase of the Kuwait Internet Interconnection Project (KCCI), which links all telecommunication networks operating in the country together. During Al-Othainah's speech at the Kuwait's Telecom Company, VIVA, 10th anniversary of its launch under the patronage of His Highness Sheikh Jaber Al Mubarak Al Hamad Al Sabah, Prime Minister and Minister of Commerce and Industry, Khalid Al-Roudhan. He mentioned that The Kuwait Internet Division aims to enhance the efficiency and quality of services offered to the public and to facilitate and provide the best means of linking the telecommunication networks operating in the country as a first stage. Al-Othainah confirmed that CITRA is seeking to develop this division in its second phase to include linking all networks operating in the Middle East and then starting its third phase

internationally, pointing to the Commission's keenness to make a qualitative leap in information exchange technology. The Authority has strengthened its presence locally and regionally since its establishment through partnerships with the major ICT institutions to transfer the best experiences, which reflected positively on the indicators of the state, added Al-Othainah. Al-Othainah pointed out Kuwait's progress in the ICT tracking index in 37 points over the last two years. The country also rose in 11 positions in the network readiness index according to the World Economic Forum Report. He said, "Today, we are in the process of developing a future map in cooperation with telecommunications companies to launch the fifth-generation service by allocating frequencies required for this service. Specifying that frequency allocation (3.5Migahertz) for companies to conduct technical experiments to be the highest-level network immediately after the launch of the commercial service, indicating that this technology represents the first building to support the Internet of Things and the future of the digital economy. Adding that VIVA has

harnessed its human and technical potential over the last 10 years to promote this sector along with all companies operating in the Kuwaiti market. Mr. Salman Al-Badran, CEO of VIVA said during his speech, "We are celebrating a decade of success on December 3, 2008 with a partnership between the Government of Kuwait and the Saudi Telecommunications Company (STC). VIVA is proud to contribute as a telecommunications company in building and rejuvenating Kuwait, enriching and developing its infrastructure and joining the business system with other companies, sectors and institutions to achieve the vision of the United States on transforming the country into a financial and commercial center." He also pointed out that VIVA has faced many challenges and has attained many achievements over the past ten years. It's worth the mention that VIVA entered the Kuwaiti market in December 2008 as a third company and is one of the country's telecommunications operators and provides a range of mobile communication solutions.

(December 3, 2018) citra.gov.kw



Eng. Manal Shihab, TRA Senior Software Expert, participated in the Arab Regional Dialogue and Experts Meeting on Internet Governance and Cybersecurity Nexus that took place in the UN-House, Beirut from December 4-7, 2018 under the theme of "Promoting Trust in Cyberspace". The event was organized by ESCWA in partnership with the League of Arab States, in preparation for the fifth Arab IGF process. The meeting tackled the main topics related to Internet governance and cybersecurity in the Arab region and addressed the cybersecurity frameworks

for the region. It focused on the following topics:

- Setting the Scene: Internet Governance, Cyber Security and Trust
- Legal and Regulatory Frameworks in Selected Arab Countries
- Cyber Security and Trust in the Arab Region
- Examining Cybersecurity and Internet Economy Casualty and Correlations
- Citizen's Trust in Fintech and Digital Transactions
- Consultations on the Way Forward (December 10, 2018) tra.gov.lb

Lebanon



Nepal Telecommunication Authority (NTA) has called for an auction of the residual radio frequency spectrum in 900 MHz, 1800 MHz, and 2100 MHz. They have invited applications for interested applicants to assign the rights to use the residual spectrum in those frequency bands. NTA, under the provisions of Telecommunication regulations (2054) and Radio spectrum (distribution and pricing related) policy (first amendment 2073) makes the invitation for the auction. The criteria for the applicants is to have either a basic telephone service license or mobile service license. The applicants also should clear all dues including Royalty, RTDF, and spectrum fees. The applicants (telcos) shall buy the bid documents from NTA and submit their applicants within 35 days of December 19, 2018.

Residual frequency spectrum

Most of the telecom operators use those frequency bands for operating the mobile service (2G, 3G and 4G). NTA calls for

the auction of the frequency spectrum that is remaining from the whole band. The remaining frequency spectrum in those frequency bands are:

- 900 MHz: 3 MHz
- 1800 MHz: 16 MHz
- 2100 MHz: 40 MHz

All of the frequency chunks will be put to auctions, where the highest bidder will get the rights to use the frequency spectrum. NTA has also put the base price of the frequency spectrum.

Base price

The base price of the frequency bands are as follows:

- 900 MHz: Rs 480,00,000 per 1 MHz
- 1800 MHz: Rs 360,00,000 per 1 MHz
- 2100 MHz: Rs 1200,00,000 per 5 MHz

The telcos which already have maximum ceiling frequency spectrum in each band as mentioned in the frequency policy is also not eligible to participate in the respective band auction

process.

The maximum ceiling of those frequency bands are:

- 900 MHz: 9.6 MHz
- 1800 MHz: 20 MHz
- 2100 MHz: 15 MHz

Till now, 900 MHz has been used for GSM technology (2G) and UMTS technology (3G). Similarly, 1800 MHz has been used for 2G and 4G. Whereas 2100 MHz has been used in 3G technology only. With the use of technology neutrality spectrum, any frequency

chunk that the operator own, can be used for any of the licensed technologies. But NTA shall also issue approval of technology neutrality in those bands for the telco, which also charges some extra frequency fees to the operator. NTA has identified some of the popular frequency bands like 700 MHz, 2600 MHz and 2300 MHz for 4G technology but the necessary process (auction) for the assignment is still not started for those bands. We can expect it to start after the allocation of the residual frequency spectrums from the current auction. (December 19, 2018) nepaltelecom.com



Oman

The Information Technology Authority (ITA), represented by Sas Centre for Entrepreneurship, celebrated the website launch of Advanced Dimensions, which is one of the start-ups incubated at the center since 2018. The celebration was under the patronage of Her Highness Sayyida Dr Basma bint Fakhri Alsaïd at the Sas Centre for Mobile Applications Development and saw the attendance of a number of officials from ITA. "Our website is a reference and search engine for medical and dental clinics, in order to facilitate the process of selecting the right clinic for patients in the Sultanate," said Munira Al Husseini, Director of clnix.com. "The company seeks to reach as many users as possible and to bring more clinics to the website. The company joined the Sas Centre for Entrepreneurship because it is an incubator

that further advances and develops IT projects which serve the public," she added. SAS Center is the first specialized center aimed at incubating emerging projects and companies in the ICT field in the Sultanate, encouraging entrepreneurs to establish IT projects in the Sultanate and contributing in attracting local and international investments in this field. In addition, it seeks to provide job opportunities to citizens and encourage them to enter the field of self-employment and entrepreneurship and produce some IT products instead of importing them. The incubated companies are provided with various services and facilities, including an office in the knowledge Oasis – Muscat, technical consultancies, in addition to accounting, financial, marketing and legal services. (December 17, 2018) timesofoman.com



Pakistan

The three-day 19th Meeting of the South Asian Telecom Regulators Council (SATRC-19) commenced at Islamabad. In his inaugural address, Dr. Khalid Maqbool Siddiqui, Federal Minister for Information Technology & Telecommunications (MoIT) said that, MoIT is continuously working on new projects for maximum economic impact through collaboration, digitization, research and innovation in new emerging technologies within the ICT and other socioeconomic sectors. The Telecom Policy and recently announced Digital Pakistan Policy envisions us to become a strategic enabler for an accelerated digitization ecosystem which propagates the knowledge based economy and spurs socioeconomic growth. The Minister said that, the Government is also planning for development of IT zones, software technology parks at major cities, and to finance research & development activities, entrepreneurship and innovation. The Minister appreciated the efforts of PTA and APT to promote regional harmony and knowledge exchange through the platform of SATRC and vowed to provide continuous patronage from the Government for such efforts. On this occasion, Ms. Areewan Haorangsi, Secretary General, Asia-Pacific Telecommunity said that, this event will assist the regulatory bodies of member countries in

acquiring knowledge and skills to address the common challenges facing the region.. In addition, it will also promote cooperation and dialogue between regulators and industry to introduce best regional and international practices in the member countries. SATRC is an important forum under the APT that provides delegates with a unique networking opportunity to the country delegates which may lead to mutual collaborations on similar opportunities and challenges. She also thanked PTA for being the host of SATRC-19 and commended the excellent arrangements of the event. Mr. Digambar Jha, current Chairman of the SATRC and the Chairman of Nepal Telecommunication Authority said that, the discussions and outcome of this meeting shall have significant impact on the telecommunication/ICT industry in the South-Asian countries which cover a large percentage of the population of the Asia-Pacific region. The South Asian region has seen very rapid development of telecommunication network and services. In this era of telecommunication innovations, SATRC provides regular capacity building opportunities for the officers of the member countries. Outcomes of the difference Working Groups under the SATRC are important source of knowledge and recommendations to adopt the new technologies and regulatory

approach in an amicable environment. In his welcome remarks, Mr. Muhammad Naveed, Chairman PTA said that it is an honor for Pakistan to host this key meeting of SATRC. PTA has been an active member of the SATRC and will continue to share its regulatory wisdom and regulatory skills with the regional regulators. He said that the Government of Pakistan has entrusted us with the task of providing state-of-the-art ICT services to the people of Pakistan. While creating smarter communities, PTA ensures affordable and broad-based communications access to the consumer. Initiation of implementation of 5G policy directive for taking broadband to the maximum speed, issuance of third party service provider's license for increasing financial inclusion, device identification registration blocking systems (DIRBS) aimed proper registration of mobile handsets, online NOC portal for import of handsets and online interactive remote education initiative are some of the recent success stories of PTA which will be shared with the other regulators through this meeting. Similarly, PTA favors learning from the experiences of APT countries and to find solutions to common issues and areas of common interest and collaborations. This may be noted that SATRC conducts training programs and research activities with the help of experts from the member countries of the Council. The Council meeting is an annual meeting of the heads of the member countries where SATRC Action Plans are discussed and approved. The meeting is being attended by the delegates from different countries like Afghanistan, Bangladesh, Bhutan, Iran, Maldives, Nepal, Sri Lanka, and representatives from regional and national telecom multinational companies.

