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SAMENA TRENDS

FOR SAMENA TELECOMMUNICATIONS COUNCIL'S MEMBERS

BUILDING DIGITAL ECONOMIES



Omantel: Gearing up for 5G in Oman

64



goetzpartners: Don't Be Rash – How to Achieve Sustainable AI ...

84

Interview



Brahim GHRIBI
Head of Government Relations MEA - Nokia

Featured

Eng. Mazyad Bin Nasser Al-Harbi
Chief Executive Officer
VIVA Telecom - Kuwait

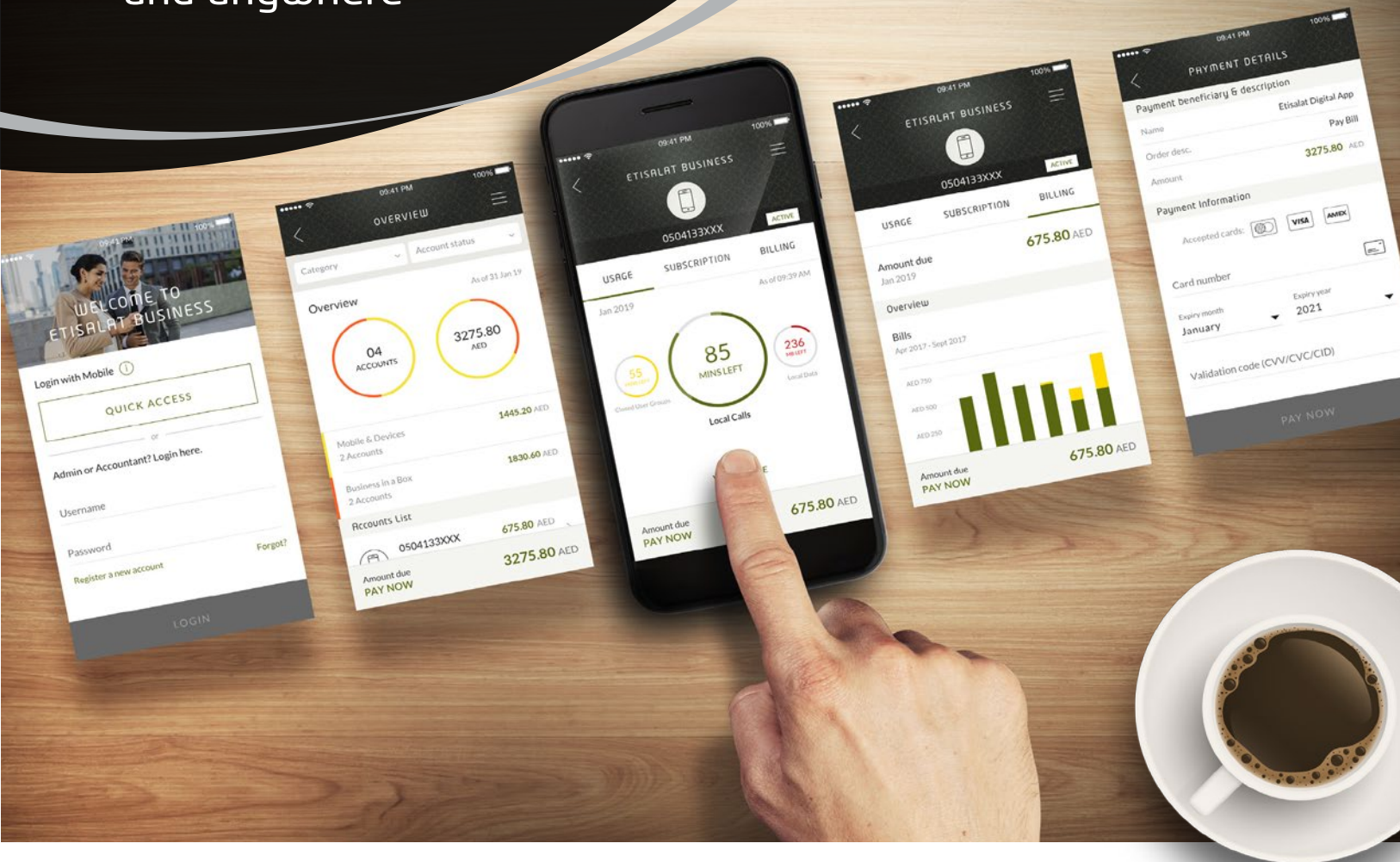
THIS MONTH

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CONTENTS

- 05 EDITORIAL**
- 13 REGIONAL & MEMBERS UPDATES**
 - Members News
 - Regional News
- 67 SATELLITE UPDATES**
 - Satellite News
- 78 WHOLESALE UPDATES**
 - Wholesale News
- 86 TECHNOLOGY UPDATES**
 - Technology News
- 92 REGULATORY & POLICY UPDATES**
 - Regulatory News
 - A Snapshot of Regulatory Activities in the SAMENA Region
 - Regulatory Activities Beyond the SAMENA Region

ARTICLES

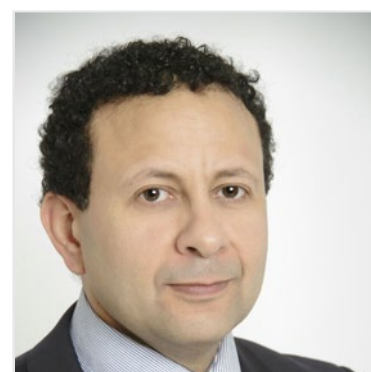
- 64** Gearing up for 5G in Oman
- 76** Building an Evolvable IP Transport Network to Enable 5G Business Success
- 84** Don't Be Rash – How to Achieve Sustainable AI Success Without Falling for the Hype

FEATURED



06 Eng. Mazyad Bin Nasser Al-Harbi
Chief Executive Officer
VIVA Telecom - Kuwait

INTERVIEW



09 Ibrahim GHRIBI
Head of Government
Relations MEA - Nokia

SAMENA COUNCIL ACTIVITY

- 11** Comviva Joins SAMENA Council to Enhance its Presence in the MENA Region

CONTENTS

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Artificial Intelligence in Telecoms Business

With the deployment of complex new network services and new technological paradigm shifts in play, the ever-rising demands of customer experience management among Operators now require more intelligence on the networks. Thus operations, planning, optimization, among other processes and procedures, need better decision-making and adaptive learning mechanisms. This is where artificial intelligence (AI) comes into play. It is with AI that network operations can be automated to bring about enhancement in customer experience, and take the notion of big data analysis and contextualized decision-making based on that data to the next level.

While AI has been in use for some time now, especially as digital voice assistants or as assistants in conducting precisely-defined household tasks, or even as chat bots assisting in rectification of issues, or routing customers or buyers to new sales opportunities; it is the use of AI in improving network efficiency, lowering operational costs, and improving QoS in the new mobile networks, which is of most interest to Operators, which have now entered the realm of autonomous learning.

Interestingly, any discussion on the 5G use-cases automatically brings attention to AI. In the age "intelligent connectivity", which we fully support and which we believe does have the potential to exponentially transform our digital economies and unlock a myriad of opportunities across all economic sectors and industries, artificial intelligence will be a game-changer for networks, allowing for the ease to self-diagnose, self-heal, and self-optimize; allocating network resources and fixing anomalies and customer issues before the customers come to hear of those issues or be impacted by them.

It has to be recognized that 5G can't be used to its fullest potential without wide deployment of 5G hardware and related equipment, and networks that are AI-driven. This requires an unprecedented scale of collaboration and understanding among local and national regulators and private-sector stakeholders, and there is also a need to become ambitious enough to implement multi-stakeholder engagement models on the robust and ethical use of AI, and to define privacy limits and security boundaries across AI implementation on the network, to both use and protect network resources (including customer data) against misuse.

In relation to this, SAMENA Council's Technology Provider and Operators members are encouraged to provide their feed to SAMENA Council's Generic Policy, Legal and Regulatory ("PLR") Framework for Digital Services, which is intended to serve in a contextual capacity to provide high-level guidance to governments and regulatory authorities across the SAMENA region (and beyond) in creating a thriving and supportive digital ecosystem that drives the development and emergence of innovative and meaningful digital services and can help push meaningful connectivity to the next level. To this effect, this Framework can also help take forward the discussion on AI implementation on networks to another level.

In the age of autonomous learning, we have much to achieve by collaborating together and contributing our knowledge base and experiences to create new intelligence, which can serve us all positively in achieving our globally defined goals as Industry. Artificial intelligence is the next big thing we must understand well, in order to harness its beneficial use as we build the foundation of a thriving digital economy. 🌱



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

VIVA Speaks to SAMENA Council



Eng. Mazyad Bin Nasser Al-Harbi
Chief Executive Officer
VIVA Telecom - Kuwait



Q. What are VIVA's latest digital offerings to enhance the experience of its customers?

A. Improving customer experience and expanding our digital service portfolio are two key pillars of our overall digital transformation strategy, to enforce execution, VIVA was keen to introduce latest ICT technologies in its network including advanced 4G in 2013 and now 5G, ensuring best experience in term of offered speeds, coverage, and overall customer digital journey. VIVA spared no efforts to introduce new digital services covering video and music content offerings, gaming services, transportation vertical, and collaborated to a wide range of partners such as PUBG, VIU, Careem, Anghami, Wavo. In addition, are also exploring the 5G potential by actively testing new 5G use cases including AR/VR, AI, CCTV, IoT, and cloud services.

The Kuwaiti market is characterized by high MBB traffic usage, current monthly data usage per customer is around 68 GB, which is the highest in world, in this contest 5G comes into picture to meet this high demand and satisfy our customers' requirements for best experience.

Q. How does VIVA view Kuwait's readiness for 5G?

A. The Kuwaiti market is characterized by high MBB traffic usage, current monthly data usage per customer is around 68 GB, which is the highest in world, in this contest 5G comes into picture to meet this high demand and satisfy our customers' requirements for best experience. 5G technology will be a key enabler of our national ICT market development, 5G fiber like services with customer speeds reaching 100 Megabits per second (Gbps) level will be more than enough to cope with current users consumption of digital services such as HD Video OTTs, augmented/virtual reality, social media etc, but also 5G will enable new services including ultra-high definition multimedia, virtual reality, massive connections, in addition to supporting the infrastructure of smart and safe cities in the near future.

Q. How soon do you predict that major network operators will adopt 5G in the GCC region, and which services will primarily be offered first?

A. The GCC region has relatively strong economy, while telecom sector is highly competitive, this push us as operators to always innovate in our service offerings and deliver higher value for our customer's base. That makes the GCC region the best candidate to adopt 5G especially that clear national ICT strategies are already under execution, we believe 5G will become the technology enabler and accelerator for the economy transformations in the region.

5G technology offers unique features such as enhanced Mobile Broad Band, ultra-low latency, and massive connectivity, this will enable the emergence of next generation services, among which enhanced MBB is the most mature from both market and standard perspectives. Fixed Wireless Access (FWA) will be the mainstream use case in 2019, targeting home broadband segment, we will be able to provide fiber like experience and support guaranteed speed provision. Another immediate 5G use case candidate is cloud gaming, we strongly believe that the current ecosystem is mature enough to deliver commercial grade cloud gaming experience, in near future, more services are planned.

Q. What are VIVA's unique service differentiators in the services you offer in the market?

A. VIVA has distinguished itself by remaining at the forefront of technology and continuously investing in its people, its infrastructure, customer experience, as well as staying relevant to current trends by continuously enhancing its products and services. Our customers are changing their behavior when it comes to data consumption, sharing, social media interactions, and so forth. We regard Simplicity, availability, and transparency as key elements of our service offering covering Voice, data, and digital services, we strive to ensure best customer journey including awareness, smooth subscription process, guaranteed experience, customer support, and multiple settlement channels. With the new 5G service commercialization, we planned one of the largest 5G rollouts in the world in order to ensure 5G availability to all our customers, while introducing AI technologies to monitor and guarantee customer satisfaction. The focus now on HBB market, but our roadmap plan is to introduce new innovative services for B2C/B2B segments.

Q. What are your plans for adopting IoT and what business growth do you foresee in this segment?

A. We regard IoT as one of the highest potential areas in terms of B2B/vertical business, IoT will be a key enabler to achieve new Kuwait vision 2035, and support government plans for smart city mega projects.

While the current IoT/M2M portfolio of VIVA comprises of POS (Point of Sale) connectivity, smarthome solution, fleet management systems, etc. VIVA is investing to deliver a strong portfolio of IoT solutions to both our B2C and B2B customers. This portfolio will leverage latest cutting edge technologies, such as 5G , network slicing, mMTC (massive Machine Type Communications) that will cater to different vertical scenarios.



However relying only on connectivity will not bring significant revenue from IoT, we need to extend the role and responsibility beyond that. In addition to data collection, the value of IoT lies in data processing, analytics, and application enablement. What's more, a mature ecosystem is key for IoT business development. We are currently exploring opportunities in IoT that will deliver great value to our customers by building an ecosystem of partners with well-established and successful worldwide practices.

Q. What are VIVA's goals in the market, including those relating to digital services?

A. VIVA has a well-balanced strategy when it comes to offered services, it's important for us to strengthen our current position in core services such as Voice and data, by ensuring consistent investment in infrastructure and organization transformation , our aim is to deliver a solid service foundation while exploring new horizons , that been said , we are keen to enlarge VIVA's digital ecosystem , in collaboration with our partners, we are working to introduce new B2C services such as cloud gaming , cloud VR/AR, smart home , etc. In addition, through our recent strategic investment of QualityNet we also plan to build a strong B2B product portfolio for multiple verticals such as finance, Oil & Gas, transportation, education, and health sectors. We will leverage our 5G/IoT/cloud capabilities to support the vision of His Highness Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah for Kuwait 2035, VIVA is ready to collaborate with government to transform Kuwait into a major financial and commercial hub in the region."

Q. How has VIVA adopted artificial intelligence across its network?

A. AI is a promising technology when it comes to boosting operational efficiency, improving customers experience, and identifying new source of revenues, VIVA is deeply involved in this technology adoption, right now we are developing our own AI system that will enable us to monitor in real time each and every customer experience and proactively solve any potential issues, by using data analytics we could develop new commercial use cases to improve channels sales, roaming experience , among many others . It also improved efficiency and automation of some of our business processes, integrating the data silos and real time actionable insights for smart operations. 📍

An aerial night photograph of a city, featuring a prominent, large, circular interchange or roundabout in the lower right quadrant. The interchange is brightly lit with warm yellow and orange lights, creating a glowing effect. The surrounding city streets are also illuminated, with light trails from cars visible. The overall scene is a vibrant, high-angle view of urban infrastructure at night.

Nokia 5G Future X

Unleashing the
potential of 5G

NOKIA

Nokia Speaks to SAMENA Council



Brahim GHRIBI
Head of Government Relations MEA
Nokia

NOKIA

New tools will transform how decisions are made in business, by governments and at the individual level, and will allow knowledge workers of all types to focus on activities with the highest return. The rise of AI is underpinned by the growing amount of available data, the power of new algorithms, and the exponential increase of computing capacity.

Q. There is considerable debate about the Fourth Industrial Revolution (4IR) and the technologies behind it. What makes it different from the previous ones?

A. The Fourth Industrial Revolution will be characterized by the digitalization and interconnection of all physical elements and infrastructure controlled by both humans and advanced intelligent systems. This will build on the developments of the Third Industrial Revolution, and will ultimately impact all sectors – energy, transport, health, manufacturing, education, and more – and will affect global value chains across the physical, digital and biological domains.

What makes the Fourth Industrial Revolution fundamentally different from the previous ones is the interconnectedness of all the different elements, and the unprecedented speed at which innovation and the diffusion of technology are taking place.

If properly addressed, the Fourth Industrial Revolution can have strong positive economic, social and environmental impacts. However, concerns are being expressed about just how much control humans would be ceding to machines. Therefore, in addition to providing a clear understanding of the benefits of the Fourth Industrial Revolution for society, comprehensively thought-out measures are required to mitigate any risks.

Q. What are the key technologies behind the Fourth Industrial Revolution?

A. There are several broad technology areas that are driving us into this new era. Their combination enables fundamental transformation of economies and societies, and will constitute a technological revolution once they reach a critical mass.

First of all, Industry 4.0 will be fueled by Robotics and Automation. The use of industrial robots goes back to the 1960s, when they were first deployed to automate tasks in the automotive, electrical, metal and plastics industries. Now, physical or virtual robots are used in almost all branches of industry, with their efficiency increasing all the time thanks to advancements in connectivity, sensors and artificial intelligence.

Data Science and Artificial Intelligence (AI) are also key enablers of the Fourth Industrial Revolution.

New tools will transform how decisions are made in business, by governments and at the individual level, and will allow knowledge workers of all types to focus on activities with the highest return. The rise of AI is underpinned by the growing amount of available data, the power of new algorithms, and the exponential increase of computing capacity.

Last but not least, Advanced Connectivity will play a key role in the future of Industry 4.0. Connectivity will be provided with virtually unlimited bandwidth and with extremely low latency. This will enable a variety of applications, including extreme broadband (delivering gigabytes of bandwidth on demand), critical machine communication (requiring ultra-reliable instant actions such as robot steering), and massive machine to machine communication (connecting multiple IoT devices at ultra-low cost). 5G for instance will be the integral technology that will be necessary for these things to fulfil their potential. It will deliver a range of use-cases for multiple industry sectors, and is seen as a societal game changer.

Q. How can we prepare society for the Fourth Industrial Revolution?

A. Current policies need to evolve to address future generational needs in the context of the Fourth Industrial Revolution.

First, it is necessary to create a common understanding of the opportunities and risks related to the Fourth Industrial Revolution. This understanding can then be used as the basis for the creation of policies, processes, ethical principles, legal frameworks and governance

structures aimed at ensuring a human-centric and sustainable approach to the Fourth Industrial Revolution. This common understanding can be reached through a multi-stakeholder approach that brings together governments, regulators, industry, NGOs, academics and other relevant parties.

Most importantly, it is fundamentally necessary to understand the evolution in the skills demanded for certain roles. The technologies behind the Fourth Industrial Revolution will bring new tools and methodologies that impact how we train, teach and learn through augmented reality, virtual reality, social learning, and more. This requires continuous feedback loops between the labor market and education system stakeholders, using labor-demand forecasting models that rely on strategic foresight groups as well as big data. In this context, any provision of education and job replacement opportunities should prioritize those most affected by automation.

There needs to be also an additional focus on entrepreneurial and social skills, as well as on the development of educational models for learning to work with and alongside connected and intelligent machines. Education systems need to incentivize the investigation of and familiarization with AI-powered tools in workers' traditional fields of activity, so that workers can learn how to use these tools to increase productivity.

In addition to investing in people, we can embrace the future by accelerating investments in ICT infrastructure and ensuring adoption of those technologies by societies. The availability of appropriate information and communications infrastructure is a pre-condition for enabling the Fourth Industrial Revolution. Accelerated investments in 5G infrastructure and ensuring 5G-ready policy frameworks are critical priorities if we are to reap the benefits of digitalization.

Q. How is Nokia positioned for the Fourth Industrial Revolution?

A. Nokia is one of world's largest providers of communications technologies and equipment with the industry's most comprehensive end-to-end portfolio and expertise. We are enabling the

infrastructure for the Fourth Industrial Revolution including for 5G and the Internet of Things.

Nokia is one of the world's largest providers of communications technologies and equipment with the industry's most comprehensive end-to-end portfolio and expertise. We are enabling the infrastructure for the Fourth Industrial Revolution including for 5G and the Internet of Things.

We have recently introduced the Nokia Factory in a box - a conscious "Lego" like building block factory - designed to provide both flexibility and agility. Built on a backbone of predictive and preventive capabilities, this concept aims to provide a fully automated, no-touch modular factory that can be transported to a desired location, making real-time localized production a reality.

Another example is our partnership with the Reboot IoT Factory in Finland, which brings together forerunner factories, IoT solution providers and top-class research organizations to revolutionize the competitiveness of Finnish manufacturing industry.

Nokia takes a positive view on the future. We believe in the principle that technology does and should continue to be designed to serve the needs of people, and as such our view is that the net long-term impact of the Fourth Industrial Revolution will be positive for our planet. At the same time, however, we believe that if the socio-economic disruptions created by the Fourth Industrial Revolution are not managed pro-actively, those could put the long-term benefits of the Fourth Industrial Revolution at risk. Governments, industries and societies must therefore act quickly and proactively to establish constructive solutions helping to manage the transition to this new era, and mitigate any negative impacts. 🌱

SAMENA COUNCIL ACTIVITY

Comviva Joins SAMENA Council to Enhance its Presence in the MENA Region

SAMENA Telecommunications Council has announced that Comviva, a global leader in mobility solutions and a subsidiary of Tech Mahindra and a part of the US\$21 billion Mahindra Group has joined its members of leading global and regional technology providers and both regional and internationally operating telecom operator groups.

Comviva is aggressively focusing on extending its footprint across the MENA region to achieve the next phase of growth. Its mobility solutions are deployed by over 130 mobile service providers and financial institutions in over 95 countries across the globe and enrich the lives of over two billion people to deliver a better future. Its extensive portfolio of solutions spans around digital financial services, analytics and data monetization, digital services and messaging. It enables service providers to enhance customer experience, rationalize costs and accelerate revenue growth.

SAMENA Council's CEO and Board Member, Mr. Bocar BA stated, "With our telecom operator members continually investing in improving the digital experience of their end-users, and given the industry's increasing focus on seeking new modes and means of collaboration with multiple partners, we are pleased to have another member of the Mahindra Group, Comviva, become among the Council's leading technology provider members. Comviva's joining the membership should open new doors for our operator members to seek new partnerships in advanced mobility solutions, and to utilize Tech Mahindra's digital, design experiences, innovation platforms and reusable assets across a number of technologies, which are delivering tangible business value and experiences to its clients."


Speaking on the membership, Ramy Moselhy, Market Unit Head for MENA region said, "We are extremely proud and excited about



our presence in SAMENA Telecommunications Council and we look forward to working closely with the regional telecom operators. We are continuously evaluating and evolving our strategy to meet the new challenges in the market. This has emboldened us to invest and grow faster in the Middle East and North Africa (MENA) over the next few years."

Since inception, SAMENA Telecommunications Council's membership platform has played an integral role in generating new business opportunities for its membership, bringing regulators, operators and vendors together, while working toward addressing digital development matters that will define the future of the industry.

About Comviva Technologies Limited

Comviva is the global leader of mobility solutions catering to The Business of Tomorrows. The company is a subsidiary of Tech Mahindra and a part of the \$21 billion Mahindra Group. Its extensive portfolio of solutions spans digital financial services, customer value management, messaging and broadband solution and digital lifestyle services and managed VAS services. It enables service providers to enhance customer experience, rationalize costs and accelerate revenue growth. Comviva's solutions are deployed by over 130 mobile service providers and financial institutions in over 95 countries and enrich the lives of over two billion people to deliver a better future. For more information, please visit www.comviva.com 

AI for Good Global Summit 2019: Focusing on Innovation and Responsible Use



The AI for Good Global Summit is the leading United Nations platform for global and inclusive dialogue on AI. The Summit is hosted each year in Geneva by the ITU in partnership with UN Sister agencies, XPRIZE Foundation and ACM. The 3rd annual AI for Good Global Summit, held this month, commenced with a range of inspiring messages, important discussions and examples of Artificial Intelligence (AI) in action.

"Very few topics have captured the imagination of the public and promised to transform humanity more than Artificial Intelligence," said ITU Secretary-General Houlin Zhao at the Summit's opening ceremony. "The path to a transformative but also a safe, trusted and inclusive AI will require unprecedented collaboration between government, industry, academia and civil society."

The Summit aims to connect AI innovators with those seeking solutions to the world's greatest challenges so as to identify practical applications of AI that can accelerate progress towards the United Nations Sustainable Development Goals.

The Summit highlighted AI's value in advancing education, health-care and wellbeing, social and economic equality, space research, and smart and safe mobility. It also hosted debate around unintended consequences of AI as well as AI's relationship with art and culture. The Summit is also expected to generate 'AI for Good' projects to be enacted in the near term.

"The key question is: how do we drive innovation in a responsible way?" said Jean-Philippe Courtois, Executive VP and President of Microsoft Global Sales, Marketing and Operations during an opening keynote presentation.

Mr Courtois spoke of the need for all relevant stakeholders to work together and explained how Microsoft is partnering with governments, academic institutions, non-governmental institutions and businesses across the world to help ensure responsible AI. He also described an ethical decision framework for AI at Microsoft based on principles such as fairness, reliability and safety, privacy and security, inclusiveness, transparency and accountability.

Several other speakers on Day 1 of the Summit also mentioned the importance of fairness, inclusiveness and accountability as we work together to build AI solutions that address the world's biggest challenges. Human beings building AI need to be held accountable for the AI solutions they create, said Jim Hagemann Snabe, Chairman of the Board of Siemens, during his keynote address.

"We need to lead technology to the places we want it to take us."
— Jim Hagemann Snabe, Siemens

Keeping bias out of AI is already shaping up to be an important theme during the Summit.

Timnit Gebru, the Lead for Ethical AI at Google and Co-founder of Black in AI, spoke about efforts to reveal and prevent bias in AI and how to build new AI solutions that do not perpetuate racial or gender bias.

5 'Breakthrough' Tracks to follow

The focus of AI Summit 2019 was on AI and Health; AI and Education; AI and Human Dignity and Equality; Scaling AI and AI for Space, the future of Smart Mobility, AI and agriculture, AI's role in arts and culture, the unintended consequences of AI, among others.

"In China, AI has already touched broad sectors of China's economy," said Yan Huang, Senior Director of AI Innovation and AI Health Lead at Baidu. She gave examples of how AI is already being used to improve manufacturing, healthcare and language preservation.

Indeed, AI is not some future technology. It is quickly being embedded into our daily lives. But we need to shift the focus of AI away from learning individual online preferences and toward accelerating progress on the SDGs, said Mr Snabe of Siemens.

"I am a technologist and I am an optimist. If we were to apply the technology we have today, we will find solutions to these problems," said Snabe, referring to the SDGs. But we need to take control of the development of the technology – and that won't happen without leadership, he said.

"We need to lead technology to the places we want it to take us," said Snabe. "We need to have a 'True North' for which problems we need to solve and how we need to solve them."

"This is truly a leadership moment," he said.

As she helped kick off the Summit during the opening ceremony, Vicki Hanson, CEO of the Association for Computing Machinery (ACM), a partner and Gold Sponsor of the Summit, inspired the diverse crowd with her words: "Our decisions could change everything." 🌱

MEMBERS NEWS



We Have Achieved Impressive Results due to STC One Spirit: Al-Nasser during the Meeting of TOP 400



STC Group CEO Nasser bin Sulaiman Al-Nasser, considered the announcement of the upgrading of Moody's credit rating of STC as an evidence of the strength and the leading position of the company in CIT sector in MENA. He was talking during the Forum for Cultural Change (TOP 400) when he referred to STC New Values Drive, Devotion, and Dynamics, which represents the company's one team spirit. He added that many files have been closed with the government in a move that will contribute to the ease of implementation of many things in the future. In terms of DARE's strategy, he explained that it encouraged the spirit of innovation and teamwork. This is a great challenge for any system.

STC Maintains Its Lead as the Most Valuable Brand in Saudi Arabia in 2019

The STC brand maintained its rank on top of the list of the most valuable brands in Saudi Arabia and as the third in the Middle East in 2019, according to a recent valuation by the expert Brand Finance entitled "The top 50 most valuable brands of Saudi Arabia". The classification revealed that the value of the STC brand reached \$7.095 billion, at an increase of 6.7% from last year, maintaining the first rank for the second year in a row, while rising by 6 ranks on the list of telecom companies that are

valued at more than USD 5 billion. Brand Finance valuation consultancy revealed that Saudi Basic Industries Corporation (SABIC) brand was ranked second with \$3.96 billion in 2019, at an increase of 6.5% from last year. Al-Rajhi Bank came third with a \$2.92 billion brand value, at an increase of 12.4% from 2018, whereas Ahli Bank came in fourth with \$2.47 billion. As for Almarai, it maintained its fifth position with a brand value that reached \$2.18 billion, at an increase of 3.5%.





Batelco Group Announces Q1 Financial Results For 2019

Bahrain-based Batelco Group has announced its financial results for the first quarter of 2019, reporting an 11% rise in net profits to BHD14.6 million (USD38.4 million) on revenues of BHD101.2 million (up 2%), thanks to strong performance at Batelco Bahrain, Umniah in Jordan and Dhiraagu in the Maldives. The group also stated EBITDA grew 6% in Q1 2019 compared with the same period of 2018 to BHD38.6 million, while operating profits were up 8% to BHD21.9 million. Batelco Group CEO Ihab Hinnawi said that strong operational performances across the group represented a very promising start to the

year. 'Intense competition in the telecommunication markets we operate in continues to present challenges. However, growth in key areas including in our digital services, which improved by 12% year-on-year, supported the positive revenue contribution.' During the first quarter of 2019, Batelco's domestic fixed line and fixed broadband customer bases grew by 1% and 4% respectively, compared to 31 December 2018. However, the group's total subscriber base declined to 8.4 million in Q1 2019, a 10% drop on the 9.3 million recorded in the same period of 2018.



Batelco Completes the Sale of Its Kuwait Subsidiary, QualityNet General Trading and Contracting Company W.L.L

Batelco has announced that it has completed the sale of its 90% shareholding in its Kuwait subsidiary, QualityNet General Trading and Contracting Company W.L.L ("QualityNet") to Kuwait Telecommunications Company ("VIVA") in accordance with the signed Share Purchase Agreement ("SPA") dated 9th April 2019. The full transfer of shares has been completed with the fulfillment of the terms, conditions and covenants that were agreed between the parties in the SPA with the total transaction value of Kuwaiti Dinars 25.5M (BD31.6M), for the 90% shareholding. Batelco Chairman Shaikh Abdulla bin Khalifa Al Khalifa, who confirmed the finalisation of the sale, stated that as part of the Company's corporate strategy Batelco carries out strategic

reviews annually on its assets in order to crystalize value by rationalizing and optimizing its current portfolio of assets. "The sale of QualityNet for KD25.5M (BD31.6M) provides peak valuation for Batelco's shareholders and allows us to focus on redeployment of funds to a number of areas including acquiring synergistic growth opportunities in existing markets, funding the expansion of our current operations into selected adjacent businesses and funding investments in high growth digital adjacencies," Shaikh Abdulla said. Commenting on the sale, Batelco CEO of International Investments Ihab Hinnawi said that QualityNet, one of Batelco's earliest overseas acquisitions, has been a very strong asset for Batelco for more than 20 years and has contributed

significantly in providing value creation for shareholders. "The telecommunication industry in Kuwait has been going through a transformational phase in recent years with a focus on consolidation of fixed, mobile and broadband providers. QualityNet is the first, largest and leading ISP in Kuwait, and this deal supports the best strategic interest of all parties." "In line with our strategic objectives, developed to create the best value for our shareholders, the sale of QualityNet comes at the right time and supports our investment plans for Bahrain and all our operations footprints," he added. "Going forward, we will continue to assess all our investments and explore a number of opportunities with a view to strengthening our portfolio and capabilities," Mr. Hinnawi concluded.

Batelco Announces the Completion of Its Legal Separation to Two Independent Entities during a High Level Press Conference

The Minister of Transportation and Telecommunications, His Excellency Engineer Kamal bin Ahmed Mohamed, announced the completion of Batelco's legal separation process in implementation of the 4th National Telecommunication Plan (NTP4). This announcement was made during a press conference held 13 May in the presence of Batelco Chairman, Shaikh Abdulla bin Khalifa Al Khalifa, Acting Director of TRA, Shaikh Nasser bin Mohammed Al Khalifa, Batelco board members, executive management, stakeholders and officials from concerned parties. On this occasion, the Minister of Transportation and Telecommunications commented: "Batelco, one of the leading telecommunication providers in the Kingdom, has completed the legal separation as part of the National Telecommunications Plan approved by the Council of Ministers in May 2016. The Ministry of Transportation and Telecommunications continues to provide its support to all telecommunication companies in the Kingdom of Bahrain, including Batelco." "We have worked closely with Batelco to coordinate with all governmental entities and stakeholders in order to create comprehensive plans for the facilitation of the legal separation and restructuring of the two companies," added His Excellency. "The new infrastructure company will work with the government to create a fiber optic network providing residents in all areas of the Kingdom with high-speed internet access. These developments come in line with the Economic Vision 2030, which focuses on the provision of high quality services in the Kingdom of Bahrain and will achieve the government's vision of the 4th National Telecommunications Plan," he added. Batelco has recently announced the appointment of Mohamed Bubashait as the CEO of the new infrastructure company for National Broadband and Mikkel Vinter as the new CEO of Batelco Bahrain, which will be the entity responsible for the retail and enterprise operations. The two separate entities will remain under the ownership of Batelco. Batelco Chairman, Shaikh

Abdulla bin Khalifa Al Khalifa confirmed the completion of the legal separation, including the restructuring of the executive management teams, separation of operations systems and human resources, in line with the NTP4 telecommunication guidelines and TRA Regulations. Shaikh Abdulla also stressed on the importance of maintaining the best interests of the company and its stakeholders by stating, "It is a priority for the Board of Directors to achieve the highest possible returns as well as enriching future returns, and

growth and economic diversification of the telecommunication sector. It is thanks to the vision of our leadership that the Kingdom has received the highest level of international acclaim over the last few years, the latest being the Kingdom's ranking as fourth in the world according to the United Nation's Index of Communications Infrastructure." "Through the regulatory framework of the 4th National Communication Plan, the success of this project is based on the competition of providing high-speed



ensuring the continuous and sustainable success of the company in the long run." "We also want to confirm that the restructuring of the Company, as part of the NTP4, is going to create new horizons for Batelco and opportunities to invest in digital technology and furthermore, create new and diverse revenue streams which is in line with the Kingdom's vision for the growth of the digital economy." Acting General Director of the TRA, Shaikh Nasser bin Mohammed Al Khalifa said, "The legal separation project reflects the vision of His Majesty the King, His Royal Highness the Prime Minister and the Crown Prince, Deputy Supreme Commander and First Deputy Prime Minister to develop the

internet for the benefit of the consumer in order to provide them with unprecedented speeds of broadband services and support the business sector in order to make the Kingdom of Bahrain a strategic investment destination and a regional hub for trade and ICT," he added. Shaikh Abdulla concluded the press conference by stressing the importance of continued cooperation between all concerned parties in order to achieve the objectives of the national project. "The company's policy and strategic plan reflect the future of the telecommunication sector and its aim to provide a free and fair atmosphere for competition in line with the Kingdom's vision."



Alfa CEO and Chairman Marwan Hayek Wins Best Social CEO Award

Alfa Chairman and CEO Marwan Hayek won the Best Social CEO Award at the Middle East Social Media Festival 2019 that was held in Beirut. The award was offered to Hayek after obtaining the majority votes of 2000 marketing and communication experts who were surveyed for a month. The award was launched this year to reflect the importance of each executive's effective digital presence in view of the significant increase in the use of social networking platforms. The result of the vote was decided in view of Hayek's commitment to interact personally and on daily basis with followers in order to better serve customers.



du Acknowledged as Best Managed Security Service Provider in the Middle East by Fortinet

du, from Emirates Integrated Telecommunications Company (EITC), has been acknowledged for its prominent efforts in the Middle Eastern cybersecurity space after being presented the Managed Security Service Provider, "Visionary of the Year" Award by Fortinet, a global leader in high performance cybersecurity solutions. Andy Ward, Senior Vice President ICT Products, du, said: "As businesses across the UAE undergo rapid digital transformation, the need for comprehensive solutions to counter emerging security threats and breaches is becoming paramount. At du, we are proud to be acknowledged as a leader in this category and we will continue to steer industry innovation to ensure our enterprise customers receive the best possible technologies, solutions and expertise to guide their businesses into the future." du was awarded the accolade during Fortinet's annual Partner Sync

Conference. Fortinet leveraged this event across the GCC. to recognize its partners and distributors



du's BPaaS-Based Use Cases Lead Blockchain Technology Revolution in the UAE

Reiterating its commitment to regional growth, du, from Emirates Integrated Telecommunications Company (EITC), is test-driving a number of solutions designed to enable government entities to support the UAE Blockchain Strategy by transforming their current and future activities with the goal of making them digital by the year 2021. The paperless vision and blockchain initiative by Smart Dubai also supports the objective of making Dubai the smartest and happiest city on Earth. "Blockchain technology is at the heart of the region's technology transformation. Designed for transparency, it provides advanced transactional data security and provenance of transactions," said Farid Faraidooni, Deputy CEO – Enterprise Solutions, EITC. "By building on top of our BPaaS, du's new use cases are an important step towards providing smart solutions that create efficiencies for government transactions leading up to 2021, solutions that will usher in the region's digital future."

'Digital inspections and permits'

Through its partnership with ConsenSys, a leading blockchain solutions provider and venture production studio, du is building decentralized applications and

offering an integrated set of solutions for the blockchain ecosystem. This solution features a digital inspection checklist which can be filled and the inspector will assign a number of signatories to approve /reject on the form to generate the final permit. It will have an executive dashboard for the authorized entities to see how many documents have been approved/rejected or are pending for a specific reason. Use cases include inspection processes (food, consumer goods, and buildings), institutional permits (clinics, schools) as well as individuals permits.

'Document attestation'

Part of the Blockchain Platform as a Service (BPaaS), document attestation solution uses contract capabilities that will facilitate and automate the process of attesting any document by governmental entities. The proposed solution allows government employees to attest or accredit documents and stamp the document on the blockchain once validated. From there on, any employer or individual can instantly verify the validity of the attested document via a web browser or a mobile-based application. "The recent showcasing of these groundbreaking solutions marks the next phase of our collaboration with du

who remain at the forefront of blockchain adoption in the region. By providing access to a robust and scalable platform to develop, test and manage blockchain applications, ConsenSys is helping entities from various sectors reduce costs, increase efficiency and together create this decentralized world that we have envisioned," said Rami Maalouf, Solutions Managing Director, ConsenSys MENA. The above use cases are built on the Blockchain Platform as a Service (BPaaS), a cloud native blockchain infrastructure that can provision private blockchain networks with a high level of customization, support multiple consensus algorithms with monitoring, managing capabilities and smart contract capabilities in addition to supporting multi-protocols. BPaaS platform offers an easy way to explore new technology and how it can be used to help businesses access and develop blockchain-based applications. They can then focus on the business use case itself as it plays across all industries including government, financial services, insurance, supply chain, healthcare, education and more.



Etisalat Misr Outlines Investment Plans For 2019; Eyes Fixed line launch in Less Than Two Years

Egyptian mobile network operator (MNO) Etisalat Misr has announced that it will invest more than EGP4.5 billion (USD261 million) in 2019, EGP3 billion of which will be spent on modernizing its network infrastructure. With the spending plans outlined by the cellco's CEO Hazem Metwally in an interview with Reuters, the executive also revealed that his company is aiming to begin offering a commercial fixed line service in less than two years, with the MNO having already reportedly activated hundreds of lines 'experimentally'. As noted in TeleGeography's GlobalComms Database, in October 2016 Etisalat Misr acquired a license allowing it to 'provide a fixed service using the core infrastructure of licensees to set up and establish the infrastructure of telecom networks'; this concession, which is initially valid for 15 years – was taken up by the cellco in tandem with its acquisition of a 4G licenses at an additional cost of USD11.3 million.



Tamdeed Projects and Etisalat Facilities Management Highlight Digital Transformation Trends at BICSI MEA Conference

Tamdeed Projects and Etisalat Facilities Management, subsidiaries of Etisalat Services Holding, highlighted the latest trends and best practices for powering digital transformation in smart cities and smart buildings at the recently concluded 2019 BICSI Middle East & Africa (MEA) Conference and Exhibition. The conference was held at the Dubai World Trade Centre under the theme 'From AI to Zettabytes: A Connected Future!' It featured keynotes, a panel discussion, and technical presentations by international experts sharing the latest advancements in the world of structured cabling infrastructures, extra low voltage (ELV) systems and Information and Communications Technology (ICT). Tamdeed Projects and Etisalat Facilities Management (eFM) were the event's exclusive diamond-level sponsors. The participation of both entities reinforces their commitment to support the ELV, ICT and communications network community and promoting innovation within all aspects of telecom network and smart city solutions. Tareq Salman, General Manager, Tamdeed Projects, delivered a presentation on 'Tamdeed's transformation journey from passive to active technologies'. Tamdeed's vision is to be the leading strategic partner in value-added communications networks. Salman shared insights into Tamdeed's journey from a fiber optic solution provider to an ELV and ICT player. Eng. Ali Hassan Abdulla Al Harmoodi,

General Manager, eFM, presented "eFM – The Future of FM", highlighting the company's skilled workforce, diversified industry knowledge, smart and integrated facilities management offerings, IoT, cloud, and AI-based solutions, and reliable technology ecosystems, among others. The conference hosted an exhibit hall with over 40 exhibiting companies, a BICSI Theatre where companies gave short presentations on their latest innovations, and a Technology Showcase featuring new products, projects, and services from multiple exhibitors. Tamdeed showcased its broad portfolio of integrated OSP (Outside Plant – outdoor

fiber optic infrastructures), Telecom, ELV and ICT solutions and services in the UAE, while eFM presented innovative Smart Training Rooms, Smart Meeting Rooms, and the integration with various building management and automation systems. The conference was organised by Building Industry Consulting Service International (BICSI), a professional association supporting the advancement of the information and communications technology (ICT) community covering the spectrum of voice, data, electronic safety & security, extra low voltage, audio & video technologies and project management.



Omantel Q1 Net Profit Up 34%

Oman Telecommunications Company (Omantel), the Sultanate's incumbent telecoms operator, has announced its unaudited financial results for the first three months of 2019, including the effect of fully-consolidated Zain Group results. Omantel has posted group revenue of

OMR628.7 million (USD1.6 billion) for Q1 2019, compared to OMR470.0 million a year earlier, mainly due to the consolidation of Zain's revenue, while turnover from domestic operations fell 10% year-on-year to OMR130.5 million. Group EBITDA rose by 77% to OMR269.9 million in 1Q19,

while net profit grew 34% from OMR45.2 million to OMR60.5 million over the same period. Domestic profit rose 12% y-o-y to OMR19.0 million, on the back of growth in fixed line revenue, improved gross margins and cost optimization measures.



Sudatel's CEO Wins Major African Telecom Award

At a ceremony in Nairobi, Mr. Tarig Hamza Zain Elabdein, President and CEO of The Sudatel Group, was named East African CxO of the year at the annual East Africa Com awards. These awards celebrate the achievements of the people and organizations improving connectivity and accelerating digital transformation in East Africa. They are part of the East AfricaCom show, the premier strategic event for telecoms, media, broadcasting and technology leaders in East Africa which is taking place in Nairobi this week. Mr. Zain Elabdein beat off strong competition in his category from Ben Roberts, Group Chief Technology and Innovation Officer of Liquid Telecom; Erik Hersman, CEO of BRCK; Joshua Sandler, CEO of Lori Systems and William Kibiwott Chesire, CEO (East Africa) of Mtech Ltd. Mr. Zain Elabdein has been President and CEO of The Sudatel Group since 2014. During this time he has developed Sudatel into a major telecom operator with operations across Northern, Central and Western Africa – and an award-winning data center. Internet capacity in Sudan will increase eightfold during 2019 as a result of Sudatel's recent investments in its 4G network whilst inter-country connectivity has been improved through the connection of Sudatel's fibre to the border countries of Chad, Ethiopia and Egypt. Mr. Zain Elabdein also organized the

first US trade delegation to Sudan in 20 years following lifting of US sanctions. Mr. Zain Elabdein said: "This is a wonderful recognition for both myself and Sudatel. I would like to thank my colleagues and partners for working together to build Sudatel into a world-class operator. Our ongoing strategy is to expand beyond a pure connectivity provider to offer a range of ICT services across the region."