(December 17, 2018) phoneworld.com.pk

PTA has introduced Device Identification, Registration and Blocking System (DIRBS) in order to identify and block the

smuggled and unregistered mobile phones. They are going to implement this system on December 1. With the aim to curtail the counterfeit mobile phone usage, discourage mobile phones theft and protect consumer interest and in line with Telecom policy 2015, issued by Ministry of Information Technology & Telecom section 9.6, PTA has developed/established a system Device Identification Registration & Blocking System (DIRBS) at PTA premises and will be implemented on 1st December, 2018. DIRBS is a forward working solution and is designed to cater for no service interruption for all Pakistani cellular mobile service users. All mobile devices, including non-compliant that are active on cellular mobile networks within Pakistan till 1st December, 2018 will remain operational and not be blocked, interrupted from mobile services. To facilitate any user currently using non-compliant mobile devices (15 digit IMEI of mobile device is not as per international standards), Pakistan Telecommunication Authority (PTA) shall auto-pair all such IMEIs with their mobile numbers and they will remain operational without any service interruption. After DIRBS implementation on 1st of December, 2018 any new mobile device programmed with a non-standard IMEI number will be considered as non-compliant device and shall not be allowed any mobile connectivity/service in Pakistani territory as per PTA/DIRBS regulations. PTA is already carrying out extensive awareness campaign to educate masses on DIRBS. PTA is sending informatory SMS to all mobile subscribers to notify status of their mobile device(s) in use on Pakistani cellular mobile networks. For all Pakistani mobile device users wishing to know status of a device can send each 15 digit IMEI number via SMS to 8484. The status of the mobile device can also be checked via PTA website link www.dirbs.pta.gov.pk or by downloading DIRBS android mobile application. (November 28, 2018) phoneworld.com.pk



The RIPE Network Coordination Centre (NCC) held recently roundtable meeting in Saudi Arabia, hosted by the country's Communications & Information Technology Commission (CITC). The meeting focused on the current opportunities and challenges across the Middle East in managing Internet resources, including trends, statistics and recent developments in the region. Themed 'Managing Internet Resources in Arab Countries', H.E. Dr. Abdul-Aziz Al-Ruwais, Governor of CITC opened the meeting with Mr. Paul Rendek, Director of External Relations, RIPE NCC. The discussion took off with a review of the collaboration and outcomes after the previous roundtable meeting in Bahrain in 2017. H.E. Al-Ruwais said: "The Communications & Information Technology Commission remains committed in boosting the engagement of government regulators in the discussions related to internet resources. He added that Saudi Arabia is keen to tap the developments in the internet sector to accelerate growth and continuously diversify the economy in the country and the region." Mr. Paul Rendek, Director of External relations at the RIPE NCC, noted: "At the RIPE NCC we're committed to working with stakeholders in the Arab countries to help them advance

their Internet sectors. We commend the work of Saudi Arabia's Communications & Information Technology Commission in taking a leadership role and developing new initiatives to support the growth of networks in their country. These meetings are an ideal platform to address some of the pressing challenges facing information sharing and Internet security today." The RIPE NCC explained how to leverage the opportunities that come from a growing Internet sector and smart regulations and detailed how the not-for-profit group has worked with regulators in the region to promote development. Also discussed was the impact of the European Union's recently-introduced General Data Protection Regulation (GDPR), which establishes protections surrounding the personal data of EU citizens and residents. Among the countries participating in the meeting were the Kingdom of Saudi Arabia, the UAE, Bahrain, Iraq, Kuwait, Yemen and Egypt.

(December 8, 2018) zawya.com

The Ministry of Communications and Information Technology (MCIT) and Huawei have announced the launch of the Kingdom's first Internet of Things (IoT) lab and a fund of \$1 million to support

Saudi Arabia

Saudi entrepreneurs. The announcement was made during the Huawei Day 2018 event held at The Ritz-Carlton, Riyadh. The event was attended by Dr. Sulaiman Mirdad, Minister Adviser for IT Industry Development; Dennis Zhang, CEO of Huawei Saudi Arabia; and other representatives, including senior government officials, IT leaders and professionals. The new lab will be located at Huawei's innovation center in Riyadh and aims to provide entrepreneurs with a platform to innovate IoT applications, which will directly target the most important vertical sectors to the Kingdom. This joint initiative between MCIT and Huawei is expected to boost the development of products and applications and promote an open and participatory IoT ecosystem. The new IoT lab is the first such innovation and development joint lab in Saudi Arabia. Under this cooperation, Huawei has also made available \$1 million of funding to developers to accelerate the adoption of IoT in the Kingdom. IoT development and innovation have transformed traditional industries and daily life. As hundreds of millions of IoT devices will be used for innovative services, the technology has a key role to play in digitalization across industries. Yet currently there is not much IoT adoption in Saudi Arabia, and

there is a shortage in local skills and funding necessary to drive the sector forward. The lab is intended to bridge this gap, and ultimately to drive forward the Kingdom's digital transformation forward and assist the leadership in achieving their vision of building a knowledge economy, in line with Saudi Vision 2030 and the National Transformation Plan 2020. Dr. Ahmed Altheneyan, deputy minister for technology and digital capacities at MCIT, said: "We are proud to launch the Kingdom's first IoT lab and fund with our partner Huawei, believing as we do that this initiative will help to promote ICT innovation and entrepreneurship ecosystem, accelerate the adoption of emerging technology within the Kingdom, and support in developing the skillset and technology necessary to enable our vision and national transformation plan." Huawei Saudi Arabia CEO Zhang said: "Saudi Vision 2030 calls for the development of the Kingdom into an innovative and globally competitive economy through digital transformation, and our aim at Huawei is to support the success of this vision. We are committed to open innovation and collaboration to promote the IoT sector here in Saudi Arabia and we see the launch of this lab as another milestone in our strategic partnership with MCIT."

(December 11, 2018) arabnews.com



The Tunisia's telecommunications regulator launched a new service helping telecom subscribers reduce the number of advertising messages sent to them by operators. The service baptized "STOP SMS", is the result of an agreement signed by the regulator, the national institution for the protection of personal data (Instance Nationale de Protection des Données Personnelles -INPDP) and the consumers' organization. It is executed via a toll-free number that the telecom regulator will reveal. For subscribers bothered by the numerous advertising SMS they receive daily

and even late at night, the regulator's initiative shows its strong implication in the protection of consumers' interest. It is also a call to order issued to Maroc Telecom, Orange and Inwi on the use of consumers' personal data. Article 27 of the organic law number 63 of July 27, 2004, on personal data protection, stipulates that "with the exception of cases mentioned in the organic law or already existing law, the processing of personal data can be done with the express and written agreement of the person concerned". (November 28, 2018) ecofinagency.com

Tunisia



Dubai's Roads and Transport Authority (RTA) is working on a series of projects related to Artificial Intelligence (AI), autonomous mobility, and shared mobility/transport including the Dubai Sky pods. The RTA recently unveiled two models of Dubai Sky pods - a futuristic mobility system for the emirate before Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of Dubai Executive Council, said a statement from RTA. Characterized by using an area of land that is 100 times less than conventional means of the same capacity, the pods' power efficiency is five times less than electric vehicles and the system requires infrastructure, which is ten times less than conventional transit systems of the same capacity, it stated. Sheikh Hamdan lauded the efforts of RTA and its initiatives aimed at facilitating the mobility of public transport riders to their final destinations.

He made these remarks during a visit to the Metro Depot at Al Rashidiya, where he was received by Mattar Al Tayer, Director-General and Chairman of the Board of Executive Directors of the RTA. The first model of the Dubai Sky pod units is the Unibike. It is a small-size, and lightweight transit mean fitted with steel wheels to move on suspended rails. Each unit can accommodate one to five riders along with individual transport design. It can travel at a maximum speed of 150 km/h and carry about 20,000 riders per hour. The second model is the Unicar. It is designed to carry passengers for a distance up to 200 km. These units have a stylish design and conform to Dubai's global standards. The unit can accommodate one to six riders and travel at a maximum speed of 150 km/h. The network can transport about 50,000 riders per hour. Sheikh Hamdan also inspected the new train of the

United Arab Emirates

Dubai Metro which has recently arrived and is being tested at the depot. He checked the additions and improvements made to the interior of the metro carriages such as dedicating the last carriage to women and children and leaving part of the first carriage for the Gold Class. Other carriages were designated as Silver Class. The Dubai Crown Prince also inspected the world's latest rail maintenance system. A Grinding Machine automatically restores worn tracks, and realigns the rail tracks with the train wheels and thus eliminates the risk of rail breaking. Sheikh Hamdan inspected the Range Rover Evoque convertible limo and the Dubai Taxi limo bike. The convertible limo offers a unique mobility experience befitting the luxury of Dubai. The Limo Bike offers riders and tourists an exceptional mobility experience, especially in winter, besides being a practical solution during peak hours at high-population-density areas. He also inspected the Mobile Command Vehicle in support of roads and transport-related emergency and crises. The vehicle is fitted with cutting-edge technologies such as wireless connection with the Enterprise Command and Control Centre, EC3, and satellite connectivity enabling direct transmission to the Centre from the site, said the statement from RTA. Sheikh Hamdan was also briefed on RTA's AI experience highlighted by Dubai Metro, the world's longest driverless metro. The use of AI in the Dubai Metro fully automated operation covers automated journey planning, lines signaling system to enhance security, and risk prevention, such as the collision, while enabling trains to travel at maximum speed. This system has reduced operational costs by seven percent and improved punctuality by 6.4 per cent, it stated. The Crown Prince attended a presentation highlighting RTA's efforts in operating the autonomous air taxi which was run tentatively in 2017. The technical specifications are currently being set after finishing the assessment of air taxi manufacturers. He was also briefed on the progress of preparations for the Dubai World Challenge for the Self-Driving Transport Congress, which aims to showcase the leading role of Dubai Government in self-driving mobility. The Challenge covers three pillars: self-driving vehicles integrated with public transport; self-driving vehicles used for transporting passengers within certain zones; and self-driving vehicles that link parking lots with entrances of destinations, said the statement. The RTA has already started receiving applications for participation since February 2018. The names of those qualified for the Challenge finals were announced last October, and the winners will be honored in October 2019, it added.