Sudatel Participates in the Successful Launch for Arabsat 6A Satellite

The Sudatel Telecom Group, through one of its companies Sudasat and Hajar Group, in partnership with Canar Telecom, witnessed the launch of Arabsat 6A satellite at orbital position 30.5, which includes a load of four Ka-band transponders, through which Sudasat will provide broadband communications and broadband services across the Sudanese territory to Internet providers, VSAT subscribers and mobile network operators. It also provides multi-purpose solutions for commercial and government sectors. Arabsat 6A includes many of state-of-the-art services that makes it the most satellite up-to-date, effective, flexible and versatile as it

has a high capacity and provides digital broadcasting, telecommunications and Internet services to the customers in Sudan. It is worth mentioning that this satellite ground station services is hosted by the Sudatel Telecom Group via Abu Haraz satellite station. The satellite has been launched successfully from Cape Canaveral, Florida, USA after all necessary measures have been completed. This operation has been attended by Eng. Tarig Hamza Zain Elabdein, President & CEO of Sudatel Group and Chairman of Board of Directors of Sudasat, who received an invitation from the Kennedy Space Center in Florida and Arabsat for attending the

launch operation. The President & CEO of Arabsat, member of Sudatel Board of Directors, Eng. Khalid Balkheyour and the CEO of Canar Telecom, Eng. Hashim Hasab El-Rasoul, witnessed this launch operation as well. Arabsat President & CEO Khalid Bin Ahmed Balkheyour expressed his pleasure with this strategic partnership with Sudatel Group through Sudasat. He pointed out that the increasing demand for satellite telecommunication services in the region requires cooperation and agreement with leading companies, Providing high quality and reliable services Eng. Tarig Hamza Zain Elabdein, President & CEO of Sudatel Group, Chairman of Sudasat, said: "This move marks a milestone in the company's history and confirms its strategic plan to move the company to an integrated telecommunications operator to deliver unprecedented services through partnerships, upgrading it from the local and regional level to a much higher level. This move will be the first step in the process of launching a satellite for Sudan in which Sudatel will play a pivotal role through its foreign strategic partnerships" Zain Elabdein concluded.





Telecom Egypt Releases Q1 Results

Telecom Egypt has announced its Q1 2019 results ending 31 March 2019.

Q1 2019 key highlights

Consolidated revenue came in at EGP 6.1bn, recording +27% YoY. Retail revenue contributed 57% to the total YoY growth backed by the rise in data services revenue. Customer base continued to rise on all fronts. On a YoY basis, fixed voice subscribers increased +11%, fixed broadband jumped 27% and mobile subscribers rose 45% reaching 4.2mn customers.



EBITDA totalled EGP 1.9bn, climbing 26% YoY with a healthy margin of 31%.

Net Profit doubled YoY, landing at EGP 1.6bn with a margin of 27%.

In-service CapEx intensity reached 23% on continuing infrastructure expansion.

Net Debt recorded EGP 8.1bn down from EGP 12.6bn in Q4 2018, representing 1.1x annualized EBITDA down from 2.1x in Q4 2018.

Adel Hamed, Group Chief Executive, commented: "This quarter shows strong results and a robust preface to Telecom Egypt's strategic objectives for 2019. Our retail revenue continues its notable growth driven by both fixed and mobile data, reflecting the growth of our customer base across our spectrum of services, which will soon expand to quad play. We aim to build upon our network capabilities and grow to become a fully-fledged ICT provider within 2019. The quarter is also marked by the strong execution ability of this organization having completed two strategic national projects in record time, reflecting our key

role as the facilitator of Egypt's digital transformation initiative. After the success of the schools' connectivity project in Q3 2018, Telecom Egypt, in March 2019, distributed 613k data SIMs to students in their first-year of secondary education in four days. We have also successfully connected more than 650 governmental buildings in Port Said with fibre, with more governorates to follow in the next phase. On the wholesale front, this quarter's performance shows the strong growth in wholesale revenue especially in light of the growing data consumption of MNO customers. I'm also very pleased with the PEACE cable system agreement signed in April that secures USD 45mn of revenue over the lifetime of the cable and will significantly contribute to IC&N revenue in the second quarter. Moreover, we signed a USD 20mn Lol with PEACE's parent, HENGTONG, which will allow us to further monetize our international network, while simultaneously optimizing our Capex spending."

Viva Completes Qualitynet Takeover

Mobile operator Viva Kuwait – part of the Saudi Telecom Company (STC) group – has acquired 100% of the capital of Kuwaiti ISP Qualitynet at a total price of KWD28.3 million (USD92.8 million), after receiving final regulatory permission to buy stakes from Bahrain-based Batelco (90%) and National Bank of Kuwait (10%). The Kuwait Times quotes Viva chairman Mahmoud Ahmed Abdulrahman as saying: 'The acquisition allows Viva to capture the growth potential in the business market ... for the journey towards fully integrated products and services and innovative solutions.' Viva CEO Maziad Nasser Al-Harbi added: 'The acquisition of Qualitynet is a corner stone for us to successfully implement our strategy to grow in the

enterprise segment. It will enable us to offer unique products and services to the Kuwaiti corporate customers bringing it to the equal of international standards. At the same time, individual customers will benefit with diversified and enhanced service offerings tailored to solve their ever changing communication needs – at

home and on the go.' A Share Purchase Agreement was signed by Batelco to sell its 90% Qualitynet stake to Viva in early April, confirming a deal which was initially struck in November 2018. Later in April, Qualitynet won a license to provide internet, telecommunications and satellite services in Iraq.

Kuwait's #1 Internet,
Data Services,
Enterprise and ICT
Solutions Provider

VIVA Reports KD 66.6 Million (US\$ 219 Million) of Revenues for First Quarter 2019

Kuwait Telecommunications Company (VIVA), Kuwait's fastest-growing and most developed telecom operator, announced the financial results for the first quarter of the period ended 31 March 2019; whereby VIVA's revenues reached KD 66.6 million whereas the net profit reached KD 9.6 million during the first quarter in 2019. Commenting on the Q1-2019 financial results, Dr Mahmoud Ahmed Abdulrahman, VIVA's Chairman said: "Despite the continued competition witnessed in the Kuwaiti telecom market, VIVA was able to achieve good levels of revenues as well as enhanced the operational efficiency to ensure generating positive return to our shareholders. VIVA achieved these results due to an integrated management approach by a highly professional team that reinforces VIVA's substantial and positive role as a leading telecommunications company that always provides intelligent communications solutions to satisfy the needs of its customers and meet their needs." He added: "VIVA was able to achieve revenue of KD 66.6 million during Q1- 2019 compared to KD 77.6 million for the same period last year. Also, VIVA managed to achieve positive earnings for its shareholders as a result of the commitment to elevate the quality of customer service and improving the operational efficiency". On his part, Eng Maziad Nasser Al-Harbi, VIVA's CEO said: "During Q1-2019 VIVA achieved a good levels of its revenues and profitability in addition to strengthen its leadership in

the telecom market; in line with its plan to launch the fifth generation 5G network in the near future in Kuwait, to be one of the first telecommunications companies in the Middle East to introduce this service to its customers to match the world's largest companies in this field. It is noteworthy to mention that VIVA won recently "the third place as Best Company in the Middle East in Investor Relations for 2018 and the first in Kuwait to be the "Leading Corporate in Investor Relation of 2018" according to MEIRA and Best Network Development Award for Best Network Development in the Middle East and North Africa at the 5G MENA Awards 2018. He added: "We will continue our efforts to implement our strategy to enhance our competitiveness and further growth and success in the Kuwaiti telecom market by launching a unique and innovative portfolio of services, products and offerings that are in line with the technological development and customer needs and requirements". Commenting on VIVA Financial Results Al-Harbi added: "The Company's revenues declined in Q1-2019 to reach KD 66.6 million compared to Revenues of KD 77.6 million during Q1-2018. The reason for the decline is that the comparative period of 2018 witnessed extraordinary promotions resulted in high increase in the revenue. Currently and during 2019, VIVA has adopted a balanced operating policy in its marketing strategy to focus on the quality, which is reflected in the financial and operational efficiency of the company.

Despite this decline in revenues during Q1-2019, VIVA recorded a growth of 4.2 percent in its EBITDA to reach a KD 18.7 million with EBITDA margin of 28 percent during the first quarter of 2019 compared to 23 percent in the first quarter of 2018. As a result, VIVA reported a net profit of KD 9.6 million (earnings per share of 19 fils) during the first quarter of 2019 with a profit margin of 14.5 percent. VIVA's customer base reached approximately 2.04 million at the end of March 2019. On his part, Mohammed Bin AbdulMohsen Al-Assaf, VIVA's CFO, said: "VIVA's financial results reflected its ability to compete, sustained revenues and maintain its position as the second largest telecom operator in the Kuwaiti market in term of revenues in the telecom sector. Due to VIVA's secure financial policy we continued to implement the cost reduction program adopted by the company during the previous year to reach the best results to enhance profitability by adopting a balanced and effective financial policy in operating and capital expenditures. To shed the light on the financial position of the company as of 31 March 2019, Al-Assaf Added: The Total assets at the end of the period reached KD 331.8 million where total shareholders' equity reached KD 181.6 million, with a book value per share of 364 Kuwaiti fils. In addition, VIVA has strong financial solvency position, which is considered to be the best across the Middle East telecoms companies.



Zain Group Net Profit Rises 15% in Q1 2019 to Reach US\$ 155 Million

Zain Group, a leading mobile telecom innovator in eight markets across the Middle East and Africa, announces its consolidated financial results for the first quarter (Q1) ended 31 March, 2019. Zain served 50 million customers at the end of the period, reflecting a 6% increase year-on-year (Y-o-Y). Zain Group generated

consolidated revenues of KD 404 million (USD 1.33 billion) for the first quarter of 2019, up 56% compared to the same period in 2018. EBITDA for the quarter reached KD 178 million (USD 586 million), up 111% Y-o-Y, reflecting an EBITDA margin of 44%. Net income for the quarter reached KD 47 million (USD 155 million), up 15% Y-o-Y

reflecting Earnings Per Share of 11 Fils (USD 0.04). For Q1 2019, foreign currency translation impact, predominantly due to the 48% currency devaluation in Sudan from an average of 24.9 in Q1 2018 to 47.5 in Q1 2019 (SDG / USD), cost the Group USD 59 million in revenue, USD 27 million in EBITDA and USD 10 million in

net income. The company held its Annual General Meeting (AGM) on 20 March 2019 and approved the distribution of a cash dividend of 30 fils (USD 0.10) per share for the 2018 financial year. The consolidation of Zain Saudi Arabia (KSA) into Zain Group started in Q3 '18 resulted in an additional USD 559 million in revenue and USD 255 million in EBITDA during Q1' 19. The adoption of new accounting standard IFRS 16 – 'Lease' from the beginning of 2019 resulted in a benefit to EBITDA by KD 19 million (USD 61 million), and a minimal increase in net income of KD 1.75 million (USD 5.8 million). Group data

revenue experienced a 118% growth in Q1 2019, representing 37% of the Group's total revenue. It should be noted that the data growth is predominantly due to the consolidation of Zain KSA results. The three-month period was further highlighted by the notable 77% increase in net income in Zain Iraq; healthy net profit growth of 11% by Zain Kuwait and 55% by Zain Bahrain; with Zain Sudan continuing to perform exceptionally well in all key financial indicators in local SDG currency terms. Commenting on the results, Chairman of the Board of Directors of Zain Group, Mr. Ahmed Al Tahous said, "The

impressive first quarter 2019 results were achieved through the Board's and Executive Management's focus on implementation of the digital transformation strategy that has seen substantial investments in network upgrades, fiber optics and 5G readiness. These initiatives have been aimed at diversifying income sources primarily from digital-related areas and at the same time improve customer experience. We will continue driving cost optimization initiatives to improve the efficiency of the operations and seek new lucrative opportunities in driving the business forward and increasing shareholder value."

Zain Group and EXFO Honored at 5G MENA Awards



Zain Group, one of the region's leading mobile network operators with a presence in eight countries and EXFO Inc. (NASDAQ: EXFO, TSX: EXF) the communications industry's test, monitoring and analytics experts, have been jointly recognized with the 5G MENA award for Best Telecom Service Innovation. The award was presented at 5G MENA 2019, the largest event in the Middle East and North Africa region to focus on advancing and commercializing 5G networks. It recognizes the operator "winning in the Digital Revolution by utilizing existing technology capabilities or developing new ones to introduce new products and services for consumers and customers." Highlights of the Zain Group-EXFO

submission:

- Solution name: Nova
- Objective: Unlock the value of network data to enrich customer experience and boost data service revenues
- Support CEM not only for network and service operations but also for business teams
- EXFO and Zain collaborated on 40+ innovative use cases embedding AI and machine learning to improve end-user experience, raise customer satisfaction, fight against fraud and generate new revenue streams
- Successful modeling for churn prediction at a rate above 70%
- Data service adoption model helps Zain increase subscriber access to data

services; measure and deliver superior customer experience; and monitor the impact of network optimization and marketing campaigns as well as associated revenues

- The result of a partnership of more than 10 years spanning Zain's 2G, 3G, 4G and 5G journey with EXFO's test, monitoring and analytics portfolio

"Zain's innovative digital strategy is built on solid customer experience management and evolving the existing telco core to maximize value," said Khawla Al-Jaber, Zain Group's Technology Strategy and Performance Director. "The customer intelligence provided by EXFO is one of the crucial factors in achieving this goal and in helping Zain turn this data into service differentiation and efficiency improvements that impact our revenues." "EXFO has been Zain's close partner for more than a decade, supporting their operations in technology and business transformations with our test, monitoring and analytics," said Abdelkrim Benamar, EXFO's Vice-President of Service Assurance, Systems and Services. "Using technologies such as AI and machine learning helps us take predictive analytics to the next level. Our customers get a deep understanding of an increasingly complex ecosystem; actionable insights to automate network operations; increased subscriber satisfaction; and the ability to monetize their investments. These are the foundations you need to do 5G right."

Zain Showcases Its Role in Contributing to Kuwait National Development Plan

Zain, the leading digital service provider in Kuwait, concluded its platinum sponsorship of the 2nd Consulting Services for Development Plan Forum (ENCON2) entitled "Role of the Private Sector in Execution and Automated Integration among Related Agencies to Boost Productivity and Combat Corruption". The event, held at Sheraton Kuwait Hotel from 30 April – 2 May, came under the patronage of H.H. First Deputy Prime Minister, Minister of Defense, and Chairman of the Supreme Council for Planning and Development Sheikh Nasser Sabah Al Ahmad Al Sabah. Zain took part in the forum's opening ceremony, which witnessed the presence of Director of the Financial Supervisory Commission Dr. Abdulaziz Al Dakheel, Director of the Federation of Kuwaiti Engineering Offices and Consultant Houses Bader Al Salman, and General Manager of the forum's organizer NoufEXPO Nouf Al Marzouq, who all took part in recognizing Zain Kuwait's Chief Corporate Communications and Relations Officer Waleed Al Khashti for Zain's support to the event. During the forum, Zain participated in the first panel discussion entitled "Role of the Private Sector in Executing Development Plans" represented by Zain Kuwait's Government and Large Segment Director Basima Al Enezi. The panel discussion also featured the Secretary-General of the Supreme Council for Planning and Development Dr. Khalid Mahdi, CEO of the Arab Office for Engineering Consultancy Tareq Shuaib, General Manager of Molden Technical and Consulting Projects Company Abdulaziz Al Sadoun. During the discussion, Al Enezi showcased Zain's leading role in contributing to elevation of the efficiency of the execution of the Kuwait National Development Plan (New Kuwait), being a leading national company in the Kuwaiti private sector, which is considered a strategic partner in the country's developmental goals and one of its main pillars. ENCON2 featured the presence of many entities from both the public and private sectors, which added a great value to the forum's program on multiple levels. NoufEXPO organized the

event in collaboration with the Federation of Kuwaiti Engineering Offices and Consultant Houses, with a participation from the Supreme Council for Planning and Development, Central Agency for Public Tenders, Central Agency for Information Technology, and Kuwait Municipality, the Apparatus for Developing Silk City (Al Sabbiya) and Boubyan Island, Kuwait Direct Investment Promotion Authority (KDIPA), Kuwait Fire Service Directorate, Ministry of Electricity and Water, Environment Public Authority, Ministry of Public Works, Ministry of Health, Kuwait University, Ministry of Education and Higher Education, and Kuwait Petroleum Corporation (KPC). The forum also featured the presence of several supervisory bodies, including the State Audit Bureau of Kuwait, Department for Legal Advice and Legislation, Kuwait Anti-Corruption Authority (Nazaha), the Financial Supervisory Commission, and the Government Performance Follow-Up Agency. Zain affirmed its commitment in being present at the various projects and

that projects are executed accurately according to specifications and within their budgets. Shortening the documentary cycle and significantly limiting variation orders to boost transparency and combat corruption were also among the main topics of the event. In addition, the forum focused on increasing the level of cooperation and coordination among all agencies mandated with the delivery of consulting services. As a first step, ENCON2 discussed the requirements for developing a healthy administrative and technological environment among the executive and supervisory government agencies to automate the issuance of approvals and permissions related to consulting services. The target is the development of a web portal to be the unified gateway for issuing all approvals and permissions related to deliver consulting services for government and private sector projects in general, and especially for projects of the Development Plan. ENCON2 also discussed the best approach to implement



activities that contribute to pushing the national economy wheel and achieving the various developmental objectives of the country, further reflecting its role as a leading national private sector company that engages with planning initiatives that achieve Kuwait's prosperity on all levels. The 2nd Consulting Services for Development Plan Forum (ENCON2) mainly aimed at boosting the efficiency by which the phases of Kuwait's 2035 Development Plan are executed. It also aimed at ensuring

Kuwait's government vision of empowering the private consulting sector to assume the roles of approvals and permissions issuance and execution of projects of the Development Plan, and the best approach to empower the government agencies to carry out an accompanying effective supervisory role only. This conforms to Kuwait's strategy of mandating the private sector with a more significant economic role.



Accenture Helps Occidental Advance Its Digital Transformation

Accenture is helping Occidental Petroleum, an international oil and gas exploration and production company, accelerate the transformation of its information technology architecture in support of its business objectives. Accenture, working with Occidental since 2016, is continuing to collaborate on ways to streamline core business processes from the back office to field operations to improve operational agility and efficiency and unlock business value. Targeted benefits include reduced

downtime and operational cost as well as enhanced production using digital capabilities. Accenture's Innovation Hub will help the project's teams to explore and act on the latest thinking, industry research and cutting-edge technology. "Occidental strives to implement transformational technologies to improve operations and increase efficiencies across all of our business units," said Yanni Charalambous, vice president and CIO for Occidental. "We look forward to continuing our

collaboration with Accenture to capitalize on leading digital technologies and practices." Jeff Miers, a managing director in Accenture's Energy practice and client account lead for Occidental, said, "Occidental is taking an end-to-end look at how digital technologies can be applied in the organization. This approach leaves no stone unturned in the hunt for new ways of working and improving efficiencies across the company."

Accenture Joins Forces with Al Maskari Holding to Help Emiratis Develop New Skills Needed for the Workforce of the Future

Accenture a global professional services company, is collaborating with investment company Al Maskari Holding on a program to equip UAE nationals with the skills needed to future-proof their careers and to strengthen the local talent base. The collaboration focuses on attracting and nurturing the best regional talent as well as Emiratis living abroad. It is also designed to enable Emiratis to build their careers and contribute to their country's growth and innovation agendas. In line with its commitment to helping UAE nationals hone their future workplace skills, Accenture has launched multiple initiatives to help address talent gaps. These initiatives are designed to help Emiratis acquire the practical skills, including critical thinking and problem-solving, that are universally applicable regardless of their professional interests. "In keeping with the objectives of the UAE Vision 2021, we are dedicated to playing an active role in developing young talent," said Alexis Lecanuet, Regional Managing Director for Accenture in the Middle East and Turkey. "With proper support, Emirati youth will be able to reach their true potential. Our collaboration with Al Maskari Holding will considerably increase employment opportunities for UAE nationals and provide them with the skills needed for success." Mohamed Al Maskari, Director of Government Affairs at Al Maskari Holding, said, "To keep up with the rapid pace of technological

change, UAE nationals – as is true of all nationalities – must continually challenge themselves and embrace lifelong learning to stay relevant. Accenture's global reach and breadth of experience allow it to understand local market nuances and requirements and develop targeted programs that align the currently available talent supply with employer needs." The program will include support for the hiring of Emirati talent, campus development campaigns in the UAE, corporate social responsibility programs, and inclusion and diversity programs. Of equal importance, supporting women throughout their careers and driving gender diversity within the workforce are crucial in the UAE as organizations work to harness and develop their people's skills. A recent

report by Accenture titled "Getting to Equal 2019" shows that while diversity factors alone have a significant impact on the willingness and ability to innovate, a culture of equality is the essential multiplier to help companies maximize innovation. "In addition to developing tailored up skilling programs that help people transition to jobs that are in demand locally, we are using Accenture's insight into creating a culture of equality to attract Emirati talent from abroad," Al Maskari said. In 2018, Accenture was ranked No. 1 on Thomson Reuters' Index of the World's Most Diverse and Inclusive Companies. On the path to gender equality, Accenture set bold goals to achieve a gender-balanced workforce by 2025 and to have women account for 25% of managing directors by 2020.



"OUR COLLABORATION WITH AL MASKARI HOLDING WILL CONSIDERABLY INCREASE EMPLOYMENT OPPORTUNITIES FOR UAE NATIONALS AND PROVIDE THEM WITH THE SKILLS NEEDED FOR SUCCESS."

ALEXIS LECANUET

Regional Managing Director - Accenture Middle East & Turkey

accenture



Accenture to Help Hawaiian Airlines Recruit Professionals for New IT Center in Arizona

Accenture has been selected by Hawaiian Airlines to support recruiting efforts for the company's recently opened information technology (IT) center in greater Phoenix. Drawing on its expertise in developing proactive recruiting models to deliver high-value, IT-focused and skilled talent, Accenture will help create a recruitment program that is closely integrated with the airline's corporate strategy and human capital strategies. Hawaiian Airlines expects to hire more than 100 IT professionals for its Phoenix Technology Center. Combined with the over 250-person Honolulu Technology Center, Hawaiian Airlines will develop solutions that enhance and transform its operations, as well as provide additional layers of security and redundancy for the airline's IT systems and personnel. The Arizona facility is the airline's first such center outside of Hawai'i, and is a complement to the carrier's current IT workforce. "This facility serves as an additional incubator for continued IT innovation and development. Working as one team, our Honolulu and Phoenix centers will deliver customer experience and operational solutions for the airline," said John Jacobi, senior vice president of IT at Hawaiian Airlines. "Commercial aviation is heavily dependent on technology and creating better connections with customers through IT innovations can also pay dividends in improving our brand affinity and customer loyalty. We're excited to have Accenture help us lead this transformational recruitment program, capitalizing on Accenture's knowledge of the local IT market and relationships with regional colleges and universities." Jonathan Keane, managing director of Accenture's Aviation practice, said, "We're excited to be working closely with Hawaiian

Airlines to help manage recruiting efforts for its new IT center. Leading companies like Hawaiian Airlines see the advantage of efficient recruitment processes that deliver high-quality engaged hires to provide a competitive advantage that can positively impact business performance." Sandra Watson, President & CEO of the Arizona Commerce Authority, said, "Hawaiian Airlines' new IT center will help enhance the Phoenix area's reputation as a regional hub for technology and innovation. This effort is reinforced by recruitment support from Accenture, which knows the Arizona market and is an important technology employer itself with more than 300 people and decades of service in our state." Hawaiian Airlines announced last November that it would open an IT center in Arizona in the first quarter of 2019.



AT&T Floats Proposal for New Category of CBRS Devices

Members of AT&T's technical and regulatory staff met with officials in the FCC's Wireless Telecommunications Bureau to discuss a possible new category of devices operating in the Citizens Broadband Radio Service (CBRS) 3.5 GHz band. According to an ex parte filing (PDF), the meeting primarily focused on AT&T's questions about whether the commission would entertain a proposal to increase the power levels for a new category of CBSDs, a term that generally refers to CBRS small cells. The FCC currently has two categories for CBSDs: Category A refers to a lower power base station and Category B refers to a CBSD that must be deployed

outdoors and has higher maximum power limits compared with Category A devices. According to AT&T's presentation (PDF), it is advocating a proposal to allow a new Category C CBSD with even higher power, which would allow for "operational, technical flexibility" and enable additional 5G use cases for CBRS as a midband anchor for 5G New Radio (NR). Specifically, it proposes the addition of a third category with maximum allowable Equivalent Isotropically Radiated Power (EIRP) up to 62 dBm/10 MHz. EIRP refers to the total RF power radiated by the antenna. For Cat A devices, it's 30 dBm/10 MHz and for Cat B CBRS devices, it's 47 dBm/10 MHz.

Under certain conditions, as determined by the Spectrum Access Controller (SAS), Cat C devices could take advantage of midband propagation characteristics, but AT&T said its proposal would continue to protect incumbents and not impact current SAS certifications. The proposal comes as the CBRS industry prepares for initial commercial deployments in the General Authorized Access (GAA) portion of the band. The Priority Access License (PAL) portion of the band involves the auctioning of licenses and that's not expected to happen until next year.

AT&T and Mutualink Enhance Interoperable Communications for First Responders

Clear, consistent and reliable communications are critical to helping first responders effectively achieve their mission. That's why AT&T has entered an agreement to resell Mutualink to enhance interoperable communications for public safety. This new relationship will allow AT&T to bring Mutualink's Interoperable Response and Preparedness Platform (IRAPP) to first responders and supporting agencies using services provided over FirstNet – America's public safety communications platform. "FirstNet brings public safety one, nationwide platform for consistent, reliable communications across agencies and jurisdictions," said Chris Sambar, senior vice president, FirstNet Program at AT&T. "As apps and mobile data increasingly become critical components of the public safety response, we want to help make sure the flow of information that FirstNet provides remains seamless. Our agreement with Mutualink aims to do just that, taking the interoperability that FirstNet provides to the next level." FirstNet already facilitates multi-agency communications to aid in incident response and resolution. The agreement with Mutualink builds upon this, expanding the reach, reliability and

capability of FirstNet services today. FirstNet subscribers can use the Mutualink IRAPP solution to enhance their ability to easily and quickly communicate across systems and applications, sharing voice, data, video and more in a highly secure environment. Take a school emergency as an example. Quick access to security cameras and building schematics can provide integral insight into the situation to aid in the response. With the Mutualink IRAPP solution, school districts and first responders subscribing to FirstNet can more easily link these systems to better share information when every second counts. By bringing the Mutualink solution to the FirstNet platform, first responders using Mutualink's IRAPP will be able to simultaneously take advantage of key FirstNet capabilities – like First Priority™, which enables priority and, for first responders, preemption. "Adding Mutualink's Interoperable Response and Preparedness Platform to the FirstNet communications platform will increase the level of interoperability for public safety, especially with respect to on-demand cross-agency interoperability. Our solution enables highly secure sharing of video and data across systems and

integration with smart sensor and IoT systems," Mark Hatten, chief executive officer and chairman, Mutualink. "This will help FirstNet subscribers scale up their access to emerging information as the situation unfolds, creating a common operating picture for all involved." The agreement with Mutualink is an important next step on the FirstNet journey to provide public safety with agnostic, interoperable tools that will help make advanced communications more meaningful and commonplace. FirstNet is built in public-private partnership with the First Responder Network Authority (FirstNet Authority). This helps to ensure that the FirstNet communications platform and service offerings meet the short- and long-term needs of the public safety community. "FirstNet is helping first responders solve long-standing interoperability challenges and arming them with the information they need to coordinate action plans and make critical decisions. We're pleased to see AT&T form innovative collaborations that will help foster a new era of situational awareness for public safety," said FirstNet Authority Acting CEO Edward Parkinson.

AT&T, FMC GlobalSat Sign Operating Agreement

At the RSA conference last month, AT&T Cybersecurity took the opportunity to speak to over 700 attendees about their perception of cyberthreats and how security is viewed within the organization. The full study, entitled "Confidence: the perception and reality of cybersecurity threats" and authored by security advocate Javvad Malik, has shown key findings that:

- Large enterprises are FMC GlobalSat will provide AT&T 4G LTE wireless connectivity to its enterprise customers to help drive the next-generation Internet of Things (IoT) and transportation applications through converged wireless services and satellite connectivity. FMC GlobalSat's 4G/LTSAT service bundles software, hardware, and network access into a single usage-based subscription model. Through its 4G/LTSAT converged

connectivity solution, FMC GlobalSat delivers network uptime at rates approaching 99.96 percent. Customers using FMC GlobalSat's services include cruise lines, energy producers, and maritime operators in the United States, and across the globe. "FMC GlobalSat is excited to provide our customers with connectivity through the AT&T 4G LTE network," said Emmanuel Cotrel, chief executive officer of FMC GlobalSat. "Working with a top-tier provider like AT&T enhances our ability to deliver the most reliable cost-effective solutions in every sector. With many organizations looking to implement reliable and low-cost IoT applications, we are confident that our converged connectivity offering will resonate with many organizations." of participants stating 'not at all' and a huge 43 percent stating that they

only saw eye to eye with stakeholders "sometimes".

- The biggest threats that worry companies of all sizes are phishing (29%) and cloud security threats (27%).
- Only 17% of smaller enterprises are very confident in defending against DDoS attacks compared to 29% of large enterprises. Additionally, only, 15% of smaller enterprises are very confident in defending against IoT attacks compared to 21% of large enterprises.
- The majority of companies view supply chain security as an essential component of any security function (37%), although 18% of smaller companies feel these activities take away resources from important work, while 19% believe it merely serves as a 'tick box' activity.

AT&T Expands Digital Hospital Portfolio with Mobile Wayfinding Partnership with Gozio Health

Gozio Health announced a new strategic alliance with AT&T expanding its mobile wayfinding and patient engagement platform to healthcare systems nationwide. The agreement allows Gozio to quickly scale its wayfinding platform to provide hospitals a digital solution that addresses the growing importance of patient experience in the consumerization of healthcare. "Mobile wayfinding is no longer a nice-to-have service offered exclusively by the most forward-looking hospital systems, but essential to a patient-centric approach to healthcare," said Joshua Titus, CEO and founder of Gozio Health. "Gozio's collaboration with AT&T enhances our mission to improve patients' access to care and give health systems access to the boundless patient engagement opportunities available with a customizable mobile platform." Gozio's interactive maps provide users with step-by-step navigation to doctor's offices, on-site dining, pharmacies, restrooms, parking decks and other points of interest, but the extensible mobile wayfinding platform does more than fulfill its fundamental mission of helping patients find their way around facilities. Advanced features give patients the ability to access urgent care and emergency department wait times, virtual visits, appointment scheduling, physician directories, electronic health records, ride share services, bill pay, and more. "Today, the solutions AT&T offers go beyond traditional services to boost

patient satisfaction and support optimal patient outcomes," said Rod Cruz, General manager Healthcare Industry Solutions, AT&T. "Together with Gozio, we can help healthcare customers improve patient outcomes by engaging our collective capabilities in connectivity and data analytics." In the era of touchscreens and mobile devices, patients expect immediate access to information with the tap of a button. The strategic alliance builds on AT&T's Edge-to-Edge Digital Hospital solutions to help simplify the patient journey, both inside and outside the hospital as AT&T empowers digital healthcare with highly secure patient intake, entertainment,

navigation and education solutions. The Gozio and AT&T relationship complements the companies' commitment to improving overall patient experience during hospital visits by expanding connectivity to go beyond the four walls of the provider space and orchestrating the transformation of healthcare to connected care. As the healthcare industry navigates through a massive digital transformation, the existing and future Edge-to-Edge capabilities that the business collaboration provides can position healthcare companies for greater growth, profitability, and clinical and operational innovation.

Gozio's Mobile Platform Delivers



Wayfinding Technology
Indoor and outdoor navigation for the entire hospital system

Content Management
Update services, amenities and physicians in real time

API Integrations
Improve access to care with deep integrations of EHR, Urgent Care wait times and *Save my Spot* scheduling

Analytics
Create surveys and review patient engagement

Kiosks
Deliver maps and content to kiosks for the episodic hospital visitor

Turnkey Installation
No broadband or network log on required

AT&T Prepared to Keep Communities Connected During Hurricane Season

AT&T is committed to keeping its customers and FirstNet subscribers connected during the upcoming hurricane season. With nearly 30 years of experience responding to large-scale events, we've proven time and time again that we are ready and prepared to restore and maintain service if disaster strikes. And this year, we're accomplishing this like never before. We're prepared with a fleet of equipment that can be quickly deployed before, during and after any storm. Plus, public safety agencies on FirstNet – the only dedicated communications network

platform purpose-built for first responders – also have 24/7 access to a nationwide fleet of dedicated deployable network assets, helping them connect to the critical information they need. "Staying connected during severe weather events is critical," said Scott Mair, president of Operations, AT&T Technology & Operations. "In the last few years alone, we have responded to countless major storms and other natural disasters. Our people are experienced, constantly perfecting the process and are ready to respond at a moment's notice." How we prepare:

Boosting network capacity to accommodate increased call volume. Testing the high-capacity backup batteries located at cell sites. Topping off and maintaining existing fixed generators with fuel at cell sites and switching facilities. Staging additional generators in safe locations for immediate deployment once a storm has passed. Response equipment we use in the wake of an event:

- Mobile cell sites and mobile command centers, like Cell on Wheels (COWs) and

Cell on Light Trucks (COLTs)

- Emergency Communications Vehicles (ECVs)
- Flying Cell on Wings (Flying COWs)
- Drones
- A self-sufficient base camp: It's complete with sleeping tents, bathrooms, kitchen, laundry facilities, an on-site nurse and meals ready to eat (MREs).
- Hazmat equipment and supplies.
- Technology and support trailers to provide infrastructure support and mobile heating ventilation and air conditioning.
- Internal and external resources for initial assessment and recovery efforts.

Our team has spent more than 145,000 hours in the field over the last 25 years. We have invested more than \$650 million in our Network Disaster Recovery program (NDR), making it one of the nation's largest and most advanced.

Prioritizing first responder communications We know how critical communications are to rescue and recovery efforts. That's why we partnered with the First Responder Network Authority (FirstNet Authority) – an independent agency within the federal

government – to deliver the FirstNet communications platform to public safety. FirstNet gives first responders the throttled connectivity they need, no matter the emergency:

Priority & Preemption: In emergencies and disasters, commercial networks can quickly become congested. That's why FirstNet is the only nationwide platform that gives first responders always-on-priority and preemption. It puts them at the front of the "communications line," prioritizing their access to the network.

Greater Command & Control: Public safety agencies have access to 75 mobile cell sites that link to FirstNet via satellite and do not rely on commercial power availability. And, to give first responders greater command and control of their

network, the FirstNet Response Operations Program aligns with the National Incident Management System to better guide the deployment of these assets.

Enhanced Coverage and Capacity: We've also deployed FirstNet Band 14 spectrum across 600+ markets nationwide. Band 14 is high-quality spectrum provided by the FirstNet Authority with special capabilities just for public safety. During an emergency, this band can be cleared and locked just for FirstNet subscribers. That means only those on FirstNet will be able to access that spectrum, further elevating their connected experience and emergency response. When not in use by FirstNet subscribers, AT&T customers can also enjoy Band 14's added coverage and capacity.



AT&T Explores On-the-Scene Newsgathering Using 5G Live Video Streaming

Network operators continue to explore potential use cases for 5G, and an interesting one comes this week from AT&T and LiveU, developer of cellular equipment for high-quality live video streaming suitable for use by broadcasters. The companies said they will test 5G live video streaming and the "real-world impact and performance enhancements 5G technology can have on live broadcast video production."

5G Live Video Streaming

LiveU currently offers live video streaming equipment that bonds multiple cellular networks together and LiveU Co-founder and Chief Operations Officer Avi Cohen said in an email to Telecompetitor that he expects to use that approach whenever LiveU launches a 5G offering. "In the early days of LTE, it was important to have a failover to another carrier to ensure reliability for our broadcast customers," said Cohen. "We don't see cross carrier bonding going away completely as the backhaul is still important." AT&T Business

Chief Marketing Officer Mo Katibeh said in a press release that he expects 5G to support new live video streaming capabilities such as ultra-high-resolution 8K video or a 360-degree format of augmented reality and virtual reality. LiveU Broadcast Units will use the AT&T 5G Network for Mobile Video Production. Asked about practical implications for AR/VR, Cohen noted that NBC already has streamed live VR using LiveU technology at the Women's March and the inauguration of President Trump. "The VR element allowed viewers to feel like they were alongside the crowds and getting an immersive view beyond the angle you would typically get from a single-camera view," Cohen said. "5G will definitely take this a step further and open up more content opportunities." Cohen also expects 5G to support a higher-quality video return. Asked about when that capability would be used, Cohen pointed to the example of a reporter out in the field covering a weather event. In that situation, the reporter can use video return to mon-

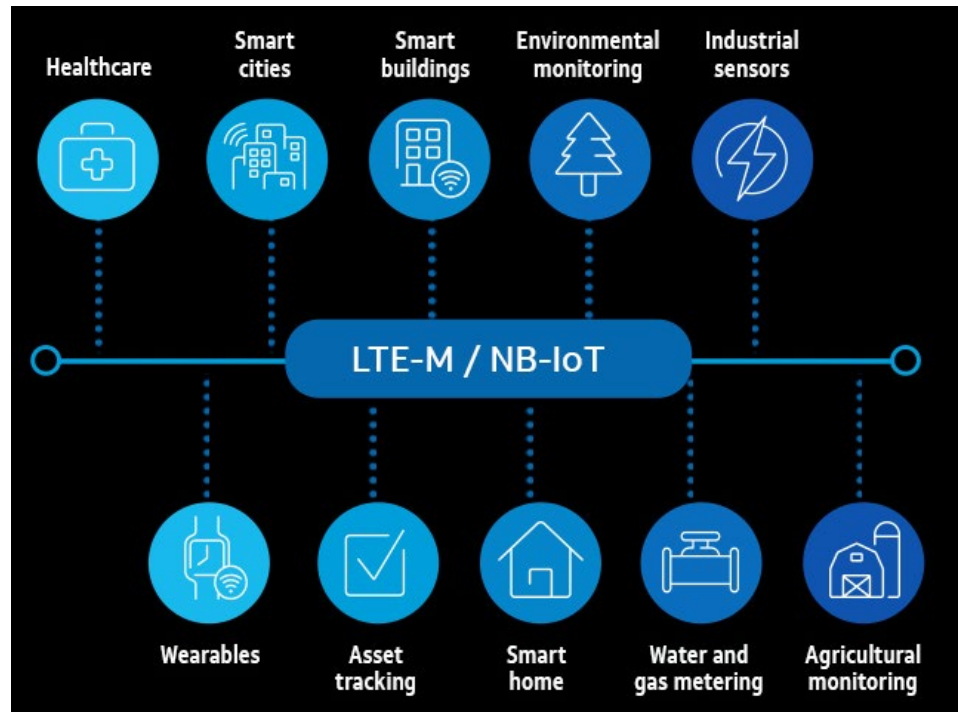
itor the studio while the weather map is being displayed and he or she is waiting to go live. The video return also could be used as a teleprompter in the field, Cohen noted. Other capabilities that Cohen expects 5G to support include multiple channels of audio and multi-camera productions from a single portable transmission solution. LiveU currently offers several versions of its product. One is a backpack offering, which according to Cohen, offers more modems and redundancy, providing higher quality and more reliable transmission in comparison with a smartphone offering which, he said, complements the company's transmission solutions. The smartphone offering allows reporters to go live in "a moment's notice" from their smartphones and send the cellular transmission to the station for broadcasting, he said. LiveU expects to use its portable broadcast units in the trials with AT&T. The companies plan to use the AT&T Foundry for their testing of 5G live video streaming for broadcast applications.

AT&T Lights Up NB-IoT Network Across the U.S.

AT&T has officially launched its narrowband internet of things network in the U.S., which joins its existing LTE-M network to add a second low-power wide-area network option for IoT uses. In a blog post from Chris Penrose, SVP for AT&T IoT Solutions, he wrote that the expansion of IoT network options “will help unlock the next wave of IoT connections” and is “a big step toward massive IoT and 5G.” The carrier said that it will expand NB-IoT connectivity to its network in Mexico later this year, which Penrose said would be “the start of a unique North American footprint.” Penrose said that NB-IoT, which was deployed via an upgrade to AT&T’s existing LTE network sites, is “optimized for stationary use cases with basic data requirements”: simple sensors, smoke detectors, door locks, industrial monitors, smart agriculture uses, and so on. LTE-M, meanwhile, has higher bandwidth and the ability for full mobility and voice as well as firmware and software updates, according to AT&T. Penrose said that some of the device types deployed on its LTE-M network include medical wearables, utility meters, pet trackers and devices for asset management. “With NB-IoT, we now have two complementary Low-Power Wide Area networks – including our LTE-M network in the U.S. and Mexico. Both networks are designed for the IoT within

licensed spectrum and provide carrier-grade security,” Penrose wrote, adding “Having both networks offers our business customers more options to implement IoT solutions with security, interoperability, and lower costs.” He went on to say that AT&T is working with its suppliers to certify \$5 NB-IoT device modules, and that “multi-mode modules that support both NB-IoT and LTE-M are not far behind.” Penrose

also noted that AT&T has an integrated IoT module in the works that includes prepaid IoT connectivity. The GSMA has said that IoT network coverage was expected to reach 93% of the world’s biggest IoT markets by the second quarter of this year. GSMA Intelligence has predicted that there will be 3.5 million cellular IoT connections – including 1.9 billion licensed LPWA connections – by 2025.



BT Chief Outlines 5G, fiber Ambitions

BT boss Philip Jansen (pictured) confirmed it will launch 5G imminently and unveiled a plan to ramp investment in fiber in the UK, as the company reported a small revenue decline in its fiscal Q4. In a statement announcing figures for the year and quarter to end-March, BT said mobile operator EE was on track push 5G live in 16 cities in the current calendar year, as detailed in a previously announced plan. The company increased its fiber to the premises target from 3 million to 4 million by March 2021, with the goal of hitting between 10 million and 15 million by the middle of the decade “subject to conditions being right”. Its

quarterly results announcement was the first under new CEO Jansen, who took over from Gavin Patterson in February. In a statement, Jansen said his initial months with the company highlighted “just how fundamental BT’s role is in connecting our society”. “While we are really well positioned in a very challenging and competitive UK market, we have a lot of work to do to ensure we remain successful and deliver long term sustainable value to our shareholders,” he said. BT reported a year-on-year revenue decline for fiscal Q4 of 1 per cent to £5.9 billion. For the full fiscal year, revenue dropped 1 per cent to

£23.4 billion, as strength in the consumer division was offset by regulated price reductions at Openreach and weakness in its enterprise unit, particularly in fixed voice. Net income increased 6 per cent, from £2 billion to £2.2 billion (the company does not release quarterly figures for this metric). BT’s consumer division, which includes operator EE, reported revenue of £2.6 billion for the quarter, a 3 per cent increase, driven by continued rises in handset costs and growth in its SIM-only plans, though the rises were partially offset by voice price reductions.

British Telecom Announces Financial Results for the Full Year

BT Group plc announced its results for the full year to 31 March 2019.