(December 8, 2018) zawya.com

The Telecommunications Regulatory Authority (TRA) has overseen an exercise to test the readiness of UAE telecoms operators for business continuity in a disaster. The 'Sada Al Barq' exercise, which was organized by the TRA, was intended to test how the telcos Etisalat and du could respond to a simulated disaster. The exercise was conducted within the framework of the initiative 'Telecom business continuity in emergency, crisis and disaster'. The TRA established an integrated training camp at Etisalat Academy that included teams from both Etisalat and du. The exercise was conducted in a hypothetical scenario, where a tropical tornado accompanied with thunderstorms across the country prevented telecom employees from reaching their workstations, and also affected transmission networks. The joint teams responded immediately and formed groups whose pre-defined competencies focused on maintaining telecommunication services from the main operations management center setup at Etisalat Academy camp by TRA. The exercise included the main stages of response to a natural disaster, starting from prevention, to preparedness, to response and finally recovery. This exercise is an ideal model for securing and protecting the vital telecom sector, by providing an effective communication network in difficult and challenging circumstances. Furthermore, the exercise also included establishment of a customer service center within the camp; stationing mobile vehicles equipped with transmission stations for mobile phones; providing equipped mobile service centers to facilitate provision of services to the customers, including maintenance services for mobile and fixed lines, home internet and others. Eng. Saif Bin Ghelaita, Acting Deputy Director General for Telecommunication Sector in TRA, said: "The sixth Sada Al Barq exercise is an important element in the ICT sector readiness system to respond to emergencies as it directly supports the directions of TRA to join forces with various parties to ensure continuity of services in this sector in such circumstances." The Sada Al Barq exercise combines two modules, a table exercise and a field exercise. During the two days of the exercise, the participants were exposed to obstacles aims at exploring the opportunities for improvement in relevant plans and procedures, in addition to moving the mechanisms and equipment, and establishing integrated centers to simulate and emergency situation that could require transforming the employees into temporary working stations." Bin Ghelaita said that the exercise confirms the need for skilled personnel and national capacity to be able to deploy disaster recovery and business continuity centers. (November 27, 2018) arabianindustry.com

REGULATORY ACTIVITIES BEYOND THE SAMENA REGION



Albania

Telecoms watchdog the Electronic and Postal Communications Authority (Autoritetit Te Komunikimeve Elektronike Dhe Postare, AKEP) has amended its plans for the auction of spectrum in the 800MHz (792MHz-862MHz) band to provide further clarity regarding the terms of the tender. The regulator specified that operators can bid for any number of the three allocations on offer and that disqualification from one would not prevent a company from competing

for the remaining frequencies – provided that all the requirements were met – and the regulator adjusted the text of the document to clarify that fact. Consequently, AKEP has postponed the deadline for submitting offers until 7 February 2019. The regulator had amended the document in September this year to provide clearer distinction between the requirements of new and existing users, and set a deadline for offers of 3 December 2018.



Angola

The Secretary of State for Telecommunications, Manuel Homem, announced this week the department's plans for 2019, including finalizing the award of a fourth telecoms license in the first quarter. The process of licensing a fourth operator began in November 2017 and the result of the public call for tenders is set to be announced in February 2019. The anticipation is

that the introduction of a new operator will stimulate competition in the telecoms sector and improve the overall quality of service. Among other objectives for 2019 is the realization of broadband programmes enabling wider internet access in schools and public spaces, as well as a plan to privatize Angola Telecom. (December 21, 2018) Agence Ecofin



Armenia

The industry watchdog the Public Services Regulatory Commission (PSRC) has agreed to allow the country's mobile network operators (MNOs) – VEON Armenia (Beeline), MTS Armenia (VivaCell-MTS) and Ucom (formerly Orange Armenia) – to cover the whole territory with LTE-A, by issuing a decision for rights to use radio frequencies at: 811MHz-821MHz, 852MHz-862MHz, 1765MHz-1785MHz and 1860MHz-1880MHz. According to the PSRC decision, the incumbents will be able to 'compete' for the radio frequencies, including presenting their development plans and strategies for

deploying their networks. Details are sketchy at this time, but the PSRC is likely to set a reserve price on the spectrum noting that 'within two years, operators will have the opportunity to provide high-quality mobile communications to all the most important highways of Armenia, in particular, from Yerevan to Sevan, Dilijan [and] Jermuk'. The decision also highlights that MNOs will be required to provide high-quality mobile voice/data coverage in all 121 settlements that still have 'problems' with accessing services.

(December 18, 2018) telegeography.com



Australia

The Australian Communications and Media Authority (ACMA) announced the conclusion of the country's auction of 5G suitable 3.6GHz spectrum, with four operators splashing AUD853 million (\$615.4 million) in total. In a statement, ACMA said all 350 lots available across 14 regions were sold, at a price equivalent to almost AUD0.29 per MHz, per citizen (MHz/pop). Market leader Telstra emerged as the biggest spender, spending AUD386 million on 143 lots. TPG and Vodafone Hutchison Australia teamed up in a venture named Mobile JV, securing 131 lots for AUD263.3 million; Optus won 47 lots for AUD185.1 million; and Dense Air Australia spent AUD18.5 million on 29 lots. Licenses won from the auction will be available from March 2020, although operators could have access

earlier provided that no interference is caused to existing licenses. They are valid until 13 December 2030. Telstra has said it plans to launch commercial 5G services in 2019, while rival Optus is aiming for an initial fixed wireless 5G offering in key metro areas in early 2019. (December 10, 2018) mobileworldlive.com

Regulation of the Domestic Transmission Capacity Service (DTCS) is set to continue for a further five years, after the current arrangement expires on 31 March 2019, as per a draft proposal put forward by the Australian Competition and Consumer Commission (ACCC). In a press release regarding the matter, the regulator said that its draft report formed part of a public inquiry under the Competition and Consumer Act 2010 examining

whether regulation of the DTCS should be extended. In its proposals, the ACCC has, however, called for an end to regulation in 137 metropolitan and 27 regional exchange service areas (ESAs), where it said it is now satisfied that there is effective competition due to new investment in transmission infrastructure. In addition, the regulator is also proposing to update the DTCS service description, which sets out which types of transmission services can be classified and regulated; it is looking to have separate service categories for mobile backhaul transmission and common bandwidth capacities. Interested parties have been invited to comment on the plans by a 1 February 2019 deadline, with a final decision regarding the matter due by 31 March. Commenting, ACCC Commissioner Cristina Cifuentes was cited as saying: 'Regulating the DTCS helps ensure access to backhaul where competition is limited, which can be particularly the case in outer metropolitan and regional areas.'

(December 5, 2018) telegeography.com

Following a public inquiry on the matter, the Australian Competition and Consumer Commission (ACCC) has confirmed it is extending the declaration of Telstra's

six fixed line telecommunications services to 30 June 2024. In a press release the regulator noted that it will continue to declare the following six fixed line services: unconditioned local loop service (ULLS), line sharing service (LSS), wholesale line rental (WLR), local carriage service (LCS), and fixed originating and terminating access services (FOAS and FTAS). In so doing, the ACCC said it believed the continued regulation will 'help improve certainty for end users during the transition to the NBN [National Broadband Network], expected to be completed in 2020'. The ACCC must now launch a separate inquiry to consider and then determine access terms and pricing that will apply to both the six fixed line and wholesale ADSL services; these conditions will be set out in the Final Access Determination (FAD), which is expected to be published in June 2019. Commenting on the matter, ACCC chairman Rod Sims was cited as saying: 'Continuing regulation during the NBN build and migration period will ensure service providers that use Telstra's copper network at reasonable terms and prices. This will encourage competition in the retail market and deliver greater choices for end-users in the form of better prices, service quality and service options.' (November 27, 2018) telegeography.com



Belgium

The Belgian Institute for Post and Telecommunications (BIPT) has launched a consultation regarding the cost models for access to cable operators' networks and to Proximus' fibre-to-the-home (FTTH) network. The regulator says that the consultation aims to provide transparency in the sector with regards to the cost

modelling process and to gather useful comments and suggestions regarding the cost models. The BIPT states that stakeholders have until 24 January 2019 to give their comments; the consultation can be found on the regulator's website.

(December 14, 2018) telegeography.com



Burkina Faso

The government of Burkina Faso approved the introduction of technology-neutral licenses on 5 December, paving the way for the country's incumbent operators to re-use 2G and 3G spectrum for 4G LTE networks. A statement issued to the local media reads: 'The adoption of these decrees makes it possible to set generally the duration of individual licenses up to 15 years, subject to certain incentives that may be granted by the state. The technologically neutral individual license replaces the other individual licenses already granted to the licensees.' Maroc Telecom-

backed Onatel has wasted little time in capitalizing on the decision, and staged a 4G trial in Manga, a town in the Centre-Sud Region, on 11 December. The test was announced via the telco's Facebook page. Previously, cellular rival Orange staged a 4G demonstration at the annual Semaine Nationale de l'Internet (SNI, National Internet Week) event, which took place in late November. While Orange's precise 4G plans are unclear, the cellco is now offering 4G-compatible handsets via its website.

(December 20, 2018) telegeography.com



Canada

Canada's telecommunications regulator has issued a temporary order ruling Telus needs to make sure calls from its customers get through to Ice Wireless customers in northern Canada. The Canadian Radio-television and Telecommunications Commission (CRTC) granted two interim relief requests Friday in an ongoing dispute involving Telus and Iris Technologies Inc. Each company made those requests as part of

their submissions in the case earlier this year. Iristel – the parent company of Ice Wireless – alleges Telus is actively blocking calls from Telus customers to Ice Wireless customers, and has been doing so since May 29. Telus insists it's not blocking any calls. Instead, it says it's taking steps to "control the flow of traffic to Iristel," according to a Sept. 10 submission to the CRTC. Telus argues that it's doing this because Iristel is

engaging in traffic stimulation, a practice where Iristel numbers in northern Canada are assigned to services not located in the North, illegally boosting its profits from a previous agreement with Telus. The CRTC has yet to rule on the validity of either claim, but says in the meantime, the reduced capacity on the network “is not reasonable nor in the public interest” and the issue of calls not being completed needs to be addressed in an “expeditious manner.” The telecommunications regulator cited call failures reported by Iristel in its application and reporting from CBC News earlier this

fall as evidence in the ruling. Friday's ruling orders Telus make sure all calls to Iristel's users in northern Canada with an 867 area code connect within 10 days (Dec. 3). It also requires that Telus file a report with the CRTC confirming they've done this within the same time span. It also granted Telus' request to make the fees Iristel charges to use its network “interim.” That leaves open the possibility the CRTC could order compensation to Telus if the regulator rules in its favor. It's not clear when the CRTC will make its final ruling in the case. (November 26, 2018) cbc.ca



Chile

The Supreme Court is set to rule again on the return of excess spectrum, following appeals by the affected providers Diario Financiero writes. The apex court ruled in June this year that Movistar, Entel and Claro had broken rules regarding spectrum holding limits by bidding for spectrum in the 700MHz band in 2014, and ordered the providers to return an amount of spectrum matching their allocations from the auction: 2x10MHz each for Movistar and Claro, 2x15MHz for Entel. The operators were permitted which frequencies to keep and which they could return, however. Then, earlier this month, the Antitrust Tribunal (Tribunal de Defensa de la Libre Competencia, TDLC) ordered the providers to comply with the order, rejecting arguments from the trio that they could not return airwaves as the Department of Telecommunications (Subsecretaria de Telecomunicaciones, Subtel) has not defined a mechanism to do so. In addition, the cellcos claimed that there was no need to return the frequencies, as Subtel is currently revising the spectrum cap. Entel, Movistar and Claro have now challenged the TDLC's ruling, requiring the Supreme Court to rule on the matter once more. In a related development, Movistar

has submitted a complaint to the TDLC regarding Subtel's partial freezing of the 3.5GHz band, arguing that it will provide Entel and Claro with an advantage in launching 5G services. Subtel suspended use of the range in June this year on the basis that the spectrum was not being used efficiently – 73% of locations it tested had no signal – and that it needed to conduct an in-depth study of the band for its potential use in the development of 5G in Chile. Following complaints from Claro and Entel, however, Subtel partially reversed its decision, allowing the operators to use the airwaves where they were using the spectrum to provide fixed-wireless broadband access. According to Movistar, the partial reversal gives Entel and Claro an anti-competitive advantage in bidding for 5G spectrum and launching 5G services that would 'allow them to exclude their competitors in the mobile telecommunications industry and compete outside the concessional structure of the market.' The Spanish-owned cellco stressed its point, noting that Claro and Entel's use of the spectrum already falls outside of the remit of their concessions, as it was originally intended for fixed-wireless telephony.

(November 30, 2018) telegeography.com



Cyprus

Cyprus Telecommunications Authority (Cyta) has received the go-ahead from the Ministry of Communications and Works to stage a 5G trial in the first three months of 2019. The company said in a press release: 'The 5G pilot network will be launched in the first quarter of 2019 and will enable Cyta to acquire the required specialized knowledge and experience for the next major challenge: the installation and commercial exploitation of the 5G network.' Elsewhere, Cypriot cellco PrimeTel has announced its participation in the

EU's 5G test platform '5Genesis', which will be carried out in five areas: Athens (Greece), Malaga (Spain), Berlin (Germany), Surrey (UK) and Limassol (Cyprus). The main objective of the Limassol platform is to showcase 'radio interfaces of different characteristics and capabilities, combining of terrestrial and satellite communications, integrated to showcase service continuity and ubiquitous access in underserved areas'. (December 18, 2018) telegeography.com



Finland

Finland is to create a new body to oversee both the country's telecoms market and its transport sector. On January 1, 2019 the Finnish Communications Regulatory Authority (FICORA), the Finnish Transport Safety Agency (Trafi) and certain functions of the Finnish Transport Agency will be merged to form

the new Finnish Transport and Communications Agency, or Traficom. The Ministry of Transport and Communications (MoTC) says it plans to appoint the new Director General of the Agency by the end of November.

(November 26, 2018) telegeography.com



France

Arcep has opened a public consultation on its decision to cancel technological restrictions related to the 900MHz and 2100MHz bands in the overseas territories of Guadeloupe, Martinique, French Guiana, Reunion, Mayotte, Saint-Martin, Saint Barthelemy and Saint Pierre and Miquelon. Arcep has awarded tech-restricted concessions as follows:

- Guadeloupe: Digicel (Decision No.2009-0839, GSM-900), Orange Caraibe (No.2010-1388, GSM-900) and SFR Caraibe (No.2016-0211, GSM-900)
- Martinique: Orange Caraibe (No.2010-1388, GSM-900), SFR Caraibe (No.2016-0211 GSM-900 and UMTS-900)
- Mayotte: BJT Partners (No.2011-0306, GSM-900), Orange (No.2007-0156, GSM-900 and UMTS-900), Telco OI (No.2015-0661, GSM-900 and UMTS-900)
- Reunion: Orange (No.2006-0141, GSM-900 and

UMTS-900), Telco OI (No.2015-0661, GSM-900 and UMTS-900)

- Saint Barthelemy: Orange Caraibe (No.2010-1388, GSM-900), UTS Caraibes (No.2008-1259, IMT-2000, and No.2016-0893, GSM-900 and UMTS-900)
- Saint Martin: Orange Caraibe (No.2010-1388, GSM-900), UTS Caraibes (No.2008-1259, IMT-2000, and No.2016-0893, GSM-900 and UMTS-900)
- Saint Pierre and Miquelon: GlobalTel (No.2012-0853, GSM-900).

Arcep highlighted that tech neutrality in the 900MHz and 2100MHz bands is in line with its aim to ensure effective and fair competition between operators and the effective use and management of frequency bands. All interested parties are invited to submit their comments until 17 December 2018.

(December 11, 2018) telegeography.com



Germany

Germany's Federal Network Agency (FNA, or BNetzA) has announced the final auction rules and award conditions for its upcoming 5G spectrum sale. Alongside this, the regulator has officially opened the qualification procedure for admission to the auction, which is scheduled to take place in spring 2019. Companies wishing to participate in the spectrum sale have until 3pm on 25 January 2019 to submit their applications. The award conditions include obligations for better coverage in both urban and rural areas as well as along transport routes, plus measures to promote competition, such as service provider regulations and national roaming requirements. The coverage obligations for the 2100MHz and 3.6GHz license 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 main 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 so-called 'white spot' unserved rural areas. For any potential newcomers, separate coverage requirements apply. (November 27, 2018) telegeography.com

Germany approved controversial coverage targets and national roaming provisions in its 5G auction rules

hours after the GSMA said the proposed conditions could poison network rollout in the country. At a meeting today (26 November) the advisory council of regulator Bundesnetzagentur gave a green light to a draft proposal defining broad terms for the country's 5G auction. Conditions include clauses to impose national roaming requirements, coverage targets and separate provisions for a new entrant. Prior to the meeting, Vodafone Germany threatened legal action and other operators were severely critical of the move. However, politicians and MVNOs backed some of the provisions supplied by regulators. Hours before the regulator's meeting, industry group GSMA slammed the conditions for being "unrealistic". Mats Granryd, director general of the organization, stated: "We are alarmed that, despite real and substantial concerns raised by the mobile industry on the original proposals, the proposed terms make the situation worse by doubling down on unrealistic conditions that puts Germany's 5G future at risk." Vodafone Germany's criticism echoed that of Deutsche Telekom, which last week said the 5G auction process was destined to fail, and long-standing concerns from Telefonica Germany over the feasibility of the plan. Specifically, Vodafone Germany slated rules around national roaming, infrastructure sharing and a plan to enable the "easier" entry of a new player through lightening conditions. It also said any other changes to the country's Telecommunications Act raised as part of the plan should be rejected. "To make one thing clear: competition is a good thing,"

Vodafone Germany executive board member Christoph Clement said. "For competition to work, however, the same rules of the game must apply to all market players. If a team is allowed to use the best players of the opponent, the same chances of winning cannot be said." Among the many grievances, he pointed to a requirement for a newcomer to only cover 25 per cent

of households. This, he added meant the new operator could meet regulations by just connecting already well-served urban areas. With final conditions now approved, operators have until 3pm local time on 25 January to complete the application process with the auction scheduled to take place in the Spring.