Key strategic developments:

- FTTP build targets increased from 3m to 4m premises passed by March 2021; FTTP ambition increased from 10m to 15m by mid-2020s and remains subject to conditions being right
- EE to launch 5G imminently and on track to go live in 16 cities in 2019 with a range of device partners
- Continued quarterly improvement in customer experience metrics; Group NPS up 6.5 points, Right First Time up 5.4%
- Initiatives to transform our business are on track; restructuring program achieved annualized cost savings of £875m

Operational:

- Openreach passed c.2m premises with Gfast and c.1.2m with FTTP; now passing c.20,000 premises with FTTP per week
- BT Plus take up remains encouraging with around 1 million subscribers since May 2018 launch
- Consumer fixed ARPC down 0.3% in the quarter to £38.8 reflecting retail market competition; postpaid mobile ARPC down 0.9% in the quarter to £20.9 due to increased mix of SIM only; RGUs per address stable at 2.37
- Mobile churn down to 1.1% reflecting improved retention and successful device launches; fixed churn flat at 1.4%

Financial:

- Reported revenue of £23,428m and adjusted revenue of £23,459m both down 1% as growth in Consumer was offset by regulated price reductions in Openreach and declines in our enterprise businesses, in particular in fixed voice
- Reported profit before tax of £2,666m, up 2%; adjusted3 EBITDA of £7,392m, down 2%
- Net cash inflow from operating activities of £4,256m, down 14% mainly due to pension deficit payments, increased capital expenditure and lower EBITDA; normalized free cash flow of £2,440m, down 18%
- Capital expenditure £3,963m, up £441m, of which £213m relates to BDUK grant funding deferral including the change in take-up assumption announced in Q2, and the remainder primarily to increased investment in FTTP
- Proposed final dividend of 10.78p pence per share, giving a full-year dividend of 15.4p; unchanged on last year
- Outlook for 2019/20: adjusted3 revenue down c.2%, adjusted3 EBITDA £7.2bn - £7.3bn, capital expenditure £3.7bn - £3.9bn and normalized free cash flow of £1.9bn - £2.1bn

Philip Jansen, Chief Executive, commenting on the results, said, "BT delivered solid results for the year, in line with our guidance, with adjusted profit growth in Consumer and Global Services offset by declines in

Enterprise and Openreach." "Since joining the company three months ago, it has become clear to me just how fundamental BT's role is in connecting our society. While we are really well positioned in a very challenging and competitive UK market, we have a lot of work to do to ensure we remain successful and deliver long term sustainable value to our shareholders. We need to invest to improve our customer propositions and competitiveness. We need to invest to stay ahead in our fixed, mobile and core networks, and we need to invest to overhaul our business to ensure that we are using the latest systems and technology to improve our efficiency and become more agile. "Our aim is to deliver the best converged network and be the leader in fixed ultrafast and mobile 5G networks. We are increasingly confident in the environment for investment in the UK. We have already announced the first 16 UK cities for 5G investment. Today we are announcing an increased target to pass 4m premises with ultrafast FTTP technology by 2020/21, up from 3m, and an ambition to pass 15 million premises by the mid-2020s, up from 10 million, if the conditions are right, especially the regulatory and policy enablers. "For 2018/19 the Board has decided to hold the full year dividend unchanged at 15.4p per share. The Board also expects to hold the dividend unchanged in respect of the current financial year given our outlook for earnings and cash flow."

BT Launches New 'Stay Fast Guarantee' Providing Reliable Broadband Speeds for Customers

BT has launched a new service commitment for home broadband customers, which includes a new Stay Fast Guarantee and expert customer service care to provide reliable broadband speeds. BT's latest broadband offering is a further commitment to provide the best and most personal service for all customers. When BT customers sign up to a new BT broadband plan or extend their existing contract, they will be given a bespoke speed guarantee for their home based on the estimated capability of their line. If it's believed a broadband customer could get a faster line speed, BT will first remotely optimize broadband performance

without the customer having to do a thing. Alternatively, if required, an engineer can then be sent to find the best solution for that customer. If BT has not managed to get a customer's broadband speeds back to where they should be after 30 days of a fault being identified, they will be eligible to receive £20 back, up to 4 times a year. BT will also ensure customer broadband speeds are being monitored and optimized remotely 24 hours a day, every day with support on hand from experts in the UK & Ireland to resolve speed issues quickly. Customers can also proactively check speeds themselves with their My BT account. Kelly Barlow, Marketing Director,

BT: "With our new Stay Fast Guarantee, we don't just guarantee customers' broadband speeds, we constantly check and optimize them, so they'll get reliable broadband speeds all day every day. If a customer's broadband falls below their personal speed guarantee then we have an expert team of service agents on hand to get things back to normal as soon as possible - ensuring they get the best and most personal broadband experience." BT already offers a speed guarantee for Ultrafast Fibre customers - BT is the first and only fiber broadband with a Stay Fast Guarantee for speeds up to 150Mb.



Cisco Reinforces Commitment to Africa

At the Cisco Connect conference, Cisco outlined its commitment to support the digitization of Africa's communities, businesses, and governments through several initiatives for skills and talent development, innovation and job creation. "We are living in a world that is changing faster than ever imagined. We are inspired by the prospect of an economy with abundant jobs, a place where entrepreneurs can thrive. Our goal is to enable small and medium businesses to accelerate their growth by helping them access our world class technology," says Clayton Naidoo, General Manager for Cisco Sub-Saharan Africa.

African Partner Repair Centers

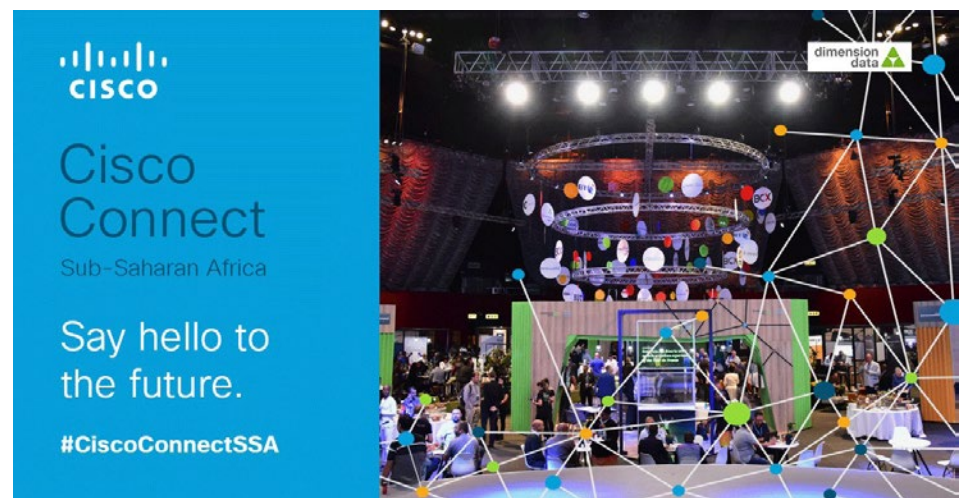
Cisco announced plans to launch a Repair Partner program. The aim is to work with selected distributors who will repair and restore Cisco hardware and make high quality, refurbished technology accessible, especially for small and medium sized organizations. By investing in repair centers in Africa, Cisco intends to contribute to job creation, skills development, fighting counterfeiting and promoting Cisco's Authorized Channel. In addition to repair, Cisco intends for the centers to carry out testing, quality engineering, fulfillment, process management and procurement, as well as inventory control, serving customers in Africa. "Our goal is to create value through 'glocal' manufacturing and channel models. By glocal, we mean utilizing global manufacturing practices with local execution," Clayton Naidoo added. Skills and Talent Development: Cisco to train additional one million students over the next five years in Africa through the Networking Academy Program. In Cisco's vision, technology enables inclusion and opportunities for people. For more than 20 years, Cisco has invested in educating and up skilling students, graduates and unemployed youth through its Networking

Academy (NetAcad). NetAcad provides students hands-on digital skills to prepare them for careers in the digital economy. Since its launch in 1998, close to 700,000 students participated in NetAcad courses throughout the African continent. Cisco has set an ambitious goal: to train a total of 1 million additional students by 2025 in Africa. During the next three years, Cisco will focus on training students. This will be followed by reskilling initiatives for active workforce and job seekers, based on content from Cisco NetAcad. Through NetAcad, Cisco intends to support the creation of Digital Learning Hubs in public libraries, accessible by the local population. In addition, Cisco plans to actively engage with employers to identify job opportunities that align to the skills of NetAcad students and alumni. In South Africa, in April 2019, Cisco launched a talent bridge platform aimed at small and medium businesses and professionals. Talent Bridge helps match supply, the skilled talent pool coming from NetAcad, with demand that is entry-level jobs available in Cisco's partner ecosystem.

Cisco EDGE: Fostering Innovation & Digital Entrepreneurship

In November 2018, Cisco opened the first

Cisco EDGE Incubation Centre in Pretoria, South Africa. Since then, it has continued to expand the reach of EDGE, opening incubation centers in Dube Trade Port, KZN and the University of Nairobi in Kenya. In the coming months, Cisco plans to establish similar centers in Egypt, Ethiopia, Ghana and Nigeria. There are plans for additional centers also in South Africa, including the Eastern Cape and Gauteng. EDGE stands for Experience, Design, GTM (Go to Market) and Earn. The objective is to share business knowledge, help develop small and medium businesses in the digital age, speed up their entry to market and, as a result, create new jobs for the local economy. EDGE Centers function as incubators: they provide small and medium businesses with state-of-the-art Cisco communication and collaboration technology, alongside training and enablement programs. They specialize in topics that are relevant to the local economy, such as smart ports, IoT in agriculture and smart cities. In addition, small and medium businesses are able to connect with global Cisco experts, who can support them with developing business ideas and concepts.

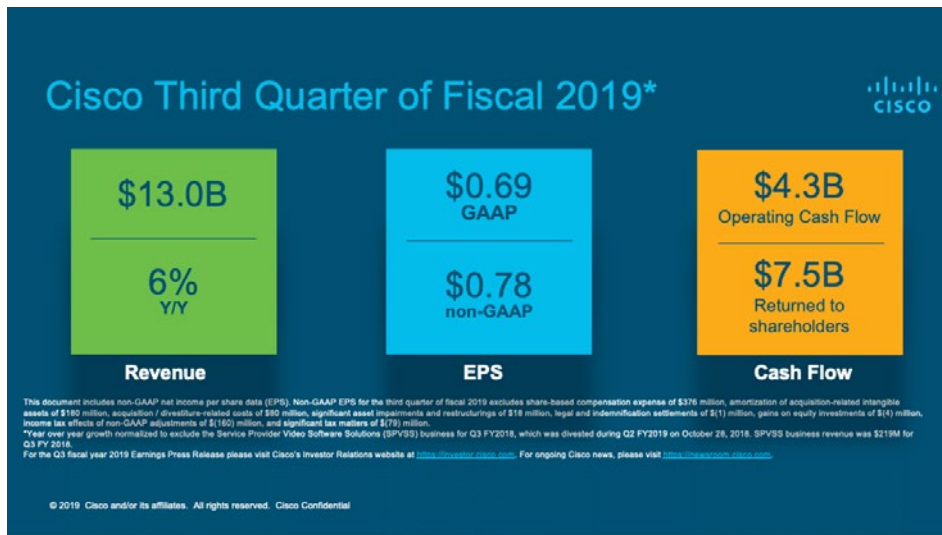


Cisco Reports Third Quarter FY19 Earnings

Cisco has reported third quarter results for the period ended April 27, 2019. Cisco reported third quarter revenue of \$13.0 billion, net income on a generally accepted accounting principles (GAAP) basis of \$3.0 billion or \$0.69 per share, and non-

GAAP net income of \$3.5 billion or \$0.78 per share. As previously disclosed, Cisco completed the divestiture of the Service Provider Video Software Solutions (SPVSS) business in the second quarter of fiscal 2019 on October 28, 2018. Revenue,

non-GAAP financial information, and Q4 FY 2019 guidance have been normalized to exclude the SPVSS business from prior periods for comparative purposes. "Our strong performance in the quarter was across the business, reflecting our customers' confidence in our strategy, business model and market-leading portfolio," said Chuck Robbins, chairman and CEO of Cisco. "Technology is at the heart of our customers' strategies and we are building the technology to help them achieve their business objectives." "We executed well in Q3, delivering revenue growth of 6%, non-GAAP EPS growth of 18%, as well as strong margins and cash flow," said Kelly Kramer, CFO of Cisco. "We continue to invest in our innovation pipeline to drive long-term profitable growth, while successfully evolving our business model through software offerings and subscriptions and delivering value for shareholders."



Tata Communications Taps Cisco's SD-WAN for Multi-cloud Deployments

Cisco chalked up another customer win for its Viptela-based SD-WAN offering and extended its partnership with Tata Communications in the process. While Tata Communications and Cisco have long been technology partners—Tata has deployed Cisco's Integrated Service Routers and other hardware devices for years—the two companies announced on Thursday that they had expanded their partnership to create a fully managed hybrid SD-WAN solution for Tata. Tata is using Cisco's managed SD-WAN technology for enterprises in conjunction with its IZO cloud platform. "Tata has been offering managed WAN services for a number of years," said Tata Communications' Song Toh, vice president of network services. "In fact, we've had our IZO SD-WAN implemented with dozens of global enterprises, and we have a few thousand sites running SD-WAN with other technology vendors. "We're seen as a leader in managed WAN services, and

we see Cisco as a leader of WAN edge technology. The two of us together can definitely serve a lot of the enterprises that are going through their network transformation and digitization journeys. With Cisco able to support us globally, as well as our own mature SD-WAN technology, we believe we can support an even greater swath of customers and help them achieve success on a wider scale." The combined service, which is called "IZO SD-WAN," is underpinned by Tata's hybrid networking capabilities, Tier 1 backbone and partnerships with hyperscale cloud providers including Amazon, Google, Microsoft and Alibaba. The IZO SD-WAN service is available in more than 150 countries. "There are so many types of customers out there, and they all have varied needs," Toh said. "The customers that we talk to are certainly on the journey to cloud. To me, that means using more SaaS-based applications that includes video conferencing and Office 365, and

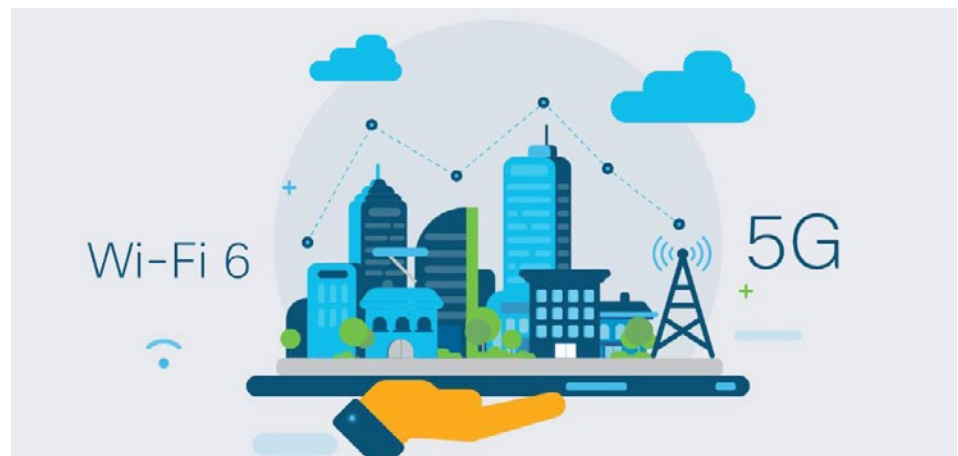
moving some traditional IT applications to the public cloud. "The other aspect is that their sites are no longer just the physical branch sites, the headquarters and data centers, but also these virtual CPE into the public cloud. With SD WAN, we can show performance from the data centers, from the developers, and from the branches to the cloud to achieve some type of performance control and security." In addition to its own SD-WAN offering, Tata has also deployed Versa Networks SD-WAN solution. Partnering with Cisco gives Tata Communications more options in terms of offering managed SD-WAN services to its global enterprises. Toh didn't rule out adding additional SD-WAN vendors going forward, and said Aryaka Networks and Cato Networks, which own networks, were "pretty intriguing." Tata competes against other global service providers, including Orange and BT.

Cisco Sees 5G Money in Its Future

Cisco is primarily known for its switches and routers for service providers and enterprises. It has not been a big competitor in the radio access networking space against vendors such as Ericsson and Nokia. But on its fiscal third-quarter 2019 earnings call this week, Cisco CEO Chuck Robbins mentioned “wired and wireless” networking a few times. “We are moving into an era of truly immersive and pervasive wireless connectivity, which generates demand for high density, low latency performance, for real-time experiences over both wired and wireless networks,” said Robbins, according to a Seeking Alpha transcript. “Our guys like to say behind every great wireless network is a great wired network.” In fact, the company has been hired by Rakuten to help it build its new greenfield mobile network in Japan. Cisco is building Rakuten’s network functions virtualization infrastructure (NFVi) with 4,000 edge nodes. In addition to software, Cisco is delivering routing and switching hardware. And Cisco is also the primary systems integrator for Rakuten’s virtualized telco cloud. On its earnings call, Robbins said, “With our newest Catalyst 9000 family additions, we have completed the most comprehensive enterprise networking portfolio refresh in our history. We have rebuilt our entire access portfolio with intent-based networking across wired

and wireless.” Robbins also mentioned 5G, saying Cisco is helping telcos build out their core networks ahead of large-scale 5G rollouts. Although Cisco is already selling packet core technology to carriers for their new 5G networks, “the big play for us is when they begin to evolve their networks to accommodate the traffic,” he said. “And we’ve always said we felt like that would be sometime in calendar 2020.” Carriers are leveraging their existing core networks to run the early trials on 5G. “We believe that sometime in the future when the number of connections increases and the capacity gets to a point, then they’re obviously going to begin to build out these new backbones dedicated to the 5G infrastructure, where we will generally come into play,” he said.

Although Robbins focused on telcos’ core networks in the earnings call, the company has investments in Altiostar, a startup that has developed RAN virtualization technology. Altiostar is also working with Rakuten. Finally, Robbins talked a bit on the earnings call about Wi-Fi 6. Cisco recently announced new Wi-Fi 6 access points across its Catalyst and Meraki portfolios, as well as the Catalyst 9600 core switch family. “Wi-Fi 6 is effectively what used to be called 802.11ax,” said Robbins. “And, what’s happening now is when you get these high-performance access points into the organizations and you get the low latency immersive experience possibilities, then it’s also going to drive the need to upgrade the backbones.”

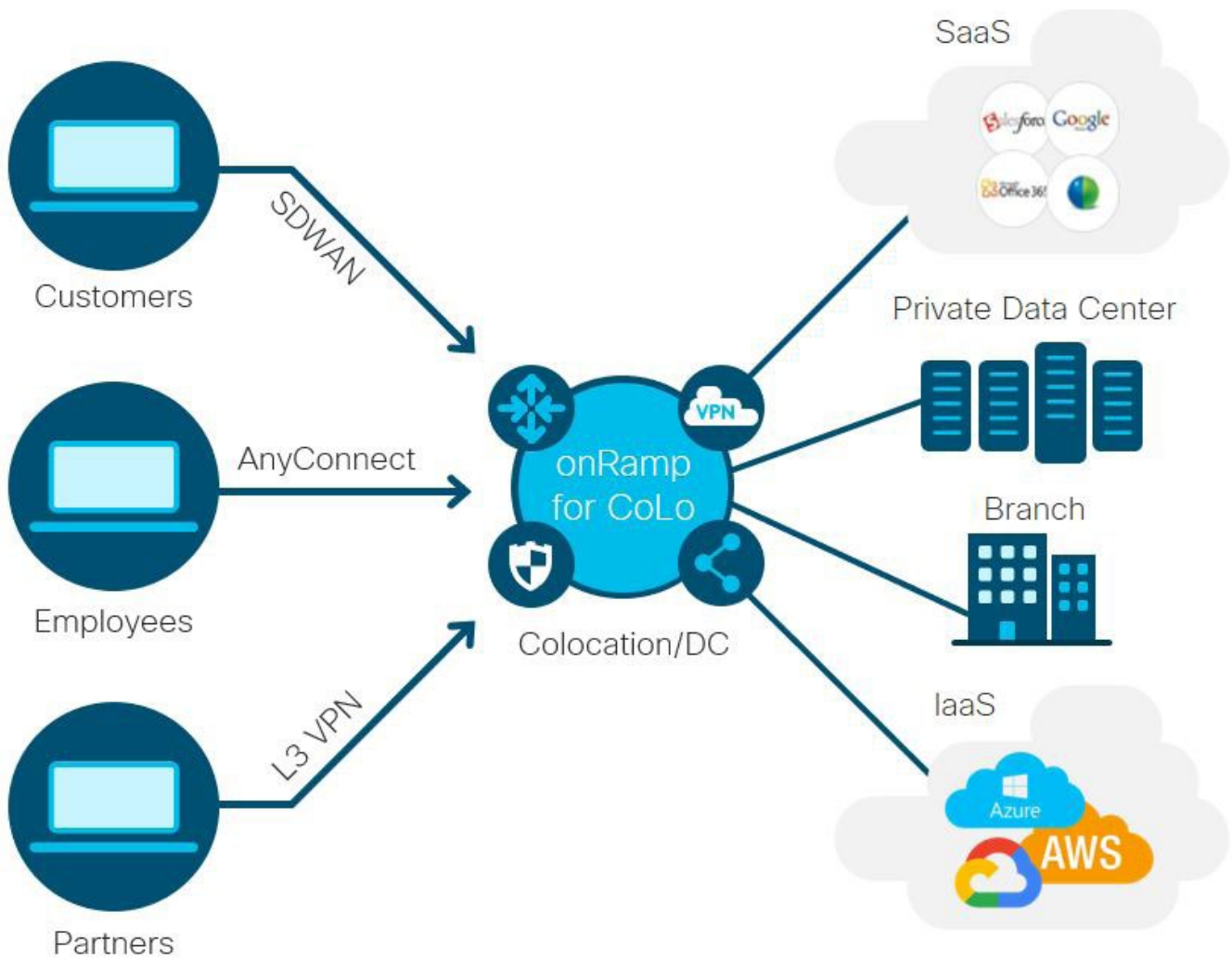


Cisco Takes SD-WAN Into Colocation Facilities

Cisco announced new SD-WAN on-ramps that were designed to tie branch offices to private data centers by going through colocation facilities. Cisco’s SD-WAN Cloud onRamp for CoLocation is a blend of Cisco’s hardware and software solutions that allows distributed enterprises, such as global organizations, to tie each branch office to enterprise data center databases. The benefits include a shorter path between cloud-to-branch links while also improving on the connectivity between infrastructure-as-a-service (IaaS) and software-as-a-service (SaaS) providers. All of which sounded familiar to analyst Scott Raynovich. “It looks like Cisco is creating regional POPs (points-

of-presence) for SD-WAN, which has already been implemented for many years by SD-WAN players such as Aryaka, Cato Networks, and VeloCloud (VMware),” said Raynovich, the founder and chief analyst of Futurium. “Cisco is acknowledging that routing may increasingly happen in the cloud in the future.” In addition to large global organizations, Cisco’s Anand Oswal, senior vice president of engineering in Cisco’s Enterprise Networking Business, wrote in a blog today that aggregating access to multi-cloud applications from multiple branches to regional CoLocation facilities could be a good fit for multinational organizations that can’t use direct internet connections to cloud and

SaaS platforms due to security restrictions and international privacy regulations for sharing information across borders. Another use case for Cisco’s SD-WAN Cloud onRamp for CoLocation could include partners and vendors that are not using SD-WAN but still need connectivity to their customers’ enterprise resources and applications without installing an SD-WAN device at each location. Remote office workers also stand to benefit from it because they need low cost secure VPN connections to enterprise resources over direct internet links without first backhauling the traffic to a VPN firewall or central data center. “With Cisco SD-WAN Cloud onRamp for CoLocation



operating regionally, connections from colocation facilities to branches are set up and configured according to traffic loads (video vs web browsing vs email), SLAs (requirements for low latency/jitter), and quality of experience for optimizing cloud application performance,” according to Oswal. “Each branch or private data center is equipped with a network interface that provides a secure tunnel to the regional colocation facility. “In turn, the Cloud onRamp for CoLocation establishes secure tunnels to SaaS application platforms, multi-cloud platform services, and enterprise data centers. All traffic is securely routed through the Cloud onRamp for CoLocation stack which includes security features such as application-aware firewalls, URL-filtering, intrusion detection/prevention, DNS-layer security, and Advanced Malware Protection (AMP) Threat Grid, as well as other network services such as load-balancing and

Wide Area Application Services.” OnRamp works with Cisco’s SD-WAN vManage for centralized management of the SD-WAN fabric. The Cloud onRamp CoLocation feature also makes it easier to manage and deploy virtual network functions (VNFs) in a colocation facility. The platform, which is based on Cisco’s Viptela SD-WAN technologies, also uses Cisco’s Catalyst 9500-40 switches to provide multi-gigabit backplane switching to the VNFs, redundancy, inbound and outbound WAN connectivity and access to the colocation management tools. According to Oswal, all of the traffic is securely routed through the Cloud onRamp for CoLocation stack which includes security features such as application-aware firewalls, URL-filtering, intrusion detection/prevention, DNS-layer security, and Advanced Malware Protection (AMP) Threat Grid, as well as other network services such as load-balancing and wide area application services. “With the SD-

WAN functionality hosted in a colocation facility, ensuring that router appliances and software are original Cisco products and have not been tampered with at any stage of installation and operation is a critical consideration,” according to Oswal. “That’s why Cisco embeds an encrypted Secure Unique Device Identifier (SUDI) in tamper-resistant silicon in SD-WAN router appliances. This foundational level of trust is complimented with VNF image signing, secure boot, and the Cisco Secure Development Lifecycle to ensure software and hardware are tamper-proof. “With this built-in level of trust established, IT can remotely configure and manage Cisco Cloud onRamp for CoLocation installations from the other side of the world with confidence that the target Cisco hardware and software are original and uncorrupted.”

Government of Colombia and Cisco Partner to Drive Digital Economic Opportunities and Develop Cyber Security Workforce

Cisco and Colombian President Ivan Duque Marquez announced joint efforts to fund and develop secure digital solutions addressing key social and economic goals in Colombia through the Country Digital Acceleration (CDA) program. These efforts will focus on supporting several priorities from Colombia's National Development Plan that advance citizens' quality of life, create jobs and workforce education, and enhance global economic competitiveness. "Working with government, industry, and academia in Colombia, Cisco's CDA program aims to help redefine healthcare and education, create digital age jobs and enable Colombia to be a leader in Latin America in the new digital economy," said Michael Timmeny, SVP & Chief Government Strategy Officer, Cisco. CDA Colombia will drive projects with the goal to advance citizens' quality of life, create jobs and workforce education, and enhance global economic competitiveness. Together with government leaders, entrepreneurs, academics, ecosystem partners and technology companies, Cisco will address

the following areas:

Innovation in Education, Health and Digital Government: CDA Colombia will focus on co-innovation with key institutions in these areas of national interest.

Cyber Security: Partnering with the National Government and the Organization of American States (OAS), Cisco intends to establish a Cybersecurity Innovation Council in Colombia and is already building cyber security skills through foundational,

advanced networking, and IoT trainings. This initiative will be part of a broader partnership with the OAS that seeks to strengthen cybersecurity capacities in Colombia. **Enhancing Entrepreneurship and Digital Skills:** Cisco will expand its Networking Academy program to include partners such as Servicio Nacional de Aprendizaje (SENA), focusing on fostering technology entrepreneurship, networking, and developer skills for all Colombians.



Cisco Webex will Connect Astronauts and Other Space Pioneers on 50th Anniversary of Apollo 11's Historic Lunar Landing

"That's one small step for man, one giant leap for mankind." Chances are good you know exactly who said those words...and where he was when he said them. The simple act of reading them might even bring to mind grainy TV images of the moment. But did you know it took a team of 400,000 people worldwide to make sure his historic moonwalk was a success? July 16th will mark the 50th anniversary of the launch of the Apollo 11 mission and, to help celebrate, Cisco will connect some of those 400,000 teammates—including astronauts and ground controllers—with the official Apollo 50th Anniversary Gala at the Kennedy Space Center Visitor Complex in Florida. The gala, presented by Northrop Grumman, will gather space legends, celebrities and enthusiasts from around the world, including the children of the Apollo 11 astronauts Buzz Aldrin and Neil Armstrong, Felix Baumgartner, pilot of Red Bull Stratos, Scott Kelly, Rusty

Schweickart and other Apollo astronauts. They will celebrate the historic milestone and raise funds to support STEAM-based educational programs of the Aldrin Family Foundation (AFF) and the Astronaut Scholarship Foundation. Cisco technology including Webex Meetings, Calling, and Devices will be used to reconnect the space legends on this milestone anniversary for a panel discussion moderated by Professor Brian Cox of the BBC. This is part of Cisco's platinum sponsorship of the gala, which AFF announced. "We're passionate about connecting teams to get great work done," said Aruna Ravichandran, Cisco's vice president of marketing for collaboration. "What better way to celebrate teamwork than to celebrate the Apollo legends who made this moment happen? In celebrating the accomplishments of the Apollo era, we hope to inspire a new generation to make something amazing possible." "The Apollo 50th Gala is all about showcasing

legends in this historic moment in time," said Andrew Aldrin, president of the AFF. "Cisco is a tech industry powerhouse and a legend in its own right. Their technology is the wave of the future, and is going to be used at the event to help us connect the gala to audiences on a grander scale than we ever have before. We are honored to have them on board as a partner." More than 500 guests will attend the celebration, which will feature not only the panel discussion with the legends of Apollo, but also live and silent auctions with rare space memorabilia, and awards to recognize individuals who are pioneering space. All proceeds raised from the event will support multiple initiatives by the AFF to mould the next-generation of explorers – from K-12 through working professionals – as well as go towards an endowment for the Aldrin Scholarship fund with the Astronaut Scholarship Foundation.

Cisco Ushers In a New Wireless Era with Wi-Fi 6

Cisco is announcing innovative solutions that help customers embrace a new age of wireless connectivity. Wi-Fi 6 (also known as 802.11ax), the new standard for Wi-Fi networks, is redefining what's possible for businesses — powering a new era of immersive wireless experiences and the connecting of billions of things. Cisco is also extending the industry's most extensive campus networking portfolio by delivering a campus core switch purpose-built for cloud-scale networking. By coupling powerful automation and analytics software with a complete array of next-generation switches, access points, and controllers for the campus, Cisco enables the industry's only end-to-end, wireless-first architecture. Built on the same fundamental wireless innovations as 5G, these new standards will reshape how businesses and consumers interact with the world. Beyond being significantly faster than the previous generation, Wi-Fi 6 delivers up to 400 percent greater capacity and is more effective in high-density settings like large lecture halls, stadiums and conference rooms. Wi-Fi 6 is also easier on connected devices' batteries and provides an overall more predictable user experience. Today, Cisco is rolling out several products and partnerships so that businesses can deliver a genuinely unplugged and uninterrupted experience. **Wi-Fi 6 Access Points:** New access points across the Catalyst and Meraki portfolios go beyond providing the new Wi-Fi 6 standard. Cisco's latest APs deliver a smarter and more secure wireless network. The new access points are also multilingual, with the ability to

communicate with multiple IoT protocols, including BLE, Zigbee, and Thread. **Core Switch for the Campus Network:** Cisco raises the bar with the Catalyst 9600 core switch family, which will serve as the foundation central to any network's successful operation. To deliver the most secure and efficient wireless experience, organizations need a single networking fabric that brings wired and wireless together. Built as the next evolution of the Catalyst 6000 — the most successful networking product in the history of the internet — the Catalyst 9600 will be the bedrock for the next generation of intent-based business networks. **New Developer Resources:** Wi-Fi 6 and 5G represent an incredible opportunity for developers. To enable them to create the immersive DevNet, Cisco's developer network, offers the learning labs, sandboxes and developer resources needed to create game-changing wireless applications. The Cisco Catalyst and Meraki access platforms are open and programmable all the way down to the chipset level, allowing applications to take advantage of network programmability in new and exciting ways. **New Ecosystem Partnerships:** Prior to the launch of its Wi-Fi 6 access points, Cisco completed interoperability testing with Broadcom, Intel and Samsung to address the inevitable gaps that come with a new standard. Samsung, Boingo, GlobalReach Technology, Presidio and others are expected to join the Cisco OpenRoaming project to solve one of today's biggest wireless pain points. The Cisco OpenRoaming project aims to make it easier to seamlessly and securely

hop between Wi-Fi and LTE networks and onboard public Wi-Fi. "Every leap in connectivity enables the next wave of profound innovation. 5G and Wi-Fi 6 represent a new era of connectivity," said David Goeckeler, EVP and General Manager, Networking and Security Business at Cisco. "Developers are already creating the next generation of wireless-first, immersive experiences. With billions of things connecting to the network, this growth will create unprecedented complexity for IT. Cisco is building a multi-domain network architecture to simplify complexity for IT, allowing CIOs to deliver against their innovation agenda."

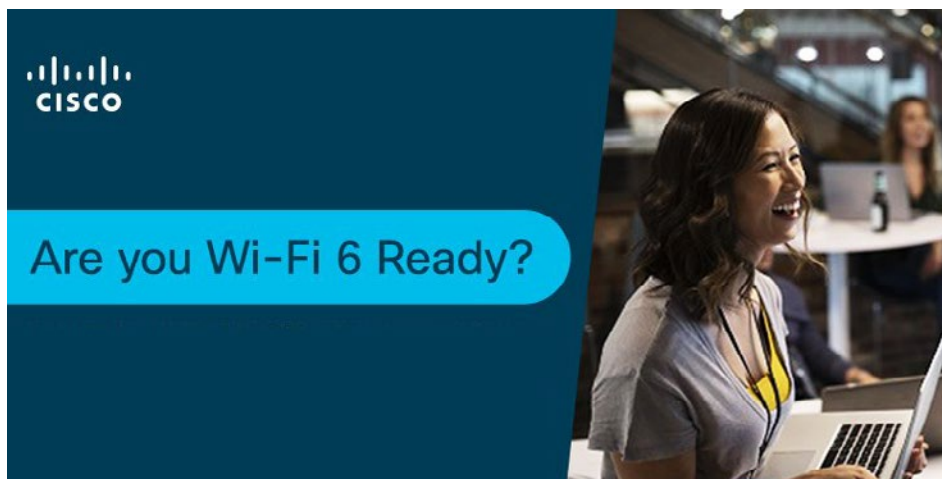
Wireless-first, cloud-driven, data-optimized

Wi-Fi 6 and 5G represent an enormous opportunity but require businesses to tackle big challenges. Today, the workplace is wherever we work. Users are more dependent on mobile experiences and have no tolerance for downtime. To meet these demands, the network must be:

Wireless-first: Today, mobile technologies are fueling economic growth — making it easier for workers to collaborate, shoppers to purchase, students to learn — from anywhere. To deliver a great wireless experience, IT needs to look beyond the Wi-Fi and solve for the full end-to-end experience — driving consistent security, reliability and performance.

Cloud-driven: The cloud enables unprecedented scale. Cisco uses the cloud to deliver new innovations faster. The cloud also helps IT move from reactive to proactive by taking global insights and delivering best practices to help address problems before they impact users.

Data-optimized: The network offers millions of data points, providing context on users, their experience, and their vulnerabilities. Using powerful analytics, we can unlock new solutions that optimize IT operations, support better business decisions, provide innovative security solutions and engage customers in more effective ways. Cisco has built out its intent-based networking portfolio to prepare customers for tomorrow's challenges. Cisco's new access points and campus switch are purpose-built for intent-based networking and represent the culmination of Cisco's efforts to reinvent its entire access portfolio.





Dialogic and Epsilon Collaborate to Launch a Global, Carrier Class Dialogic BUZZ™ UCaaS Platform

Dialogic, a cloud-optimized applications and infrastructure solutions provider for service providers, enterprises, and developers, announced that the Company has teamed with Epsilon, a privately-owned global communications service provider, to launch a fully managed and hosted carrier-class UCaaS platform based on the award-winning Dialogic BUZZ™ Unified Communication platform. Dialogic BUZZ is disrupting the business communications paradigm by offering not only a single platform to address calling, conferencing, and collaboration, but also an API-driven, extensible architecture to enable the rapid integration of AI and IoT technologies. This powerful combination allows the easy incorporation of advanced functionality such as chatbots, call transcription, intent analysis, workflow automation, and fraud detection. The availability of this powerful functionality in a UCaaS platform will allow service

providers and channel partners to offer carrier-class enhanced UCaaS services to their customers without the need for investment in infrastructure. "Dialogic is working with Epsilon as a key network provider to help launch the Dialogic BUZZ UCaaS platform due to Epsilon's global presence, high-performance network, and customer-focused approach," said Bill Crank, President & CEO of Dialogic. "Dialogic and Epsilon have enjoyed a long-term relationship and we are excited to join together in this venture and leverage the global reach and high-performance of the Infiny by Epsilon on-demand connectivity platform." Epsilon will host the Dialogic BUZZ UCaaS platform in its global Tier-3 colocation facilities while extending connectivity to enterprises through its global connectivity services. Dialogic BUZZ customers gain access to Epsilon's connectivity and intelligent communications services, including

Ethernet Data Centre interconnection, direct connectivity to the leading cloud and Internet exchanges, Internet and hybrid SD-WAN, as well as a comprehensive voice portfolio of enterprise-grade SIP trunking, inbound, porting and termination services. Epsilon's global network fabric is currently deployed in over 100 of the world's leading data center hubs with direct connectivity to hundreds of cloud services, Internet exchanges, and network service providers. "Epsilon is pleased to be working with Dialogic as the leader in the real-time communications space," added Jerzy Szlosarek, Chief Executive Officer, Epsilon. "Our shared vision in using cloud-centric software and an API-driven framework will offer service providers and channel partners an accelerated path to competitive and innovative UCaaS cloud offerings. Not only will users of this service be able to enjoy the features of the powerful Dialogic BUZZ platform, but they will also have on-demand access to Epsilon's carrier-grade, next-generation network through our software-defined networking (SDN) platform, Infiny." UCaaS is one of the fastest growing markets and is experiencing extensive pressure to evolve and keep up with the latest collaboration trends. The powerful combination of Dialogic BUZZ and Infiny by Epsilon will give service providers and channel partners the ability to keep up with these demands with an unparalleled set of UC and collaboration tools combined with a suite of high-performance connectivity and intelligent communications services available at the click-of-a-button.



Dialogic PowerMedia XMS 4.0 Enhances Media Resource Function (MRF) and Media Resource Broker (MRB) Offerings

Dialogic, a cloud-optimized applications and infrastructure solutions provider for global service providers, enterprises, and developers, announced the general availability of Dialogic® PowerMedia® XMS Release 4.0 of the company's media server software, adding a number of improvements that address the emerging

needs of network operator, over-the-top (OTT), and enterprise markets. A significant feature of the PowerMedia XMS 4.0 release is the high capacity and scalability of the Dialogic® PowerMedia® Media Resource Broker (MRB), which can now support up to 50 XMS instances and manage 100,000 total media server ports. This increased

capacity is complemented by additional PowerMedia MRB features, such as improvements in failover handling, which provides for media continuity even during outages, safeguarding availability of media processing as applications expand in size. XMS 4.0 also offers security improvements, enhancing instance security and providing

applications with additional mechanisms to protect personal user information. New security features further include support for SIP TLS to secure the signaling, the ability to mask DTMF digits in logs that often carry personal information, configurable authentication of RESTful media and management APIs, support for XMS authentication to an HTTP server using client certificates, and a mechanism to protect personal information in temporary recordings, allowing the automatic deletion of all recordings associated with a call or conference once the call session ends. In addition to these and other enhancements, XMS 4.0 introduces a cloud license server deployment option, which provides network-wide licensing with entitlements stored in the cloud for improved operational support. This licensing model can help reduce total cost of ownership (TCO) by allowing applications to easily share and re-allocate XMS resources as needed. "Dialogic continues its tradition of software media server leadership and innovation with this major release of Power Media XMS," stated Bill Crank, President and CEO of Dialogic. "Dialogic is second

to none when it comes to performance, scalability, real-time video processing, and redundant media processing in public cloud environments, such as AWS. The new features added in XMS 4.0 help solidify our position as a market leader." Dialogic's PowerMedia XMS is a highly scalable, software-only media server that enables standards-based, real-time multimedia communications solutions for IMS, MRF, enterprise, and WebRTC applications on

premise or in the cloud. Built on 20+ years of software media processing experience, PowerMedia XMS is trusted by world-class service providers and large enterprises to power millions of rich media sessions. Experts on the PowerMedia XMS will be available for meetings and demonstrations this week at Enterprise Connect 2019 in Orlando, Florida. To book a meeting with us, visit <https://web.dialogic.com/enterprise-connect-2019>.



Eutelsat America Corp. to Participate in NASA's Space Relay Partnership and Services Study

Eutelsat America Corp., a subsidiary of Eutelsat Communications (Euronext Paris: ETL), has been selected by NASA for the Next Space Technologies for Exploration Partnerships-2 (NextSTEP-2) as part of the NASA Space Relay Partnership and Services Study. The NextSTEP-2 program seeks to establish partnerships with US companies to evaluate the incorporation of commercial elements into the future space relay services that will be provided by the agency's Space Communications and Navigation (SCaN) Networks. This first stage, for which Eutelsat America Corp. has

been selected, is a five-month study that will examine how relay communications and navigation services can be provided on commercial platform solutions based on standards interoperable across commercial and NASA networks. The study will determine the elements required to incorporate NASA's optical technology onto commercial spacecraft. This project could open the door to the use of Public-Private Partnerships to develop and introduce new operational capabilities for future use by NASA. David Bair, CEO of Eutelsat America Corp., said:

"We are delighted to have been selected for this study by NASA as they evaluate partnerships with commercial operators across the industry to foster the growth of the commercial satellite communications relay services market. This project could benefit future NASA missions for new and greater scientific discovery, in alignment with the NASA envisioned Next Generation Architecture. We look forward to the success of this initial stage and to continuing to work with NASA as this project grows."

Eutelsat Selects Ground Infrastructure Providers for Its KONNECT Satellite Program

Eutelsat Communications (Euronext Paris: ETL) has chosen high-performance ground infrastructure providers to operate its future KONNECT satellite and associated broadband services: General Dynamics SATCOM Technologies has been selected to offer and deploy seven antennas, while Hughes Network Systems (HUGHES) will provide its JUPITER™ ground network system. With 75 Gbps of capacity, KONNECT is a new generation multi-beam satellite scheduled for launch at the end of this year. Once in service in 2020, the all-electric satellite will serve the broadband Internet market on a large scale throughout Western Europe and Africa. General Dynamics SATCOM Technologies' solution will provide seven 9-metre antennas to support traffic exchange between the satellite and its ground network system, ensuring a best in class performance and speed of deployment on a cost-efficient basis. Eutelsat's long-standing partner, Hughes, a world leader in satellite broadband networks and services, will provide its Jupiter platform for KONNECT's ground network system, including baseband equipment and new generation user terminals. Yohann Leroy, Deputy Chief Executive Officer and Chief Technical Officer of Eutelsat, said: "Ground infrastructure was the last missing

link in our KONNECT satellite program and this has been bridged thanks to orders placed with Hughes Network Systems and General Dynamics SATCOM Technologies, two trusted partners and references in their respective fields. The satellite, which has just completed its construction and is currently starting its test phase, will thus benefit from high-performance ground and in-orbit infrastructure on a cost-efficient basis to deliver competitive services to our customers."



facebook.

Facebook Launches Ramadan Hub in Middle East

Facebook users looking for inspiring tales about everyday heroes and initiatives that will allow them to give back to the communities that they live in during Ramadan will be able to do that and more, as 'SHARED by Facebook' goes live in the Middle East and North Africa (Mena) region. The new hub will be home to locally-relevant and data driven insights, as well as community stories during Ramadan. The launch comes as Facebook's online community continues to grow with its user base reaching 183 million users in the Mena region - 86 per cent of whom celebrate Ramadan. Statistics by Facebook IQ showed that thanks to shorter working hours and holidays, users in the Middle East increase the time that they spend on mobile and social media during the holy month. Facebook has recorded a five per cent increase in the time that its users spend on the portal during Ramadan, compared to any other time of the year. As a result, brands have 57.6 million more hours to capture a user's attention during

Ramadan. SHARED by Facebook will offer brands and people an easy-to-navigate platform to engage more meaningfully with their audiences, said Ramez T. Shehadi, managing director at Facebook for the Mena region. Facebook users looking for inspiring tales about everyday heroes and initiatives that will allow them to give back to the communities that they live in during Ramadan will be able to do that and more, as 'SHARED by Facebook' goes live in the Middle East and North Africa (Mena) region. The new hub will be home to locally-relevant and data driven insights, as well as community stories during Ramadan. The launch comes as Facebook's online community continues to grow with its user base reaching 183 million users in the Mena region - 86 per cent of whom celebrate Ramadan. Statistics by Facebook IQ showed that thanks to shorter working hours and holidays, users in the Middle East increase the time that they spend on mobile and social media during the holy month. Facebook has recorded a

five per cent increase in the time that its users spend on the portal during Ramadan, compared to any other time of the year. As a result, brands have 57.6 million more hours to capture a user's attention during Ramadan. SHARED by Facebook will offer brands and people an easy-to-navigate platform to engage more meaningfully with their audiences, said Ramez T. Shehadi, Managing Director at Facebook for the Mena region. Leen Fakhreddin, Creative Agency partner for the Middle East and Africa region at Facebook, also highlighted the important role that communities play in our lives and how they serve as important points of engagement. She recalled how the Ramadan Fridges initiatives had set in motion the drive to ensure that less food was wasted during the holy month. The growing concern about the phenomenon had also resulted in the creation of the Food Bank, which ensured that excess food is distributed to worker camps in a timely and safe manner. "We have seen a shift in the perception of brands among

their users, especially when it comes to millennial," she said. "Millennial want to see the brands that they are loyal to be active in social situations especially if it involves their community." Highlights from Ramadan insights last year indicate over 280 million people globally had about three billion interactions with

Ramadan 2018-related content. At the end of Ramadan 2018, more than 150 million people worldwide came together on Facebook to wish a "Happy Eid" to their community. In 2018, the 'Giving is in Your Blood' Hack for Good initiative in collaboration with The International Federation of Red Cross and Red Crescent

Societies (IFRC) was shared across Facebook and Instagram. The initiative tackled the issue of decreased blood donations during the month of Ramadan in the region, and resulted in blood donations increasing in all nine countries.