(November 26, 2018) mobileworldlive.com



Ghana

Phase two of Ghana's 'Mobile Money Interoperability Payment System' was launched on 28 November. The second phase involves the interconnection of Vodafone Ghana, MTN Ghana and AirtelTigo's networks to E-zwich, Ghana's chip-based switching and payment system, managed by the Ghana Interbank Payment System (GhIPSS). Ghana's Minister of Information, Kojo Opong Nkrumah said that phase one of the

project saw the interconnection of the operators' mobile money platforms and the Ghana National Switch (gh-link system), which made it possible for mobile money customers to send and receive money across networks. The minister also stated that over 1.3 million transactions had been made during phase one of the project, worth GHS134 million (USD27.1 million).

(November 29, 2018) [My Joy Online](http://MyJoyOnline)



Hong Kong

The Office of the Communications Authority (OFCA) in Hong Kong has concluded its auction of spectrum in the 900MHz and 1800MHz bands. The sale had a hybrid format which reassigned 2x10MHz to each of the territory's four cellcos, while auctioning off a further 120MHz across the two bands, comprising 50MHz at 900MHz and 70MHz at 1800MHz. All four incumbents took part in the auction, which raised a total of HKD6 billion (USD767 million). On top of the 20MHz assigned to each operator, the remaining 120MHz was allocated as follows: HKT 40MHz, China Mobile Hong Kong (CMHK) 30MHz, SmarTone 30MHz and Hutchison Telecom 20MHz. The reassignment of frequencies was carried out to pre-empt the expiry of existing licenses in 2020/21. The new concessions will run from 15 years from the start date and will be used to maintain current 2G services while also helping to reinforce 4G networks. (December 19, 2018) telegeography.com

auctions in the 3.3GHz, 3.5GHz and 4.9GHz bands in July or August, and finalize the SUF during the sales. In a statement, a CA representative explained: "The 3.5GHz band will be used by both the existing satellite services and the new mobile services. The Office of the Communications Authority has been coordinating with the relevant network operators to enable controlled deployment of spectrum in the 3.5GHz band within the restriction zone where the [AsiaSat] Tai Po satellite earth stations are located." The regulator has faced strong criticism over the past two years for its 5G spectrum policy, particularly from market leader HKT, which often complained about the slow release of the airwaves. All four mobile operators located in the territory submitted bids in late November for 200MHz of spectrum in the 900MHz and 1800MHz bands.

(December 18, 2018) mobileworldlive.com

Hong Kong mobile operators will be able to launch 5G services as early as April 2019, after the Communications Authority (CA) announced it will assign the first batch of spectrum in the 26GHz and 28GHz bands for use across the territory by Q2. The regulator also plans to auction off 380MHz of higher-band spectrum in mid-2019. Following a public consultation on the process for assigning spectrum for 5G services, the CA said radio waves in the 26GHz and 28GHz bands will be assigned administratively (not involving a competitive auction). A total of 3,700MHz of spectrum will be assigned for public mobile services, with applications due by the end of 2018. Another 400MHz will be set aside for the provision of localized 5G services to specific groups of users on a geographic sharing basis: applications for this will be invited in Q2. The government won't charge a spectrum utilization fee (SUF) if less than 75 per cent of the spectrum in the bands has been occupied. The agency said it will hold

Hong Kong's Communications Authority (CA) has laid out its plans for the allocation of 5G spectrum. Beginning in April next year the regulator will offer a total of almost 4,500MHz of frequencies, including 100MHz in the 3.3GHz band, 200MHz at 3.5GHz and 80MHz at 4.9GHz, plus 4,100MHz across the 26GHz and 28GHz bands. Due to higher demand, the 380MHz of spectrum in the lower ranges will be offered via auction, while the ample supply in the higher bands means those frequencies can be allocated directly. A spokesperson for the CA commented: 'Starting from April 2019, a total of about 4,500MHz of spectrum will be made available to the market for 5G services, representing more than eight times the existing amount of 552MHz of spectrum being used for 2G, 3G and 4G services in Hong Kong.' Hong Kong is currently home to four mobile network operators (MNOs): HKT, Hutchison 3, China Mobile Hong Kong (CMHK) and SmarTone. (December 14, 2018) telegeography.com



India

India's Department of Telecommunications (DoT) announced it will wait until the second half of 2019 to auction additional spectrum, giving some ground to mobile operators' plea to delay the sale due to high levels of debt and an ongoing price war. Telecom Secretary Aruna Sundararajan said the DoT is reviewing recommendations submitted by the Telecom Regulatory Authority of India (TRAI) and the country's 5G task force, but hasn't set a date for 4G and 5G auctions. Market leader Vodafone Idea recently urged the DoT to push back future auctions until 2020, arguing demand for new spectrum will grow only once the 5G ecosystem is in place, ET said. Bharti Airtel executives in November said they would sit out any early auction of 5G spectrum due to a lack of clarity over business cases and a shortage of compatible handsets. They believe deployment of the technology is at least three-to-four years away and don't want a 5G auction until 2020. Meanwhile, Reliance Jio is seeking additional spectrum and wants an early sale of 4G and 5G airwaves. In August TRAI recommended releasing more than 8,500MHz of spectrum across nine bands for an auction and reduced the reserve prices of most of the bands to attract interest. Although no date was scheduled, the government was pushing for a sale in the fiscal year to end-March 2019 to generate revenue. Last month DoT acknowledged the next 4G auction would likely raise significantly less than previous sales of similar spectrum due to market consolidation and operators' high debt levels. (December 18, 2018) The Economic Times

Executives from five mobile operators called on the Telecom Regulatory Authority of India (TRAI) to reduce the price of 4G frequencies and release a long-term spectrum roadmap so the companies can plan for future auctions. Representatives from Vodafone Idea, Bharti Airtel, Reliance Jio, and state-run BSNL and MTNL met with TRAI chairman RS Sharma to push for a reduction in the reserve price for the 900MHz, 800MHz and 1800MHz bands. A source told ET Sharma agreed to consult with the operators in 2019 on a variety of spectrum issues and look at how reserve prices are determined, but he said the discussions would not affect the pricing it already set for the next 4G and 5G spectrum sales. TRAI in August recommended releasing more than 8,500MHz of spectrum across nine bands for the next auction and reduced the reserve prices of most to attract interest. It is yet to set a date for the sale. The executives also called for action on high fees, such as spectrum usage charges, with nearly a third of operators' revenue going to the government in the form of taxes. P Balaji, Chief Regulatory and Corporate Affairs Officer at Vodafone Idea, told ET: "The telecom regulator conducted a transparent discussion on the opportunities and challenges for the telecoms sector, and we look forward to actively working and supporting the government and the regulator's digital agenda." Earlier this month, the Department of

Telecommunications said the country's next 4G auction would likely raise significantly less than previous sales of similar spectrum due to market consolidation and operators' high debt levels, which reduce their access to credit. A 4G auction in 2016 generated \$9.8 billion, but 60 per cent of the 2,300MHz of spectrum made available was left unsold. (November 29, 2018) The Economic Times

The Department of Telecommunications (DoT) is considering a reverse auction model to ensure that the government is able to raise timely money from sale of bandwidth for meeting fiscal needs without further adding to the financial stress of mobile phone operators. "The industry is divided; some operators want airwaves at current price, rest want it either at a reduced price or don't want an auction right now," a senior DoT official told ET. "Under the reverse auction model, one could put up all bands for auctions. The bandwidth which doesn't elicit any response will automatically see a cut, say of 10% in the reserve price. This can once again be repeated till we hit a floor cap, say of 25% below the reserve price, after which we pull the particular bandwidth out of the auction and continue to sell the rest," the official added. As reported earlier by ET, new entrant Reliance Jio Infocomm has backed an auction of both 4G and 5G airwaves in the current fiscal year at the prices recommended by the sector regulator, Telecom Regulatory Authority of India. Second largest telco Bharti AirtelNSE -1.91%, however, is keen on a sale of only 4G airwaves in the current fiscal year and has sought a reduction in the price of sub 1 GHz bands. Market leader Vodafone Idea doesn't want auctions till 2020. Its chairman, Kumar Mangalam Birla, has recently told top finance and telecom ministry officials that the severe liquidity crunch it was facing may force the telco to default on a Rs 900 crore spectrum-related charge it must pay the government in March. This has nudged the government to consider some relief measures for the sector at large, with telecom and finance ministry officials having discussed Birla's proposals that the period of payment for spectrum purchases be increased to 18 years from the current 16, extended the two-year moratorium to three, besides spreading the payment of Vodafone Idea's Rs 900 crore into 12 instalments. Birla also flagged high levies in the telecom sector – nearly a third of a telco's revenue goes to the government in the form of different levies – and the recent hike in import duty of telecom equipment apart from the Rs 30,000 crore that is locked up on account of GST payment under the 'reverse charge mechanism'. Further, DoT feels that auctions should be made an annual event, with the government putting up for sale whatever bandwidth it has. "See, all players want different things, we want to ensure that we sell bandwidth on time and of course at prices which are not exorbitant for the sector and that is why we are now considering the reverse auction model," the official said, adding

that the petroleum ministry is currently following the model. In August, Trai recommended the starting prices for spectrum in the 4G bands of 700 MHz, 800 MHz, 900 MHz, 1,800 MHz, 2100 MHz, 2300 MHz and 2500 MHz, besides 5G airwaves in the 3300-3600 MHz bands. It didn't mention a specific timeline for the sale. While deciding on the timing and the modalities of the next sale, the communication ministry would need to factor in the views of the finance ministry which needs funds to meet its fiscal deficit target of 3.3% for FY18-19 and for social sector spending in the run-up to the

general elections in 2019. While deciding on the timing and the modalities of the next sale, the communication ministry would need to factor in the views of the finance ministry which needs funds to meet its fiscal deficit target of 3.3% for FY18-19 and for social sector spending in the run-up to the general elections in 2019. The government has budgeted in FY19 revenue from the sector at Rs 48,661.42 crore, a 58% rise from the year ago, but far lower than the Rs 78,715 crore it received in FY16-17 with the October 2016 bandwidth sales. (November 26, 2018) economictimes.indiatimes.com



Italy

Italian wholesale network operator Open Fiber has been awarded the third and final government tender for the rollout of broadband infrastructure in unserved and underserved areas of the country. The EUR103 million (USD117 million) contract was awarded by the government's infrastructure agency Infratel and covers

882 localities in the regions of Calabria, Puglia and Sardinia. Open Fiber was the winner of the previous two tenders, which covered the remaining Italian regions. The tenders were held to ensure that high speed connections are deployed to those areas deemed to be not economically viable for commercial rollouts. (December 19, 2018) telegeography.com



Jamaica

The Supreme Court has cleared the way for the government to revoke the telecoms license granted to Symbiote Investments, which trades as Caricel. In handing down its ruling, the court also rejected an application from lawyers representing Symbiote to appeal the decision. Confirming the development, Attorney General Marlene Malahoo Forte told the Jamaica Gleaner that the Government will now move to complete the process, which was initiated based on a recommendation from the Office of Utilities Regulation (OUR). Ms. Forte told the newspaper: 'The process had commenced for the revocation of the licenses of Symbiote under the Telecommunications Act, and they made an application for leave to appeal. The leave was denied. There was a stay of execution of continuing the

process of revocation, and that has been lifted ... There were a number of issues regarding the fitness and propriety of the licensee, many questions regarding what was disclosed, and the accuracy of the information ... Information provided was discrepant and inconsistent and sometimes unverifiable. There were a number of issues.' In October 2017 troubled 4G start-up Symbiote agreed to sell its small-scale Jamaican 4G business to South Africa-based Involution for an undisclosed price. The sale was made public in February 2018, only for the regulatory authorities to protest that Symbiote had not sought government approval for the transaction. The following month, Andrew Wheatley, the Minister of Science, Energy and Technology, initiated the process to revoke the license altogether. (December 11, 2018) telegeography.com



Kosovo

Kosovan telecoms watchdog the Regulatory Authority for Post and Electronic Communications (ARKEP) has launched a public consultation on the distribution and use of spectrum in the 800MHz, 900MHz and 1800MHz bands, with a view to harmonizing spectrum use with the rest of Europe. The regulator has requested comments on the subject by 21 December 2018. The documents set out plans to assign the 800MHz (791MHz-821MHz/832MHz-862MHz) band for use for mobile/fixed communication networks (MFCN), with options to allocate the frequencies on either a TDD or FDD basis. The former would see the range carved into 13 5MHz blocks, whilst the latter would split the band into six 2x5MHz blocks. The 900MHz and 1800MHz bands, meanwhile, are to be used for GSM, UMTS, LTE, WiMAX and IoT services. The 900MHz

(880MHz-915MHz/925MHz-960MHz) plan breaks the range into seven 2x5MHz blocks, with a 10MHz space at 915MHz-925MHz. Similarly, the 1800MHz (1710MHz-1785MHz/1805MHz-1880MHz) plan looks to distribute the frequencies as 15 2x5MHz blocks, with a 20MHz space at 1785MHz-1805MHz. ARKEP has been gradually improving its management of the nation's spectrum in recent years, a process that was accelerated in 2017 after a bilateral agreement between Kosovo and Serbia brought to a close a long-standing practice of illegal cross-border communications. More recently, in January this year the regulator established a new fee structure for spectrum and in March ARKEP identified 680MHz of unused spectrum across nine bands that could be made available to operators. (November 26, 2018) telegeography.com



Malta

The Malta Communications Authority (MCA) has issued decisions on the designation of significant market power (SMP) in the country's fixed and mobile sectors. In the wholesale markets for the provision of fixed voice call termination on individual public telephone networks, five firms have been identified as having SMP status: GO, Melita, Vodafone Malta, Ozone

Malta and Vanilla Telecoms. In the wholesale markets for the provision of voice call termination services on individual mobile networks, GO, Melita and Vodafone were ruled as having SMP. The SMP designation means operators must adhere to guidelines on: access to/and use of specific facilities; non-discrimination; transparency; price control; and cost accounting. (December 21, 2018) telegeography.com



Macau

The regulator Post and Telecommunications Bureau (Correios e Telecomunicacoes, CTT) has issued its spectrum usage plan for future 5G mobile services. The regulator is looking at the following bands for 5G services: 3.3GHz-3.4GHz (for indoor use only); 3.4GHz-3.6GHz; 4.83GHz-4.93GHz; 24.25GHz-27.5GHz; and 27.5GHz-28.35GHz. Spectrum in the 3.4GHz-3.6GHz band, which is being widely utilised for 5G services internationally, is currently part of the wider 3.5GHz-

4.2GHz range which is reserved for satellite services in Macau. The CTT is aiming to migrate all satellite use in this band to 3.7GHz-4.2GHz in order to free up the 3.4GHz-3.6GHz range for 5G services, while retaining 3.6GHz-3.7GHz as a guard band. Macau is home to four active cellcos – CTM, Hutchison 3, SmarTone and China Telecom – with the first 5G services expected to be launched in 2020.

(December 20, 2018) telegeography.com



Mexico

Mexico's Federal Telecommunications Institute (Instituto Federal de Telecomunicaciones, IFT) has confirmed that AT&T and Movistar have been formally awarded the concessions they won in the regulator's 2500MHz-2690MHz ('2.5GHz') spectrum auction, which was held in August this year. In terms of up-front costs, AT&T has paid MXN1.4 billion (USD68.4 million) for two FDD-LTE blocks and two TD-LTE blocks, while Movistar has paid MXN700 million for a pair of FDD-LTE blocks. Over the course of the next 20 years the allocated spectrum will generate revenues close to MXN44.4 billion, which includes annual usage rights.

Going forward, both licensees will be obliged to provide services in at least 200 of the 557 localities with a population between 1,000 and 5,000 inhabitants, which currently lack a mobile service. In addition, they must deliver connectivity to at least ten of the 13 metropolitan areas with more than one million inhabitants within the next four years. The market leader Telcel did not participate in the process, after acquiring 60MHz of 2.5GHz frequencies via the secondary spectrum market in July 2017. Telcel's concessions were acquired from Grupo MVS and cover 1,575 localities, equivalent to coverage of 75.41% of the national population.

(November 27, 2018) telegeography.com



Mozambique

Mozambique's National Communications Institute (Instituto Nacional de Comunicacoes de Mocambique, INCM) has revealed that the government brought in a total of USD83.4 million from its recent 4G spectrum sale. While frequencies were on offer in the 800MHz, 1800MHz and 2600MHz ranges, only the lower band attracted bids, with the three incumbent operators – Vodacom, Movitel and mCel – all securing 800MHz spectrum. Payments for the licenses are due in instalments, with 34% to be paid when the concessions are allocated and further payments of 33% each are due in 2019 and 2020. (December 6, 2018) telegeography.com

Three incumbent cellular operators, Vodacom, mCel and Movitel, have been awarded 4G-suitable spectrum

in the 800MHz, 1800MHz and 2600MHz bands. Americo Muchanga, director general of the National Communications Institute (Instituto Nacional de Comunicacoes de Mocambique, INCM) told A Verdade that all available spectrum in the 800MHz band had been acquired, but did not give details on the other two bands. In the 800MHz range, five lots of 2x5MHz were on offer, with a reserve price of USD15 million per lot, while six blocks of 2x5MHz were up for sale at 1800MHz, with a minimum bid of USD30 million per lot. At 2600MHz, meanwhile, nine packets of 2x5MHz spectrum were up for grabs, with each lot carrying a reserve price of USD15 million.

(November 26, 2018) telegeography.com



Netherlands

Deutsche Telekom is set to win unconditional approval from the European Commission for its planned takeover of Tele2 Netherlands, people familiar with the matter told Reuters. The Commission's competition

authorities had set a deadline of 30 November to take a decision on the deal, which would reduce the Dutch market from four to three mobile network operators. (November 27, 2018) reuters.com



Nigeria

The Nigerian Communication Commission (NCC) has said it is making moves to address the challenges facing the telecommunication industry in the country, especially as it affects service providers. NCC Executive Vice-President, Professor Umar Danbatta disclosed this in Port Harcourt, the Rivers State capital, while speaking at a one-day stakeholders' consultative forum, organized by the commission. Danbatta, who the forum was aimed at interfacing with the service providers to identify their challenges and discuss way forward, said the commission interested in the welfare of service provider so that they can remain in business. He said: "This meeting, which is put together by the commission with theme "Talk To The Regulator (TTTR) is aimed at interfacing with the service providers to identify their challenges and discuss way forward. "As a proactive and responsive regulator, the Commission has taken steps to ensure that the industry continually adapts to the evolution in the telecommunications sector. It has, to this end, licensed InfraCos to roll out shared access broadband infrastructure across

the country on an output based incentive system, with a view to speeding up broadband penetration. "The Commission has also recently concluded the licensing of Value Added Services (VAS) Aggregators in the bid to improve the service delivery framework and improve consumer satisfaction on value-added services. "The framework will therefore ensure that telecom subscribers truly get added value when they sign up for such services, and that all stakeholders along the value chain are treated equitably so that the industry can grow". Danbatta, who was represented by the Director, Licensing and Authorization, Ms. Funlola Akiode, noted that expectation is that licensees will compliment interventions like these from the Commission by instituting best practices in the running of their activities. He said: "There are existing Service Level Agreements and codes of conduct that, when appropriately implemented, would guarantee conducive operating environment that will significantly reduce the need for regulatory intervention."