Facebook Set to Create Privacy Positions as Part of F.T.C. Settlement

The Federal Trade Commission is negotiating a settlement with Facebook that would create new positions at the company focused on strengthening its privacy practices, according to two people with knowledge of the talks. Facebook has agreed to create a privacy committee to protect its users' data, as well as an external assessor who would be appointed by the company and F.T.C., said the people, who declined to be named because they were not authorized to speak publicly. The social network will also appoint a head compliance officer — who could be its chief executive, Mark Zuckerberg — to oversee privacy efforts, one of the people said. The proposed commitments are part of negotiations between the agency and Facebook to settle privacy violations. Both have been talking for months over claims that Facebook violated a 2011 privacy consent decree. Last week, Facebook announced that it expected to be fined up to \$5 billion by the agency, in what would be a record financial penalty by the United States against a technology company. A Facebook spokeswoman and an F.T.C. spokesman declined to comment. The settlement details were earlier reported by Politico. The settlement talks are being watched as a potential blueprint for privacy in the United States at a time of fierce criticism over the competition, labor and privacy policies of big tech companies like Google, Amazon, Facebook and Twitter. The agency has been widely criticized in the past for limited oversight of the companies. Officials elsewhere, particularly in Europe, have been more aggressive. The case against Facebook is also being watched as a measure of the Trump administration's willingness to regulate American companies. The White House has rolled back rules for

many industries, but President Trump has been critical of tech companies, arguing that they have too much power. No company has been more under the glare of regulators than Facebook, which the F.T.C. began investigating 13 months ago after revelations the company allowed user data to be turned into political profiles by Cambridge Analytica, a political consulting firm used by Mr. Trump. Privacy advocates and Democratic lawmakers have pushed for more aggressive changes at Facebook, including higher fines and holding Mr. Zuckerberg personally liable for the company's privacy violations related to the investigation. "Any settlement with Facebook must hold Mr. Zuckerberg individually accountable or his flagrant, repeated violations of Americans' privacy will continue," Senator Ron Wyden, a Democrat from Oregon, wrote in a letter to F.T.C. commissioners last week. The company has strongly resisted naming Mr. Zuckerberg in the F.T.C.'s settlement as personally liable for privacy violations, according to the two people with knowledge of the talks. The company has offered what it has described to the F.T.C. as a new corporate governance structure built around privacy, the people said. The promises include the creation of an independent committee, which could include members of Facebook's board of directors, to oversee privacy policy. The committee would meet quarterly. Facebook also agreed to the creation of a position for an independent assessor, the people said. The assessor would be appointed by the F.T.C. and the privacy committee. That person would determine whether the company is complying with a new F.T.C. privacy order as well as the company's own privacy policy for users. The assessor would give biannual reports

to the company and F.T.C. The company would also designate a compliance officer internally at the executive ranks. There was discussion at one time that Mr. Zuckerberg could be given that role, but it is unclear if he would ultimately do so, according to one of the people familiar with the talks. When the company announced putting aside the \$5 billion to pay for potential penalties, it said that "the matter remains unresolved, and there can be no assurance as to the timing or the terms of any final outcome." A \$5 billion penalty would be far higher than the F.T.C.'s current record against a tech company. The agency fined Google \$22.5 million in 2012 for misleading users about how some of its tools were tracking users. But that amount would still be a small percentage of the company's \$56 billion in annual revenue. Despite all of the public scrutiny the company has faced in the past year, Facebook said last week that its revenue increased 26 percent in the first quarter, to \$15 billion, from a year earlier. Some privacy advocates have said that more meaningful action from the agency would require curbing Facebook's ability to share data with business partners, requiring it to take more measures to inform consumers when and how it collected data, or other demands to change its operations. Those sort of requirements are not expected to be in the settlement, according to the people familiar with the talks. Since the F.T.C.'s investigation, Mr. Zuckerberg has announced a focus toward privacy. On Wednesday, the company announced redesigns of Facebook's apps to focus more on groups and private communications, a shift from its long push for more public posts. The features "will end up creating a more trustworthy platform," Mr. Zuckerberg said.



Huawei Launches AI-Native Database

Following the announcement of its AI strategy and full-stack, all-scenario AI solutions in 2018, Huawei launched the AI-Native database GaussDB and the highest-performance distributed storage FusionStorage 8.0 in Beijing. The aim of this launch is to redefine data infrastructure through a Data + Intelligence strategy. "Humanity is entering the age of an intelligent world," said David Wang, Huawei Executive Director of the Board and President of ICT Strategy & Marketing. "Data is the new factor of production, and intelligence the new productivity. Heterogeneous, intelligent, and converged databases will become the key data infrastructure of the financial, government, and telecoms industries." Committed to building a fully connected, intelligent world, Huawei is a major contributor to ICT infrastructure and smart devices. The leading ICT product and solutions provider continues to invest and innovate in AI computing power, algorithms, and labeled data with many breakthroughs. Mr. Wang added, "AI-Native database GaussDB will help enhance HUAWEI CLOUD's capabilities and fully unleash the power of diversified computing, which includes x86, ARM, GPU, and NPU computing. We aim to continuously push our AI strategy forward and foster a complete computing

ecosystem. Together with our partners, we will move further towards the intelligent world." At the launch event, Mr. Wang also reiterated Huawei's commitment to advancing intelligent industries by innovating together with customers and partners and building a data industry ecosystem on the principles of openness, collaboration, and shared success.

GaussDB: The world's first AI-Native database

GaussDB represents two major breakthroughs:

First, GaussDB pioneers the embedding of AI capabilities into the full lifecycle of distributed databases, making their self-O&M, self-tuning, self-diagnosis, and self-healing possible. In online analytical processing (OLAP), online transaction processing (OLTP), and hybrid transaction/analytical processing (HTAP) scenarios, GaussDB uses the optimality theory to create the industry's first reinforcement learning self-tuning algorithm, improving tuning performance by over 60%.

Secondly, thanks to its innovative heterogeneous computing framework, GaussDB harnesses the power of diversified computing, including x86, ARM, GPU, and NPU computing. In the TPC-DS benchmark test, GaussDB ranked No.1 in terms of performance, 50% higher than the

industry average.

GaussDB supports multiple deployment scenarios, including local deployment and deployment on private or public clouds. On HUAWEI CLOUD, GaussDB provides a full spectrum of high-performance data warehouse services for customers in financial, Internet, logistics, education, and automotive industries.

FusionStorage 8.0: The world's highest-performance distributed storage

The intelligent world will raise standards even higher for the performance, scale, and manageability of storage systems. In response, FusionStorage 8.0 offers three innovative features:

First, FusionStorage 8.0 boasts the industry's highest distributed storage performance. In the SPC-1 test, FusionStorage 8.0's read-write performance per node reached 168,000 IOPS in 1ms, powering distributed storage for the first time to support critical enterprise applications.

Secondly, FusionStorage 8.0 simultaneously supports block, file, object, and Hadoop Distributed File System (HDFS) protocols, allowing a single storage system to manage an entire data center.

Thirdly, FusionStorage 8.0 integrates AI into full-lifecycle storage management, from resource planning and service provisioning, to system optimization, risk prediction, and fault location.

An industry ecosystem of openness, collaboration, and shared success

Huawei has redefined data infrastructure from computing, storage, and data processing. It leads diversified computing to make computing power more accessible and affordable. By redefining storage architecture, Huawei helps to increase storage efficiency and lead the way to intelligent storage. And a redefined data processing platform will make data analytics more intelligent and unleash the data of value faster. So far, Huawei's GaussDB and FusionInsight big data solutions have been deployed in 60 countries and regions, serving over 1,500 customers. These two solutions have been adopted by over 500 business



partners, and are widely used in industries such as finance, telecoms, government, energy, healthcare, manufacturing, and transportation. HUAWEI CLOUD has launched 13 database services, including data warehouse services on the cloud for industry customers. Huawei FusionStorage was the market leader according to the IDC's software-defined storage market share report in 2018. Upholding the principles of openness, collaboration, and shared success, Huawei actively works with customers and partners to foster a database and storage industry ecosystem consisting of industry applications,

platforms and tools, and standards organizations and communities. To this end, Huawei has established long-term partnerships with independent software vendors, including iSSTech, DCITS, DHC Software, E-Hualu, Yonyou, and AsialInfo, to pursue data applications in vertical industries. Huawei has conducted innovations in platforms and tools with partners such as Fanruan Software, ARM, Veritas, and China Standard Software. It is also an active contributor to standards organizations and communities, including OpenSDS, China Artificial Intelligence Industry Alliance, Open Compute Project,

OpenStack, and Cloud Native Computing Foundation. The Huawei Global Industry Vision (GIV) predicts that global data volume will increase from 32.5 ZB in 2018 to 180 ZB in 2025. Enterprise demand for AI computing power doubles every three months, and AI adoption will rise to 80% by 2025. Looking to the future intelligent world, Huawei will continue to invest and innovate, and work with partners to redefine data infrastructure. Together, they aim to build a complete ecosystem for diversified computing and make intelligent industries a reality.

Huawei's ON2.0 Leads the Commercial Use of All-Optical Networks in Partnership with Operators Worldwide

Richard Jin, President of Huawei's Transmission and Access Product Line, shared updates on the commercial use of Huawei's ON2.0 solution with more than 200 customers worldwide during Huawei's Sixth Optical Network Innovation Forum. At Mobile World Congress (MWC) 2019, Huawei officially unveiled the concept of ON2.0, which features new speed, new sites, and new smart O&M to build experience-centric next-generation optical networks, helping operators to offer optical networks as a service and transform transmission networks from connectivity-centric to experience-centric, thereby enabling operator business success. Currently, Huawei's ON2.0 solution has been implemented globally in the optical transport network field.

New speed: Huawei's Super 200G solution has over 80 commercial deployments around the world. In addition, Huawei is working with leading operators in spectrum expansion. Huawei has cooperated with operators in Asia and Europe to achieve Super C-Band innovation, increasing the effective spectral width by 50% compared with the traditional C band.

New sites: OXC, the world's first commercialized all-optical cross-connect solution, has been put into commercial use by multiple operators to provide all-optical interconnection for hundreds of super core nodes around the world. At the same time, Huawei's OSN 9800 M series and OSN 1800 series support the extension of OTN to the metro network. More than 60% of OTNs have been moved to COs in China, and that number exceeds 50% in Europe.

New smart O&M: Huawei has worked closely with 38 operators around the world to develop OTN premium private lines and help operators achieve revenue growth. In the meantime, Huawei, together with leading operators in China and Europe, has completed joint innovation in Optical Intelligence by introducing AI into optical networks to predict faults on optical networks and better anticipate future network resource requirements, improving

O&M efficiency and marking a critical step towards zero-touch optical networks. Richard Jin said that "Looking to the future, the bandwidth potential of optical fibers is infinite. In a fully-connected 5G era, Huawei proposes to redefine the optical industry. Massive connectivity will promote the continuous expansion of optical networks. When optical transport networks are moved from CO nodes to sites, the number of optical connections increases 10-fold; when optical connections extend from homes to rooms and from machine to machine, the number of optical connections will increase 100 fold. Optical networks will evolve from all-optical access to all-optical connectivity, which will increase the market space of optical networks from \$30B to \$100B. ON2.0 is on, and Huawei will continue to work with worldwide operators and seize the \$100B market window of opportunity during the transformation towards all-optical connectivity and build next-generation optical networks for the 5G era."



CAAC and Huawei Sign a Strategic Cooperation Agreement

The Civil Aviation Administration of China (CAAC) signed a strategic cooperation agreement with Huawei in Beijing. Under the agreement, Huawei and the CAAC will cooperate on top-level design and construction of smart civil aviation, demonstrations of technological innovations and their application, standards formulation, and talent cultivation and exchanges. The two parties will make joint efforts to promote smart civil aviation construction and implement the civil aviation power strategy. The rapid development of ICT has ushered in the smart society, bringing fundamental changes to industry production modes. Driven by new technologies such as 5G and AI, ICT will be applied in industry production systems more than personal services and enterprise office, boosting digital transformation of various industries, including the civil aviation industry. CAAC Administrator Feng Zhenglin said that the CAAC highly values its cooperation with Huawei, which has strategic significance in improving civil aviation development quality and shifting China from a great civil aviation nation to a civil aviation power. The cooperation will focus on smart civil aviation construction, where Huawei's strengths and advantages can be fully leveraged. Feng Zhenglin thanked Huawei for its years of technical support in China's civil aviation development. He believes that this strategic cooperation with Huawei marks the starting point for the CAAC to further promote all-round digital, smart civil aviation construction for air traffic control (ATC), airports, airlines, and service assurance. The CAAC and Huawei will team up to construct smart aviation with powerful capabilities, strong ambition, and great confidence. Guo Ping, Huawei's Rotating Chairman, said that Huawei welcomes the opportunity to carry out digital cooperation with the CAAC. Huawei with its partners will fully support digital and intelligent transformation of the civil aviation industry. He added that China is at a critical point of moving from a great civil aviation nation to a civil aviation power. As a leading global provider of ICT infrastructure and smart devices, Huawei faces great new challenges in terms of achieving high-quality civil aviation development. Huawei will



facilitate industry development through its successful practices and experience in digitalizing the civil aviation industry. Huawei's vision is to bring digital to every person, home and organization for a fully connected, intelligent world. Guo Ping pointed out that Huawei has cooperated with ecosystem partners to develop reliable solutions, including 5G, AI, and big data, to continuously create value for customers and drive cross-industry innovation. According to the agreement, the CAAC and Huawei will jointly set up a leadership office and team. The cooperation focuses on the following five aspects:

Smart civil aviation top-level design by the CAAC and Huawei. Smart civil aviation construction. The two parties will carry out results-oriented cooperation in multiple civil aviation topics, including safe, green, smart, and cultural airports; safe, efficient, smart, and collaborative ATC; airline operations management, general aviation, smart security, civil aviation big data, on-board Internet access, drone, industry supervision and statistics, and more. Demonstrations of technological innovations and their application. The CAAC supports Huawei to strengthen its technological innovation capabilities in the civil aviation industry in order to enable the company to help construct innovative civil aviation projects. Standards formulation. The CAAC encourages Huawei to participate in standards research for the civil aviation industry, as well as development of rules, standards, and operating procedures for the International Civil Aviation Organization (ICAO). Talent cultivation and exchanges. The CAAC

encourages civil aviation universities and research institutes to carry out talent communication and cooperation with Huawei, and supports Huawei's application to join the Plan on Promoting Innovative Talents in Civil Aviation Science and Technology project. Huawei has accumulated extensive experience in digitalizing the civil aviation industry through years of hard work. In terms of building safe, green, smart, and cultural airports, Huawei deeply engaged in ICT-based construction of Beijing Daxing International Airport, Qingdao Jiaodong International Airport, and Shenzhen Bao'an International Airport. Huawei has joined hands with its partners to develop the Smart Airport Solution, providing innovative technical architectures, solutions, products, and services for airports. During the construction of safe, efficient, smart, and collaborative ATC, Huawei has cooperated closely with Air Traffic Management Bureau of the CAAC to establish a joint innovation engineering center. In addition, Huawei has explored and researched the ATC development trend as well as current business challenges with regional bureaus, aiming at incubating scenario-based solutions based on in-depth integration of the latest technologies and ATC service scenarios. Huawei is a cloud service provider for airport digital operations. It aims to maximize the advantages of HUAWEI CLOUD, including intelligence, wide coverage, and strong support. It will lay a solid foundation for airline service deployment on the cloud, as well as flexible and diversified services and functions.

CCTV, China Mobile and Huawei Jointly Complete First 4K Live Streaming on 5G Dual-Band Convergent Network

CCTV, China Mobile, and Huawei successfully completed the industry's first 4K live streaming test on a 5G dual-band convergent network in Beijing. Compared with the previous fixed-point 4K live streaming tests, this test has successfully expanded the application scope and scenarios of 4K live streaming, and takes another step towards 5G commercial use. The real 4K video had a resolution of 3840 x 2160 px and a frame rate of 50 fps. They render lifelike details with a wider color gamut and more natural colors to deliver an immersive experience. However, real 4K video transmission consumes a large amount of bandwidth. The transmission rate on a 5G network can reach 10-100 times that on a

4G network. This caters for the ultra-high bandwidth and ultra-low latency required by the real 4K live streaming. The joint test of 4K live streaming used the route from the high-quality 5G network, provided by China Mobile and Huawei. The test route passed through the Beijing Mobile Building in Dongzhimen to the Meihui Building covered by multiple 5G gNodeBs. The test verifies that the 5G network of China Mobile can effectively support 4K UHD live streaming of CCTV at a rate of 40 to 60 Mbit/s in mobility scenarios. During the test, the three parties proposed the innovative "5G dual-band networking+live streaming package" solution. This solution helps transmit 4K UHD live video signals

to the CCTV headquarters through 2.6 GHz and 4.9 GHz frequency bands. Smooth, stable 4K video signals were observed during the test. Live streaming in mobility scenarios is an important requirement of the media industry. The success of this test will greatly change the production mode of video collection, editing, and broadcasting in major events and sports events. By leveraging 5G technologies and commercial networks, the media industry will unleash new vitality through digitalization and informatization. In addition, the innovation of vertical industry applications is the ultimate goal in realizing the value of the 5G network and fully demonstrates the strong capability of 5G to enable an industry.

Huawei AI Portfolio Debuts at Ai Everything Summit, Accelerating Intelligence

Huawei, a leading global provider of information and communications technology (ICT) infrastructure and smart devices, participated in the first Ai Everything Summit held in Dubai, UAE. Under the patronage of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President & Prime Minister of the UAE and Ruler of Dubai, the first Ai Summit was hosted by the UAE National Program for Artificial Intelligence. During the Ai Everything Summit, to which Huawei was a Platinum Sponsor, the company presented its global AI development strategy to government leaders, enterprise customers, and technology partners through a series of keynotes, panel discussions, and exhibits. Huawei showcased industry leading AI infrastructure—including its Atlas AI computing platform—which comprises cloud, edge and terminal solutions, and builds on Huawei's longstanding commitment to delivering an all-scenario AI portfolio that enables local industries to contribute in building a fully connected, intelligent world. Jinshui Liu, Chief Architect of Huawei Intelligent Computing, delivered a keynote "AI Accelerates the Intelligent World" and also introduced how Huawei's Atlas AI computing platform can help accelerate AI development, deployment, and applications.

Huawei Atlas AI computing platform - Covering the cloud, edge, and terminal

Computing power for AI needs to be deployed not only on the cloud, but also at the edge and terminal to meet the real-time data processing for AI applications. The Huawei Atlas AI computing platform, based on Huawei self-developed Ascend series AI chips, includes a variety of product forms such as AI accelerator module, AI accelerator card, AI edge station and AI server, which meets the needs of cloud, edge and terminal all-scenario AI deployment. The Huawei Atlas 510 AI Edge Station, an innovative exploration of one-stop edge AI deployment, made its global debut at the summit. The innovation not only provides superior edge AI computing



power, but also integrates multiple designs into one package, including power supply, water-proof, dust-proof, high and low temperature tolerance, and network connection designs. It can be quickly installed and deployed along with municipal outdoor facilities, such as lamp poles, to support real-time pedestrian and vehicle analytics, accelerating intelligence.

Work with industry partners to accelerate the intelligent transformation

As a new general-purpose technology, AI will benefit all industries. Huawei have forged AI solutions for multiple industry applications with ecosystem partners. Within the Summit, Huawei partners such as YITU and CCI Intelligence demonstrated AI applications in the fields such as campus, finance, power sector, medical care, and intellectual property protection, making AI applications easier to use and accelerating the intelligent transformation of the industry. Huawei will continue to work with local AI developers, research institutes and ecosystem partners to provide the UAE government and enterprise customers with pervasive intelligence.



Nokia President and CEO Rajeev Suri Comments on the 5G Market at Annual General Meeting

In addition to addressing the company's 2018 financial performance and Group Annual Accounts, at the AGM, Rajeev Suri, President and CEO of Nokia Corporation, speaks on environmental, social and governance (ESG) matters and provides an update on one of the most radical technology transitions ever as 4G begins to give way to 5G. Nokia also emphasizes today efforts undertaken to eliminate, by July 2019, any statistically significant pay gap in the company that cannot be explained by factors such as performance, experience, job grade, or location. Nokia

will become one of a small handful of companies that have taken such action. During the past year, Nokia has also continued to work hard to contribute to making a healthier, connected, sustainable planet. Nokia recently launched the industry's first-ever liquid-cooled base station, emitting 80 percent less CO2 emissions than previous generations of products, and sought innovative ways to use its connectivity technology where it is most needed. For example, in the Philippines, the Red Cross was provided with Nokia drones and portable networks

to improve first response in areas struck by disaster. Nokia's strategy is to lead in high-performance end-to-end networks for operators, expand to select vertical markets that need high-performing secure networks, build a strong standalone software business and create new licensing opportunities. The 5G-driven spending cycle that is now building momentum supports Nokia's end-to-end, full-portfolio strengths. Consequently, end-to-end sales as a percentage of sales pipeline are now at the highest point ever. Nokia President and Chief Executive Officer Rajeev Suri says: "5G is not the future anymore. It is here, and Nokia is leading it. We are winning deals and rolling out some of the world's first 5G networks. We now have 37 5G commercial contracts - 20 with named customers including T-Mobile, AT&T, STC, and Telia - and more than half of them include wider portfolio elements that our competitors cannot match. We have some amazing technology. In fact, in pretty much every network where Nokia products are deployed, we are the performance leader. This doesn't just happen on its own. It happens because we focus on excelling in the technology that matters the most. 5G is now accelerating and the power of Nokia's end-to-end portfolio is being recognized."



ONI Telecom Meets Increased Demand for Enterprise Cloud and Datacenter Interconnect Services with Nokia Optical Solution

Nokia announced that ONI Telecom of Portugal will deploy the Nokia 1830 Photonic Service Demarcation (PSD) to provide cost-effective 10G dedicated links to customers in key Portuguese cities. The Nokia solution extends the optical network through to the customer premises, giving ONI the end-to-end visibility required to meet service level agreements (SLAs) for its retail enterprise and wholesale datacenter interconnect and cloud service offerings. With the increasing demand for cloud services by Portuguese enterprise customers, the need for dedicated high-speed, low-latency access and datacenter interconnect (DCI) is growing. Given the mission-critical nature of these wavelength and Ethernet services, it is all-important for ONI to provide SLAs up to the customer premises (also called the demarcation point). Paulo Teixeira,




"Nokia is helping us to provide cost-effective 10G wavelength services to our Enterprise customers with full service assurance right to their premises."

Paulo Teixeira
Engineer at ONI Engineering
and Planning Department



from Engineering and Planning of ONI Telecom, said: "With this device, Nokia is helping us to provide cost-effective and guaranteed 10G wavelength services

to our enterprise customers in key metro markets. With the growing importance of public-private cloud deployments, we are especially pleased to be able to offer our customers dedicated optical links with full service assurance to their premises." Miguel Araújo, CT Head of Portugal at Nokia, said: "The 1830 PSD is an exciting addition to our optical networking solution set. Paired with the Nokia NFM-T optical

manager, it provides a unique solution for dedicated optical links, especially useful for enterprise wavelength services and datacenter interconnect. We have been very pleased to work closely with ONI Telecom as they deploy this world-leading 10G wavelength service to their customers." The Nokia 1830 PSD is the industry's first universal Ethernet and Wavelength service demarcation device. Based on a new MEF

3.0 standard, the Nokia 1830 PSD provides both Wavelength and Ethernet services in a low-power, small-footprint device. It will enable ONI to manage and monitor its entire transport network, end-to-end. It effectively extends ONI's optical domain management system, the Nokia NFM-T, across the entire network, up to and including the 1830 PSD at the customer premises.

Nokia Joins ConectarAGRO to Bring Access for Over 500,000 Brazilian Farmers to IoT and Agriculture 4.0 Technologies

Nokia announced that it has joined ConectarAGRO initiative to promote innovative connectivity solutions to the Brazilian agribusiness sector. It was created by agribusiness leaders CNH, AGCO, Bayer, Jacto, Solinftec and Trimble, and telecom leaders Nokia and TIM. ConectarAGRO will bring connectivity to some of the 93% of Brazilian farmers who currently have no wireless access to broadband services on their farms. Nokia will contribute the technology to enable TIM to provide 4G coverage and support IoT and other precision agricultural technologies that will boost yields and help to meet rising food demand. There is currently next-to-no wireless broadband coverage of Brazil's agricultural areas (less than 7%). The companies supporting ConectarAGRO initiative will contribute to enable 500,000 Brazilian farms, for the first time, to connect their farm fleets, employ robots, temperature and moisture sensors, drone aerial images and GPS - boosting farm yields for soybeans, cotton, corn, sugar cane and many other crops while reducing fuel consumption, insecticides and water for irrigation. This will give a significant boost to Brazil's agribusiness segment, which in 2017 contributed to 23.5% of Brazilian GDP and accounted for nearly 80% of GDP growth. As part of its contribution to the ConectarAGRO initiative, Nokia will develop and provide solutions for the agribusiness sector and Agriculture 4.0. Nokia's wireless broadband solutions include 4G/LTE and 5G, as well as satellite and microwave technology. These will provide a powerful connectivity platform for supporting advanced IoT solutions that improve efficient use of resources and boost productivity for farmers. Nokia is



currently the only connectivity technology vendor contributing to ConectarAGRO and plans to expand its activities to other rural areas in Latin American and worldwide. Gregory Riordan, Director of Digital Technologies for CNH Industrial South America, said: "Brazil already has some of the most advanced farmers on the planet that use state-of-the-art technologies and management practices. However, reaching the next level of productivity is impossible without connectivity. We are eager to collaborate with a company of Nokia's caliber to find innovative solutions, especially for farmers in underserved areas. The agricultural sector is a key contributor to Brazil's economy and we are proud to have joined with the other members of the ConectarAGRO initiative to serve and enhance Brazilian Agriculture." Rafael Marquez, Marketing Director Corporate Market at TIM Brasil said: "This initiative connects machines and people. On the business side it drives productivity, efficiency and economic growth. On the social side it has the potential to change

millions of lives, providing voice and internet connectivity, enabling access to education, entertainment and public services." Luiz Tonisi, Head of Market Unit Brazil at Nokia, said: "The ConectarAGRO initiative provides an industry-coordinated approach to facilitate the development of these precision agricultural technologies for Brazil's farmers. This open approach will help to spur innovation by creating an ecosystem of companies that can support the digital transformation of the Brazilian agricultural sector. The Nokia team is very pleased to help realize Agriculture 4.0 for Brazil's farmers." This agreement complements work Nokia is already doing in the IoT space with its recent launch of prepackaged vertical solutions for agriculture and livestock management. These vertical solutions are offered on Nokia's Worldwide IoT Network Grid (WING), which is gaining increased interest and customer traction across South America.



Now TV, Now E and ViuTV to Exclusively Broadcast UEFA EURO 2020

PCCW Media is pleased to announce it has secured the exclusive rights in Hong Kong for the 2020 UEFA European Football Championship (UEFA EURO 2020™), and that Now TV, Now E and ViuTV will broadcast the tournament exclusively. UEFA EURO is one of the most popular football tournaments in the world. To celebrate the 60th anniversary of the tournament, the UEFA EURO 2020™ will be held in 12 cities across 12 European countries, and 24 national teams will compete for the championship from June 12 to July 12, 2020. Given the exciting outcome from the 2018 FIFA World Cup™, top European teams will compete to enter the UEFA EURO 2020™ and battle each other in an attempt to be crowned the European champion. The UEFA EURO 2020™ will also use the video assistant referee (VAR) system for the first time in the tournament.

In addition, as the kick-off times are expected to be in Asia's prime time viewing hours (as early as 8 p.m.), a wider audience of Hong Kong viewers will be able to enjoy the excitement of UEFA EURO 2020™. Now TV and Now E will exclusively broadcast all matches live for Hong Kong viewers, while ViuTV will broadcast selected matches live. Ms. Janice Lee, Managing Director of PCCW Media Group, said, "PCCW Media is excited to acquire the exclusive pay-TV, free TV and OTT rights of UEFA EURO 2020™. Now TV has broadcast every cycle of the UEFA EURO since 2008. With our extensive experience in producing and broadcasting large-scale international and local sporting events, alongside the local production strength and creative productions from ViuTV and the OTT flexibility from Now E, we aim to offer an all-round viewing experience to Hong Kong

viewers. Whether viewers are enjoying the matches on a live or on-demand basis, and whether they view them on TV, Internet or mobile platforms, we will strive to make this mega event a most remarkable football viewing experience." Together with the top European leagues and other major leagues currently available, namely Premier League (available in 4K), UEFA Champions League, LaLiga, Bundesliga, Serie A, Ligue 1, UEFA Europa, Major League Soccer, Superliga Argentina, Turkish Süper Lig and AFC, Now TV customers may enjoy more than 1,500 of the world's top football matches in a season. Besides, Now TV also delivers world-class movies, dramas, and children's programmes. By consolidating the most comprehensive football leagues and the best entertainment content, Now TV is truly the best choice for families.



SES Showcases 8K Content Over Satellite

SES has demonstrated the delivery of an 8K signal directly to a flat screen TV without the need for a separate external receiver or decoder. The demonstration in partnership with Samsung and Spin Digital marks the start of the satellite operator's annual Industry Days in Luxembourg. The signal is being broadcast at SES prime satellite position of 19 degrees East. The 8K content, with 7680 x 4320 pixels at 50 frames/s, is encoded by Spin Digital using its HEVC encoder at a bit rate of 70 Mbps for broadcast-grade quality, while the transmission is carried out by SES on a single 33 MHz transponder using DTH broadcast parameters. "Audiences today

want richer video experiences that can be best fulfilled by immersive Ultra HD content, hence a lot of our broadcast and video customers are migrating their channels to high definition (HD) and Ultra HD. As their trusted partner, our vast TV audience reach and ability to deliver truly engaging video experiences via satellite mean we are well placed to differentiate their offerings and deliver customer success," said Thomas Wrede, Vice-President of New Technology & Standards at SES Video. The 82-inch Samsung 8K Q950RB QLED production model TV receives this signal directly, and is using DVB-S2 transmission parameters specifically for this demo. This Samsung

flagship TV features a 4000 Nits peak luminance, an 8K-compatible HEVC 50/60 fps video decoder, the latest HDMI interface and is capable of displaying High Dynamic Range (HDR) content. "Samsung is delighted to partner once again with SES with another leading-edge technology demonstration at the SES Industry Days. Samsung is fully committed to the development of a future 8K TV market and this demonstration of the viability of the SES satellite platform is an important step towards that goal", said John Adam, Head of Business Development and Industrial Affairs at Samsung Research UK. The TV will soon be available across Europe.

Dream Cruises Selects SES Networks' Game-Changing Connectivity for Cruise Fleet

Dream Cruises, a brand of Genting Cruise Lines, has selected SES Networks' Signature Cruise Solution to provide exceptional speeds, low latency, and unmatched fiber-like service to its passenger ship fleet, comprised of World Dream, Genting Dream and Explorer Dream, for the Asian luxury market, SES announced. Crew and guests of the newly-launched Explorer Dream will experience exceptional SES-powered guest connectivity onboard the 75,000-gross-ton, 2,000-passenger ship. The SES Networks' solution will also be introduced onboard Genting Dream in September this year, completing the fleet-wide implementation that follows the successful launch of SES Networks' managed service onboard World Dream, Dream Cruises' second cruise ship, which

debuted in 2017. The new Explorer Dream will have homeports in Shanghai and Tianjin, as well as Sydney and Auckland later in the year. Its significantly enhanced connectivity will enable guests to chat with friends on WeChat, pick up a bargain on Taobao, or stream high-resolution video on YouKu without interruption or lag. It will also mean that guests can share photos and videos from their trip in real-time across social media, or battle with their friends in League of Legends as easily as they can on land. SES Networks' Signature Cruise Solution combines the low latency of its O3b medium earth orbit (MEO) satellite constellation with a fully managed end-to-end service, backed up by its highly reliable geostationary (GEO) fleet to ensure network resilience. The result is a

seamless, high-performance broadband service delivered to everyone onboard the Dream Cruises fleet. "Today's cruise passengers demand excellent connectivity even when they are travelling on the high seas. As part of our efforts to provide our guests with the best possible services and amenities on board our ships, we partnered with SES Networks because of their high-speed capability to deliver a terrestrial broadband-like internet experience in some of the most challenging of conditions," said Thatcher Brown, President at Dream Cruises. "A Dream Cruise has the ability to deliver inspirational voyages at sea that create memories to last a lifetime. A key part of that adventure nowadays is the digital experience. Our Signature Cruise Solution ensures that passengers onboard Explorer Dream – along with World Dream and Genting Dream – will experience the new standard of enhanced guest connectivity," said Simon Maher, Vice President Global Sales, Cruise Maritime Services at SES Networks. "Because SES Networks and Dream Cruises have shared values around delivering transformational and inspirational experiences at sea, we are incredibly proud to partner with them to enable this level of service."



SES Networks and PNG DataCo Restore Connectivity to Earthquake-Stricken Papua New Guinea

Mobile networks and broadband internet access for corporate and consumer customers operated by PNG DataCo have been restored by SES Networks following a 7.2-magnitude earthquake that struck near the town of Bulolo, Papua New Guinea in the early morning hours of 7 May 2019, SES announced. Connectivity for DataCo customers was disrupted due to damage caused to critical nodes of terrestrial and subsea transmission infrastructures between Port Moresby and Madang following the earthquake. Contingency teams from SES Networks used an additional O3b Medium Earth Orbit (MEO) beam to deliver an extra 1.5 Gbps of low-latency IP Transit service

to ease network congestion on DataCo's damaged primary link. The additional bandwidth was made available within hours of receiving a request from DataCo. "Together with DataCo, we are glad that connectivity has been restored swiftly to enable communications and critical disaster recovery services in the immediate aftermath of the earthquake," said Imran Malik Khan, Vice President, Global Fixed Data Sales of SES Networks. "We recognize the importance of communications services in the event of natural disasters to facilitate quicker information transfer between families and communities, as well as to coordinate recovery and search-and-rescue operations. Our thoughts are with

the affected communities, and we offer our well wishes." "It is our duty to provide the essential communications links for our customers to connect with their loved ones and facilitate critical business and operational activities," said Paul Komboi, Managing Director of DataCo. "We are glad that SES's O3b MEO satellites has provided us and our customers with a reliable, high-throughput and low-latency solution in our time of need. The fact that connectivity services were restored in the shortest possible time at critical areas where our primary linkages were down has helped the local communities, businesses and organizations greatly."

SES and BCE Showcase One-Stop Video Production and Contribution Solution at SES Industry Days 2019

SES and BCE team up to demonstrate a one-stop automated studio solution capable of producing content, streaming it live via satellite, and distributing it onto an online video portal at SES Industry Days 2019. The end-to-end video production and contribution solution will integrate BCE's StudioTalk and MX1's OU Flex solution, with video production carried out via a camera on automated mode, distributed reliably via satellite, and simultaneously fed into external video feeds over IP networks. During the annual SES Industry Days event, SES and BCE will use the integrated solution to film subject experts during one-on-one interviews. The content will be pushed onto BCE's SNG van onsite equipped with an OU Flex modem before it is distributed through a high-performance link with guaranteed quality of service from SES' satellite. The content will then be streamed onto BCE's Online Video Platform for live and VOD distribution on websites and social networks. OU Flex provides a dependable video distribution and bi-directional IP connectivity solution for broadcasters, live event producers, event organizers, and remote operators. The solution works even when terrestrial and mobile networks are congested, and in remote areas, to ensure that OTT streaming and social media updates can be executed from the field, while also distributing video

feeds to TVs globally. StudioTalk is an all-in-one production solution, allowing a single operator to produce live multi-camera shows via a touchscreen and remote that can be operated in manual or automated mode. "StudioTalk has traditionally been used to produce sports events, such as the Montreux Volley Masters and for visual radio for stations such as RTL Radio, FunRadio and BNJ," Olivier Waty, Technology and Project Director at BCE. "We are excited to work with our long-time partner SES to further develop this product. By combining both of

our flagship products we can open up new production and distribution possibilities to the market, regardless of where events are taking place." "MX1's OU Flex is unique in that it enables event organizers to distribute content from anywhere in the world in a short turnaround time," said Steve Bisenius, Vice President, Regional Sales Engineering at SES Video. "BCE's StudioTalk solution complements OU Flex by simplifying video production, a benefit that will be welcomed by event organizers around the world."



**Tech
Mahindra**

Tech Mahindra FY19 Revenue Up 12.9%, EBITDA Up 34.6% YoY

Tech Mahindra Ltd., a specialist in digital transformation, consulting and business reengineering announced the audited consolidated financial results for its fourth quarter and year ended March 31, 2019

Financial highlights for the Year (USD)

- Revenue at USD 4,970.5 mn; up 4.2% YoY
- Revenue growth up 5.8% YoY, in constant currency terms
- Revenue from digital services grew 41% YoY
- EBITDA at USD 905.9 mn; up 24.3% YoY
- Consolidated PAT at USD 614.6 mn, up 4.5% YoY
- Free Cash flow for FY19 at USD 534.5 mn
- Financial highlights for the year (₹)
- Revenue at ₹ 34,742 crore; up 12.9% YoY
- EBITDA at ₹ 6,337 crore; up 34.6% YoY;
- Margins at 18.2%; up 290 bps YoY
- Profit after tax (PAT) at ₹ 4,298 crore; up 13.1% YoY
- Earnings per share (EPS) was at ₹ 48.5 for the year ended March 31, 2019
- The Board has proposed a dividend of ₹ 14 /- per share on the FV of ₹ 5 (280%).
- Free Cash flow for FY19 at ₹ 3,708 Crore
- Financial highlights for the quarter (USD)
- Revenue at USD 1,267.5 mn; up 1.9% YoY
- EBITDA at USD 234.8 mn; up 8.1% YoY
- Consolidated PAT at USD 162.3 mn, down 13.7% YoY



Other Highlights

- Total headcount at 121,082; up 8,275 annually;
- BPO headcount at 43,081
- Cash conversion to PAT at 107% for Q4'19 and 87% for FY'19
- Cash and Cash equivalent of USD 1,401 mn as of March 31, 2019
- The Active Clients count stood at 938 in Q4'19, up by 3 QoQ

C P Gurnani, Managing Director & Chief Executive Officer, Tech Mahindra said, "We had a satisfactory year, characterized by significant margin improvements, a growing digital portfolio and considerable increase in deal wins. While our Enterprise business has performed satisfactorily during the year, we are encouraged by the revival of the Communications business. Our continued investments into our partner ecosystem for building a unique portfolio of 5G offerings will enable us to address the Networks of the Future opportunity." Manoj Bhat, Chief Financial Officer, Tech Mahindra said, "It has been a year of overall operational performance improvement on various fronts, leading to a significant expansion in EBITDA margin year on year. We initiated our maiden share buyback program on the back of a healthy cash conversion during the year, with a view to returning enhanced value to our shareholders."

Key Wins:

Selected by one of the world's top technology players in Asia as an automation partner to digitally transform and enhance its process efficiency and IT solutions through smart and intelligent operations. TechM has been selected by

a leading Aircraft Manufacturer for full aircraft cabin design and engineering for all its programs. Engaged by a Government Agency in the Middle Eastern region as a strategic partner to support their digitization initiatives. TechM has been selected by a Tier 1 American Telco to design, build, maintain and support their real-time analytics platform, leveraging Tech Mahindra's agile delivery model. Signed a deal with a Department of an African Government for SAP S/4 HANA Implementation across different units. TechM has won a deal with a leading network equipment provider. TechM will be responsible for end to end management of their cloud engineering services. Engaged by a UK-based multinational banking and financial services organization as a strategic partner for transformation journey of its Malaysian operations. Signed a deal with a leading semiconductor manufacturer in the US. TechM is required to design, build and manage the IT Infrastructure (Towers – hosting, networking, workspace, IT security and service management) and applications environments and services for the customer over the next four years. Selected by a leading cloud platform company as the managed services partner for the management, maintenance, support, and operations of the infrastructure. TechM has won a deal with one of the largest Telcos in the Caribbean region for a greenfield transformation project, leveraging Tech Mahindra's knowledge of best practices and processes. Selected by a US headquartered largest wellness platform serving 35 Mn customers across

130 countries as a strategic consulting and transformation partner. Engaged by one of the largest courier and local package delivery service provider as a managed services partner for its infrastructure services.

Business Highlights:

Tech Mahindra and University of Nebraska at Omaha (UNO) collaborate to create a Future-Ready Workforce in the Midwestern U.S., armed with the latest digital capabilities and in-demand skills. Tech Mahindra will enter into a unique partnership with U.S. Based Orbic to co-design and co-create a 5G device portfolio including a Smartphone, Tablet, Hotspot and Home Router in India and the U.S., for the global markets. Tech Mahindra has joined the TBCASoft to promote the Cross-Carrier Blockchain Platform for telecom carriers. University of Sydney partners with Tech Mahindra's research arm, Makers Lab to co-create Next Gen Technology Solutions to tackle issues set out by industry, community and government organizations. Tech Mahindra Launches "netOps.ai" its Network Automation and Managed Services Framework based on CI/CD (Continuous Integration / Continuous Deployment) principles to accelerate 5G Network adoption by automating all the key network life cycle stages.

Awards and Recognitions:

Tech Mahindra has been recognized as a gold winner for being the Most Innovative Cybersecurity Company for GDPR compliant offering – PDPAAS - Privacy and Data Protection as a Service at the Cybersecurity Excellence Awards 2019. Tech Mahindra won Best Crisis and Reputation Communication of the Year 2019 at 1st edition of Corporate Communication PR Summit & Awards organized by Kamikaze B2B Media. TechMNxt Communication campaign emerged as a winner in the Best Campaign in Enterprise (B2B) category at the Economic Times Kaleido Awards 2019. Tech Mahindra has been selected as Brand of the Decade 2019 by BARC Asia, a media research and rating agency. The parameters for judging included - Trust, Image, Sustainability, Goodwill, Positioning, Recall, Growth, Reach, Innovation.

Tech Mahindra and Rakuten Aquafadas Collaborate to Leverage Cutting-Edge Technologies to Power Enterprises of the Future

Tech Mahindra, a leading provider of digital transformation, consulting and business reengineering services and solutions, and Rakuten Aquafadas, a France-based leader in digital content publishing and experience, signed an MoU (Memorandum of Understanding) to collaborate on building Enhanced Customer Experience Offerings leveraging latest innovations to power Enterprises of the Future. This collaboration will drive innovation to bring transformation of content deployment technologies across multiple screens and enhance customer experience for users around the world. Rakuten Aquafadas and Tech Mahindra aim to build a World Class Customer Experience Offering leveraging the unique suite of software that Rakuten Aquafadas provides for digital publishing,

unleashing the potential of new content consumption era driven by latest innovation and accelerated by Rakuten technology, content, services and data. Manish Vyas, Global President of Tech Mahindra's Communications, Media & Entertainment Business & CEO of Network Services said, "5G has the capability to unlock unprecedented opportunities in every industry vertical and domain. Our collaboration with Rakuten Aquafadas will help us further drive innovation in the Artificial Intelligence, Machine Learning, Digital Transformation space, and enable us to enhance customer experience from the forefront". Tech Mahindra will bring its deep domain experience across industry verticals, expertise across Artificial Intelligence, Machine Learning and Natural

Language Processing making it simpler, faster and better for the customers to go digital and to enhance the customer experience. Olivier Alluis, CEO, Rakuten Aquafadas said, "We're excited to enter into a partnership with Tech Mahindra. We strongly believe that together we'll be able to bring a unique offering to the market, helping businesses across the world drive cutting-edge content experiences for their end users underpinned by innovation and services driven by the Rakuten Group." As part of the TechMNxt charter, Tech Mahindra has a deep focus on Enhancing Customer Experience, and is currently engaged with multiple Fortune 500 customers globally on their digital transformation journey.



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

Tech Mahindra Ltd., a leading provider of digital transformation, consulting and business reengineering services and solutions, and UiPath announced their first joint solution offering - an end-to-end cognitive operations automation solution, in the area of Service Desk Operations. This ready-to-use cognitive operations solutions will help to accelerate the automation journey of an enterprise. Due to ongoing digital transformation

efforts, service desks have become more accessible to customers, and need to support a wider and complex range of offerings. The cost of manual service desk support increases by 3X with every escalation. Further, the high volume of customer requests and limited service desk capacity leads to a high average wait and response time, which then translates into an average customer experience. Keeping these industry pain points in mind,

Tech Mahindra and UiPath have developed a solution to enhance operational efficiency, business agility and provide better customer experience. Combined with self-service capabilities, the solution will support the entire life cycle of a service desk ticket from creation to closure i.e. categorization, triaging, resolution and knowledge management. Sameer Dania, Global Head, Business Development - Platforms, Tech Mahindra said, "With

Artificial Intelligence (AI) and Automation at the core of the digital transformation journey of an enterprise, Tech Mahindra is happy to partner with UiPath to introduce a comprehensive cognitive automation solution to our customers in the area of Service Desk Operations. TACTiX, our AI powered IT Operations Platform, powered with UiPath's superior enterprise Robotic Process Automation capabilities will provide deeper automation across the Service Management activities leading to increased operational efficiencies and business agility." As part of the TechMNxt charter, which supports building a collaborative disruption ecosystem to drive innovation, Tech Mahindra and UiPath came together in 2016. In this Joint Solution Offering, Tech Mahindra has integrated their flagship AIOps (Artificial intelligence for IT operations) platform TACTiX, powered by Machine Learning and Natural Language Processing capabilities, with UiPath's industry leading RPA (Robotic Process Automation) capabilities

and platform to provide end-to-end automation in the area of Service Desk Operations. Venu Kannan, Chief Solutions Officer, UiPath, said, "We are very excited to combine years of practical delivery experience, productized ML engine, and service desk solution from Tech Mahindra with UiPath's enterprise RPA. This solution will improve speed of service desk resolution and help identify root cause of

the issues leading to overall decrease in service requests" As part of the TechMNxt charter, Tech Mahindra is betting big on next gen technologies such as Artificial Intelligence, Machine Learning, Internet of Things (IoT), Cybersecurity, Robotics, Automation, Blockchain and 5G, to solve real business problems of the customers by delivering innovative solutions and services.



Yahsat and Hughes Form Satellite Services Joint Venture in Brazil

Yah Satellite Communications Company (Yahsat), a leading global satellite operator based in the United Arab Emirates and wholly owned by Mubadala Investment Company (Mubadala), and Hughes Network

Systems, LLC (HUGHES), a subsidiary of EchoStar Corporation (NASDAQ: SATS), announced an agreement to enter into a joint venture to provide commercial Ka-band satellite broadband services in

Brazil. This new venture combines Hughes experience delivering satellite networks and services in Brazil with Yahsat's strong position and capabilities in the region. Hughes will hold the majority interest in the joint venture. The new entity will combine Hughes do Brazil with Yahsat's consumer broadband company in Brazil, creating a strong value proposition to serve the growing market demand for a wide range of broadband services, including consumer Internet access, enterprise networks, cellular backhaul and community Wi-Fi hotspot solutions. The venture will combine the companies' more than 65 Gbps of Ka-band satellite capacity on Hughes 65 West, Hughes 63 West and Al-Yah 3 high-throughput satellites (HTS), reaching more than 95% of Brazil's population. It also includes Hughes and Yahsat's three gateways in Brazil. In addition to the combined existing capacity, the new entity will also leverage the capacity on Hughes next-generation



JUPITER™ 3 Ultra High Density Satellite (UHDS), designated EchoStar XXIV, planned for launch in 2021. In 2018, Yahsat and Hughes launched a joint venture to provide satellite broadband services to the Middle East, Africa and southwest Asia markets. "The formation of the new joint venture with Hughes in Brazil will strengthen the nation's digital landscape and bring with it a host of lasting benefits for communities and businesses across Brazil," said Masood M. Sharif Mahmood,

Yahsat's Chief Executive Officer. "Our partnership with Hughes supports Yahsat's mission to enable social and economic development by empowering communities in remote regions with high-performance broadband connectivity. We now look forward to combining our efforts to unlock the massive potential of the largest and most exciting economy in Latin America." Pradman Kaul, president of Hughes, added: "Yahsat is the logical partner for Hughes in Brazil as we continue

to expand our services and meet growing demand across consumer, enterprise and carrier markets. Brazilians throughout the country will benefit from the capacity, scale and operational synergies of our combined entity as we connect the unconnected and enable businesses and communities to thrive." Completion of the transaction is subject to customary regulatory approvals and closing conditions, and is expected to occur later this year.



Zain Saudi Completes First Call over Its 5G Network

Zain Saudi Arabia (Zain KSA) has completed what it claims is 'one of the first 5G calls in the region on its network'. The company said that it exceeded speeds of 1Gbps, with various other tests being conducted to determine the average speed that a 5G network offers and ensure full

technical readiness. Commenting on the achievement, Eng. Sultan bin Abdulaziz AlDeghaither, CEO of Zain KSA, said: 'This is one of the first 5G call experiences in the region, and one of the first in the world without using voice-call apps. We have managed to tap into unprecedented

speeds via 5G technology, demonstrating once again the active role Zain KSA plays in the ICT sector. This milestone also reflects Zain's relentless pursuit of state-of-the-art technology without compromising on quality.'

Zain Bahrain Partners with Alkeri Partners to Launch a New Startup Initiative 'Zainnovate'

Zain Bahrain, a leading telecommunications provider in the Kingdom, and Alkeri Partners, a Bahrain based startup Foundry has announced a new startup initiative 'Zainnovate' to support the Bahraini startup ecosystem. Zain Bahrain has officially launched the first phase of 'Zainnovate' initiative on 2nd May at Zain Headquarters with a signing ceremony to announce the partnership with Alkeri Partners. The event showcased Oqal Angel Investors Network; the first angel investor community in the Kingdom of Saudi Arabia. Since its incorporation in 2011, Oqal has grown to build an active Angel investor community of over 350 members across Saudi Arabia, arranged 100 meetings connecting entrepreneurs with Angel investors, overseen more than 300 investment opportunities within its platform and successfully its members investing over SAR40 million in Angel investments within the Saudi startup ecosystem. The Chairman and Founder

of Oqal Saudi Arabia Faris Al-Rashid Al-Humaid, Jamal A. Al-Hazeem Chairman of Alkeri Partners and Khaled Zainalabedin Founder and Managing Director of Alkeri Partners announced a partnership with Oqal Saudi Arabia to setup Oqal's first

regional Chapter outside the Kingdom of Saudi Arabia in the Kingdom of Bahrain. Upon incorporation and launch of Oqal Angel Network – Bahrain, the Chapter shall operate within the Zainnovate initiative and platform in partnership with Zain



Bahrain. "We are delighted to announce our partnership with Zain Bahrain and Oqal Angel Network – Saudi Arabia to setup Oqal's first cross border Chapter in the region considering the thriving growth and potential for startups and angel investors in both Saudi Arabia and Bahrain. As part of this strategic partnership, early-stage startups, businesses, and angel investors affiliated with both ecosystems will now have access to unique funding perks, early-stage startup investment opportunities in both regions. We truly believe that this partnership will set forth a major milestone towards building future collaboration initiatives benefiting and enhancing cross pollination of both the Saudi and Bahraini startup ecosystems and developing the Angel investing sector being a major funding contributor for early-stage startups," said Khaled Zainalabedin, Founder and Managing Director of Alkeri Partners. "The new Bahrain Chapter is a strategic decision that aims to close investment gaps within the region and supports regional investments for early-stage startups. OQAL believes that collectivist culture embedded within the region is the foundation that should be utilized to support the angel investors in contributing and growing the entrepreneurial ecosystem. Underlying the decision is the efforts to enforce the important role of angel investors in growing the maturing entrepreneurial scene" said Faris Al-Rashed Founder of OQAL Angel Investors Network. The event also announced the inauguration of a partnership between Russian Venture Company (RVC) and Alkeri Partners to launch GenerationS Accelerators across the Middle East region with Bahrain being the main headquarters and first Launchpad under the Zainnovate initiative. RVC is the Russian Federation's venture capital

fund of funds managing over 25 backed VC funds with over 200 startup portfolio companies and operates GenerationS Accelerators, Europe's leading Corporate Accelerator with Clients the likes of Airbus, VT Bank, Alrosa, Unilever, Michelin etc. the partnership was inaugurated by H.E. Alexander Povalko General Director, Chairman of the Management Board of RVC JSC, Jamal A. Al-Hazeem Chairman of Alkeri Partners and Khaled Zainalabedin Founder and Managing Director of Alkeri Partners. "The partnership with RVC sets out a unique proposition linking the Russian Federation to the Middle East region and would setup up the pace for further sought after and mutually beneficially economic collaborations between both regions. We are confident that through launching the first planned GenerationS Accelerator in Bahrain will be a birthing ground not only for local talent, but also talented entrepreneurs from across the Middle East and the Russian Federation who yearn to revolutionize the tech industry by building innovative startups for the global consumer market," said Jamal A. Al-Hazeem Chairman of Alkeri Partners. "This agreement is the first step towards creating favorable conditions for the development of innovative cooperation between Russia and the Middle East. The partnership will allow RVC to work closely with Middle Eastern development institutions and major corporations through using the Kingdom of Bahrain as a Launchpad. This initiative confirms that RVC is a significant player in the international venture capital market that promotes Russian technology abroad. Our joint work will help startups to enter the MENA market and will help startups from the Mena market access and enter the Russian market and attract funding from local investors," said CEO of RVC Alexander Povalko. "The Kingdom

of Bahrain is considered one of the best jurisdictions for doing business in the Middle East region and is also among the TOP 5 countries for expats. The GenerationS team will develop the first program in Bahrain followed by the Kingdom of Saudi Arabia and thereafter scale up the accelerator model across other regions within the Middle East," added Ekaterina Petrova, director of corporate accelerator GenerationS. Finally, a Zainnovate demo day pitch was later presented for five leading global and regional startups. The startups included AliHuda, a US based clean kids entertainment and content developer, Bayshore Networks, a US based industrial cyber security company, Surkus, a US based company offering, all-in-one solution that optimizes brands and consumer engagement, Flashh, a Bahraini based time-based deal platform for consumer products and Easy Financial Services, a leading Bahraini Fintech biometric payment gateway and block chain service provider. "The new partnership is a continuation of the efforts made by Zain Bahrain to support Bahrain's vision 2030 as a leading tech and startup hub in the region. Zainnovate initiative was also launched to create strategic platform through partnerships supporting startups in developing an entrepreneurial environment in the Kingdom of Bahrain and providing the necessary support for SME sector projects for them to grow, develop and sustain," said Abdulla Bin Khalid, Zain Bahrain Director of Communications & Investor Relations. 'Zainnovate' comes under Zain's contribution towards the startup ecosystem in Bahrain which is also in line with their corporate sustainability and social responsibility strategy which focuses on three core pillars: Innovation, Thought Leadership and Youth Empowerment. 🇧🇭

REGIONAL NEWS

UAE to Establish International Technology Centre

The Ministry of Finance, MoF, signed a Memorandum of Understanding, MoU, with Abu Dhabi Global Market, ADGM, and the International Bank for Reconstruction and Development, IBRD, to provide innovative financial technology services, FinTech, to maintain an efficient growth in the financial sector. The MoU aims to establish an International Technology Centre, ITC, in the UAE, and came on the sideline of the launching event of the Gulf Economic Monitor initiative, spring 2019. The event was held by the Ministry of Finance in partnership with ADGM and the World Bank Group, WBG, under the title: "Building the Foundations for Economic Sustainability: Human Capital and Growth in the GCC." The biannual Gulf Economic Monitor report of the World Bank highlights the key development achievements realized in the Gulf countries, by shedding the light on the comprehensive economic trends and the major challenges facing the GCC countries. The MoU was signed in the premises of ADGM by Younis Haji Al Khoori, Under-Secretary of MoF, and Dhaher bin Dhaher Al Mheiri, CEO of the Registration Authority of Abu Dhabi Global Market, and Dr. Issam Abousleiman, Country Director of the GCC Countries, Middle East and North Africa, IBRD. Younis Al Khoori confirmed that the UAE is committed to participating in the realization of economic development, financial sustainability and economic diversity through adopting new innovative technologies and consolidating the UAE's position as an international centre for FinTech. He also noted that the conclusion of this agreement comes in line with the ministry's interest in strengthening its relationships with different active international financial institutions within the WBG and IBRD. Al Khouri said, "The International Technology Centre of the UAE shall take the achievement of the

common goals of the UAE and the IBRD as its main task, and shall provide a platform that offers the exchange of experiences and best practices in the field of legislation and financial policies formulation, by encouraging the adoption of the latest modern techniques by governments and private and public sectors alike." Ahmed Ali Al Sayegh, Minister of State and Chairman of ADGM, said: "ADGM is pleased to work with the Ministry of Finance and World Bank to further develop the technology start-up ecosystem and build a community of leading global and local technology companies. The UAE has been a strategic partner of the World Bank Group and through this MoU, ADGM will strengthen this partnership. We look forward to collaborating to reinforce global initiatives that promote the long-term economic growth and development of the community. As an International Financial Centre, ADGM supports the government plans of achieving economic diversification and contributes to the competitiveness of the UAE market, by acting as a catalyst of

growth for innovation and technology." As per the MoU, the International Technology Centre is decided to be established in the office of IBRD in Abu Dhabi and is anticipated to be the location of concluding financial partnerships and agreements bringing together governments and private sectors' companies both on the regional and international levels. The ITC center is meant to support the efforts exerted for the application of FinTech and Digital Economy in the MENA region. The Centre shall enable IBRD to practice its developmental operations in the region, after consulting the involved parties of the MoU. Dr. Issam Abousleiman said: "The choice of the UAE as an international technology center comes from its pioneering role in promoting innovation, supporting youth and women, and harnessing technology to promote development. These key pillars are the focus of WBG's strategy in the region, aiming to encourage investment in human capital, the digital economy and in supporting the private sector as an engine to create jobs for youth and women."



Omani Based IoT Startup Scores US\$1 Million in Pre-Series A Funding

eMushrif turns ordinary school buses into smart buses to make sure that children are safe. The company brings IoT to transportation and logistics to create the next generation of safe and smart transportation. eMushrif announced today that it has successfully completed a Pre-Series A funding by a prominent group of Oman-based investors (Phaze ventures, Oman Technology Fund – Wadi, Sparklabs energy, Myrad holding and Angels) and one Bahrain based investor (Dividend Gate Capital). The investment will focus on the growth of eMushrif operations across mass production of IoT devices, R&D of new technologies, sales, marketing and research regional markets, as well as strengthening the product offering to feature state of the art technologies and services in IoT and AI. Co-Founder and CEO, Adnan Alshuaili said, "eMushrif is on a mission to save lives on school buses and re-gain parents trust in school transportation. Our system consists of sophisticated hardware and intelligent software that help schools and parents to keep track of buses and students with four levels of safety checks inside the bus to provide high level of safety and efficiency. We are also revolutionizing commuting services in other verticals such as oil and gas by providing intelligent commuting management system". Commenting on technology, Awadh Alshukaili, Co-founder and CTO, said "At this day and age, Internet of Things and Artificial Intelligence are becoming an important part of logistics.

At eMushrif we solve real-life problems using these technologies and challenge our own solutions every single day to set the bar higher and over deliver to our happy clients". Issa Alshuaili, Co-founder and COO, said "In the past two years of operation, we served Tens of schools in Oman, Thousands of parents use our system everyday which is installed on Hundreds of buses across the country, and just last month, we completed 1 million protected trips". The Pre-Series A financing will enable the company to expand to other countries in the region and capture more market share.



DTH Operators Set to Transform TV Connectivity in Bangladesh

TV viewers from across the country are expected to enjoy uninterrupted high definition video signals directly from satellite with the introduction of long-awaited Direct-To-Home or DTH technology. DTH technology which remains as the most-used TV reception method in many parts of the world, allows reaching anyone in anywhere with high-quality television connectivity without any cable. Bangladesh Communication Satellite Company has provided bandwidth connectivity to one of the Direct-To-Home service provider from the country's own satellite Bangabandhu Satellite-1. Bangladesh Communication Satellite Company Limited, or BCSCCL, Chairman Shahjahan Mahmood told New Age that one of the DTH operators, Akash, has already been availing service of Bangabandhu Satellite-1 on a trial basis. DTH operator Akash's service is expected to start transmission in the country from today. 'We are hopeful that they would get good quality service from Bangabandhu

Stellite-1 in proving DTH service,' the BCSCCL chairman said. DTH technology allows reaching anyone anywhere with high-quality television connectivity. Even the people of most remote areas in the country could be provided with TV connectivity within couple of minutes by way of the 'set top box'. DTH technology helped attain around 24 crore subscribers across the globe at the end of December, 2018 and the number of subscribers is expected to reach 30 crore by 2020. Speaking about its prospect in Bangladesh, Bangladesh Telecommunication Regulatory Commission Senior Assistant Director (Media) Zakir Hossain Khan told New Age, 'As DTH technology is capable of providing high-quality service without the cable infrastructure, the technology would be able to make room in Bangladesh.' By the use of the country's own satellite Bangabandhu-1, DTH service in Bangladesh would be cost-efficient for the customers, he said. Under the technology, customers will enjoy uninterrupted

television services as the issue of cable cut or power cut during natural disasters or any other reasons will be the thing of the past, he said. Customers will enjoy true 1080 pixel video and 5.1 Dolby surround sound content which has often been unachievable through cable connections even when the TV channels were fully HD. Due to its convenience, seven operators have been providing DTH service in India since 2009 with the total number of subscribers exceeding seven crore. In Bangladesh, the telecom regulatory body, following government approval, has formulated guidelines on DTH in 2015 after awarding licenses to two operators in 2013. As the Internet Protocol Television service, internet-based high-quality TV streaming technology, providers have become major competitors of DTH operators, providing new innovative offers and services to the subscribers has become a major issue for the DTH operators in gaining popularity.

Saudi Arabia Is Among the Markets with Highest Consumer Awareness of 5G

Ericsson has released a new ConsumerLab report, 5G Consumer Potential, which busts industry myths surrounding the value of 5G for consumers and outlines the opportunities available for communications service providers. Backed by solid research from one of the biggest ever consumer expectation studies, the report looks at the potential of 5G to benefit consumers, uncovering certain realities about them (consumer realities) to bust the following four common industry myths:

- 5G offers consumers no short-term benefits.
- There are no real use cases for 5G, nor is there a price premium on 5G.
- Smartphones will be the “silver bullet” for 5G: the magical single solution to delivering fifth-generation services.
- Current usage patterns can be used to predict future 5G demand.



The study brings some sense of reality to the ongoing debate in the ICT industry about whether there is an opportunity for a premium consumer offering based on 5G's extra capabilities. The key findings of the study include the fact that consumers expect 5G to provide relief from urban network congestion in the near term – especially in megacities, where six in 10 smartphone users report facing network issues in crowded areas. The respondents also anticipate more home broadband choices to be available with the launch of 5G. Saudi Arabia is one of the markets with highest consumer awareness of 5G and its promises together with China,

South Korea, the US and Italy. The report also dispels the ICT industry myth that consumers are unwilling to pay a premium on 5G. In fact, smartphone users state that they are willing to pay 20 percent more for fifth-generation services, and half of early adopters as much as 32 percent more. However, four in 10 of these high spenders expect new use cases and payment models as well as a secure 5G network in addition to a consistently high internet speed. Another key finding is that current 4G usage patterns are not indicative of future usage behaviors. Video consumption is set to rise with 5G. Consumers expect to not only stream video in higher resolutions but also use immersive video formats such as Augmented reality (AR) and Virtual reality (VR), resulting in an additional three hours of video content being watched weekly on mobile devices by users in the 5G future when they are out and about, including one hour wearing AR glasses or VR headsets. The study also reveals that one in five smartphone users' data usage could reach more than 200GB per month on a 5G device by 2025. Ericsson ConsumerLab has drawn up a consumer roadmap of use cases involving 31 different applications and services. The roadmap is divided into six use-case categories, namely: entertainment and media; enhanced mobile broadband; gaming and AR/VR applications; smart home and fixed wireless access; automotive and transportation; and shopping and immersive communications. Worth to know that Saudi Arabian consumers would prefer to pay for an immersive entertainment experience like the diorama stadium* tabletop AR experience. Jasmeet Singh Sethi, Head of ConsumerLab, Ericsson Research, said: “Through our research, we have busted four myths about consumers' views on 5G and answered questions such as whether 5G features will require new types of devices, or whether smartphones will be the silver bullet for 5G. Consumers clearly state that they think smartphones are unlikely to be the sole solution for 5G.” This latest Ericsson ConsumerLab study is based on 35,000 interviews with smartphone users aged 15 to 69, carried out in 22 different countries. The views of the participants are representative of almost 1 billion people. To gain a perspective on industry sentiment regarding the consumer value of 5G, a further 22 interviews were conducted with experts including academics as well as senior executives working for telecom operators, handset and chip manufacturers, start-ups and think tanks.

South Sudan Launches International Voice Gateway

South Sudan has announced the launch of its own international voice gateway in the capital Juba, in a move which is expected to improve the quality and affordability of the country's telephony services. 'The new international gateway we are

launching is a public-private partnership with international partners experienced in telecommunication that includes a shared revenue agreement with the government and also promotion of low cost and quality voices and data traffic to the world,' Xinhua

quotes Michael Makuei Lueth, Minister of Information and Broadcasting, as saying. Martin Keller of MGI, the company that supplied the gateway, said the firm will now work on the installation of a data gateway to improve internet services.

Chinese Company Starts Laying Optical Fiber to Help Build “Digital Nepal”

China Communications Services International Limited started to lay optical fibers along a highway connecting the eastern and western border of Nepal for Nepal Telecom (NT), one of the biggest telecom service providers of Nepal. The Chinese company is responsible for laying 555 kilometers of optical fibers out of the planned 2,179-km long fibers from Chiyabhanjyang in eastern Panchthar district to Arughat in western Gorkha district along the Mid-Hill highway. Once completed,



the optical fibers are expected to provide an access to high speed internet and mobile services to the Nepali people.

PTCL Group Books 95% Increase in Q1 Net Profit

Pakistan's fixed line incumbent Pakistan Telecommunication Company Limited (PTCL) – which also offers mobile services via its Ufone-branded subsidiary – has

booked consolidated total revenue of PKR33.5 billion (USD224.8 million) for the first three months of 2019, up from PKR30.3 billion twelve months earlier.

EBITDA for the period increased from PKR10.2 billion to PKR11.9 billion, although the company notes that the growth was amplified by a change in accounting standards, excluding which EBITDA would have grown to PKR11.0 billion. Net profit grew 95% year-on-year to PKR2.0 billion, or to PKR2.2 billion excluding the new accounting standards. The expansion was driven primarily by strong growth at the company's mobile subsidiary, which recorded revenue growth of 22% y-o-y, and an 82% increase in net profit. PTCL's standalone business, meanwhile, continued to improve after the company registered its first annual growth since 2014, reporting a 0.7% increase in turnover for 2018. PTCL's revenue for Q1 2019 was flat at PKR17.9 billion – down 0.6% y-o-y – whilst net profit for the quarter grew by 10% to PKR2.0 billion.



HiWEB Buys Stake in Iranian Net

Iranian ISP HiWEB has acquired a 23% stake in Iranian Net, a firm which has been tasked by the government to roll out fiber-to-the-home (FTTH) infrastructure in the country's major cities. A report from the

Financial Tribune says that HiWEB has bought its shares from the ICT arm of the Mobin Trust Consortium (Etemad-e-Mobin), which is also the majority shareholder in national fixed line operator

Telecommunications Company of Iran (TCI). HiWEB currently uses a mixture of fixed and fixed-wireless networks to offer internet access in Iran. Iranian Net is part-owned by South Africa's MTN Group.

TRA UAE Celebrates the World Telecommunication & Information Society Day

The UAE Telecommunication Regulatory Authority (TRA) celebrated the World Telecommunication & Information Society Day under the theme "Bridging the Standardization Gap", in a special event at the TRA's office in Dubai. The event aims at raising awareness about the international practices in bridging the standardization gap, as well as the international cooperation to keep up with the rapid ICT developments. The celebration started with a speech by Eng. Majed Al Mesmar, the Deputy Director General of the Telecommunications sector at the Telecommunications Regulatory Authority (TRA), who welcomed the attendees and extended his congratulations on the holy month of Ramadan. Al Mesmar said: "I would like to describe our relationship with our strategic partners as the same one of family members. In our culture, the family is the strongest example of mutual support, cooperation and partnership. We, in the UAE, believe that cooperation and solidarity work miracles. Our joint journey has embodied this spirit of cooperation for decades. Today, we meet on another occasion to revive this spirit. We meet today to celebrate the 50th anniversary of World Telecommunication and Information Society Day, which has been celebrated annually since 1969 to mark the founding of ITU on 17 May 1865." Al Mesmar emphasized that the International Telecommunication Union was successful in choosing the theme of this year, bridging the standardization gap, to be highlighted in this event. He said: "Gaps in areas such as standardization are one of the challenges we must urgently address in order to shape the future on basis of sustainable development, and contribute to the well-being of our peoples and societies. It is no longer possible to deal differently with things going on in

the developed world and the developing world. We live in one world and have the necessary tools, convergent concepts and similar goals and challenges. During the event, there was a message from the ITU Secretary-General Houlin Zhao. He talked about the importance and symbolic value of the World Telecommunication and Information Society Day. Zhao touched on the role of the ITU to develop different service standards since it was established. The TRA presented its staff's experiences in standardization process and its vital role as a chair of the Study Group 20, Internet of things (IoT) and smart cities and communities. It also presented the UAE's practices in standardization, which include chairing the ITU ST20 on Internet of Things and Smart Cities and participating in work of other study groups. Participants touched on the role of the UAE to highlight the importance of capacity building and enable developing countries via smart learning. Public, private and academic partners of the TRA participated in the

event and highlighted the importance of standardization to link research and development with the market needs. The attendees agreed on the importance of enhancing awareness of standardization and cooperation of different sectors to contribute effectively in standardization activities. The event included a discussion about the importance of enabling local experts in standardization at the national, regional and international levels and encouraging developing countries to apply international standards. The discussion called for highlighting the role of standards in achieving two sustainable development goals: quality of education and sustainable cities. The UAE, represented by the TRA, is always supporting the ITU in its efforts to enhance the ICT sector in developing countries. The UAE provides logistic and technical support to developing countries to improve their ICT infrastructure and achieve sustainable development, which is the basis for economic growth and society happiness.



Abu Dhabi Ports Ramps up Digital Transformation with Dell Technologies

Abu Dhabi Ports has signed a Memorandum of Understanding (MoU) with Dell Technologies that will see the organizations combine their expertise in maritime and IT to develop technology-based concepts, solutions and services specifically for the maritime industry. The MoU with Dell Technologies is designed to provide Abu Dhabi Ports with consulting services and help them leverage high value-added technologies such as blockchain, and artificial intelligence (AI) to fuel their digital transformation journey. In addition, this strategic partnership will also see an exchange of industry best practices and expertise needed to develop truly integrated smart ports that can better serve the customers and other stakeholders of Abu Dhabi Ports. The agreement was signed by Abdullah Al Hameli, Executive

Vice President – Corporate Support at Abu Dhabi Ports, and Mohammed Amin, Senior Vice President, Middle East, Turkey & Africa at Dell Technologies. The signing took place at Dell Technologies World 2019 in Las Vegas – the annual flagship event hosted by Dell Technologies that allows decision makers, customers, partners and analysts to discover how to learn new capabilities, reinvent processes, innovate faster and create value that will change the game across industries. Abdullah Al Hameli, executive vice president, Corporate Support at Abu Dhabi Ports, said, “At Abu Dhabi Ports, innovation is at the heart of everything we do. We are excited about the growth and opportunities created by the Fourth Industrial Revolution, and we are constantly striving to deliver products and services that transpose the latest

emerging technologies into a maritime context. “We are delighted to partner with Dell Technologies on our ongoing digital journey. Dell has long been a leader and pioneer in IT, and we look forward to combining their knowledge and insights with that of our own maritime experts. Together, we will explore ways to harness the most exciting technologies to make the future of maritime operations and services safer, more efficient, and more sustainable.” Mohammed Amin, senior vice president, Middle East, Turkey & Africa at Dell Technologies, said, “At Dell Technologies, we primarily aim to help organization build their digital future and transform their infrastructure. We are well positioned with end to end solutions to enable Abu Dhabi Ports modernize their IT infrastructure to efficiently operate their traditional applications as well as run their cloud native applications allowing them to unlock the potential of artificial intelligence and blockchain to develop new services. It is a pleasure to partner with Abu Dhabi Ports to achieve their visionary step towards transforming the logistics and industrial services in Abu Dhabi and the UAE and lead the disruption of the maritime industry in the region.” Ahmed Auda, Managing Director Middle East, Turkey & North Africa at VMware, said, “As Abu Dhabi Ports drives ahead with its digitization agenda, VMware, a Dell Technologies company, is excited to provide cutting edge technologies that will help Abu Dhabi Ports leverage the full strengths of its network and tap into the benefits of fast developing technologies including cloud, AI and blockchain.”



Pakistan USF Board Approves Telecom Projects for Sindh

Board of Directors of Universal Service Fund (USF) approved to award contract to Telenor for next Generation Broadband to provide telecom communication services to unserved and underserved areas in districts of Dadu, Jamshoro and Thatta. Federal Minister for Information

Technology and Telecommunication Dr. Khalid Maqbool Siddiqui chaired the 63rd Board of Directors meeting of USF which was also attended by Federal Secretary Ministry of Information Technology and Telecommunication Maroof Afzal, a press release said. The minutes of the meeting

were confirmed. The meeting also approved award of contract to Telenor in respect of NG-BSD NH & MW Lot-2 (N-25 & N-65), and NH & MW Lot-3 (N-50 & N-70). The Board also approved award of contract to Pakistan Mobile Communications Limited (PMCL) in respect of South Waziristan Lot.

UAE TRA Organizes the Middle East and Africa Workshop on Globalization of Trust Services

The Telecommunications Regulatory Authority (TRA) held a workshop in Dubai for Middle East and Africa on Globalization of Trust Services, in cooperation with The European Telecommunications Standards Institute (ETSI), with the participation of representatives of government entities and specialized regulatory bodies from Africa, Middle East and Europe. 'The Middle East and Africa workshop on Globalization of Trust Services' discussed reaching a mutual understanding of Trust Services in general and digital signature service in particular, as different regions use different schemes. This aims to enhance the global trading environment and international transactions on a global scale. In his opening speech, H.E. Majed Al Mesmar, Deputy Director General of Telecommunication sector in the TRA, welcomed the audience to the UAE, he said: "This is an ideal opportunity to work in a team spirit and come up with a clear vision

of the concept of e-trust, which contributes to the development of e-transformation and e-commerce in our countries. It has become clear to all that the digital signature has become an integral part of digital transformation and e-transactions, and therefore we need to have a common understanding of how to deal legally with this matter in order to reach a sustainable and globally acceptable vision." H.E. Al Mesmar indicated to the country's appreciation of the progress achieved by the EU countries in this field. He said: "The UAE's interest in this field is in line with the country's ambitious plans to achieve an overall digital transformation by adopting latest technologies to reach the ultimate goal of spreading happiness and improving wellbeing in our community. Today we are working to achieve this goal supported by our wise leadership, and based on the strategic plans in the fields of Artificial Intelligence, Internet of Things

(IoT), smart cities, the Fourth Industrial Revolutions, the Blockchain, 3D printing, unmanned aerial vehicles, and others." During the workshop, the participants discussed ways of enhancing regional and international cooperation in certification and digital signature, reaching results that meet the interests of different parties and a mutual understanding on how to achieve global acceptance of digital signatures through all efforts and open channels of cooperation and partnership between the public and private sectors. The participants also discussed the expected benefits of the digital signature acceptance regionally and globally, the challenges of the process from operational and legal perspectives, and the best ways to overcome these challenges. ETSI experts presented the latest EU standards for Trust Services and how it could enhance global acceptance in a globalized market of trust services-based electronic transactions. The workshop provided Middle Eastern and African representatives with an opportunity to present their views on the international recognition of national / regional digital signature-based trust services schemes in a globalized market of trust services-based electronic transactions. TRA has signed a number of MoUs with public and private entities, aiming to enhance strategic relations with the public and private sectors and academic institutions. The purpose is to accelerate the implementation of national digital infrastructure plans and provide opportunities for citizens and residents in the country to benefit from unique educational and professional careers in digital functions such as data science, IoT, artificial intelligence, and cybersecurity.



Saudi Payments to Introduce National QR Code for Payments in KSA

Saudi Payments has recently signed a memorandum of understanding with twelve parties, including nine banks and three financial technology firms, to implement a QR-based national payment system that matches service providers' demands, creates new opportunities, and facilitates payment services based on this technology. The QR code technology has been widely implemented for payment solutions in international markets in recent years. It allows individuals to pay via smartphone applications using QR scan features. During the MEFTECH 2019 conference that took place in Riyadh recently, His Excellency the governor of the Saudi Arabian Monetary Authority (SAMA), Dr. Ahmed Alkholifey, announced that SAMA, represented by Saudi Payments, is working on unifying the technical and commercial standards for payments based

on QR codes technology. A move that is intended to develop existing services and to facilitate the implementation of the technology via a platform that will be serving all stakeholders in the most efficient manner; i.e. e-wallet providers, merchants, and consumers. By implementing this national platform, Saudi Payments aims to provide various payment solutions for retailers, payment service providers, and individual customers through a unified platform that enables all involved parties to interact effectively using one common and consistent standards. Additionally, the unified QR code payment system will contribute to the development of the digital infrastructure for the financial system, and will be part of an integrated digital payment ecosystem that works based on the concept of an open loop payment environment. This means that retailers,

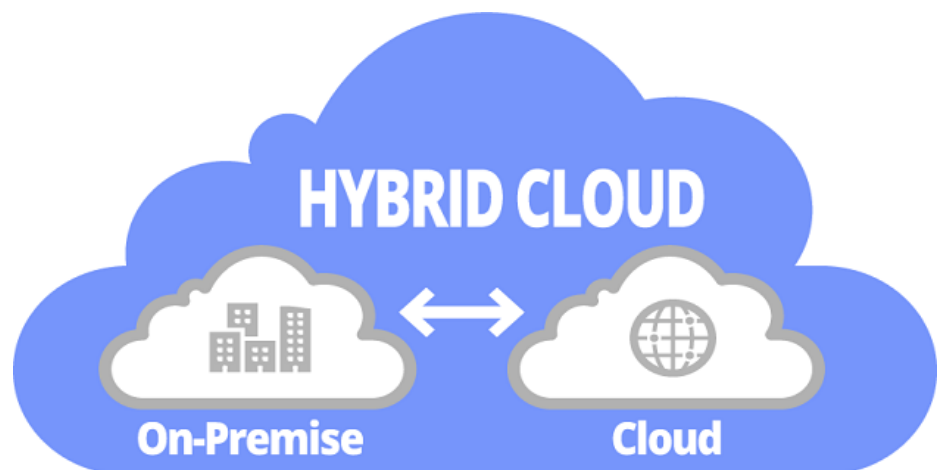
payment service providers, and digital wallets users will be able to make payment transactions regardless of the relations among the involved parties. Saudi Arabia will be one of the pioneering countries offering such an ecosystem strengthening its position as a leading country in payments technologies in the Middle East. It is noteworthy that the SAMA, represented by Saudi Payments, is responsible for the development and operation of the national payments infrastructure in the Kingdom of Saudi Arabia, which includes as part of its services the national card scheme (mada). This new service will ensure the further development of the payments ecosystem to achieve the objectives of the Financial Sector Development Program (FSDP)—one of which is to create a cashless society boosted with digital payment options.

Middle East's Hybrid Cloud Adoption On The Rise

Middle East organizations are moving to the hybrid cloud as CIOs optimize their business applications and competitiveness, a report said. Core applications and sensitive data, such as banking or patient records, are kept on the local private clouds. Services that take up a lot of computing power, such as email, are running on public clouds from global providers such as Amazon Web Services (AWS), the report said. Showing the strong growth in hybrid cloud, Gartner predicts the global public cloud services market will grow by 17 percent to a record-high of \$206 billion in 2019. Serverless computing will go from the current 10 percent rate of adoption to mainstream by 2020-2022, according to a separate report from Gartner. "The hybrid cloud market will reach new heights as Middle East organizations understand that their digital transformation relies on a mix of public and private clouds," argues Savitha Bhaskar, chief operating officer at the UAE-based IT infrastructure and information management consultancy and solutions provider Condo Protego. "With

hybrid cloud, Middle East organizations can gain flexibility, scalability, and security to optimize costs based on application-level requirements." Moving information on, off, and between clouds can be time-consuming, and prohibitively expensive, requiring the support of specialized tools and services. However, VMware Cloud on AWS allows organizations to create unified environments across public and private clouds, it said. In the Middle East, Condo Protego is seeing especially strong demand

for the Dell EMC VxRail hyper-converged infrastructure running VMware Cloud Foundation private cloud for customers looking to leverage VMware Cloud on AWS. "With AWS planning to open several regional data centers in 2019, the Middle East is set to experience a rapid adoption of organizations running on AWS," said Bhaskar. "Early adopters of AWS cloud can optimize their cloud environments for digital business, and free up their IT staff to support business innovation."



Over 4.3 Billion Cyberattacks Thwarted in Oman

Oman warded off more than 2.632bn cyberattacks on government networks in 2018 and 1.726bn malicious attempts against Oman's private space, taking the total to over 4.3bn. The cyberattacks on government networks in 2018 were over three times more than in 2017 when the country recorded 880mn such attacks. While over 900mn attacks specifically targeting government websites were successfully prevented in 2018, which was also several times more than 2017 when such attacks were 1.41mn, according to the Information Technology Authority's (ITA) Annual Report 2017. According to the United Nations eGovernment Survey 2018, Oman is among the top ten best countries in cybersecurity globally, second in the Online Service Index among the Arab region and 63 worldwide. ITA's two main divisions focus on cybersecurity: Information Security Division (ISD), which is responsible for the security of government entities, and the Oman Computer Emergency Readiness Team (OCERT), which is responsible for the security of cyberspace in Oman. ISD, which provides networks and portals protection, secure Internet access, end-point security, information security operations, security assessment and IT security consultancies,

rendered 2,632,006,039 cyberattacks useless against government networks while it thwarted 901,569,883 cyberattacks against government websites and 1,726,990,120 attempts against Oman's private space. ITA further detected, prevented and analyzed 872 spyware (1,859 spyware in 2017) and 4,051 (11,370 in 2017) viruses. It further said that 100 per cent of 192 known security incidents were detected within 20 minutes and closed, while 93.8 per cent security incidents were solved and closed within five business days. OCERT, which addresses the

issues of cyberthreats and risks and the provision of a secured cyber environment in using eServices and protection of critical national information infrastructure, discovered and handled 432,978 real cybersecurity attempted attacks (44,340 in 2017) and 71,472 web attacks. In addition, 203 malware infections through OCERT intelligence gathering system were thwarted. OCERT also handled 140 digital forensics cases with 828 evidence devices including computers, mobile phones, external hard disk and USBs.



UAE Telecoms Authority Urges Users to Update WhatsApp

WhatsApp users should update their app immediately to avoid being hacked, the UAE's Telecommunications Regulatory Authority has said. The warning came after it emerged an Israeli firm had developed surveillance software which could be installed on mobiles and other devices via a phone call. The malware is understood to be so advanced that those targeted by hackers did not even need to answer the WhatsApp call to fall victim. WhatsApp released a patch

for the vulnerability for customers on Monday, urging all of its 1.5 billion users to download the fix immediately. "Due to detecting a vulnerability in [the] WhatsApp mobile application in the beginning of May 2019 - which put your smart device at risk of penetration - we advise you to update the application to its latest version from the play Store or Apple Store," the TRA said in a tweet. Only a select number of users are thought to have been singled out by an "advanced cyber actor," according to

Bloomberg. But the TRA still urged users to update the app just in case they had been targeted. WhatsApp calls are blocked in the UAE. A statement from WhatsApp said: "WhatsApp encourages people to upgrade to the latest version of our app, as well as keep their mobile operating system up to date, to protect against potential targeted exploits designed to compromise information stored on mobile devices." 📱

ARTICLE

Gearing up for 5G in Oman



Bernhard Van der Merwe

Vice President of Technology
Omantel



With the world's tech giants vying for leadership in 5G technology, it is uncertain who will win the heated race, but one thing we know is that not only will 5G be an essential and integral part of our Network in the future, it will also change the way we design, operate, sell and live.

As a premier telecom company that leads the future with innovation and excellence, Omantel had been gearing up for 5G over the past 2 years, and our network is now fully ready to adopt this new technology.

At speeds up to 10 Gbps and ultra-low latency, this new technology will pave the way for a thriving digital society, with huge potential to massively develop smart cities, campus networks, Internet of Things, autonomous vehicles, entertainment and many more.

As a premier telecom company that leads the future with innovation and excellence, Omantel had been gearing up for 5G over the past 2 years, and our network is now fully ready to adopt this new technology.

Omantel, being a partner of choice for major public and private entities in the Sultanate, works hand in hand with all parties to enrich the digital experience in the country, and support the Government in achieving Oman 2040 vision, where economic diversification is included as one of the key goals.

This article will elaborate on the correlation between the Fourth Industrial Revolution and Omantel's efforts into introducing the development of 5G use cases, the current challenges, the motivation, and the ultimate solution.

5G Use Cases: Current Challenges and Motivation

The increasing demand of highly customized and digitized products can be seen as a trigger for the "Fourth Industrial Revolution", where we will see increased integration between digital domains and offline reality. Current LTE wireless technology fall short to sustain such requirements in mainly three areas:

- LTE does not support fiber-like throughput
- LTE does not support Massive Number of sensor networks
- LTE latency does not support mission-critical applications

To overcome these challenges in LTE, current systems highly rely on wireline technologies to connect sensors and control systems. This vastly restricts its current flexibility, and will not enable new solutions related to remote control and critical response systems; such as remote mining, remote manufacturing, robotics, drones and the ability to connect hard to reach locations.

Ultimate Solution:

Enabling the demands of a digitalized future can only be realized through the development of technologies that overcome the prevailing limitations, and 5G has emerged as a bold solution due to major improvements in:

- Ultra-High-Speed Broadband (10 – 100 times faster than LTE)
- Massive Machine Type Communications (100 times existing LTE connectivity per square Km)
- Critical Machine Type Communications / Ultra Reliable Low Latency Communication (50 times faster than average 4G latencies)

5G Use Case Development Challenges:

Although 5G standards were recently established, and equipment makers are producing the first batch of 5G ready systems (starting first half 2019), use case development is still in its infancy stage, as well as general availability of mobile devices and CPEs will only commercially evolve in volume by second half of 2019.

As a Communications Service Provider, our present dilemma rests fully in the question of monetization of use cases at scale to justify nationwide 5G rollout:

- While eMBB (enhanced Mobile Broadband) might naturally be assumed the cornerstone of 5G, Mobile Broadband depends heavily on device and coverage penetration, both of which are limited during early network deployment, and further suffer the challenge of matching their simultaneous geographical presence.
- Fixed Wireless Access on the other hand offers much faster monetization opportunities, as its ecosystem is inherited and coordinated with 4G where device readiness is more

mature, and the technological complexity is much reduced due to limited mobility.

- Vertical use cases are covering diverse areas without bounds and limitless in its variety. However, specific use cases are expected to remain small in scale and limited in creativity for a while, waiting for more maturity to develop in the market on understanding 5G and its potential.