(December 1, 2018) leadership.ng



Philippines

The Department of Information and Communications Technology (DICT) in the Philippines plans to publish a new policy document by Q1 2019 that would allow it to take back and redistribute mobile spectrum frequencies currently allocated to the country's incumbent operators, which Philstar says could pave the way for even more telcos to enter the market. Outgoing DICT Acting Secretary Eliseo M Rio, Jr., is cited as saying: 'There will be laws that will come out in the first quarter of next year that will redistribute frequencies more equitably ... The frequencies are a very limited resource that have been awarded. Once we take back the frequencies, we [could] have a fourth, even fifth telco.' However, the official added an important caveat that radio spectrum would not be pulled if the owner of the bandwidth proves that they 'serve a certain number of subscribers'. For example, Mr. Rio pointed out that the DICT could look to measure how many 2G subscribers an operator has – numbers for which are generally getting smaller – and recall 2G frequencies should that figure fall below its threshold.

The paper notes too that the Philippine Competition Commission (PCC) has said that regulatory reforms are needed to ensure that the newly anointed New Major Player (NMP) is able to compete against the de facto duopoly – PLDT Inc. and Globe Telecom. Mindanao Islamic Telephone Co (Mislattel), the consortium of China Telecommunications, Dennis Uy's Udenna Corp and Chelsea Logistics Holdings Corp, has been declared the NMP and provisionally awarded spectrum at 700MHz, 2000MHz, 2100MHz, 2500MHz, 3.3GHz and 3.5GHz. However, PCC Commissioner Johannes Benjamin R Bernabe points out that the 'majority of the frequency is still held by the two incumbents' pointing to the National Telecommunications Commission (NTC's) finding from June 2018 that 30.32% of frequencies are owned by PLDT, 24.9% by Globe, with a further 39.35% classed as unassigned or under litigation, and about 5.41% remaining. Mr. Rio hopes the proposed redistribution policy will help ensure a more level playing field.

(December 3, 2018) telegeography.com



Romania

The National Authority for Management and Regulation in Communications (ANCOM) has launched a public consultation entitled 'The National Strategy for the Implementation of 5G in Romania.' The telecoms regulator announced the consultation last week during its international '5G – to Fuel the Fourth Industrial Revolution' conference and the strategic objectives proposed in the document include 'the timely launch of services' (in 2020) in several representative Romanian cities, chosen by socio-economic criteria. Other plans set out by ANCOM in the consultation document include simplifying regulations to make the implementation of 5G smoother, while the regulator also plans

adaptations to infrastructure to suit 5G technology. ANCOM President Sorin Grindeanu said: '5G will unleash a real industrial revolution and an opportunity to reduce development gaps in Romania... We aim that all urban centers, modernized motorways and railways, international ports and airports should benefit from 5G coverage by 2025. Moreover, in order to maximize social and economic benefits, we intend to have seven pilot projects distributed throughout the country.' The 5G consultation document is available to view in full on the ANCOM website, with comments and suggestions required to be submitted to the regulator no later than 21 December 2018. (November 26, 2018) telegeography.com



Serbia

President Aleksandar Vucic has ruled out a sale of state-backed Telekom Srbija, saying that the company is 'totally safe' in the short and medium-term periods, and no minority share packages would be sold off, Novosti reports. The comments follow a statement made by the government's trade and telecommunications minister a month ago, in which the official said that a decision

on Telekom Srbija – which operates under the MTS brand in its domestic market – had not been made and that privatization was still an option. Mr. Vucic has now clarified that that is not the case, however, and no sale would take place for the foreseeable future, adding that Telekom is expanding and should continue to fight for its market share. (November 29, 2018) telegeography.com



Somalia

The telecommunication regulator has kicked off consultation process aimed at regulating the information and communications technology (ICT) sector. Abdi Sheikh Ahmed, General Manager of the National Communications Authority (NCA), said the industry regulator will formally go through consultation process every time it wants to introduce regulations and seek public comment before they are adopted. "We understand regulator is a new concept in Somalia, so does introducing regulations developed by a regulator. Therefore we are not only inviting comments from operators, but also want the general public to actively participate in our consultation process," Ahmed said in a statement issued during the launch of the consultation process in Mogadishu. Ahmed said NCA will give priority to rules of procedures to interact with NCA, numbering regulation, interconnection regulation and public notice, spectrum and service provider, Somalia frequency allocation table, and type approval guidelines. The government in February established the country's first-ever ICT body NCA to help regulate

the country's telecommunication sector. NCA later in March took control of the domain from the Somali National Information Center (SONIC) and Cloudy Registry, who ran the operations and the management of the domain Registry. Abdi Ashur Hassan, minister for Post, Telecom and Technology, lauded the ICT stakeholders for successfully establishing NCA that is now ready to take its due role in regulating the sector. Hassan said the ICT sector is of utmost importance for the government because of its potential multiplier effect on all sectors of the economy. The Minister said once the ICT sector is regulated it will be a win-win situation for all because investors will have assurances for their investment instead of the current chaos in the market. "Consumers will have better services such as interconnected mobile networks instead of carrying several mobile phones, and finally government revenue from the sector will increase through taxation and other charges, which will also help us in reinvesting through infrastructure and universal access fund," Hassan said. (December 3, 2018) en.ce.cn



Sweden

The telecoms regulator PTS said that auction to assign licenses for the use of radio transmitters in the 700 MHz band would start on 4 December and that progress would be published on its website at the end of each day. PTS said the licenses are technology and service-neutral. The auction comprises 60 MHz, divided into seven licenses. There are two licenses for 10 MHz (2 × 5 MHz) and one license for 20 MHz (2 × 10 MHz) in the part of the frequency band offering both

uplink and downlink communication; and four licenses for 5 MHz each in the downlink only part of the band. The minimum bid in the auction is SEK 50 million per 5 MHz, which adds up to a total minimum bid of SEK 600 million for all seven licenses in the auction. PTS has decided on a spectrum cap of 40 MHz to ensure that there will be at least two license holders in the 700 MHz band. The first stage of the auction consists of a simultaneous multi-round auction, deciding how

many frequency blocks in the different parts of the band each bidder wins. The following stage decides the placement in the band. PTS expects the auction to take approximately two to ten working days, but it may take longer. For confidentiality reasons, the names of the bidders will not be published until the first phase of the auction is concluded. (December 4, 2018) telecompaper.com

Hi3G Access, which offers mobile services in Sweden under the Tre (3) brand of majority owner CK Hutchison, says it will appeal the outcome of the recent 700MHz spectrum auction. As reported by CommsUpdate, frequencies were won by the three largest operators in Sweden's four-player mobile market. Telia agreed to pay SEK1.38 billion (USD152 million) for 2x10MHz blocks of spectrum, with its concession including a

minimum coverage requirement. Net4Mobility, the infrastructure joint venture (JV) of Tele2 and Telenor, offered SEK1.44 billion for two lots of 2x5MHz with no coverage obligations. Tre Sweden participated in the bidding but emerged without spectrum. It says, as the market's smallest operator, it was at a disadvantage to its three larger rivals. It adds that the auction was badly planned, with 20MHz of spectrum – four unpaired 5MHz blocks reserved for supplemental downlink (SDL) – remaining unsold. Johan Johansson, CEO of Tre Sweden, commented: 'We have previously stated that PTS [the Swedish Post and Telecom Agency (Post & Telestyrelsen)] made a poor analysis of the effects on the competitive situation in the Swedish telecom market. We therefore intend to push the matter further and [have] it legally tested.' (December 12, 2018) telegeography.com



Thailand

Thailand's National Broadcasting and Telecommunications Commission (NBTC) is planning to auction spectrum in the 2600MHz band in the second half of 2019. The authority appointed a subcommittee last week tasked with recalling unused spectrum from state-owned public broadcaster MCOT, which is licensed to operate using 190MHz in the band until 2022. In line with the government's roadmap for 5G adoption in the country, the NBTC plans to recall

spectrum in other ranges for future auctions: 470MHz (currently held by TOT), 1500MHz (35MHz used by TOT, 56MHz by Chevron Thailand Exploration and Production and Chevron Offshore Thailand), 3400MHz-3800MHz (partly used by satellite provider Thaicom) and 26GHz-28GHz (partly used by Thaicom). The NBTC is planning to recall 360MHz in the 3400MHz-3800MHz band and 6GHz in the 26GHz-28GHz range. (December 11, 2018) The Bangkok Post



Ukraine

Telecoms regulator the National Commission for State Regulation of Communications & Informatization (NCCIR/NKRZI) has extended the national 3.6GHz-

3.7GHz spectrum rights of WiMAX licensee Aero Telecom for five years, from 2020 to 2025. The frequencies are potentially useable for 5G services. (December 19, 2018) telegeography.com