Unlike previous wireless generations, 5G does not present a single killer app, nor is a single killer app expected to be identified. It is clear that 5G presents new challenges that the industry did not face before; the need for collaboration beyond the confines of vendor and Communication Service Providers (CSP) to create value that the market will demand in volume. CSP's are no more the single entity responsible of developing and providing the service. This time, use case development requires joint-development between

- Telecom Operators
- Government and Municipalities
- Large and Medium Enterprise corporates
- Entrepreneurs and Small Businesses
- Network Equipment Makers
- Universities and Research Institutes
- + many other entities

Telecom Operators may play the role of incubators to allow the orchestration of such use case development, and Omantel is already finalizing the setup of an incubation centre at its new HQ in Muscat.

5G Use Case Development Engagements:

To serve as an example of collaboration between industry and community, Omantel recently (Mar 2019) concluded a year-long 5G Use Case competition titled 'Omantel 5G Use Cases University/College Competition'. This initiative is a first of its kind in Oman, and serve as a continuation of the innovative spirit in our quest of engaging local entrepreneurial minds to identify relevant 5G use cases and innovations that will transform the way we live, work and learn.

This initiative is aimed at raising awareness on the importance of technology, and

encourage students to increase their interest and participation in innovative technologies, which contribute to 'Digital Oman' efforts. The competition included all engineering colleges within Oman, and resulted in choosing best 5G use case ideas out of young college students. The 1st winner will receive an intensive one-week course in Stockholm and 3 months of remote coaching, while in addition the 1st, the 2nd and 3rd winners will be given a one-month training by Omantel to incubate their project ideas and involve them into Omantel's use case development teams to witness the business lifecycle and implementation.

As our Omantel 3.0 transformation strategy has already changed the company from a primarily infrastructure player to a digital customer oriented service provider, we are looking to enhance the public participation in innovative and smart technologies that will change the way we live and do business.

As for 5G Use Case engagements in the Enterprise domain, Omantel engage with enterprise players through workshops and collaboration, and we have already reached advanced discussions on several 5G use cases with multiple entities from Oil & Gas, Ports Authorities, and many others are under way.

Conclusion:

As our Omantel 3.0 transformation strategy has already changed the company from a primarily infrastructure player to a digital customer oriented service provider, we are looking to enhance the public participation in innovative and smart technologies that will change the way we live and do business. The days of working alone on creating monetization out of Telecom investment is gone, and the time for collaboration across the full value chain is essential. 📍



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SATELLITE NEWS

UAE Space Agency to Launch New Satellite by Year-End

The UAE Space Agency and Exolaunch have announced a joint agreement to launch a new satellite by the end of this year to measure the abundance and distribution of methane and carbon dioxide in UAE's atmosphere. The agreement to launch MeznSat was signed during the recent Global Space Congress in Abu Dhabi, reported Wam. MeznSat was developed by students from the American University of Ras Al Khaimah (AURAK) and Khalifa University. The satellite will operate using a shortwave infrared spectrometer. A team of students will monitor, process, and analyze the data sent from the satellite at a ground station in YahSat Labs in Khalifa University. Dr Eng. Mohammed Nasser Al Ahbabi, director general of the UAE Space Agency, said: "The MeznSat project falls within the framework of the UAE Space Agency's strategy, which aims to develop Emirati capacities and expertise and support scientific research. The satellite will play a key role in studying the Earth's atmosphere and providing high-quality data which will help to address the many challenges facing our planet." "It is a privilege to arrange launch services for the MeznSat mission and support the growth of the UAE's small satellite industry," said Jeanne Medvedeva, Launch Services commercial director at Exolaunch. "Our wide experience in cubesat launches will ensure the success of this important

milestone. As the project also aims at developing competencies in a University setting, our educational background will lead the students through the whole process of a launch arrangement so they will be able to apply these skills in the future," He added. Abdulla Al Marar, Head of Space Projects in the UAE Space Agency, said: "During the upcoming months we will assemble the satellite and then conduct comprehensive tests in a simulated space environment to ensure that MeznSat will

operate efficiently once it is in orbit above Earth. It is crucial that we test the satellite prior to its launch at the end of this year." "MeznSat will join the outstanding collection of satellites developed, owned and operated by the UAE for a breadth of purposes, ranging from remote sensing and Earth observation to communications and navigation, collectively showcasing the UAE's position and leadership within the space industry," he added. (May 13, 2019) zawya.com



Atlas Space Operations in Traverse City Tracking and Predicting Weather Through 20 Small Satellites

The next generation of weather satellites will have a Northern Michigan connection. Atlas Space Operations in Traverse City is teaming up with Planet IQ to provide support for a constellation of 20 small satellites. The satellites will collect 50,000 data points every day, measuring reflective energy to help predict hurricanes and other

weather phenomena. They'll provide more than ten times the amount of data than sensors gather from current satellites. Atlas will provide communications between those new satellites and ground stations around the world. "So they'll be using our ground stations globally in the Arctic and eventually Antarctica. But also

in the mid-regions of Earth to capture this data in a very timely manner," Mike Carey with Atlas Space Operations. The partnership between Atlas and Planet IQ has already begun. The first satellites are preparing for launch sometime this fall.

SpaceX Puts Up 60 Internet Satellites

The SpaceX Company has begun the roll-out of its orbiting broadband system. A Falcon-9 rocket launched from Cape Canaveral in Florida late on Thursday, packed with 60 satellites capable of giving users on the ground high-speed connections to the internet. Entrepreneur Elon Musk's firm aims eventually to loft nearly 12,000 spacecraft for its "Starlink" network. SpaceX is one of several commercial outfits with permission to fly an internet mega-constellation. Others include the UK-based start-up OneWeb, which began its roll-out in February with six operational spacecraft. Online retailer Amazon also has ambitions in this market. It's working on a 3,200-satellite proposal known as Project Kuiper. All the concepts envisage flying spacecraft in a low-Earth orbit less than 2,000km above the planet. This will minimize the delay, or latency, in the internet connections. The Falcon lifted off from Space Launch Complex 40 (SLC-40) at Cape Canaveral Air Force Station. SpaceX has kept secret much of the development activity on its multi-billion-dollar broadband plan. The company launched a couple of technology demonstrators, Tintin-A and Tintin-B, in February 2018, but the "first production spacecraft" that went up on Thursday look very different. Each satellite weighs 227kg, has multiple high-throughput antennas and a single solar array, the SpaceX CEO explained in a briefing last week. The platforms are also equipped with electric propulsion - a system that expels electrically charged atoms of krypton to provide thrust. The engine is needed to lift a Starlink from its drop-off altitude of 440km to its operational height

of 550km. The propulsion system will also act to maintain the satellite's correct position in the sky, and to bring it down at the end of its service life. Mr. Musk said the newly launched Starlinks were an iterative design and later platforms would have a higher specification, featuring for example inter-satellite links. It was "one of the hardest engineering projects I've ever seen done," he said, and cautioned that much could go wrong in the early phases of the roll-out. There is increasing unease about the number of satellites that could be launched in the next few years - for many purposes, not just broadband delivery - and how this might potentially clog up the space environment. To give context to what is about to happen - there are just 2,000 operational satellites in orbit today, according to the Union of Concerned Scientists' database. SpaceX's ambitions alone, if fully realized, would dwarf this population. The great fear is that congested orbital highways will result

in collisions and the production of debris that then initiates further destructive encounters. SpaceX said it intended to be a responsible actor and had given its satellites the ability themselves to track orbital debris and to autonomously avoid it. What is more, it added, all the Starlinks were 95% constructed from components that would burn up rapidly on re-entry to the atmosphere when decommissioned - exceeding all current safety standards. It will be some time before SpaceX can actually offer connections to the internet. Six further rocket flights will have to take place before minor broadband coverage is achieved. A dozen launches are required for moderate coverage, says Mr. Musk. He hopes ultimately that revenue from the telecommunications network can fund some of his other ideas: "We think this is a key stepping stone on the way towards establishing a self-sustaining city on Mars and a base on the Moon."



India's PSLV-C46 Launches the EO RISAT-2B to Serve Agriculture, Forestry and Disaster Management

India's PSLV-C46 successfully launched the RISAT-2B satellite from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota. PSLV-C46 lifted-off from the First Launch Pad of SDSC SHAR, Sriharikota. PSLV-C46 was the 72nd launch vehicle mission from

SDSC SHAR, Sriharikota. In this mission, the 'Core-Alone' configuration of PSLV was flown (without the use of solid strap-on motors). About 15 minutes and 30 seconds after lift-off, RISAT-2B was injected into an orbit of 555 km at an inclination of 37

degree to the equator. RISAT-2B with a lift-off mass of 615 kg, is a radar imaging Earth observation satellite. The satellite is intended to provide services to agriculture, forestry and disaster management domains.

M-ARGO Mission Assigned to GomSpace by European Space Agency

GomSpace's subsidiary in Luxembourg and the European Space Agency (ESA) have signed a contract of 400,000 euros for the Phase A design of the Miniaturized Asteroid Remote Geophysical Observer (M-ARGO) mission. Under the contract, GomSpace will be in charge of preliminary design of the mission, spacecraft and implementation planning. A "12U" cubesat spacecraft configuration is envisioned for the mission, packing in beyond state-of-the-art advancements in miniaturized technologies including communication, instrumentation, electric propulsion and operational autonomy to be demonstrated in the deep space environment. Expected launch of the mission is in 2023, subject to funding of the implementation phase, and it will be the first nanosatellite ever to rendezvous with an asteroid and perform close proximity operations over an extended period for identification of in-situ resources. The NEO population now has more than 20,000 largely uncharted asteroids and the M-ARGO capability will be able to access the nearest 100 or more in terms of propellant needed to achieve

a rendezvous. NEOs are interesting for scientific exploration as well as for the potential of future long-term exploitation of minerals and other useful materials mined from asteroids. In addition, NEOs pose a threat for potential collisions with the Earth, requiring the need for further understanding of their physical properties for future planetary defense purposes. Smallsat technology will allow future cost-efficient exploration of these objects in significant numbers. The work will be implemented in Luxembourg in line with GomSpace Group's ambitions to benefit from the local space ecosystem. The work will be supported by the scientific-technological university, Politecnico di Milano in Italy, providing expert support on deep space mission analysis and navigation of low thrust trajectories associated with electric propulsion. The contract is funded by the Luxembourg Space Agency through the Fly element of ESA's General Support Technology Program. The mission implementation beyond the current phase A contract is open to further European cooperation,

and to maximize outcome of the mission a scientific committee on asteroid mining is being set up to consolidate the scientific requirements and propose the most suitable instruments for the mission. Roger Walker, Head of ESA's Cubesat Systems Unit, said the M-ARGO technology demonstration mission is intended as an enabler of a potential future operational capability for highly cost-effective in-situ resource exploration of the accessible Near-Earth Object (NEO) population using a fleet of deep space cubesats. GomSpace CEO, Niels Buus, added that activities such as M-ARGO allow the company to develop the firm's internal capabilities and technologies to new levels to the benefit of science and exploration as well as to build competitive advantage for the commercial markets. With these orders, GomSpace is satisfied to have built significant momentum for space exploration capabilities and positions the company well to serve ESA as well as other institutional customers on future, high-profile long duration missions.

HUBER+SUHNER Launches Outdoor MIMO Antennas to Ease Urban 5G Deployments

HUBER+SUHNER launched its compact omnidirectional and directional outdoor antennas for use in 4G and 5G deployments. Operators are faced with the challenge of providing cost-effective 4G and 5G in urban areas. Small cells are critical to providing increased capacity and coverage in urban areas where networks are highly congested with growing numbers of wireless devices. However, creating new cellular sites in urban areas is very challenging with only limited space available for installation and restrictions by municipal governments. To overcome this, HUBER+SUHNER has developed small omnidirectional and directional antennas to maximize performance. The new SENCITY Urban 100 and 200 outdoor MIMO antennas cover both 4G and 5G high frequency ranges and are as compact as possible for discreet installation in different types of street furniture, such as bus shelters, poles or walls, depending on the location, thanks to various bracket mounting options. "Operators are under pressure to provide widespread, fast 4G and 5G coverage in urban areas where space is limited and existing infrastructure is condensed and our unique range of outdoor MIMO antennas can play a major

role in overcoming these challenges in small cell deployment," said Claudia Bartholdi, Product Manager at HUBER+SUHNER. "At the moment there are no other antennas on the market that are as compact as the SENCITY Urban 100 and 200 that cover 4G and 5G bands, so we are incredibly excited to be releasing the SENCITY Urban series to the wider industry."



Amazon Web Services Reveals AWS Ground Station for Satellite Control and Data Delivery

Amazon Web Services, Inc. (AWS), an Amazon.com company, has announced the general availability of AWS Ground Station, a new service for customers to control satellites from AWS and download data from satellites into AWS Global Infrastructure Regions using a fully managed network of ground station antennas located around the world. Once customers upload satellite commands and data through AWS Ground Station, they can quickly download large amounts of data over the high-speed AWS Ground Station network, immediately process it in an Amazon Elastic Compute Cloud (Amazon EC2) instance, store it in Amazon Simple Storage Service (Amazon S3), apply AWS analytics and machine learning services to gain insights, and use Amazon's network to move the data to other regions and processing facilities. Getting started with AWS Ground Station takes just a few clicks in the AWS Management Console to schedule antenna access time and launch an Amazon EC2 instance to communicate with the satellite. Satellites are being used by more and more businesses, universities and governments for a variety of applications, including weather forecasting, surface imaging, and communications. To accomplish this today, customers must build or

lease ground antennas to communicate with the satellites. This is a significant undertaking and cost as customers often require antennas in multiple countries to download data when and where they need it without waiting for the satellite to pass over a desired location. The antennas are just the start of the infrastructure requirements as customers need servers, storage, and networking in close proximity to the antenna to process, store, and transport the data from the satellite. Then customers must build business rules and workflows to organize, structure, and route the data to employees or customers before it can be used to deliver value. This requires significant capital investments and operational costs to build, manage, and securely maintain antennas, compute infrastructure, and business logic at each antenna location. AWS Ground Station allows customers to more easily and cost-effectively control satellite operations, ingest satellite data, and integrate the data with applications and other cloud services running in AWS. Using AWS Ground Station, customers can save as much as 80 percent of their ground station costs by paying for antenna access time on demand and they can rely on AWS Ground Station's growing global footprint of ground stations to downlink data when and where they

need it. These ground stations are also located in close proximity to AWS Regions around the world, so customers can store, process, and analyze the data locally, rapidly gain insights, and then quickly take action. The regency of data is particularly critical when it comes to tracking and acting upon fast-moving conditions on the ground. This timeliness depends on frequent communications between ground stations and satellites, which can only be achieved with a large, global footprint of antennas maintaining frequent contact with orbiting satellites. For example, as fast-moving environmental, geopolitical, or news events unfold on the ground, AWS Ground Station customers can downlink current data to any of the AWS ground stations around the world. Customers can get timely data sooner, rapidly experiment with new applications, and deliver products to market faster without buying, leasing, or maintaining complex and expensive antennas and infrastructure. AWS Ground Station's self-service graphical interface makes it easy to identify downlink opportunities, communications windows, and schedule antenna time. This enables customers to review confirmed times in the console and cancel or reschedule prior to the scheduled contact time.



Ovzon and GetSAT Reach Agreement to Develop Mobile Satellite Terminals for Defense, Government and Emergency Response Services

Ovzon, offering a revolutionary global mobile broadband service via satellite, and GetSAT, the manufacturer of innovative satellite terminals for aerial, maritime and land-based applications, have signed an agreement to develop Satcom on The Move (SoTM) terminals for Ovzon's global satellite service. By combining SoTM terminals developed by GetSAT and Ovzon's world leading secure end-to-end mobile broadband satellite service, both companies strengthen their business opportunities for land, sea and air applications. This joint solution ensures secure and robust SoTM broadband communications for defense, government, emergency response and broadcast customers worldwide. The companies reached the strategic partnership after the successful testing and demonstration of GetSAT's MicroSAT L/M (Land/Mobile)

for Land and Maritime applications in Sweden and the United States. GetSAT's terminals are based on its patented InterFLAT technology, which allows signals to be transmitted and received in the same panel, thus reducing the size, weight and energy consumption to provide advantages essential for the success of critical missions. The agreement enables simpler accessibility for potential clients, because the terminals are included in the Ovzon service, thereby minimizing the user's investment and operating costs. Magnus René, CEO of Ovzon, said, "Ovzon wants to address the need for Satcom on the Move services for land, maritime and airborne based applications with very small mobile broadband terminals for our global service. GetSAT provides a powerful solution with a very small footprint." Kfir Benjamin, GetSAT CEO reported, "GetSAT is

very excited to announce this partnership with Ovzon. GetSAT's low size, weight and power terminals are a perfect match with Ovzon's robust and agile end-to-end service. We look forward to supporting a very demanding customer base together with Ovzon." GetSAT's terminals are constructed in a light and compact installation. The L/M family of products are micronized, fully integrated, on-the-move, ruggedized solutions. All L/M terminals are easy to deploy and integrate, and can be outfitted with various antenna sizes in accordance with bandwidth requirements of ground, air and marine applications. A unique all-in-one design including BUC and modem is optimized for harsh environments specs and its ultra-low power-consuming platform is compatible with KA and KU-Band applications.

China Launches BeiDou Navigation Satellite System Satellite

China launched a new satellite for the BeiDou Navigation Satellite System (BDS) from the Xichang Satellite Launch Center. The satellite was launched on a Long March-3C carrier rocket, and is also the fourth BDS-2 backup satellite and 45th satellite of the BDS satellite family. After being sent to Geostationary Orbit (GEO) and completing in-orbit testing, it will be connected to BDS to provide users with more reliable services and enhance the stability of the constellation. The BDS-2 system and BDS-3 system will jointly provide services before October 2020, and after that the BDS-3 system will be the main system. China began to construct its BDS navigation system, named after the Chinese term for the Big Dipper constellation, in the 1990s. It started serving China with its BDS-1 system



in 2000 and started serving the Asia-Pacific region with its BDS-2 system in 2012. China will complete the BDS global

network by 2020. Additionally, the launch was the 304th flight mission for the Long March series of carrier rockets.

Honeywell Selects Gilat's Aero Modem for Its JetWave Satellite Communication Solution

Gilat Satellite Networks Ltd., a worldwide leader in satellite networking technology, solutions and services, announced today that Honeywell has selected Gilat's Taurus IFC modem for its JetWave™ satellite communication system. The integration of Gilat's aero-modem will enable Honeywell to offer its JetWave solution within territories as well as to roam in-and-out of territories where Gilat's ground network is deployed. The Honeywell-Gilat

solution will first be deployed in China over China's HTS Ka network for both domestic and flights going in-and-out of China, expanding later to additional regions around the globe. Gilat's high-performance Taurus aero modem, has a proven global track record of providing unparalleled passenger user experience. Gilat's industry leading IFC solution operates the largest global IFC network with over 1,000 commercial aircraft installed with

Gilat's solution. "Gilat is pleased to partner with Honeywell to offer JetWave in new territories and regions of the world, and are looking forward to further expansion and cooperation of this strategic relationship," said Ron Levin VP, Mobility and Global Accounts. "This achievement is another step in materializing Gilat's vision of enabling broadband anywhere, as well as a testament of Gilat's recognized global HTS and IFC leadership."

NASA Awards ATLAS Space Operations Space Relay Partnership and Services Study Contract

ATLAS Space Operations, Inc., a leading innovator in communications for the space industry, today announced NASA has awarded it a contract for the Space Communications and Navigation (SCaN) Program's Space Relay Partnership and Services Study. Prime contractor ATLAS partnered in its proposal with Laser Light Communications, Inc, a leader in advanced optical communications and data distribution via its proprietary HALO Global Network. Both firms are founders of the Empower Space Alliance. As part of the contract, ATLAS will explore ways to help NASA enable new and greater scientific discovery, improve communication and navigation services, and reduce development and operations costs for

both networks and missions. During the evaluation process, NASA found that ATLAS's proposal "would provide substantial value to the government through completion of its study." In recognition of ATLAS's promising technology and industry experience, ATLAS was the only small business that was awarded a contract. "ATLAS is pleased to be among the selected community which represents the depth and breadth of the emerging field of optical communications," said Sean McDaniel, CEO and Founder of ATLAS. "NASA's awarding of this contract to participate in the study is the latest step in ATLAS' mission to demonstrate the value of integrating advanced commercial communication technology in government

applications. We are especially proud to be the only small business and new entrant in this sector, which represents NASA and the government's interest in new approaches and applications in space communications." "Working with Atlas on its submission to NASA for this study, was a tangible extension of our existing relationship as founders and partners in the Empower Space Alliance," said Bob Brumley, CEO, Laser Light. "This study will enable us to outline and validate for NASA, the benefits of a secure, commercially-owned and operated solution for space-based optical communications in near Earth and Deep Space."

Maxar to Build 1st Element of NASA's Lunar Gateway

Maxar Technologies was selected by NASA to build and perform a spaceflight demonstration of the lunar Gateway's power and propulsion element spacecraft. Blue Origin and Draper will join the Maxar-led team in designing, building and operating the spacecraft through the demonstration period. The power and propulsion element is a key component to NASA's overall plans to land American astronauts on the surface of the Moon by 2024, and will be the first segment of the Gateway tested in space. Maxar previously conducted a four-

month study to develop affordable and innovative electric-propulsion-enabled concepts for the power and propulsion element spacecraft. Building on the successful completion of the study, Maxar has been selected to proceed with development. The power and propulsion element will provide power, maneuvering, attitude control, communications systems and initial docking capabilities. Maxar is currently targeting launch of the element on a commercial rocket by late 2022. "Maxar Space Solutions is proud to play a critical

role in enabling American astronauts to build a sustainable presence on the Moon. Our power and propulsion element partnership enables NASA to leverage Maxar's commercial capabilities to cost-effectively expedite plans for sustainable exploration of the Moon, while also providing significant benefits to American industry," said Dan Jablonsky, Maxar CEO. "As a valuable part of Maxar, our Space Solutions group serves the global commercial and U.S. government satellite market."

Viasat Contracted to Deliver the World's First Link 16-Capable Low Earth Orbit (LEO) Spacecraft

Viasat has been awarded a contract by the Administrator of the Space Enterprise Consortium, under the Air Force Research Laboratory Space Vehicles XVI program, to deliver and test the first-ever Link 16-capable LEO spacecraft. Leveraging the Company's leadership in satellite innovation and military communications, the Viasat-designed spacecraft is intended to enhance warfighters' situational awareness by extending the range of Link 16 networks – using a constellation of satellites to provide greater access to Link 16 capabilities in contested or congested environments. Under the XVI program, Viasat will become the first company to prototype and test space-based Link 16 capabilities compatible with fielded U.S. Air Force, Army, Navy, Marine Corps, and Special Operations Link 16-enabled platforms, including ground vehicles, aircraft, maritime vessels, and dismounted users. The XVI program is a key step towards making a global Link 16-enabled LEO satellite constellation, transforming Link16 from a Line-of-Sight (LOS) to a Beyond Line-of-Site (BLOS) network, providing U.S. and allied military forces with ubiquitous, secure, high-speed and resilient communications necessary to improve the common operating picture across the global battlespace. "The XVI award highlights Viasat technology leadership in Link 16 and space-borne tactical communications," said Ken Peterman, president, Government Systems,

Viasat. "Our innovative spacecraft design and development coupled with expertise in next-generation tactical datalinks and cybersecurity places Viasat in a unique position to address the Department of Defense's urgent need for a fast-to-market, cost-effective, space-based Link 16 solution to maintain a technological edge in contested environments." Viasat's Link 16-capable LEO satellite is designed to fit the Viasat Hybrid Adaptive Network (HAN) satellite communications (SATCOM)

highly-contested environments. The Link 16-capable LEO satellite will allow Link 16 networks to leverage the resilient, global connectivity capabilities of the HAN and share information with other warfighters, anywhere in the world. Viasat offers an extensive portfolio of Link 16 terminal configurations and form factors. Link 16 communications networks provide the U.S. and international allies with greater situational awareness by exchanging digital data over a common data link



concept. The HAN architecture will allow users to operate across commercial and government SATCOM networks and multiple orbital regimes, creating an end-to-end multi-layered solution resilient to network congestion, intentional and unintentional interference and cyber threats – even in

that is continuously and automatically updated in real-time, reducing the chance of fratricide or duplicate assignments, while significantly enhancing mission effectiveness.

ULA's Vulcan Centaur Rocket Completes System CDR Milestone

United Launch Alliance leaders and engineers completed an important milestone with the conclusion of the system Critical Design Review (CDR) for the company's new Vulcan Centaur rocket – the system-level CDR is the final review of the design for the overall rocket. The system CDR was a week-long detailed review of the entire Vulcan Centaur system with the primary focus to verify all of the elements will work properly together

as a system. As part of the certification process with the U.S. Air Force, Air Force representatives are included as part of the design review. Artistic rendition of ULA's Vulcan Centaur rocket lifting off. Image is courtesy of the company. When the first Vulcan Centaur rocket flies in less than two years, a high percentage of the rocket will have flown before on ULA's Atlas launch vehicle including the fairing, upper stage engines in a dual

configuration, avionics, software and solid rocket motors. ULA and its suppliers have invested in and modernized the factory in Decatur, Alabama, bringing in state-of-the-art manufacturing technologies. Flight hardware is already being built for the first flight, and the production is on schedule for the initial launch in 2021. With more than a century of combined heritage, ULA is the world's most experienced and reliable launch service provider. ULA

has successfully delivered more than 130 satellites to orbit that provide Earth observation capabilities, enable global communications, unlock the mysteries of our solar system, and support life-saving technology. Tory Bruno, ULA's president and CEO, said this is a tremendous accomplishment for the ULA team and a significant milestone in the development of a rocket – signaling the completion

of the design phase and start of formal qualification. Vulcan Centaur is purpose built to meet all of the requirements of the nation's space launch needs and its flight-proven design will transform the future of space launch and advance America's superiority in space. ULA's Atlas and Delta rockets have served as the backbone for American space launch for decades and the company's next-generation rocket

will advance this rich heritage. Vulcan Centaur will provide higher performance and greater affordability while continuing to deliver our unmatched reliability and precision. Vulcan Centaur brings together the best of Atlas and Delta technology, and the company is flying all of the major components that the firm can on Atlas V first to reduce the risk for ULA customers on the first flight.

Thuraya's X5-Touch, the World's Smartest Satellite Phone, Lands 'Top Mobility User Experience Solution' Award

Thuraya Telecommunications Company, a subsidiary of Al Yah Satellite Communications Company (Yahsat), has won the Top Mobility User Experience Solution at this year's Mobile Satellite Innovation award organized by Mobile Satellite Users Association (MSUA). The accolade was won by the Thuraya's X5-Touch device – the world's smartest and most innovative satellite phone. The announcement was made during the company's participation at the Satellite 2019 Conference in Washington DC, US. The Top Mobility User Experience Solution award recognizes the X5-Touch's superior usability, as well as its market-leading status, which is underpinned by a series of category-firsts. The X5-Touch is the first satellite phone to run on the Android operating system – a fundamental pillar of its award-winning flexibility and user experience. The operating system provides users with a multitude of apps on purchase, while developers gain the freedom to develop and customize bespoke apps to meet the unique needs of device users. This complements the 'bring your own application' (BYOA) concept, where customers can download any app of their choice. An unrivalled 5.2-inch HD touchscreen protected by a rugged Gorilla® glass display, front and rear camera, and high-capacity battery bring everyday smartphone functionality to the remote environments of satellite communication. Meanwhile, the X5-Touch's omni-directional satellite antenna ensures uninterrupted communications in more than 160 countries, including a number across Africa, Asia, Australia, and Europe. In addition, full dual-mode and dual-SIM capabilities provide the flexibility to effortlessly switch between satellite and terrestrial networks. A host of crucial safety features such as advanced navigation and tracking functions, alongside a built-in SOS button, reinforce the X5-Touch's credentials as a device built for the most remote and testing environments. "Congratulations to all at Thuraya for securing today's award, which is testament to the inventive mindset we encourage at every level of our organization," commented Ali Al Hashemi, Thuraya CEO. "Our customers rely on dependable communications to do their job and, in many cases, remain safely connected in remote environments. With this award, the X5-Touch continues to reinforce its credentials for the most demanding of users." The MSUA accolade isn't the first to be awarded by the association to Thuraya. In 2017 the company's XT-PRO DUAL

device won the Top Land Mobility Satcom Innovation Award for a second year, after landing the same title in 2014. Also in 2014, Thuraya's SatSleeve product – which converts a smartphone into a satellite phone – received MSUA's Innovator Award. "Through the design and functionality of the X5-Touch, we set out to create a device that felt as natural and effortless to use as our personal smartphones, but with added ruggedness," commented Shawkat Ahmed, Thuraya's Chief Commercial Officer. "Usability is in many ways more important in remote and testing environments than it is elsewhere, and as this award demonstrates, the X5-Touch provides fast, simple and trusted connectivity wherever users venture." The Thuraya X5-Touch launched in November 2018 with a high-profile promotional campaign that included digital display advertising in Times Square, New York City. Just four months earlier, Thuraya and Yahsat announced an agreement that saw Yahsat acquire a majority and controlling stake in Thuraya. The agreement enabled Thuraya to significantly expand Yahsat's satellite solutions portfolio on both commercial and government fronts, while creating a strong platform to capture the growing opportunity around IoT and M2M applications across both sectors. 📍





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

ARTICLE

Building an Evolvable IP Transport Network to Enable 5G Business Success

The maturity of 5G standards has finally brought 5G from vision to reality.

Many countries, such as Japan, South Korea, and Gulf Cooperation Council (GCC) countries in the Middle East, have started building 5G platforms and will soon put 5G into commercial use. It is widely accepted in the industry that 2019 will mark the start of 5G commercialization.

The 5G early stage focuses on enhanced mobile broadband (eMBB) services. In this phase, the biggest challenge for operators is to quickly construct networks at affordable costs, while meeting the requirements for 10-fold bandwidth growth at single site and fast service deployment.

However, as the cornerstone of the 5G industry, how should the transport network evolve to enable 5G business success?

5G service development typically covers two phases. The 5G early stage focuses on enhanced mobile broadband (eMBB) services. In this phase, the biggest challenge for operators is to quickly construct networks at affordable costs, while meeting the requirements for 10-fold bandwidth growth at single site and fast service deployment.

Following that, the 5G full-rollout stage focuses on three typical types of services: eMBB, ultra-reliable and low-latency communications (URLLC), and massive machine-type communications (mMTC). In this phase, providing differentiated service level agreement (SLA) assurance for services, and building an integrated transport network that supports all business to home (B2H), business to business (B2B), and business to consumer (B2C) services to improve the return on investment (ROI), will become a top priority for operators.

To address these challenges, we have proposed an innovative 5G-oriented IP transport network solution



An Jian

President of Carrier Networks Business Group
Huawei Middle East



5G Early Stage: Fast Transport Network Construction to Support Quick Win of 5G Services

Optimal cost per bit, supporting an affordable upgrade for the transport network

Faced with the 10-fold traffic growth at single site in the 5G era, Huawei has now achieved the optimal cost per bit and fast bandwidth upgrade by multiple innovations such as NP chips, energy saving design, new interface, and new protocols.

This includes next-generation router chips with the highest degree of integration and best performance. As the core components of routers, forwarding chips are key to device capacity improvement. In 2019, Huawei will launch new-generation Solar 6.0 chip, which will integrate 60 billion transistors, enabling six-fold integration. The forwarding performance of a single chip will reach 6.4 Tbit/s, five times higher than current performance and far exceeding the industry average. With Solar 6.0 chips, the single-LPU forwarding capacity of Huawei routers can reach 14.4 Tbit/s.

We also apply innovative energy-saving technology, achieving the lowest single-bit power consumption in the industry. Reducing single-bit power consumption and improving heat dissipation efficiency has long been a focus in the industry. To minimize power consumption, Huawei offers an industry-leading Super Cooling solution by adopting the phase-change heat dissipation technology and introducing the industry's first mixed-flow fans, making power consumption 30% lower than the industry average.

It is also essential to have new-generation Interface technology, achieving optimal cost per bit. On the access side of base stations, traditional 10GE access ring cannot meet 5G bandwidth requirements, whereas traditional 40GE and 100GE are costly. To address this issue, Huawei uses PAM4 technology to provide 50 Gbit/s capacity on 25 Gbit/s optical components, making the single-bit cost 30% lower than that of traditional optical modules. In addition, single-fiber bidirectional transmission is supported, reducing the number of required fiber resources by 50%. For the backbone network, Huawei is the first vendor to support end to end 400GE Interface technology and put it into

commercial use.

4G and 5G coexistence, allowing existing networks to be smoothly evolved

SR and SRv6 are next-generation programmable network protocols that simplify service deployment and O&M. They are essential for network protocol evolution. Based on programmable chips, Huawei routers support MPLS and SR/SRv6 dual-plane deployment with capability to handle 10 label stack. An MPLS network can be smoothly evolved to an SR/SRv6 network through a software upgrade, reducing operators' device replacement costs caused by protocol upgrades.

E2E network automation, supporting fast 5G services provisioning

As new 5G services are emerging, they increase service complexity for operators. Huawei Network Cloud Engine (NCE) integrates management, control, and analysis functions, achieving network-wide service virtualization, automated service provisioning, and fast fault location and recovery. These functions greatly facilitate 5G service fast provisioning.

5G Full Rollout Phase: Building a Converged Transport Network that Supports All Services to Improve ROI

In this phase, eMBB, URLLC, and mMTC services will be fully developed and require different SLA assurance. As the density of 5G base stations increases, service access point will tend to be deployed at the same location. This brings a possibility that B2H and B2B services are accessed through the same point of presence (POP), enabling a transport network to be able to bear B2H, B2B, and B2C services at the same time.

In Huawei's opinion, a transport network in this phase should have the following characteristics:


1. The network is decoupled from services and sliced to provide services on demand. The network slicing technology works with end-to-end SRv6 path programming to provide differentiated SLA capabilities for services.
2. The network architecture is simplified, and higher bandwidths are available, providing sufficient bandwidth resources for various services and optimizing service experience.
3. Artificial intelligence (AI) and big data

Huawei Network Cloud Engine (NCE) integrates management, control, and analysis functions, achieving network-wide service virtualization, automated service provisioning, and fast fault location and recovery. These functions greatly facilitate 5G service fast provisioning.

analytics capabilities are introduced to network to build an intent-driven intelligent operation platform, realizing automated deployment, status collection, and intelligent analysis, enabling full-lifecycle network management and proactive O&M, improving service provisioning, O&M efficiency and ROI.

Promoting IP Industry Development with Operators, Together

Huawei has been investing and innovating in the IP field for decades. For example, as a major contributor to 50GE/400GE interface standards, Huawei took the lead in commercializing 50GE/400GE and drove the technology to maturity. As a major member of the new-generation SRv6 standard organization, Huawei has not only submitted more than 15+ SRv6-related drafts to the IETF, but also promoted interoperability between vendors and SRv6 commercial deployment. What's more, Huawei actively participates in multiple standard fields, such as the 5G clock synchronization field, as a major contributor.

Huawei actively carries out joint innovation with operators in Europe, Asia Pacific, the Middle East, and many other regions through NetCity projects to explore future network evolution and promote IP industry development. Currently, great progress has been made in many fields, such as automated service provisioning and cloud-network synergy. Meanwhile, Huawei helps operators cultivate IP talent through Huawei Certification (HC) program, building evolvable IP transport network to enable 5G business success. 

WHOLESALE NEWS

Kosovo and Albania to Reduce Roaming Fees

The telecoms watchdogs of Albania and Kosovo have finalized an agreement to reduce roaming fees between the two countries, applying the same principles of the EU's 'roam like home' policy. Under the agreement, regulated pricing structures will be put in place from 15 June 2019 to ensure that mobile subscribers from Kosovo do not pay higher tariffs for services whilst roaming in Albania (and vice versa) than they would in their home market. The pact will initially reduce the cost of roaming by around 90% with operators allowed

to charge a small surcharge during a transitional period, whilst roaming fees will be lifted entirely from 1 July 2021, when a wider region-wide agreement comes into effect. New regulations introduced by Kosovo's Regulatory Authority for Post and Electronic Communications (Autoriteti Rregullator i Komunikimeve Elektronike dhe Postare, ARKEP) and its sister organisation in Albania – the Electronic and Postal Communications Authority (Autoritetit Te Komunikimeve Elektronike Dhe Postare, AKEP) – to enforce the deal

establish: the conditions for wholesale access to public mobile communications networks in order to provide regulated roaming services; and transitory rules for tariffs that can be applied by roaming providers for the provision of regulated roaming services for voice and SMS calls originated and terminated between Kosovo and Albania, as well as for data services used by roaming subscribers. The rules apply both to wholesale and retail tariffs for roaming and related roaming charges between Kosovo and Albania.

ACCC Confirms No Reporting Requirements for Dark Fiber, NBN Aggregation Providers

Dark fiber and National Broadband Network (NBN) wholesale aggregation service providers will not be required to provide the Australian Competition and Consumer Commission (ACCC) with information on supply and pricing, the regulator has confirmed. Previously, in February 2019 the ACCC launched a public consultation on proposed record-keeping rules, which would have required such providers to record information about supply and pricing and provide it to the ACCC in quarterly reports. While this measure

was reportedly proposed after concerns raised about the availability and level of competition in the relevant markets during the ACCC's Communications Market Study, the watchdog has ultimately concluded that competition in the market for NBN aggregation services is developing as the NBN rollout continues, arguing that this has 'largely addressed customer concerns'. In making its decision, the ACCC also said it had observed that alternatives to dark fiber and NBN aggregation services had become increasingly available, with investment in

the domestic transmission capacity service (DTCS) having boosted access to backhaul at competitive prices. Commenting, ACCC commissioner Cristina Cifuentes said: 'We have seen significant recent developments in this market, including the entry of more providers, a bigger variety of products, and more reliable passing through of NBN price discounts and product launches to wholesale customers ... We will continue to monitor these markets as the NBN rollout progresses, and will reconsider the issue if we see competition diminishing.'

ARCEP Sets New MTR Glidepath

Chadian telecoms watchdog the Regulatory Authority for Electronic Communications and Post (L'Autorite de Regulation des Communications Electroniques et des Postes, ARCEP), has issued a decision to eliminate mobile termination rates (MTRs)

by 2021. The ruling will reduce the MTR for voice calls from its current level of XAF68 (USD0.116) per minute to XAF25 by the end of June this year, then to XAF15 in 2020 and XAF0 in 2021. Termination charges for SMS, meanwhile, will drop from the current

XAF15 to XAF5 later this year and will be reduced to zero from the start of 2020. The decision was issued on 19 April and operators must adopt the new rates within two months.

Operators Urged to Embrace Roaming Innovation

Mobile operators have yet to embrace the kind of innovation which has taken place elsewhere when it comes to roaming services, a panel of executives said. In much of the world, the roaming market has undergone significant transformation in recent years, driven in no small part by changes in regulation altering the nature of the business. "What has happened in the last couple of years because of roam like home in the EU, is that other parts of the world are following a similar pattern of bringing down the rates. So the transformation that is happening in the industry is that you are seeing lower margins, but much higher volumes. What has not happened, and will probably happen very soon, is the innovation in business models," said Kishore Vangipuram, SVP for the Roaming business unit at Mobileum. Citing changes in the airline industry, where the launch of low-cost carriers disrupted the business models of incumbents, he continued: "The airline industry did not just drop the price and stay still. They innovated by offering upsells, cross-sells, loyalty programmes, dynamic pricing, those kind of things. That level of business innovation has not happened in the operator [roaming] world yet." Benjamin Ferreira, senior consultant at WeDo Technologies, noted changes in roaming mean "we have less margin, but we have more revenue" as customers become more comfortable with the concept. Operators have tools in their armory, he said, to drive greater use of roaming. For example, so-called "silent roamers", who are connected to the network but do not consume services, could be detected and targeted with offers to stimulate use. But

he also noted operators need to make sure they are in control of their roaming businesses, so they can leverage data and drive new commercial propositions. "It's important to have systems that mean they don't delegate everything to the clearing house. That was a trend a couple of years ago, but now operators realize that if they delegate everything, there are risks," Ferreira said. There are some operators for which roaming is a big part of the business. Mircea Petrescu, carrier services, revenue assurance and fraud senior manager at MTN Cyprus (pictured, right), noted that as a key holiday destination, roamers can double the number of subscribers connected to its network during peak periods. The executive argued a core operator competency is an important factor in the roaming business. "In terms of inbound roaming, apart from the commercial conditions, it's all about the

network quality. The better the network quality, the more chance you have to get more inbound roaming. That's a very important fact," he said. In addition to innovation around business models to support current service propositions, the growth of 5G and IoT will also create opportunities. But this will mean current roaming regimes won't meet future demands and use cases. "It's obvious that the charging model, and charging only traffic, will become obsolete in the future. Because with a connected car, it could stay in our country for one month, and consume 10Mb of data. And that 10Mb is so cheap, it doesn't make any sense. That car will stay in our network for one month, and will use resources which could be used by someone talking and making us money. So it has to move from the model of charging for traffic only," Petrescu said.



UKE Publishes Guidelines for Wholesale Cable Network Access

Poland's Office of Electronic Communications (Urząd Komunikacji Elektronicznej, UKE) has published its decisions relating to wholesale access to the cable networks of six domestic operators. The decisions cover Netia, UPC Poland, Multimedia Polska, Vectra, INEA and Toya and relate to their infrastructure

in multi-dwelling buildings. According to a UKE statement, the decisions are 'aimed at promoting joint investments, supporting the construction and sharing of infrastructure and ensuring effective inter-operator cooperation'. It added: 'The implementation of the decision will favorably increase the efficiency

of using existing infrastructure and reduce the costs of new engineering and construction works to the benefit not only of telecommunications entrepreneurs, but also for subscribers, who will get a chance to take advantage of a competitive offer, and property owners through organically burdensome work installation.'

Vodafone to Offer 5G Roaming This Summer

Vodafone says it will switch on its 5G network for consumers and business customers in seven cities across the UK on 3 July 2019.



The seven cities will be Birmingham, Bristol, Cardiff, Glasgow, Manchester, Liverpool and London. Birkenhead, Blackpool, Bournemouth, Guildford, Newbury, Portsmouth, Plymouth, Reading, Southampton, Stoke-on-Trent, Warrington and Wolverhampton will follow later this year. Vodafone says it plans to price 5G the same as 4G for both consumers and business customers. Vodafone will also offer a 5G router for use in the home and office to give customers without a fixed line connection high-speed broadband access. Vodafone UK's CEO Nick Jeffery said, "We started our 5G journey more than three years ago. We led the way in setting 5G standards to ensure phones and networks work well together. "We upgraded our masts to be able to take 5G without disruption. And we were the first UK company to test 5G over our all-fiber core fixed and mobile network. "This is important. It means we can today announce the largest launch of 5G in the UK and be the first to announce 5G roaming. It means that UK businesses can lead the world in adopting 5G to boost productivity and attract investment. It means consumers can get the fastest mobile speeds ever, and it means that our public sector will be able to adopt new services to improve healthcare, social services and housing."

ACCC Aims to Continue Regulating Mobile Termination

Australia's competition watchdog proposed continuing regulating wholesale mobile voice services for an additional five years, but called for the removal of controls covering SMS termination services. In a draft report released for consultation today (2 May), the Australian Competition and Consumer Commission (ACCC) suggested the SMS regulation was no longer necessary due to increased competition

from various messaging services. The agency began regulating mobile and SMS termination access services in 2014 to ensure cross-network compatibility, it said in a statement. ACCC chair Rod Sims said its decision to regulate SMS appears to have had the desired effect: "Many consumers with smartphones are now using over-the-top messaging services such as iMessage and WhatsApp as alternatives to SMS.

Importantly, we have also found that the majority of mobile plans now on offer in the market offer unlimited SMS." But, Sims noted OTT voice services "are not yet substitutes for mobile" in terms of quality and access to services, citing emergency Triple Zero number calls as an example. Comments are being accepted on the proposals until 31 May.

Fastweb Signs Wholesale Deal with Open Fiber

Italian ISP Fastweb has signed a partnership with wholesale network operator Open Fiber to use its infrastructure in 80 cities where Fastweb is not already present. The deal will also cover so-called 'white areas' which currently have little or no access to broadband services, but are being targeted by Open Fiber in a series of state-subsidized network rollouts. As part of the agreement, Open Fiber will also be given wholesale access to Fastweb's

own fiber infrastructure to augment its own footprint. Swisscom-owned Fastweb is deploying fiber-to-the-home (FTTH), fiber-to-the-cabinet (FTTC) and fixed-wireless access (FWA) networks in cities across Italy. Alberto Calcagno, CEO of Fastweb, commented: 'The agreement represents an important part of our strategy to offer our customers the best connectivity: in addition to developing an important expansion of our proprietary

ultra-broadband network – through the new 5G Fixed Wireless Access technology – in areas not reached by our FTTC, FTTH and FWA infrastructure we will also be able to use the connectivity created by Open Fiber, always maintaining our focus on differentiation and the ability to offer each of our residential and business customers the solution best suited to their needs.'

Sierra Leone Signs Free Roaming MoU with Guinea, Liberia and Cote d'Ivoire

The Director General of Sierra Leone's National Telecommunications Commission (NATCOM), Maxwell Massaquoi, signed on 26 April 2019 an MoU with telecommunications regulatory heads from Liberia, Guinea and Cote d'Ivoire that aims to implement the One Area Network initiative. Once this plan has been put into effect, mobile phone users visiting the signatory countries would be able to use their local numbers to make and receive calls at no extra cost. Efforts to promote integration in the Economic Community of West African States union have prompted telecoms regulatory bodies to develop partnerships to improve their domestic operations and ensure customers enjoy the benefits of roaming.



Iran to Offer Wholesale Fiber Access

The government of Iran plans to open up state-owned fiber networks to third-party service providers. A report from the Financial Tribune says that the Communications Regulatory Authority

(CRA) is inviting licensed operators to apply to utilize spare capacity on networks which have been deployed by the state-backed Telecommunications Infrastructure Company (TIC). The

country's main broadband providers include Telecommunications Company of Iran (TCI), Pars Online, Shatel, MobinNet and MTN Irancell.

Vodafone Signs Cable Wholesale Agreement with Telefonica Deutschland

Vodafone Group has announced it has signed a cable wholesale agreement with Telefonica Deutschland, in order to help secure EC approval for its EUR19.0 billion (USD21.3 billion) acquisition of Liberty Global's assets in Germany, the Czech Republic, Hungary and Romania. The deal will allow Telefonica Deutschland to

market broadband services to consumers over the combined Vodafone and Unitymedia cable network in Germany, which covers 23.7 million households. Following discussions with the EC, Vodafone has submitted a remedy package comprising the cable wholesale agreement and a commitment to ensure sufficient capacity is available for OTT TV distribution. Brussels now intends to undertake market testing of the remedy package, and to adopt its decision on the overall transaction by July 2019 with completion occurring later that month. 'Our deal with Liberty Global is transformational in many ways. It is a significant step towards a Gigabit society, which will enable consumers & businesses to access the world of content & digital services at high speeds. It also creates a converged national challenger in four important European countries, bringing innovation & greater choice,' noted Nick Read, CEO of Vodafone Group, adding: 'We are very pleased to announce today our cable wholesale access agreement with Telefonica Deutschland, enabling it to bring faster broadband speeds to its customers and further enhancing infrastructure competition across Germany.'



FCC Commissioner O’Rielly Condemns Government-Led Wholesale 5G Proposal

FCC Commissioner Michael O’Rielly revived what was thought to be a dead issue this week, articulating his opposition to a proposed government-led wholesale 5G network model in a blog posted to the Federal Communications Commission’s website. “Over the last few months, various ideas have been floated about the offering of 5G wireless services via a government-sponsored network,” O’Rielly wrote in the blog post. “This entire effort seems convoluted and borders on the preposterous.” Earlier this year, members of President Trump’s re-election committee made comments to Politico appearing to back a controversial 5G proposal that would see the government taking over spectrum designated for 5G and developing a system to share the spectrum with wireless providers on a wholesale basis. The idea received swift criticism from nearly all corners of the industry, and was even rejected by the White House and the FCC. President Trump himself clarified at a later event that the U.S.’s 5G roll-out will be private sector-driven and private sector-led. FCC Chairman Ajit Pai reiterated that stance last week, speaking at the National Spectrum Consortium 5G Collaboration event in Arlington, Virginia. “Like a recurring bad dream, there have been repeated calls for government control of America’s 5G networks,” he said at the event. “Let me be clear: I oppose any proposal for the government to build, own, or operate a commercial next-generation wireless network.” O’Rielly noted that the details of such calls for government control of 5G have been “nearly impossible to nail down with any granularity.” Neither Pai nor O’Rielly named who is supposedly pushing for such a proposal to be accepted. O’Rielly

presented a laundry list of reasons why a wholesale 5G network is not feasible, including the fact that there is no available spectrum bands to be used for the network; the government would not be able to compel carriers to actually use the network; and that the government has no existing tower agreements or relationships, meaning that the network would have to build from scratch. He also noted that a government-led wholesale network could not realistically be able to offer a “more secure” 5G network than the private sector could. “Arguing that this network couldn’t be broken into ignores the reality of past breaches of high priority U.S. government networks,” O’Rielly said. 📍

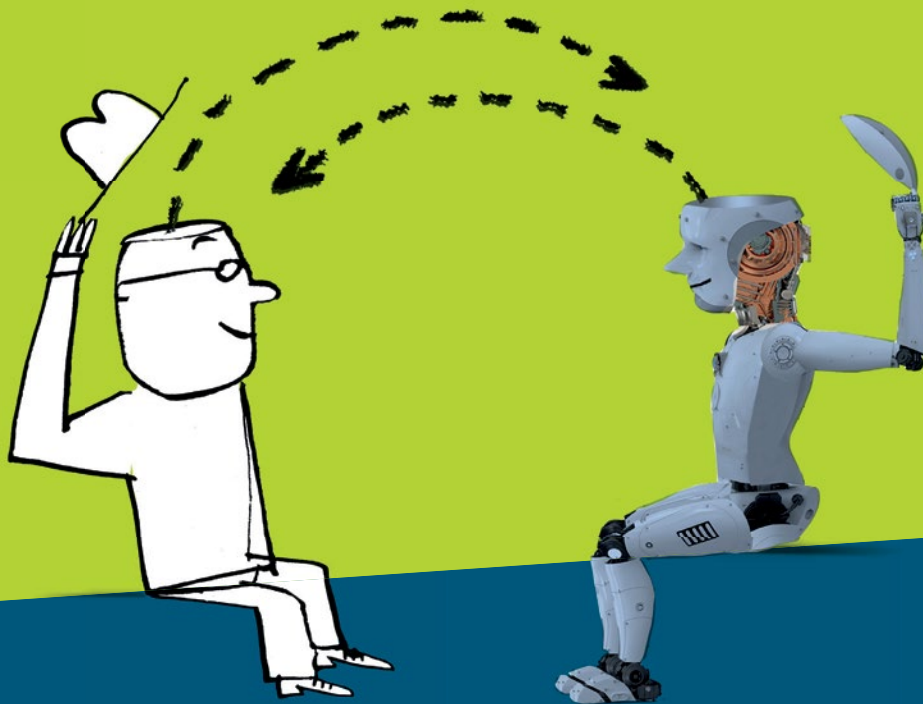




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83% of telecommunications companies already use Artificial Intelligence as a way to make their enterprises fit for the future and keep them competitive. This new wave of transformation is approaching fast – and executives should get their AI strategy in place now.

In our study 'Reshaping Business Models – Understanding the Benefits of AI', we investigate the importance and potential of artificial intelligence for businesses, presenting opinions from an industry insider survey on AI. How will you get your company ready for AI?

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ARTICLE

Don't Be Rash – How to Achieve Sustainable AI Success Without Falling for the Hype



Tim Peters

Managing Director, goetzpartners ME



Dr. Alexander Henschel

Managing Director and Head of TMT practice at goetzpartners



There is no doubt about it: Artificial Intelligence is not only part and parcel of our everyday lives already but also features strongly on business agendas as a way to make enterprises fit for the future. This new wave of transformation is approaching fast – it has taken just five to ten years of technology innovation to take AI from the sidelines and turn it into the Next Big Thing.

AI is set to become a key business driver in the future, so it is imperative to over-haul legacy structures right now, before it is too late, and create a robust future basis for capturing high-quality, comprehensive customer data, process data and machine data.

One reason for the hype is the sweeping visions that are being formulated. Technology providers such as Google, Intel or IBM talk of “improving people’s lives”, “reshaping business and society” and “the power of AI”. Meanwhile, enterprises in other industries are beset by uncertainty. Will AI genuinely revolutionize their business models? If so, how fast will it happen? And what form will the change take? Is it worth venturing beyond tentative pilot projects and splashing out on a major AI investment? What are the best areas for investment?

Even in the face of all these questions, one thing is for sure: What business leaders do today – how they get their organizations ready – will determine whether they will encounter AI as a destructive tsunami or a perfect wave for their enterprise's renewal.

83% of telecommunications enterprises already use AI¹

The telecommunications sector is certainly engaging seriously with AI. Initiatives have so far centered around two main types of processes

- » Advances in speech recognition: with error rates down to just 4.9% in 2017², enterprises are now better able to deploy chatbots and thereby automate customer service.
- » In networks, artificial intelligence can ensure that loads are distributed intelligently and that demand predictions can be accommodated in infrastructure planning.

In general, a common place to start is by automating routines, or by deploying AI to improve inefficient processes, because these are areas where quick wins can be expected. However, the value added does not emerge automatically from the type of AI technology used.

What is in AI for my business?

The value derives essentially from what AI is at its core: it distills meaningful intelligence from data that is simply too extensive for human processing, makes predictions on the basis of this data and optimizes decisions. AI helps enterprises to reduce costs, offer their customers better service, or design products more closely around what customers want. However, processes that directly translate into added value for customers are becoming more and more important, with great opportunities wherever AI can make the service not only more efficient, but more customer oriented, and wherever products can be smartly and quickly adapted to customer requirements.

The starting question: What problem should be resolved with AI?

Fixing cost and efficiency issues with AI should only be the initial stage for AI application. For telcos, for example, network infrastructure efficiency is vital in terms of cost and service quality. Looking ahead, Huawei and others anticipate that AI will be the only feasible way to manage and optimize fast-growing mobile traffic, including rising volumes of video data.³

In the mid- to long-term however, focus your attention on strengthening customer orientation through AI. A typical application scenario, where the algorithm learns and improves, are 'next best offers'. Based on an analysis of buying behavior and individual needs, an AI-based system can distill this intelligence into identifying and offering the most appropriate upselling or cross-selling products or services. The better the data analysis, the greater the likelihood that the customer will bite.

Get ready for disruption!

The experts surveyed for the goetzpartners study "Reshaping Business Models:

Understanding the Benefits of AI" (2018) agree: beyond enhancing existing processes, AI above all has the potential to be disruptive, and over the next five to ten years can be expected to radically transform entire industries.

It is of course inherently difficult to predict the exact nature of this disruption. What is certain, however, is that upheaval can always be expected where three factors converge:

- » Conventional analysis does not work: AI, with its self-learning capabilities, can however identify patterns in the data and make predictions.⁴
- » Decisions are complex, but are based on constant rules: here, AI can be used to aid decision-making.
- » Labor costs are high: AI-based automation will be relatively expensive, especially at the beginning. At the same time, AI can automate more complex tasks than present technologies and can for example simplify or support middle management activities.

The greatest changes are expected in areas where adaptive AI systems connect with other technologies, thereby forging new synergies. Used properly, AI creates the opportunity to identify early what customers are looking for, to discover niches in the market as they unfold, and to have greater affinity with customers by offering exactly the right products, services and innovations.

To make this happen, AI needs deep integration with internal processes and most enterprises will first need to set those up. By thinking beyond use cases that work in isolation from others, and applying the same technologies, these companies are poised to upend an industry, create a new product category, shape a new business model and totally reconfigure value streams. Instead of today's single purpose AI applications, such integration is possible only with a multipurpose AI platform.

Invest in expertise!

The DIY approach to building AI

competencies will only work for very few enterprises – and most of these will have an affinity with the tech sector and will already have specialist expertise in-house. How you should proceed instead, will depend on your particular AI strategy and needs. For some applications, especially those focused on efficiency gains, it certainly makes sense to buy in AI solution packages. To take the new ideas, approaches and innovations of AI right to the heart of the business, you'll need a different kind of investment. You can look into collaborations with partners with the requisite expertise or ideas of their own. Another option is to invest in a startup whose innovative strength and dynamism can have a positive impact. In any case, the investment strategy is a key part of your AI strategy and essential for success.

Align AI with the core of your business!

The main business reasoning for AI is still: what problem does an enterprise want to resolve, and what value does AI create for customers? On the technical level, if AI is cloud-based, data quality and Internet bandwidth are key to making the AI rollout a success. On the organizational level, what matters most – alongside the need for a clear strategy – is having the right expertise and enough cash to invest. Other success factors to single out are security and transparency.

AI is set to become a key business driver in the future, so it is imperative to overhaul legacy structures right now, before it is too late, and create a robust future basis for capturing high-quality, comprehensive customer data, process data and machine data. By this point, at the latest, enterprises that lag behind other players in AI adoption or have failed to adapt their business models at all will suffer serious consequences.

Yet despite the need for action, AI initiatives can only deliver genuine value if they are aligned with the core of the enterprise – they must fully embrace it and extend it. There is no point just jumping on the bandwagon without a sense of direction. 🚩

¹ Leadership in the Age of AI - Adapting, Investing and Reskilling to Work Alongside AI, Infosys 2018: <https://www.infosys.com/age-of-ai/Documents/age-of-ai-infosys-research-report.pdf>

² The Business of Artificial Intelligence, Harvard Business Review 2017: <https://hbr.org/cover-story/2017/07/the-business-of-artificial-intelligence>

³ Artificial Intelligence for 5G: Challenges and Opportunities, Huawei 2017: http://www.comelec.telecom-paristech.fr/uploads/tx_dbcomelec/Debbah_AI5G_30-03-2017_.pdf

⁴ Big Data Analytics: Cloud-supported machine learning services, Analytics Magazine 2016: <http://analytics-magazine.org/big-data-analytics-cloud-supported-machine-learning-services/>

TECHNOLOGY NEWS

IoT Solutions Taking Root in Agriculture to Connect Crops and Livestock

By 2024, over 2 million farms and 36 million cattle will be connected, announced ABI Research, a market-foresight advisory firm providing strategic guidance on the most compelling transforming technologies. A new report unveils the opportunity for the Internet of Things (IoT) within the agricultural market, specifically connected agriculture in field crops, tree crops, and livestock. For field and tree crops, the primary driver for the introduction of connectivity and the IoT is not only to irrigate sufficiently but also to limit excess water application for usage efficiency and to align with government regulation. For livestock, it is about collecting data relating to the health of the animals, including birthing activities, as well as knowledge of their whereabouts. Across all agriculture sectors, the benefits are improved yields, a higher quality product, and greater insight for farmers to more efficiently manage their operations. "Hi-tech systems involving drones are sometimes referenced when

discussing the future of farming, but a drone's primary function is to provide high-level aerial imagery, including strategic analysis of large areas to provide analytics on indices like chlorophyll content. While this is useful, it is time-consuming and can lack granular information. Ground-based sensor-based systems are more insightful and cost-effective for focusing solely on monitoring soil under the crops and animal behavior. This is exactly the information farmers need to map out their plan of action to secure the optimum yield," explains Harriet Sumnall, Research Analyst at ABI Research. The technologies that will power IoT in connected agriculture will heavily rely on gateways and low-power wide area products. LoRa is increasing finding preference in supplier solutions, particularly for sensor-to-node connections. The cost of connected agriculture system depends upon the number of sensors, with vendor pricing strategies ranging from a single

upfront fee and an inclusive subscription to a data management platform (as with Sensoterra), to a zero upfront cost but a data subscription-only model (as with CropX). The former may be preferable for large farms, and the latter better for smaller ones. "The reasons for adopting IoT in agriculture are universal – cost reduction, improved productivity, and better profit margins – but the specific prompts in terms of readiness to adopt can be more pragmatic and localized. For example, in North America, the political climate is proving challenging for the immigrant workforce required by the agricultural sector, and more automation could make up for this lack of manual labor. And, in Europe, farmers are notably younger than elsewhere in the world and are more naturally receptive to adopting new technology. In general, however, there is a lack of education among farmers about the benefits of connected agriculture. This is a vital issue that vendors must continue to be active in remedying if Agricultural IoT is to succeed," Sumnall concluded. These findings are from ABI Research's Agriculture's Digital Transformation – AgTech and Farming application analysis report. This report is part of the company's M2M, IoT and IoE research service, which includes research, data, and ABI Insights. Based on extensive primary interviews, Application Analysis reports present in-depth analysis on key market trends and factors for a specific application, which could focus on an individual market or geography.



Vodafone Hungary Launches Its First 'Live Network' 5G Base Station

Vodafone Hungary has announced the launch of its first 'live, permanent, networked' 5G base station, using its own commercial frequencies, at the 'Zala ZONE' vehicle testing ground in Zalaegerszeg, reports Vilaggazdasag. Participants at a launch event could test-drive a remotely controlled car via a 5G link, enabling real-time HD broadcast video to the remote driver who

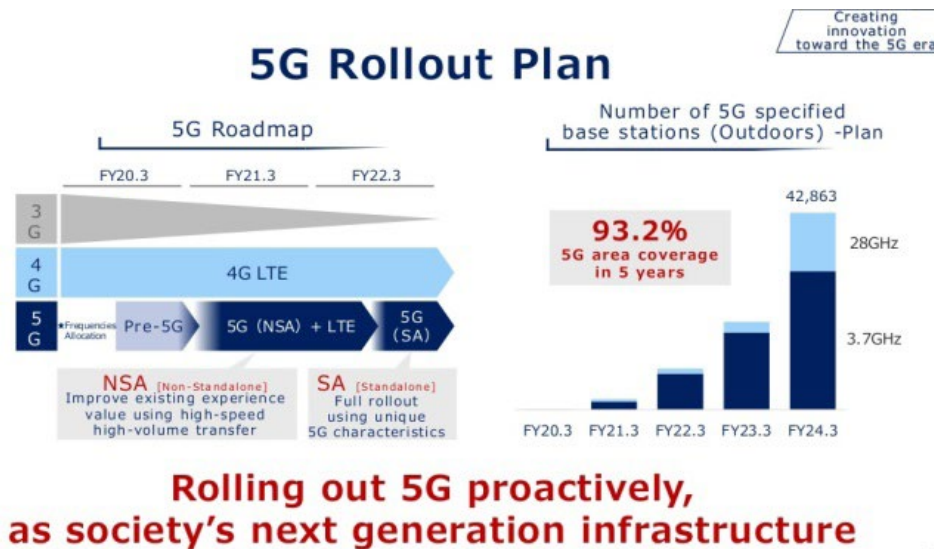
controls the vehicle utilizing very low network latency. The live 5G base station is currently running on non-standalone technology standards. Rival Telenor Hungary – part of the PPF Group – launched a 5G mobile test network in Győr last week, although it is noteworthy that Vodafone is currently the only Hungarian cellco to own commercial 3.5GHz spectrum for 5G development.

KDDI to Switch on 'Pre-5G' Network

KDDI Corp president Makoto Takahashi says that the Japanese carrier plans to launch 'pre-5G' mobile services in September 2019, ahead of the sale of 5G handsets from March 2020. In the conference call, as reported by RCR Wireless News, Takahashi set out KDDI's stall to roll out 5G coverage to 93% of its footprint

within five years, noting: 'We've been able to acquire frequency bands where global 5G use is expected, it's significant: 3.7GHz and 4GHz [spectrum]'. The official, who pointed out that domestic mobile network operators (MNOs) have agreed to share some 5G infrastructure, went on to add: 'We positively see business opportunities

in utilising 5G for regional revitalisation. We've been cooperating with various municipalities to work on projects utilising IoT. To further advance these measures, we established a regional revitalization fund in April 2019. Going forward together with venture companies we will promote digital transformation utilizing 5G'. Japan's MNOs – NTT DOCOMO, KDDI, SoftBank Corp and newcomer Rakuten Mobile – plan to launch 5G commercially in 2020 and last month, the government rubber-stamped their plans to invest upwards of JPY1.6 trillion (USD14.4 billion) over the next five years to reach national coverage. As previously reported by CommsUpdate, DOCOMO plans to invest around JPY795 billion over the initial period, with KDDI committing to invest JPY466 billion, SoftBank JPY206 billion and Rakuten JPY194 billion, respectively. Preliminary information suggests that NTT DOCOMO and KDDI have committed to reaching >90% coverage by that date, while SoftBank and Rakuten have set more conservative targets of 64% and 56%, respectively.



Tango and Telindus Announce 5G Core Readiness

Tango and Telindus, both owned by Proximus Luxembourg, have announced that they have become the country's first operators to have an operational 5G core network. This follows the successful completion of technical tests last month, which were conducted in real-life conditions at the operator's research facility in Bertrange using the 3.6GHz frequency and 3GPP's Release 15

specifications for 5G. The company claims the initial connections are the culmination of major investment that involved a complete change to its core network. This infrastructure will now make it possible to deploy 5G on the existing 4G network as soon as licenses for the frequencies have been granted. The telco aims to launch 5G for Tango and Telindus customers in densely populated areas within the next

twelve months. 'This inaugural test of 5G is a sign of our commitment to promote innovation and develop the country's competitiveness. Our network is now ready for the 5G deployment phase, which will enable us to offer new possibilities to both our residential and business customers,' says Gerard Hoffman, CEO of Proximus Luxembourg.

Videotron Switches On 5G Test Site in Montreal

Quebec-based cableco and mobile operator Videotron and its partners in the Open-Air Laboratory for Smart Living (LabVI) have announced that a 5G testing site is now live in Montreal's Quartier de l'innovation using Ericsson equipment, reports MobileSyrup. The site – utilizing an

existing 4G LTE site on the roof of the Ecole de Technologie Supérieure – is equipped with a 5G antenna, enabling faster data speeds on mobile devices, coverage improvements, increased bandwidth and reduced latency. Videotron's vice-president Serge Legris said: 'We want

to give the scientific community and start-ups the opportunity to test actual applications and projects at LabVI by making the connectivity of the future available to them.'

Vodafone UK to Switch on 5G Network

British mobile network operator (MNO) Vodafone UK has announced that it will switch on its 5G network for both residential and business customers on 3 July, with initial coverage of seven cities. In a press release regarding the development Vodafone named the locations where it will launch 5G as Birmingham, Bristol, Cardiff, Glasgow, Manchester, Liverpool and London. Looking ahead, meanwhile, coverage is expected to be extended to a further twelve cities 'later this year', namely: Birkenhead, Blackpool, Bournemouth, Guildford, Newbury, Portsmouth,



Plymouth, Reading, Southampton, Stoke-on-Trent, Warrington and Wolverhampton. Further, in what the operator claims will be a first, it will also offer 5G roaming in the UK, Germany, Italy and Spain 'over the summer'. According to Vodafone UK, it will offer a choice of 5G smartphones, with it planning to put its first 5G-compatible handset – the Xiaomi MIX 3 5G – on sale next week; this device will reportedly be useable on its LTE network initially, and then be able to use the 5G network when it is switched on and once 'all manufacturer software updates are completed'. In addition, the cellco has confirmed it will also offer a 5G router for both home and business use. Meanwhile, with regards to pricing, the MNO says its 5G service will cost the same for both residential and business users, and that new tariffs will be unveiled next week to coincide with the availability of its first 5G-compatible handset. Commenting, Vodafone UK CEO Nick Jeffery said: 'We started our 5G journey more than three years ago. We led the way in setting 5G standards to ensure phones and networks work well together. We upgraded our masts to be able to take 5G without disruption. And we were the first UK company to test 5G over our all-fiber core fixed and mobile network ... This is important. It means we can today announce the largest launch of 5G in the UK and be the first to announce 5G roaming.'

Operators Aim for Wider Impact in Digital Moves

Senior representatives from Italian operator Wind Tre and Canadian provider Telus highlighted the importance wider organizational issues and aims play as they pursue increased adoption of digital technology. Speaking in a session on 2025 Digital Operator, Wind Tre CIO Rob Visser said operators must not forget the human element, with reskilling employees seen as central to the Italian company's strategy. "There is only one budget that is unlimited and that's our training budget. We really incentivize people to become experts in AI and machine learning, whereas to be honest those things don't exist [on their own]. There is no machine that learns, there is no artificial intelligence, it's human intelligence." Commenting on vendor marketing and pressure towards digitalization, he added: "I don't believe digital is a strategy in itself. Digital is not a goal, it's a means. We don't have

a digital strategy, we have a strategy to make our customers happy." Visser added technologies associated with digital transformation were also creating jobs in his company, such as in data science. Telus digital solutions VP Harry McIntosh (pictured, second from right) said its

digital efforts were not so it could be "a better telco, but a better business", adding the strategy was "not about digital KPIs but company KPIs." McIntosh added the agility brought by new technologies would help the company move into new sectors more easily.



Berg Insight Says Cellular IoT Connections Now Exceeds 1 Billion Worldwide



A new report from the IoT analyst firm Berg Insight estimates that the global number of cellular IoT subscribers increased by 70 percent during 2018 to reach 1.2 billion. Growth was driven by exceptional adoption in China, which accounted for 63 percent of the global installed base. By 2023, Berg Insight now projects that there will be 9.0 billion IoT devices connected to cellular networks worldwide. "China is deploying cellular IoT technology at a monumental scale", said Tobias Ryberg, Principal Analyst and author of the report. "According to data from the Chinese mobile operators, the installed base in the country

grew by 124 percent year-on-year to reach 767 million at the end of 2018. The country has now surpassed Europe and North America in terms of penetration rate with 54.7 IoT connections per 100 inhabitants." The Chinese government is actively driving adoption as a tool for achieving domestic and economic policy goals, at the same time as the private sector implements IoT technology to improve efficiency and drive innovation. Berg Insight believes that the role of the government is the main explanation for why China is ahead of the rest of the world in the adoption of IoT. Like other advanced economies, the country has widespread adoption of connected cars, fleet management, smart metering, asset monitoring and other traditional applications for cellular IoT. It has also

given rise to new consumer services enabled by connectivity like bike sharing. The most distinctive characteristic of the Chinese IoT market is however the way that the government is systematically using new technology to implement its vision for urban life in the 21st century. In the report, Berg Insight also analyses the IoT business KPIs released by mobile operators in different parts of the world and found significant regional differences. The monthly ARPU for cellular IoT connectivity services in China was only € 0.22, compared to € 0.70 in Europe. Global revenues from cellular IoT connectivity services increased by 19 percent in 2018 to reach € 6.7 billion. The ten largest players had a combined revenue share of around 80 percent.

DNA Testing 5G with 3.5GHz Spectrum

DNA Finland says it is now conducting its 5G fixed broadband service tests in Vantaa using what it terms 'the actual 5G frequency', having initially used 4G spectrum for the trials. In a press release regarding the development the operator noted that the tests – which are being carried out in a residential area of the city – have switched to using 3.5GHz spectrum for all customers participating in the technical test group. DNA noted

that the pilot scheme is studying the operation of the 3.5GHz frequency band and Massive MIMO antenna technology in home broadband systems. Commenting, DNA's Senior Vice President in Consumer Business, Pekka Vaisanen, said: 'The test is a part of DNA's service development, which allows us to bring high speed broadband connections to detached homes in areas without access to optical fiber connections. We have asked the test

group for comprehensive information about the usability of the service and based on the results we have adjusted the service implementation.' Looking ahead, DNA has said it broadband services based on 5G technology for detached homes and rural areas will be made available 'once high-quality network terminals and customer terminal devices are introduced into the market'.

China Telecom and Ericsson Sign 5G MoU

Ericsson and China Telecom have teamed up to accelerate the development of commercial 5G and promote 5G technological innovation under a new 5G Memorandum of Understanding (MoU). Signed at China Unicom's 5G Innovation and Cooperation Conference in Shenzhen, China, on April 26, the agreement strengthens the strategic

partnership between the companies. The China Telecom MoU is Ericsson's forty-fifth announced service provider 5G partnership. Ericsson has embarked on in-depth cooperation on a 5G test network with China Telecom. In addition to testing the technical networking scheme, the partners have completed innovative 5G projects, such as the live 4K HD broadcast

of a marathon; live 8K HD broadcast of the Women's World Club Volleyball Championship; 360 degree panoramic live broadcasting, and driving demos. The agreement was signed by Luca Orsini, Head of Networks, Market Area North East Asia, Ericsson, and Liu Guiqing, Deputy General Manager, China Telecom.

MSIT Reveals 5G Uptake, Base Station Deployment Figures

South Korea's Ministry of Science and ICT (MSIT) has revealed that since the launch of 5G connectivity by all three of the nation's mobile network operators (MNOs) last month, around 260,000 users have signed up for the latest generation of mobile broadband technology. While the watchdog did not provide a breakdown with regards to uptake on an operator-

by-operator basis, KT Corp is reported by BusinessKorea to have revealed in a promotional event that it surpassed the 100,000 5G subscriber milestone on 30 April. Meanwhile, in its press release the MSIT also published information regarding the number of 5G-compatible base stations that have been deployed across the country. According to the regulator's

figures, there are now 54,202 5G base stations in operation across South Korea, up from 50,212 last week, with the increase said to have helped alleviate some of the complaints regarding quality of service from those users that have already upgraded to 5G.

Germany Launches 5G Broadcasting Trial



The Bavarian Broadcasting Corporation (Bayerischer Rundfunk, BR), the Broadcast Technology Institute IRT, Kathrein, Rohde & Schwarz and Telefónica Germany are jointly testing 5G for TV broadcasting. The large-area 5G field trial in the Bavarian alpine region is covered by two high-performance transmitters located in Ismaning and at the top of the Wendelstein Mountain. Both operate with 100 kilowatts effective output power (ERP). The project will test how 5G broadcasting can be used to create an 'overlay infrastructure' that can simultaneously serve millions of future 5G mobile devices. The aim is to deliver content without overburdening mobile networks or increasing costs for consumers. 5G broadcasting differs from live streaming in that it sends a single version of a program out over a wide area, which anybody in range can receive. With live streaming, the same

program is sent individually to every person that requests it. 5G could make live programmes more reliable on-the-go and reduce congestion on the network when many people want to access a live program concurrently. Further, 5G broadcast won't eat into people's data allowances. The project in Germany will trial the new FeMBMS (Further evolved Multimedia Broadcast Multicast Service) broadcast mode, which allows far-reaching and inexpensive distribution of content across large coverage areas with a radius of up to 60 kilometers. Ulrich Wilhelm, Director General of Bayerischer Rundfunk, said, "We must design our future digital communications infrastructures in such a way that everyone can continue to benefit from the diversity of media content. I welcome the fact that Bavaria is playing a pioneering role in setting standards and in shaping our digital world in this sense." Gerald Huber, Senior Manager 5G Projects at Telefónica Germany, commented, "We are supporting the 5G TODAY project in coordinating the spectrum used in the 700 MHz band. It is important for us to learn more about long-range propagation in the 700 MHz band and the application of very large radio cells." Michael Hagemeyer, Managing Director of IRT, noted that although it will be a few years before commercial terminal devices are available and 5G broadcasting is widely possible, the test will provide important insights for further research. IRT is coordinating the project and is developing a prototype FeMBMS receiver based on a software-defined radio (SDR) solution. In the future, this technology could be integrated into smartphones, tablets and TV sets to receive live and linear content over 5G. The trial will run until autumn 2019.

CMHK Carries Out Hong Kong 5G First

China Mobile Hong Kong (CMHK) has connected what it says is the territory's first 5G voice and video call. Besides a local call, a cross-border call was also made to the Chinese capital Beijing,

Xinhua reports. Sean Lee, director and chief executive officer of CMHK, said 100MHz of spectrum was used for testing purposes, and the speed of the network would become even higher if 200MHz of

spectrum was used. 5G network users can look forward to transmission rates ten to 20 times faster than 4G, he added. CMHK is the third-largest of Hong Kong's four mobile network operators (MNOs). [\[1\]](#)

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REGULATORY NEWS

Ofcom to Implement New Rules to Support Fiber Investment

British telecoms regulator Ofcom has announced draft decisions under which it claims that companies laying high speed fibre cables for broadband and mobile networks will benefit from greater access to Openreach's telegraph poles and underground tunnels. With BT subsidiary Openreach already required to let rival companies use its telegraph poles and underground 'ducts' to lay their own fibre networks under rules set by Ofcom last year, until now such access has been limited to companies focusing on residential and small-business customers. As per the regulator's latest plans, however, access will be extended to firms serving larger business customers, as well as those looking to roll out lines to support mobile and broadband networks. In addition, Ofcom has also confirmed that it is refreshing its regulation of leased lines; under the draft decision, the regulator

said that in areas of the country where Openreach faces limited competition from other leased-line networks, it will continue to regulate what that company can charge providers to use these services, 'keeping prices flat'. Further, it will also impose strict requirements on Openreach for repairs and installations. Meanwhile, in areas where there are no rival networks present at BT's exchanges, Openreach will be required to give competitors physical access to its fiber-optic cables, at 'a price that reflects its costs'. According to Ofcom, introducing dark fiber in only these areas will significantly reduce the cost for mobile and broadband operators to connect their networks, without undermining their incentives to lay new, competing fiber cables where it is economic to do so. By comparison, where the regulator sees there being stronger network competition, or prospective competition, it has

confirmed that regulation will be lighter than existing rules, to allow competition to flourish. Ofcom confirmed that the new regulations will cover the period from its final decisions, until April 2021, with the draft decisions having now been submitted to the European Commission for comment, after which it plans to publish a final statement next month. In terms of specific timelines, the regulator noted that new, unrestricted duct and pole access is expected to be implemented one month after this final statement, while dark fiber access will be required to be provided from six weeks after its final statement. Commenting on the draft decisions, Jonathan Oxley, Ofcom's Competition Group Director, said: 'Our measures are designed to support the UK's digital future by providing investment certainty for continued competitive investment in fiber and 5G networks across the country.'

FCC Eyes 5.9GHz Band for Wi-Fi

The head of the US Federal Communications Commission (FCC) called for a formal review of the 5.9GHz band, arguing the airwaves, which are currently reserved for automakers, might be put to better use as the country faces a mid-band spectrum crunch. Speaking at Wi-Fi World Congress USA, FCC chairman Ajit Pai noted the regulator had set aside 75MHz of spectrum in the band in 1999 for Dedicated Short Range Communications, which allow vehicles to communicate with one another. But with many in the automotive industry now backing the cellular Vehicle to Everything (C-V2X) standard, Pai said the time has come to re-examine the allocation. "This valuable mid-band spectrum is largely lying fallow and it has been so for two decades now, as the internet has gone from dial-up modems to gigabit Wi-Fi...It is time to launch a comprehensive review of the future of the 5.9GHz band, make a sober assessment of the facts and then make a timely decision on the best way forward." Pai said potential choices for the future of the band include keeping it reserved for C-V2X or other automotive technologies; splitting the band between automotive and unlicensed use; or allocating the entire 75MHz for unlicensed use. As other countries lead their wireless efforts with mid-band spectrum, the US has faced criticism for focusing on mmWave at the expense of other frequencies. Though the FCC has several

initiatives underway to open airwaves at 2.5GHz; 3.5GHz; 3.7GHz to 4.2GHz; and 6GHz, auctions in those bands aren't expected to begin until at least 2020. At a recent FCC meeting, Commissioner Jessica Rosenworcel urged the body to "flip its wireless priorities and pivot to mid-band spectrum" or risk losing its influence on the global wireless supply chain.



C-Band Alliance Files Band Plan for 3.7-4.2 GHz

The C-Band Alliance (CBA) has filed a band plan with the FCC that describes how cleared C-band spectrum could be divided into blocks upon which wireless carriers could bid, paving the way for 5G midband spectrum. The proposal, however, still doesn't address one of the big problems that critics cite: proceeds to the U.S. Treasury for the sale of spectrum that was designated for satellite companies years ago. Citizens Against Government Waste is among several groups, including T-Mobile, that are urging the FCC to reject CBA's proposal, which would vacate 200 megahertz of spectrum between 3.7 and 4.2 GHz in order to make way for 5G. But CBA's filing sheds some light on CBA's proposed band plan, which it insists is designed to be "competition friendly" and to facilitate a transparent auction open to all. Rural, regional and nationwide bidders will be encouraged to participate at auction, according to the group. In an early tranche, the satellite operators propose to clear 60 (out of 180) MHz in 46 of the top Partial Economic Areas (PEAs), as well as a required 20 MHz guard band to protect existing C-band services from interference. The early tranche excludes the Baltimore-Washington, D.C., Atlanta and Denver PEAs, which are initially excluded due to the existence of sizable video operations centers that require additional care,

according to CBA spokesman Markus Payer. "We selected this group based upon an analysis of registered earth stations and reflecting the number of antennas that reasonably can be filtered in 18 months," he said. "The second tranche will clear the remainder of the 180 MHz spectrum in the balance of the continental United States PEAs (i.e. 9 blocks of 20 MHz in the 360 PEAs not yet covered in the first tranche plus the remaining 6 blocks of 20 MHz in those 46 PEAs where 3 blocks of 20 MHz each have already been cleared in the first tranche). This creates a competition-friendly process open to all, smaller and larger, metropolitan and regional/ rural potential bidders." According to the alliance, its proposal embraces "consistent FCC oversight" of the entire auction and transition process and would get the job done in as little as 18 months (for the early tranche) from a final order from the FCC; clearing the entire 200 MHz would take 36 months from a final order. The group said it has worked with customers, end users, manufacturers, potential 5G spectrum users and others to flesh out the many complex technical, operational and logistical issues related to clearing and transitioning the spectrum from satellite service to terrestrial 5G. Currently, the four members of the CBA—Intelsat, SES, Eutelsat Communications and Telesat—use the C-band, which spans 500 megahertz, to provide services that ultimately deliver broadcast and audio content to millions of Americans. Last week, during a House subcommittee hearing on FCC accountability, lawmakers quizzed FCC commissioners on a range of topics, including the C-band. "If you think you're getting flak for not moving quick enough, watch how much flak you'd get if you let four foreign satellite companies keep all the money," Rep. Mike Doyle, D-Penn., told FCC Chairman Ajit Pai.



FCC Chairman Pai Endorses Sprint/T-Mobile Merger with Rural 5G Conditions

Federal Communications Commission Chairman Ajit Pai Monday morning endorsed the proposed \$26.5 billion merger between Sprint and T-Mobile, though commissioners haven't officially approved the deal yet. Sprint shares jumped 25% and T-Mobile shares grew 5.4% in early morning trading at the news. The endorsement comes after executives from the two wireless carriers met with FCC members last week to offer more concessions in a bid for approval. Sprint and T-Mobile committed to not raise prices, to sell off Sprint's Boost Mobile brand, and to build out 5G in rural areas within three years of closing the merger, according to a report from Bloomberg. In a statement, Pai said T-Mobile and Sprint

committed to build out 5G networks covering 85% of rural Americans within three years and covering 90% within six years. "In light of the significant commitments made by T-Mobile and Sprint as well as the facts in the record to date, I believe that this transaction is in the public interest and intend to recommend to my colleagues that the FCC approve it," Pai said. "This is a unique opportunity to speed up the deployment of 5G throughout the United States and bring much faster mobile broadband to rural Americans. We should seize this opportunity." The merger has faced opposition from wireless groups and some state attorneys general. Wireless industry opponents that have formed the 4Competition Coalition say

that merger would lead to price increases for virtually all wireless customers, substantially raise wholesale rates and cause significant job losses, all while failing to deliver on promises to expand rural coverage. Bloomberg reported that the prepaid business divestiture may help ease concerns presented from some state attorneys general that the merger would negatively impact low-income consumers by removing choices and raising prices. T-Mobile announced the two companies extended the deadline for completion of the merger to July 29. The FCC is expected to draft the order by June. However, the deal will still require approval from the U.S. Department of Justice's Antitrust Division before being completed.

UK Operators Could Receive €250 Million Spectrum Fee Refund

The High Court last week upheld Vodafone's complaint that an increase in spectrum license fees in 2015 did not follow due process, the Financial Times reports. Between summer 2015 and 2017, Ofcom trebled annual license fees (ALFs), despite an outcry from operators. Following a challenge from EE in 2017, a court ruled that Ofcom should not have raised the charges without conducting an impact assessment. This ruling laid the foundations for Vodafone to lead other

operators in a case to recover historical overpaid costs. A Vodafone representative is quoted as saying: "We are delighted with the court's ruling. Ofcom has previously acknowledged that it failed to follow proper process in raising the license fees and the court has now confirmed that the overpayments should be returned." "The repayment of these fees will enable us to invest in the country's digital infrastructure". However, in the latest ruling, Ofcom was immediately given the

right to appeal and is likely to do so. An Ofcom representative said, "This case has been decided on what is a technical and important point of law, and the judge has recognized this by granting Ofcom permission to appeal further to the Court of Appeal." "The mobile operators did not challenge the amount they pay for this valuable spectrum, but the judgment means they get a windfall of more than £220 million."

ETSI Releases Specification for Smart Body Area Networks to Facilitate eHealth



The ETSI Technical Committee Smart BAN has published ETSI TS 103 327, a standard for Smart Body Area Networks. It establishes standardized service and application interfaces and facilitators, APIs (Application Programming Interfaces) and infrastructure for interoperability management and offers secure interaction and access to any SmartBAN data or entities. The resulting SmartBAN reference

architecture is a global and integrated IoT reference architecture, oneM2M and Multi-Agent-based. The architecture is provided with cross-functional components for allowing non SmartBAN enabled environments to interoperate with SmartBAN and addresses network, syntactic, informational and semantic interoperability. SmartBAN uses a set of low-power embedded devices, mainly

sensors, wearables or actuators, to collect and monitor vital data of a human being and their environment, but not exclusively. This ETSI specification will enable, for instance, each patient coming to an emergency room to have their medical history already available, which should lead to an intelligent and accurate intervention. The SmartBAN reference architecture is managing semantic interoperability through in particular everything as a service (XaaS) mechanisms and a Web of Things (WoT) strategy, which will enable cooperation between different SmartBANs. It should lead to the creation of new cross-domain applications in order to integrate SmartBANs into the Web of Things and more global scenarios. On the service and application side, generic service enablers and standardized APIs will provide secure interaction and access to SmartBAN data or entities (data transfer and sharing mechanisms included), embedded semantic analytics (device/edge/fog levels), automated alarm management, distributed monitoring or control operations. This is a first step towards horizontal management of Body Area Networks in multiple vertical application areas.

Cook Islands Draft Telecoms Policy Issued for Comments

The draft Cook Islands Telecommunications Market Competition Policy 2019 has been submitted for public comments with a closing date of 14 June 2019, reports Cook Islands News. The policy is aimed at opening up the telecoms market to competition and regulating service providers efficiently and effectively, including a Universal Service Access commitment as a key element in ensuring quality and affordability of telephony and

internet services, according to Finance Minister Mark Brown (the minister responsible for telecoms). The government proposes to implement a new regulatory framework through the Competition & Regulatory Authority Bill 2019 and the Telecommunications Bill 2019, establishing the functions and powers of a telecoms regulatory body (under proposals endorsed in principle by Cabinet in August 2018) which will also cover two additional

sectors. The Pacific island nation has had a single operator (Bluesky Cook Islands, part-owned by the government) under a legislated monopoly since 1989, with limited independent oversight, and Mr. Brown highlighted that the ICT landscape has changed considerably since the Telecommunications Act 1989 came into force.

ITU Celebrates WTISD 50th Anniversary

The International Telecommunication Union (ITU) celebrated the 50th anniversary of the World Telecommunication and Information Society Day (WTISD) on May 17. The day marks the founding of ITU on 17 May 1865, when the first International Telegraph Convention was signed in Paris. The World Telecommunication Day has been celebrated annually on May 17 since 1969. It was instituted by the

Plenipotentiary Conference in 1973. In 2005, the World Summit on the Information Society (WSIS) called upon the United Nations General Assembly (UNGA) to declare May 17 as the World Information Society Day, to focus on the importance of ICT and the wide range of issues related to the Information Society raised by WSIS. The UNGA adopted a resolution in March 2006, stipulating that the World Information

Society Day shall be celebrated annually on May 17. In November 2006, the ITU Plenipotentiary Conference decided to celebrate both events on May 17 as the World Telecommunication and Information Society Day. The purpose of WTISD is to help raise awareness of the possibilities that the Internet and ICTs can bring to societies and economies, as well as the ways to bridge the digital divide.