United Kingdom

Telecom regulator Ofcom offered discounts of up to £400 million on the cost of spectrum licenses in the next UK auction on the condition operators agree to meet a series of rural targets requiring significant financial outlay. The auction, set to take place by early 2020, is for licenses in the 700MHz band and 3.6GHz to 3.8GHz range. It will have a number of binding obligations attached, potentially including spectrum caps. In its draft auction rules, Ofcom said two operators could receive the discount, but must commit to meet three targets within four years: provide "good" outdoor data coverage to at least 90 per cent of the UK's land mass; improve mobile coverage for 140,000 buildings; and install 500 new masts in rural areas. Ofcom added in return for agreeing to the requirements the winning bidders would receive a discount of between £300 million and £400 million "to reflect the significant investment required to meet them." Operators are free to bid without agreeing to these terms, but will still have to meet other obligations as part of their licenses. The terms

of the auction, which will be the country's second for 5G-suitable frequencies, are now under public consultation. Alongside the spectrum proposals, Ofcom also published suggestions for IoT spectrum sharing initiatives. Connected nation report Ofcom's move to boost nationwide connectivity is part of a long-standing aim from the regulator and government. Earlier this year, Ofcom CEO Sharon White priced complete UK coverage at £6 billion, while politicians also regularly bemoan the state of coverage in rural areas. In the latest edition of the regulator's Connected Nation report, released in 18 December alongside the draft auction consultation, Ofcom said 77 per cent of homes and offices could receive a good indoor 4G signal from all four operators as of December 2018 compared with 65 per cent in December 2017. Coverage across the UK's land mass also improved during 2018. A "good" 4G signal from at least one operator was available in 91 per cent of the country's land mass in December 2018, up from 80 per cent. Currently, 66 per cent had good 4G from all four

operators compared with 49 per cent in 2017. However, it also noted: “too many rural areas are left with patchy or unreliable mobile reception” adding some areas still had no coverage at all. (December 18, 2018) [mobileworldlive.com](#)

The telecom regulator Ofcom has launched a consultation related to the UK’s broadband universal service obligation (USO), in which it has, among other things, proposed to designate BT and KCOM as universal service providers (USPs). In March 2018 the UK government introduced legislation for a Broadband USO, following which, in June Ofcom called for applications from parties interested in becoming USPs. Having subsequently consulted on the regulations for designating USPs in September, the watchdog’s latest consultation now seeks to set out its decision to directly designate the USPs to deliver the USO, while also detailing its proposals on the providers it aims to designate, and the conditions that should apply for delivering USO connections and services. Eight expressions of interest (Eoi) were submitted for the USP roles, although only three firms – BT, KCOM and Hyperoptic – were confirmed to have met the minimum criteria, with Hyperoptic subsequently withdrawing its interest. As a result, Ofcom has proposed that BT will be the USP across the whole of the UK excluding the Hull Area, with KCOM acting as the USP in Hull. The other proposals include a number of criteria: USPs will have 30 days to determine whether a consumer is eligible for the USO; USPs will have twelve months to deliver connections to eligible consumers; and USO customers should pay the same price as the rest of the UK and this should not be more than GBP45 (USD50.5) per month. Comments on the proposals can

be submitted ahead of 13 February 2019 deadline, and Ofcom has said it intends to publish a statement by ‘early summer 2019’ on designating USPs and the final universal service conditions. In addition, the regulator has proposed an implementation period to enable the USPs to make necessary preparations for the USO, and as such it says it expects consumers to be able to make requests for connections from the end of 2019.

(December 6, 2018) [telegeography.com](#)

On the back of a steep rise in the cost of directory enquiry calls, British telecom regulator Ofcom has announced a new price cap on 118 phone numbers. The watchdog is aware that some providers currently charge almost GBP20 (USD25.6) for an average 90-second call, while the price for a 90-second call to the most popular service – 118 118 – is currently GBP11.23. Further, while the number of calls being made to 118 services has declined by around 40% each year, it says that more than a million people in the UK – many of them elderly – are still using such services and that the cost of calling is ‘now well above what people expect to pay’. As a result, Ofcom will cap the maximum amount a 118 service can charge at GBP3.65 per 90 seconds, bringing the price back to 2012 levels. To allow providers time to adjust their prices and billing systems, the regulator has ordered the price cap to come into force on 1 April 2019. Jane Rumble, Ofcom’s Director of Consumer Policy, said of the regulator’s decision to cap prices: ‘Directory enquiry prices have risen in recent years, and callers are paying much more than they expect. Our evidence shows this is hurting people, with some struggling to pay their bills ... We’re taking action to protect callers by capping 118 prices.’

(November 29, 2018) [telegeography.com](#)



United States

As expected, the FCC voted to move forward with an incentive auction that combines the upper 37, 39 and 47 GHz bands, delivering a nice gift to the wireless industry. The airwaves in the combined upper 37 and 39 GHz bands represent the largest amount of contiguous spectrum available for wireless service in the millimeter wave bands—2,400 megahertz in total—while the 47 GHz band provides an additional 1,000 megahertz of spectrum. The auction, slated for the second half of 2019, will take place in two phases: a clock phase in which firms may bid on generic license blocks, and an assignment phase in which clock phase winners may bid on specific frequencies. Incentive payments will be offered to incumbents that choose to relinquish their spectrum usage rights to make new licenses available. The FCC is modifying the band plans from 200 megahertz blocks to 100 megahertz blocks to be licensed as Partial Economic Areas (PEAs), which it says will facilitate the simultaneous auction of licenses in the three bands. Commissioner Brendan Carr noted that the plan for the three millimeter bands will result

in more spectrum being auctioned in a single year than at any time in the commission’s history. Combined with the first 5G smartphone, the first commercial launch of 5G in low-band spectrum and the first truly mobile 5G service, “2019 will be the Year of 5G,” he said. “To continue winning the race to 5G, we must keep up efforts like those that produced this item.” Some groups had pushed the FCC to combine the 39 GHz band with the 24 GHz band, which will be auctioned off after the 28 GHz auction ends. The FCC said that plan carried complications—the 39 GHz band in particular has had a thorny, and some say messy, history. It was intended for Wireless Local Loop (WLL) services back in the 1990s, but that never panned out. The FCC attempted different strategies but the band ended up with scattered licenses and overlapping geographies. Last summer, the FCC devised a plan to clean it up and get it ready for both incumbents and new users for the incentive auction that will be loosely patterned after the commission’s broadcast incentive auction.

(December 13, 2018) [fiercewireless.com](#)



Uzbekistan

The Ministry of Development of Information Technologies and Communications of the Republic of Uzbekistan (MITC) has published draft regulations regarding the implementation of mobile number portability (MNP). Under the proposals, MNP would be restricted to mobile numbers only – the document states that intermodal portability (i.e. porting numbers from a fixed line to mobile or vice versa) would be

prohibited – and would be provided for a fee, whilst subscribers would be limited to porting their number once every 180 days. Operators would be granted a single business day to complete the transfer. Consultation on the proposal is due to be completed in January next year and, if implemented, would take effect three months after being written into law.

(December 20, 2018) telegeography.com



Zimbabwe

Telecommunications regulator, POTRAZ has been urged to use both the carrot and stick concept to ensure it attains the infrastructure sharing objective. While the government has continually spoken of the need for telecommunications network service providers to fully comply with the infrastructure sharing thrust, there has not been much action on the ground, resulting in a number of areas not assessing these ICT based services. POTRAZ has however taken the first steps through the construction of shared communication facilities. Through the Universal Service Fund, to date, 367 towers each servicing a radius of 15km have been installed in Matabeleland with more set to be availed. One such was the Moran site that was commissioned at Phumula village of Tsholotsho district in what was described as a fulfillment of one of the key deliverables of the government. Guest of honor at the event, the Minister of ICT, Postal and Courier Services, Cde Kazembe Kazembe, reiterated that infrastructure sharing is a cost effective method that should be warmly embraced by network service providers. “It is our fervent hope that through such initiatives our operators learn and continue to appreciate the tenants and benefits of infrastructure sharing. Apart from providing wider consumer choice and an enhanced service competition which in turn promotes creativity and innovation, infrastructure sharing significantly brings down both capital expenditure and operating expenditure,” he said. While giving credit to network service providers for providing locals an opportunity to be part of the global digital community, POTRAZ Director General, Dr. Gift Machengete called on the need to now tackle the issue of affordability of these services. “As we now move towards addressing connectivity for the last 15% of our population, it is important to bear in mind the importance of affordability to consumers in general and bottom of the pyramid consumers in particular. Connectivity without affordability is futile and meaningless to the intended beneficiaries. We therefore believe that access to affordable quality

information communication technologies is a basic right to every citizen in as much as access to water is a basic right,” he said. Phumula villagers welcomed the availing of the telecommunication networks by the service providers, saying they are now included in the digital global world despite their rural setting. Schools in the areas were also handed various ICT gadgets that are expected to go a long way in bringing the pupils to speed with the rest of the digital age.

(December 10, 2018) zbc.co.zw

A spokesperson for the Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) says the country cannot support any new mobile network operators (MNOs). The regulator’s Director of Technical Services, Baxton Sirewu said that lack of available spectrum limits how many cellcos the market can support. Some critics have pointed out, however, that the government currently controls the bulk of wireless spectrum and could be looking to ensure that it does not face any further competition. The state owns 100% of number two cellco NetOne and 60% of third-placed operator Telecel. It also controls fixed line provider TelOne, which has a mobile concession but has failed to use it. Meanwhile, state-packed ISPs PowerTel and Africom have access to wireless spectrum for their CDMA fixed-wireless operations. The sole privately-owned operator with cellular frequencies is Econet Wireless. (December 7, 2018) The Herald

The government of Zimbabwe has outlined a USD17.9 million ICT budget for 2019, saying its priorities include research and development, science and technology business incubation, and modernization of infrastructure. A report from IT Web Africa also cites Finance Minister Mthuli Ncube as saying that fixed line operator TelOne and mobile providers NetOne and Telecel are among at least five state-backed enterprises which are up for part-privatization within the next twelve months. (November 27, 2018) IT Web Africa

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