Japan Reveals Plan to Create Ten Billion 14-Digit Mobile Phone Numbers

The Japan Times writes that Japan's Ministry of Internal Affairs and Communications (MIC) has revealed plans to create around ten billion 14-digit mobile phone numbers starting with '020' for assignment in the coming years. The move comes ahead of the imminent launch of superfast 5G mobile technologies and the acknowledgement that the country's existing eleven-digit number format is expected to run out as early as fiscal 2022. The plan to implement the new numbers

by the end of fiscal 2021 at the latest is understood to have the backing of the three incumbent mobile operators, NTT DOCOMO, KDDI (au) and SoftBank Corp. Having conducted a public consultation, the MIC now intends to formulate its implementation strategy with a view to reporting again on the matter in June and issuing the necessary ministerial ordinance by the end of this year. New numbers will be allocated to the major carriers 'early' if they finish work to update

their systems ahead of schedule, the paper says. Currently, Japan assigns eleven-digit numbers starting '070', '080' and '90' for mobile handsets (including smartphones), while eleven-digit numbers beginning '020' have been used for IoT devices since January 2017. According to the MIC, about 32.6 million of the 80 million numbers starting with 020 had already been assigned to the mobile operators by 31 March 2019.

State Council Orders Further Price Reductions; MNP to Be Rolled Out End of November

China's State Council has set out new targets for fixed and mobile internet services, continuing the government's efforts to reduce prices and increase access speeds, Xinhua reports. The decision was made at the State Council's executive meeting chaired by Premier Li Keqiang and noted that, as required by the Central Economic Work Conference and the Government Work Report, efforts must be intensified to make the country's internet services faster and cheaper. This would achieve 'multiplying effects' of increasing domestic demand, whilst also boosting investment and employment and improving the lives of Chinese citizens. The specific targets set at the meeting include rolling out gigabit broadband services to 300 cities – gigabit broadband is currently

being piloted in around 100 cities, the paper cited regulator the Ministry of Industry and Information Technology (MIIT) as saying – and improving fiber-to-the-home (FTTH) coverage as a percentage of all broadband ports to 90%. In addition, broadband networks should cover 97% of primary and middle schools nationwide by the end of the year. Meanwhile, the government is aiming to reduce the average broadband service rate for SMEs by 15%, the average price for mobile data by 20% and the roaming charges for data traffic between the mainland and Hong Kong and Macao by 30%. In a bid to improve competition, the government has also ordered operators to implement mobile number portability (MNP) by the end of November 2019. As noted by TeleGeography's GlobalComms

Database, China has dabbled with the idea of introducing MNP for more than a decade but has been reluctant to mandate its rollout, citing substantial technological barriers and questioning the level of user demand for the service. Commenting on the plans, the Premier was quoted as saying: 'Industrial internet, education and medical care are our priorities in upgrading internet services in order to boost industrial development, improve access to quality medical resources and promote fairness in education ... There is huge consumer demand for internet services in our country. We must encourage fair competition, and ensure that our measures to lower internet service charges are fully delivered as they are an important part of our efforts in improving people's lives.'

EC Moves Forward with 5G Spectrum Plan



The European Commission adopted a plan to harmonize the 26GHz band for wireless networks, a move it said finalizes the EU-wide coordination of three pioneer bands

(700MHz, 3.6GHz and 26GHz) for 5G. In a statement, the regulator said that the harmonization of spectrum is the "basis for cross-border wireless communication services and sets common technical conditions for use of these bands". Harmonized technical conditions are intended to enable spectrum use by multiple 5G networks, while mitigating interference risk and ensuring compatibility with existing services (such as satellite services) and in adjacent bands. While

the 26GHz band has limitations when delivering coverage, the EC noted it offers the highest amount of spectrum and therefore the largest capacity of all 5G pioneer bands. Possible uses include fixed wireless access, high definition video and VR/AR. The harmonization of the band across Europe must be completed in all EU Member States by the end of March 2020, while "effective use" of at least 1GHz of the band will follow by the end of 2020 at the latest.

Australian Regulator Blocks Vodafone Hutchison Merger with TPG Telecom

Australia's competition regulator has confirmed that it will oppose the merger between TPG Telecom Ltd and Vodafone Hutchison Australia. Vodafone Hutchison Australia is a joint venture between FTSE 100-listed Vodafone Group PLC and Hutchison Telecommunications (Australia) Ltd. The Australian Competition & Consumer Commission had said in mid-December it had concerns about the merger, believing it could lead to higher prices. The regulator said at the time a merger between the two, reducing the number of large players to three from four, would "likely lead to higher prices and less innovative plans for mobile customers". The ACCC said Australia already has "very" concentrated mobile services and fixed broadband markets, with three firms taking up over 85% of market share in both. "Broadband services are of critical importance to Australian consumers and businesses, across both fixed and mobile channels," said ACCC Chair Rod Sims. "Given the longer-term industry trends, TPG has a commercial imperative to roll out its own mobile network giving it the flexibility to deliver both fixed and mobile services at competitive prices. It has previously stated this and invested accordingly." "Vodafone has likewise felt the need to enter the market for fixed broadband services. These moves by TPG and Vodafone are likely to improve



competition and future market contestability," said Sims. However, a merger between the two would lessen competition, the ACCC said. "TPG is the best prospect Australia has for a new mobile network operator to enter the market, and this is likely the last chance we have for stronger competition in the supply of mobile services," said Sims. "After a thorough examination, we have concluded that, if this proposed merger does not proceed, there is a real chance TPG will roll out a mobile network."

Poorly Run Spectrum Auctions Risk Hampering 5G, Warns GSMA

The GSMA has warned of a "worrying trend" of badly run spectrum auctions which artificially inflate prices and inefficiently distribute already-scarce spectrum resources. The trade body warned that current approaches risk harming consumers. "Auctions can and do fail when poorly designed," said Brett Tarnutzer, Head of Spectrum, GSMA. "We're seeing a worrying trend of badly run spectrum awards that could seriously impact the potential of 5G before we get started. It's time for policymakers to work more closely with stakeholders to enable more timely, fair and effective awards." The GSMA didn't name names, but the German 5G spectrum auction has reached round 305 with the value of all the bids amounting to €5,687,520,000. The main operators took the regulator to court in a failed attempt to change the terms and conditions of the auction. The GSMA has published a new Auction Best Practice paper which outlines recommendations including:

- The top priority for spectrum auctions

should be to support affordable, high-quality mobile services – not to maximize revenues;

- Auctions should not be the only award process considered, as they are not always suitable;
- Assign a sufficiently large amount of spectrum and publish roadmaps to support high-quality mobile services. Set-asides for vertical sectors or new entrants may threaten how much operators can access and also risk inflating spectrum prices;
- The auction design should not create unnecessary risk and uncertainty for bidders; and
- Poorly chosen lot sizes or inflexible packages of spectrum lots risk inefficient outcomes.

According to the GSMA, the socio-economic impact of 5G will be \$2.2 trillion (€1.96 trillion) over the next 15 years, with key sectors such as manufacturing, utilities and professional/financial services benefiting the most from the new technology. By 2025, 5G is also forecast

to account for around 30% of connections in markets such as China and Europe, and around half of the total in the US.

Crucial time

Spectrum allocation early movers include Finland, Italy, Spain, South Korea, United Arab Emirates, and the United Kingdom, who all held 5G spectrum auctions last year. Austria, Canada, Denmark, Germany, Hong Kong, Japan, Saudi Arabia, Switzerland and the USA have assigned spectrum this year and over ten countries, including France, India, Mexico, Greece and Romania, plan to hold spectrum auctions by the end of the year. "This is a crucial time in the development of 5G," added Tarnutzer. "Spectrum is essential fuel for mobile networks and its ineffective use will only lead to bad consequences for consumers. The most important objective of awarding frequencies should not be about making the most money, but rather about ensuring consumers benefit from the best mobile connectivity."

COAI and ETSI Sign MoU to Foster a Closer Co-Operation on Telecom Standardization

Acknowledging the role of standards, especially in the context of emerging technologies and technologies of the future and the need to collaborate and work in partnership with different types of organizations around the world, COAI, the apex industry association representing leading Telecom, Internet, Technology and Digital Services companies and ETSI, a leading standardization organization for Information and Communication Technology (ICT) standards fulfilling European and global market needs announced to come together once again to work and collaborate on areas of mutual interest. A Memorandum of Understanding (MoU) was signed by Mr. Rajan S Mathews, DG COAI and Mr. Luis Jorge Romero, DG ETSI. ETSI and COAI have a common objective to perform and promote, directly or indirectly, regional and international standardization with the aim of contributing to the establishment of global information infrastructure. On the partnership, Mr. Rajan S. Mathews, Director General, COAI, said that, "We are extremely excited to enter into this strategic partnership with ETSI. This partnership will allow us to have a regular and continuous dialogue between EU and India to strengthen the

standardization efforts in the field of ICT, through various workshops, conferences and meetings." Commenting on the development, Mr. Luis Jorge Romero, Director-General, ETSI, further added, "We are immensely happy to partner with COAI towards the advancement of modern communication. This partnership will help ETSI to further leverage its activity in India and to promote the use of standards-based communication technologies. This

MoU is also in line with the ETSI vision of creating globally acceptable, harmonized, open standards." Seconded European Standardization Expert (SESEI) local representative of ETSI based in New Delhi will be working closely with COAI through this MoU to strengthen their relationship and foster a closer co-operation on common agenda items between them and promote ETSI-India cooperation on standards related issues.



MoIT Issues Policy Directive for Renewal of Telco Licenses

The Ministry of Information Technology and Telecommunication has issued policy directive to Pakistan Telecommunication Authority (PTA) and Frequency Allocation Board (FAB) for renewal of three cellular mobile licenses. According to the policy directive, the renewal price for the right to use frequency spectrum included in the licenses being renewed shall be in accordance with per MHz price benchmarks from frequency spectrum auctions of 2016 and 2017 i.e. per MHz price for frequency spectrum in 900 MHz and 1800 MHz shall be USD 39.5 million and USD 29.5 million, respectively. The tenure of the renewed licenses shall continue to be 15 years. Directive said that the payment terms shall be 100% upfront or 50% upfront with remaining 50% on five

equal annual installments on LIBOR+3%. The renewal fee shall be paid in US Dollars with the option to pay in Pak Rupee, which will be calculated at the market exchange rate applicable at the time of payment, as per precedence of earlier cellular licenses issuance/renewals. The licenses renewed under this policy directive shall be technology neutral in line with existing GoP policies. Provisions for Spectrum Trading/ Sharing as per the approved regulatory framework for such sharing/trading will be incorporated in the renewed licenses by PTA. Terms and conditions relating to coverage, enhanced Quality of Service (QoS), etc. under the renewed licenses, shall be incorporated by PTA in line with Telecom Policy 2015 and as per applicable regulatory practices. Frequency Allocation

Board ("Board") will provide options in lieu of cross border interfered spectrum to CMPak in 900 MHz band included in its current license. In case of non-acceptance of proposed options, renewal of CMPak license and its associated spectrum (2x 13.6 MHz) shall be dealt in accordance with S. No. 4(v) of 42nd Board's meeting decision (i.e. without any compensation in terms of additional frequency assignments). The payment (100% or 50% upfront as the case maybe) shall be due on 25th June, 2019. In case, the spectrum is utilized till 25th June 2019 and requisite payment is not made, the proportionate amount shall be charged, for the said period, in addition to any legal action as per the Act, Rules, Policy, etc.

India Moves to Full Android Probe

Indian competition officials pressed ahead with a full investigation into whether Google abused the dominant position of its Android platform to suppress rivals, after determining complaints against the company had merit following a preliminary probe, Reuters reported. Google representatives are expected to be called to appear before the Competition Commission of India in the coming months as part of the investigation, which is forecast to last about a year. Details of the probe were not publicly released, but sources told Reuters it closely mirrors an earlier investigation into Google's Android practices conducted by the European Commission. That case spanned three years, and resulted in a €4.3 billion penalty for the US-based tech giant. Following the EC ruling, Google said it would stop bundling apps with the Android platform and instead charge manufacturers a licensing fee to include them. It also

created new device set-up screens to allow users in the European Union to choose their default search service and browser. Data from StatCounter showed Android held nearly 91 per cent of the mobile OS market in India as of April 2019.



India Operators Submit 5G Trial Proposals as Telecom Ministry Frees Up Spectrum

India's Telecom Ministry said it could free up nearly 6,000 MHz of spectrum to be used for 5G networks, in a recommendation to the Indian government. The telecom ministry has identified spectrum across 11 bands that could be used for 5G services. Four of those bands, including 700 MHz band, 3.5 GHz, 24 GHz and 28 GHz, can be made available immediately, it said. The country's top wireless carriers are now planning 5G trials that could begin as early as June, in light of the telecom ministry's spectrum recommendation.

Bharti Airtel, Vodafone Idea and Reliance Jio, along with vendors Cisco, Samsung, Ericsson and Nokia, have all submitted proposals for year-long 5G trials in the country. Those proposals will need to be approved by the government before trials can begin. But wireless carriers seem to be at odds with the telecom ministry over the duration of the proposed trials. According to ET, the government's telecom department is hesitant to allocate spectrum for 5G trials beyond a three-month period. The government's wireless

planning and coordination department has said a trial period beyond 90 days would go against government policy. ET reports that the carriers believe 90 days is not long enough to hold effective trials for the new technology. India's telecom minister, Manoj Sinha, has said previously that the government would like to see commercial operators begin rolling out 5G services by 2020. The telecom ministry plans to hold a 5G auction early next year.

FCC Offers Rural Incentives; 1M Homes, Businesses Could Benefit

The Federal Communications Commission (FCC) has announced that its Wireline Competition Bureau (WCB) has extended offers of broadband subsidies to 516 rural 'rate-of-return' companies in 46 states through a predictable cost model, rather than using the current legacy system, which dates to the era of voice-only service. If all carriers opt in to the offer, they will be required to deploy 25Mbps/3Mbps

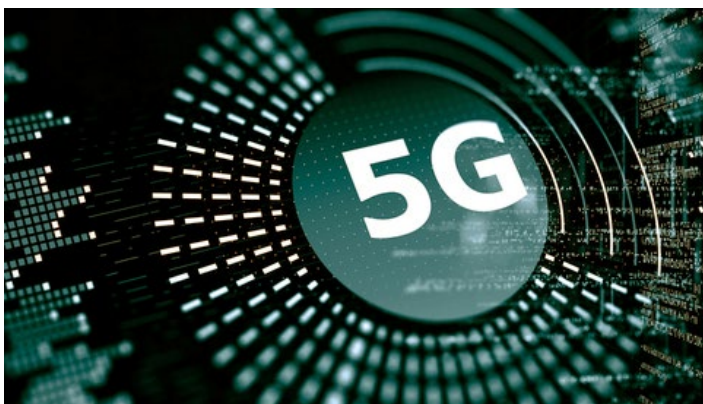
(down/uplink) broadband to at least 1,126,082 homes and businesses. The FCC previously voted to make this offer in December last year. The FCC modernized its support for rate-of-return companies through use of the Alternative Connect America Cost Mode (A-CAM), to determine support. The model calculates support required to provide service census block-by-census block and delivers that support

over a ten-year term, with a defined buildout schedule. Rate-of-return carriers receive approximately USD2.4 billion each year of the FCC's USD4.794 billion in universal service support for rural broadband, and of that, the 262 companies that have already elected A-CAM support get approximately USD607 million per year.

Lawmakers Call on FCC to Speed Efforts to Release Midband Spectrum for 5G

Just after the FCC agreed to propose rules to reallocate spectrum in the 1675-1680 MHz band for shared use between incumbent federal users and new, non-federal users, lawmakers are calling on the FCC to speed up the availability of midband spectrum for 5G. Senators Roger Wicker, and John Thune, sent a letter to FCC Chairman Ajit Pai thanking him for the FCC's progress in bringing millimeter wave spectrum to market. But they noted that in Mobile Now, Congress directed the FCC to evaluate commercial wireless use of spectrum in the 3.7-4.2 GHz band, a process that the commission has begun. "In the year since the passage of that law, the need for action has become even more acute," the senators wrote. "It has been estimated that accelerating infrastructure deployment by one year could drive an additional \$100 billion in economic impact in the next three years. Therefore, we urge the Commission to act quickly to make spectrum in the 3.7 GHz to 4.2 GHz band available for 5G." Just the day prior, the FCC voted to kick off a Notice of Proposed Rulemaking (NPRM) that proposes reallocating spectrum in the 1675-1680 MHz band for flexible wireless use, so long as incumbent federal users—namely, weather balloons—are protected. The NPRM asks a series of questions, including how best to achieve the goal of having weather forecasters continue to get access to the data they need. In voting for the 1675-1680 MHz proceeding, Republican Commissioner Brendan Carr noted that it is a "small sliver" of mid-band spectrum they're talking about, but combined with adjacent and nearby channels, it could become a 40 MHz block that offers high-throughput at great distance, which are excellent characteristics

for next-gen mobile broadband. Democratic Commissioner Jessica Rosenworcel, however, said the rulemaking they passed on Thursday begins a proceeding to make a "tiny bit of spectrum" in the 1675-1680 MHz band available for shared use, and it will only take place after the completion of a government study and an auction that's not yet scheduled. She supported the measure but added that it's a small step that doesn't change the big truth, and she reiterated calls for the FCC to act faster on scheduling midband auctions and moving faster on a plan for the 3.7-4.2 GHz band. For his part, FCC Chairman Pai, a Republican, said the movement on the 1675-1680 MHz band was another example of the FCC's aggressive "all of the above" strategy to free up spectrum for commercial use. With millimeter wave spectrum auctions on the books, the FCC is also working to repurpose midband spectrum for 5G, including rulemakings to free up spectrum in the 2.5, 3.7, 4.9 and 6 GHz bands. The 3.5 GHz band will see an auction next year, and there's ongoing work with federal partners to share the 3.1, 3.45 and 5.9 GHz bands. The 3.7-4.2 GHz band in particular has been the subject of much debate over whether to accept a proposal by the C-Band Alliance (CBA) of satellite operators that want to release up to 200 megahertz of a 500-megahertz band for 5G. Opponents say the satellite companies don't actually own the spectrum and therefore should not be able to sell it on the open market, while the satellite players insist their proposal makes the most sense and will get midband spectrum into the hands of U.S. wireless carriers the most expeditiously—plus, they need to protect incumbent users of the spectrum, which their proposal would do. Interestingly, New Street Research analysts, in a May 13 note recapping last week's spectrum-related events, said they believe it will most likely be the fourth quarter of 2019 before the C-Band issues are resolved—but it could be later. They noted that Chairman Pai has a good track record of delivering items on his publicly announced timetable, and he has indicated the commission will act by the end of the year on the C-Band. But the New Street analysts added that investors should understand that Congress might act while the FCC is considering the policy. There are continued rumblings about legislation that could include some instructions on how to address the C-Band, and several lawmakers recently reiterated concerns that the CBA proposal lacks funds for the U.S. Treasury.



CAPEX Slashed in Zimbabwe Due to Weak Economy

Cellcos in Zimbabwe were forced to make drastic cuts in capital expenditures during 2018 due to the country's ongoing financial crisis. A report from Newsday, which cites figures presented to parliament by telecoms regulator POTRAZ, says that the three active mobile network

operators (MNOs) – Econet Wireless, NetOne and Telecel – spent USD59.5 million last year, down from USD100.9 million in 2017. Operating costs increased 23.1% from USD657.4 million in 2017 to USD809.0 million a year later. The trio of MNOs deployed just 75 new base stations

between them in 2018, the report adds. All three operators recently hiked data and call tariffs, though the regulator says that prices for communications services in the country are still reasonable when factoring in the cost of delivering service.

FCC Says Revised Broadband Report Still Shows Digital Divide Closing



The Federal Communications Commission said a revised draft of its 2019 Broadband Deployment Report still shows that the digital divide is closing. Originally released in February, the report was touted by FCC Chairman Ajit Pai, who pointed to its findings that more Americans were getting access to high speed internet service.

Pai said the report was evidence that his policies of "removing regulatory barriers," such as the repeal of the 2015 net neutrality regulations, were working. But the public interest group Free Press discovered the numbers were inflated, based on the fact that one company had grossly overstated deployment data. Barrier Communications mistakenly reported that its service reached nearly 1.5 million homes and businesses in several census blocks with fiber-to-the-home and fixed wireless service. But this was inaccurate. The company had simply submitted its coverage area for each census block in eight states where it offers service, essentially reporting that it served every home and business possible in that census block. As a result, the original draft of the FCC's report showed that the number of Americans without access to 25 Mbps download speeds had dropped by more than 25% between 2016 and 2017.

The FCC agreed to revisit the data. The revised report cuts that percentage to 18%, with 26.1 million Americans having access to those broadband speeds at the end of 2016 compared with 21.3 million at the end of 2017. Of people served by newly added high-speed connections, the FCC points out that "approximately 4.3 million live in rural America, where broadband deployment has traditionally lagged." In a statement Wednesday, Pai said the revised figures show big improvements thanks to his policies. "We're pleased that the FCC's policy of making deployment data open and transparent to the public resulted in this error being discovered," he said in a statement. "Fortunately, the new data doesn't change the report's fundamental conclusion: We are closing the digital divide, which means we're delivering on the FCC's top priority."

US 3.5GHz Auction Will Not Happen Until At Least Q2 2020

Federal Communications Commission (FCC) official Mike O'Rielly has indicated that – despite a number of technical breakthroughs – an auction of 3.5GHz is unlikely to take place before mid-2020. RCR Wireless quotes the commissioner as saying: 'I frankly don't see a way it

could happen before second quarter 2020. That is just not soon enough. We seem to be stuck in the abyss of auction software development and technical-sounding excuses. Procrastination must end, and the auction must be scheduled.' The comments were made at the recent

CBRS Alliance annual meeting in North Carolina. TeleGeography notes that the 3.5GHz Citizens Broadband Radio Service (CBRS) band comprises spectrum in the 3550MHz-3700MHz range and has been earmarked for future 5G use. [\[4\]](#)

A SNAPSHOT OF REGULATORY ACTIVITIES IN SAMENA REGION



Bahrain

The Minister of Transportation and Telecommunications, Kamal bin Ahmed Mohamed, has announced the process of legally separating and restructuring Batelco into retail and wholesale divisions has now been completed. According to the Minister, the new infrastructure company will work with the government to create a fiber-optic network providing residents in all areas of the country with high-speed internet access, in line with the

government's Economic Vision 2030 and the Fourth National Telecommunications Plan. Batelco's Chairman, Abdulla bin Khalifa Al Khalifa, claimed the restructuring 'is going to create new horizons for Batelco, opportunities to invest in digital technology and, furthermore, create new and diverse revenue streams which is in line with the Kingdom's vision for the growth of the digital economy. (May 14, 2019) telegeography.com



Bangladesh

Bangladesh Telecommunication Regulatory Commission (BTRC) is preparing a guideline pertaining to the public health risk caused by radiation emitted by mobile phone towers and the guideline will be implemented soon, said BTRC Chairman Jahurul Haque. After getting directives from the HC, legal and licensing and the engineering and operations divisions of the commission is preparing the guideline, he said. "We will implement the guideline soon," Haque said. The High Court on April 25, 2019 directed the telecom regulator to run a massive study within the next four months to measure the impact of radiation from telecom towers on citizens' health and environment. In a final verdict on a seven-year-old writ petition, the HC bench, comprising Justice Syed Refaat Ahmed and Justice Md. Iqbal Kabir, came up with the directive. The bench directed the authorities concerned not to install any mobile phone tower on rooftops of residences, schools, colleges, playing fields, populated areas and heritage

areas. Those installed earlier in such areas should be removed. The HC bench also directed the authorities concerned to take steps to reduce the radiation of mobile phone towers by 1 per cent out of 10 per cent. It also directed the authorities concerned to take steps so that mobile operators do not cross the specific radiation limit. The bench directed the BTRC to form a monitoring cell on public health risk caused by radiation from mobile phone towers. It also asked the authorities concerned to replace all mobile phone towers with high radiation. When asked regarding the HC directive to form monitoring cell, BTRC chairman said, "We've already started working in this regard." The HC bench also directed the BTRC to make the verification mandatory for installing mobile phone towers. In 2012, the Human Rights and Peace for Bangladesh had filed a petition before the HC in 2012 over the radiation level of towers.

(May 8, 2019) theindependentbd.com



Egypt

The Member States of the International Telecommunications Union (ITU) have approved a new ITU Recommendation/Standard, addressing the relationship between network operators and providers of over-the-top (OTT) applications, after five years of discussions and negotiations. The working group responsible for the OTT Recommendation's development was led by Head of Economic Affairs at the National Telecom Regulatory Authority (NTRA), Vice-Chairman and Rapporteur of ITU-T Study Group 3 (SG3) Ahmed Said. The new Recommendation (ITU-T D.262)

provides parameters for the analysis of the new economic dynamics of the ICT ecosystem, and how policy and regulatory frameworks could promote competition, consumer protection and benefits, dynamic innovation, sustainable investment, infrastructure development, accessibility and affordability in relation to the global growth of OTTs. The Recommendation's approval follows ITU Member States' agreement of a new resolution outlining the scope of ITU activities relevant to OTTs at the ITU Plenipotentiary Conference 2018 in Dubai. The resolution recognizes that the

mutual cooperation of OTTs and network operators could foster considerable socioeconomic benefits, and recognizes the need to discuss the economic implications of OTTs and related policy issues. OTT business models have reshaped and expanded the ICT ecosystem. The extraordinary innovation of companies such as Google, WeChat, Line, Skype, Facebook and WhatsApp, created a more interactive, multimedia-rich communications experience. Certain OTT services are, however, direct substitutes for telecoms services, decreasing network operators' return on their investment in network infrastructure. This has provided grounds for debate as to whether the sustainability of this investment is under threat. The Recommendation describes the interdependence of OTT and telecommunications business. It represents the recognition of ITU Member States that the coexistence of OTT and telecommunications, and their complementary contributions to innovation and investment, will be central to the advance of the ICT ecosystem. The Recommendation makes an important contribution to the efforts of SG3 to strengthen the ties between technology, business and policy. It defines OTT as an application accessed and delivered over the public Internet that may be a direct technical/functional substitute for traditional international telecommunications services. The Recommendation notes, however, that the definition of OTT is a matter of national sovereignty and may vary among Member States. The definition of

OTT included in the Recommendation is the world's first definition issued by a multi-stakeholder organization. The Recommendation highlights that investment in network infrastructure has provided the foundations for the rise of OTT and, conversely, that the demand for OTT services has stimulated a demand for the connectivity offered by network infrastructure. This recognition of OTT and telecommunications interdependence will support the work of ITU Member States to promote innovation, fair competition and sustainable investment in network infrastructure. The Recommendation thus encourages Member States to assess the economic, policy and consumer welfare impacts of OTT in all critical areas affected, including their regulatory frameworks and existing economic incentives with respect to the provisioning and use of OTTs. The Recommendation highlights that ITU Member States' associated consideration of competition policy, in particular the identification and definition of relevant markets, should consider the fundamental differences between OTT and telecom business with respect to regulatory exposure, barriers to market entry and the degree of substitutability between OTT and telecom services. This encourages ITU Member States to consider and develop enabling policies or regulatory frameworks to foster fair competition between network operators and providers of OTTs, and to examine the reduction of the regulatory burden on traditional networks and telecommunication services.

(May 14, 2019) mcit.gov.eg



The Iranian government says the deployment of its National Information Network (NIN) – a state-backed nationwide intranet system – is 80% complete. A report from US-sponsored radio station Radio Farda says the project has so far cost the government IRR120 trillion (USD2.85 billion), with a further IRR70 trillion coming from the private sector. The aim of the NIN is to create a domestic internet system which can be used to promote Islamic content, offering high speed connectivity to end users

at much cheaper prices than they would pay for a connection to the World Wide Web. Critics of the system say, however, that this 'halal internet' encourages censorship and government control, while hampering free speech. The Iranian government has blocked access to social media platforms such as YouTube and Facebook, though many local users are thought to utilize VPN services to get around the ban.

(May 23, 2019) telegeography.com



Eng. Ghazi Jabour Chief Executive Officer of the Telecommunications Regulatory Authority said that as a sign of ITU's interest in the issue of standardization because it has a significant and influential impact on the global standards used in the fields of communications and information technology and the facilitation of different work paths that depend on the underlying infrastructure based on various technologies. Is essential for facilitating exchanges and cooperation between developed and developing countries alike. To achieve the best results in the field of normative work, efforts must be made by all parties concerned by agreeing on the criteria to be adopted so that they can be Application and harmonized with the rapid technological

developments and to serve the public interest by contributing to the provision of a comfortable life and luxurious for all. The ITU aims to develop international standards that provide a common basis for growth and innovation, and that the standardization process is universal. Its procedures are subject to the principle of consensus, transparency, balance and openness, enabling interconnection and interoperability, enhancing economies of scale, providing access to global markets and providing a common basis for growth. And innovation. These standards are of great importance in enhancing confidence in ICT investments. It should be emphasized that the participation of developing countries in the EU standard-setting process and the empowerment of local

Iran

Jordan

experts in the standardization process at the local, regional and international levels contribute to bridging the standardization gap and promoting the implementation of international standards in all countries. As well as allowing companies in developing countries access to global markets and enabling global players to access emerging markets. Here is the importance of facilitating the participation of experts, especially young people And standards, as well as access to the requirements of developing countries, especially since EU standards offer mutual benefits to both developed and developing countries, where standards enable firms in developing countries to access global markets and enable global actors to access To emerging markets. On this occasion, it is necessary to highlight the role of standard specifications in

light of the Fourth Industrial Revolution and its role in moving to a new era of emerging technology in a number of fields, such as robotics, artificial intelligence, Internet stuff, etc. We are all called upon to work towards a common understanding that contributes to Achieving fairness, fairness and transparency in access to ICT services by harmonizing regulatory legislation and supporting international standards aimed at creating a solid ground and a solid infrastructure capable of accommodating all variables and developments in progress. Services are developed and effective. In conclusion, I would like to commend the efforts exerted by all concerned national bodies in the field of standardization and its various activities and for all the supporters of the Authority in all its activitiesS. (May 17, 2019) trc.gov.jo



VIVA Kuwait announced that it has acquired 100 percent of the share capital of the Internet Service Provider Quality Net General Trading and Contracting Company (Qualitynet) in Kuwait for a total value of KD 28.3 million. On this occasion, Dr Mahmoud Ahmed Abdulrahman, Chairman of VIVA, said: "I am pleased to welcome Qualitynet team joining VIVA family, and I believe it's an important moment for both organizations to expand the strength of our practice and share expertise. The acquisition allows VIVA to capture the growth potential in the business market and enable the great talented people of VIVA and Qualitynet for the journey towards fully integrated products and services and innovative solutions. As well, we will delight both customers and enterprises and are committed to exceed their expectations. VIVA acquired the entire share capital of Qualitynet for a total value of KD 28.3 million, 90 percent from Batelco Group and 10 percent from National Bank of Kuwait, and conclude the acquisition process, which started mid of 2018." He added: "I would like to take the opportunity to recognize the vital role of The Communication and Information Technology Regulatory Authority (CITRA) in Kuwait for its continued support towards the telecom sector, enabling Kuwait to make its mark as one of the most developed and

advanced countries in the telecom industry, and aiming to support the vision of His Highness Sheikh Sabah Al-Ahmad Al-Jaber Al-Sabah for Kuwait 2035, in positioning Kuwait as a major financial and commercial hub in the region." On his part, Eng Maziad Nasser Al-Harbi, CEO of VIVA said: "This is a major milestone for VIVA showing strong commitment to enhance our customers' lives. This acquisition will be reflected positively and significantly on both customers and they will benefit from this outstanding transaction, as VIVA and Qualitynet are planning to enhance their service offerings and bring future-ready products and services at exceptional quality to the Kuwaiti market". He added: "We will strive to provide the best cutting-edge customer experience across both companies and boost both VIVA's and Qualitynet's growth profiles. The acquisition of Qualitynet is a corner stone for us to successfully implement our strategy to grow in the enterprise segment. It will enable us to offer unique products and services to the Kuwaiti corporate customers bringing it to the equal of international standards. At the same time, individual customers will benefit with diversified and enhanced service offerings tailored to solve their ever changing communication needs – at home and on the go." (May 7, 2019) q8dailynews.com

Kuwait



Nepal's telecoms regulator, the Nepal Telecommunications Authority (NTA), demanded Nepal Telecom pay the full NPR20 billion (USD176.7 million) mobile license renewal fee by 11 May 2019, reports local website Nepali Telecom. Nepal Telecom has claimed that the amount, which is payable every five years and applied to all operators, is excessive and unsustainable. The NTA has warned any delay in payment of the fee, which is based on the NPR20 billion rival mobile operator Ncell paid for its license in 2014, could result in legal issues. Meanwhile, Nepal Telecom trade unions have written to the NTA arguing it is hampering the

government-owned telco and losing sight of its primary role to provide affordable services to the public. (May 8, 2019) telegeography.com

Nepal's Supreme Court has maintained a temporary stay order granted to mobile operator Ncell on 25 April that prevents the country's Large Tax Payments Office (LTPO) and Ministry of Finance taking any action to secure payment of a capital gains tax bill of NPR39.06 billion (USD347.8 million). A final hearing on the case will take place on 4 June. As previously reported by TeleGeography's CommsUpdate, Ncell was ordered to pay the

Nepal

capital gains tax following Malaysian telecoms group Axiata's acquisition of an 80% stake in the mobile operator from Sweden's

Telia Company in 2016. Axiata argues the LTPO failed to comply with the country's Income Tax Act for making a tax assessment. (May 8, 2019) The Himalayan Times



Oman

The total number of internet subscriptions in the Sultanate, excluding active mobile subscriptions, surged by 4.3 per cent to touch 442,572 by the end of April 2019, up from 424,284 at the end of December 2018. Of this, fixed broadband internet connections, which have more than 256 kilobytes speed, increased by 4.3 per cent to 440,403 by the end of April 2019, according to the latest data released by National Centre for Statistics and Information (NCSI). The number of active mobile broadband subscribers rose by 0.4 per cent to 4.13 million by end of April 2019, from 4.113 million subscribers by the end of December 2018. Total fixed telephone lines rose by 2.3 per cent to 573,188 by the end of April 2019, from 560,326 subscribers by end-December 2018. According to the NCSI report, the number of voice-over-internet protocol (VoIP) lines surged by 5.5 per cent to 190,019 from 188,349 subscribers by the end of December 2018. Further, analogue fixed Telephone line connections rose by 0.6 per cent to 326,184 from 326,888 subscribers during the period under review. Public payphone connections remained unchanged at 6,801, whereas ISDN channels rose by 2 per cent to 48,529. Total number of mobile subscribers increased by 2.4 per cent to 6.596 million by the end of April 2019, from 6.440 million subscribers by the end of December 2018. Of this, postpaid mobile connections increased by 2.6 per cent to 731,265 from 712,622 subscribers in December 2018. Pre-paid mobile connections also rose by 2.4 per cent to 5.864 million from 5.76 million at the end of December 2018. The number of subscribers of resellers plunged by 1.5 per cent to 745,439 from 756,799 at the end of December 2018.

(May 23, 2019) timesofoman.com

Thousands of unapproved telecom devices were seized during an inspection campaign by Telecommunications Regulatory Authority (TRA). The inspections were carried out to ensure that the quality of telecom equipment in the local market is in line with prescribed standards and also to ascertain the adherence of these businesses to the Telecom Act and the regulations and decisions implementing its provisions. The Telecommunications Regulatory Authority (TRA) inspection team, which consists of judicial officers from TRA, confiscated around 2,000 telecom devices that were not type-approved. Accordingly, the necessary inspection and seizure reports were issued to the offenders and the inspection team drew the attention of these businesses to comply with the Telecommunications Regulatory Act, and the decisions implementing its provisions, and stressed on the need of obtaining type approval certificate from TRA prior to

dealing in selling such telecom equipment. TRA type-approves all the equipment being dealt in the telecom sector to ensure equipment quality and performance, and minimize consumer and network operator issues due to incompatibility with the telecom networks in the Sultanate such as frequency and network interference, and possible health and environmental effects. All telecommunications equipment dealers are required to obtain approvals required to deal in telecommunications equipment.

(May 7, 2019) timesofoman.com

International telecoms company Vodafone has been selected by Oman's telecoms regulator as the country's third mobile operator, local media reported. Oman's Telecommunication Regulatory Authority (TRA) has signed a memorandum of understanding (MoU) with Vodafone, which will now begin the necessary procedures to obtain the operating license. "Regarding what has been circulating on some websites and social media platforms on Vodafone being granted license to be the third mobile operator for public services in the sultanate, the public authority confirms that what has been reached is the signing of a memorandum of understanding between the company owned by the local investment funds and between Vodafone (as a strategic partner)," the TRA said in a statement. "The move will help complete the procedures for obtaining the third operator licence to provide mobile public telecommunications services in the Sultanate in accordance with the directives of the government in this regard." It added: "TRA welcomes such trade agreements, which is one of the jurisdictions of the licensing entities. The authority regards such agreements as a positive indicator that the telecommunications market in the Sultanate is an attractive market for international and domestic investors, thus enhancing the chances of competition." Currently Omantel and Ooredoo are the two telecom players who offer mobile phone packages in Oman. In February this year, both the companies renewed their operating licences for a further 15 years, at a cost of \$195m each. The TRA had confirmed in December that plans for Oman's third mobile communication operator were in the "final stages". Yousef bin Abdullah al Balushi, deputy CEO for spectrum management affairs at TRA, said that the frequencies for the third operator will be granted the same way as with Omantel and Ooredoo. "The aim of this process is to create a competitive atmosphere to provide better services at reasonable rates for all parties," he said at the time.

(May 5 2019) gulfbusiness.com



Pakistan

The Pakistan Telecommunications Authority has laid out the terms of the renewal of the mobile licenses of mobile operators Jazz, Telenor Pakistan and China Mobile Pakistan. Under the terms set by the government, a renewal price for the spectrum included in the licenses will be set at \$39.5 million per MHz for 900-MHz spectrum, and \$29.5 million per MHz for 1800-MHz spectrum. This is based on benchmarks set during spectrum auctions in 2016 and 2017. Operators will be able to choose to pay 100% of the renewal fees upfront, or 50% upfront with the remainder in five annual instalments. The upfront payment will be due on June 25. The renewed licenses will have a tenure of 15 years, and will have technology neutral terms as well as provisions for spectrum sharing or trading. Operators will need to comply with certain terms and conditions related to coverage, quality of service and other matters. China Mobile Pakistan will be provided with options to replace its 900-MHz spectrum that is subject to cross-border interference, the PTA said. If these options are not accepted, the allocation shall be dealt with without any compensation in the form of additional frequency assignments.

(May 12, 2019) telecomasia.net

Pakistani cellcos Jazz, Telenor and Zong have challenged the terms of their long-delayed license renewals, arguing that the conditions do not provide a level playing field and claiming that their concerns were not addressed. The government approved plans to renew the concessions of Telenor and Jazz (the license had originally been awarded to Warid prior to that cellco's merger with Mobilink to form Jazz) for 15 years at a cost of USD450 million apiece, whilst Zong's renewal was priced at USD470 million. The concessions had been issued in May (Telenor/Jazz) and October 2004 (Zong) for USD290 million each, and are due to expire in May and October this year, respectively. The Islamabad High Court will hear the operators' complaints on 14 May. The paper cited unspecified sources at the cellcos as complaining about the government's use of the US dollar as a benchmark for the price, given the extent of currency movements in recent years and the fact that the providers earn and spend in the local currency. The operators also drew attention to the fact that part state-owned mobile provider Ufone had renewed its license in 2014 for just USD291 million. As such, Telenor argued that the other licenses should be renewed on the same terms to maintain a level playing field. The operators also took issue with the limited notice given

by the government for the renewal, pointing out that they had first filed requests for their licenses to be extended some 18 months ago but have now been given just over two weeks to consider the policy, with one official quoted as saying: 'We are going to invest billions of rupees, how is it possible to make a decision in such a short time?' With no system or policy guidelines in place for license renewals, plans for the process were drawn up at the eleventh hour, with the PM establishing a committee to oversee the matter as late as February this year.

(May 9, 2019) The Business Recorder

In its effort to bridge the broadband services divide between urban and rural areas new areas have been identified to provide Next Generation Broadband Services (NGBS) to over 30 million people in 11,915 under-served Mouzas (a sort of administrative districts) of Pakistan. Through an official notification, MoITT has initiated the process of provision of NGBS in the unserved and underserved areas of the country through the Universal Service Fund (USF). The upgraded broadband services will be provided to around 30,435,725 people living in rural areas of the country. According to the document, the under-served areas approved by the federal cabinet in a recent meeting include Pishin, Nasirabad, Mastung, Larkana, Chitral, DG Khan, Bahawalpur, Turbat, Sukkur, Dadu, Mirpurkhas, Bahawalnagar and Rahimyar Khan. Minister of IT and Telecom, Khalid Maqbool Siddiqui while expressing his thoughts on the recent development said that in Pakistan, the socio-economic development is directly linked to the provision of ICT services and it is the endeavor of government to bring all parts of the country at par with each other with the support of USF. Meanwhile, USF will carry out NGBS initiative in a staged way. The programmes launched by the USF are as follow:

- Broadband for Sustainable Development (BSD)
- Next Generation Broadband for Sustainable Development (NG-BSD)
- Optic Fiber Cable (OFC) Program
- NG-BSD for National Highways and Motorways
- Broadband Program
- Other ICT related projects

With initiatives like these coming to light each day, the government seems to be focused towards achieving the mission of broadband penetration at every corner of the country to facilitate masses.

(May 4, 2019) techjuice.pk



Saudi Arabia

The Ministry of Communications and Information Technology (MCIT) launched an online portal for registration in its "Pioneers of Technology" program sponsored by Minister of Communications and Information Technology Abdullah bin Amer Al-Swaha. The program aims to promote the Kingdom's status as a major pioneering digital center, through raising the economic contributions of small and medium enterprises. Ahmed Hamdan Al-Thenayan, deputy minister for technology and digital capacities at MCIT, said that the program was a strategic initiative that would eliminate obstacles and challenges facing target sectors through using evolving technologies, such as artificial intelligence and the "internet of things." He noted that the program would also promote the importance of the fourth industrial revolution in business development and prosperity,

and that it would support entrepreneurs in the technological field with the required tools to implement their projects, accelerating digital transformation and supporting Saudi Vision 2030. Firms in target sectors such as e-commerce, Hajj and Umrah, agriculture, industry, recreation, sports and social entrepreneurship can apply to the program by uploading their projects or ideas on the dedicated website. The registration, presentation and evaluation of the projects will be done online through the website. The program is intended to give participating technical pioneers a chance to gain practical experience through the training camp. For three months participants will receive intensive guidance in the use of new technology, and at the end of the program, winning entrepreneurs will be honored.

(May 5, 2019) arabnews.com



Tunisia

The Ministry of Finance in Tunisia has recently introduced a set of digital services to ensure facilitation of the payment of taxes and other duties and fees by users. The government of Tunisia is set to adopt multiple strategies to enhance the utilization of electronic payment methods. The new introduction of digital services is a part of the government's strategy to boost the electronic payment methods that are faster and reduce unnecessary paper burden. The users can now pay or check their outstanding fines or taxes via the Internet and SMS. The director of the finance ministry's IT center, Salah Meddeb said that this interactive platform was

unveiled to improve tax collection. 104 electronic payment platforms have been deployed at various tax collection points. The system will be progressively generalized to allow users around the country to pay their various taxes and fines using their banking cards. On the other hand, Salah Meddeb revealed that the IT system 'Rafik' has been updated to facilitate the use of bank cards and an agreement was reached on May 2, 2019, by the finance ministry, the central bank and Banque Nationale Agricole (BNA) for the best coordination of those electronic payment systems, as reported by Ecofin Agency. (May 6, 2019) devdiscourse.com



Turkey

The World Telecommunications and Information Society Day event was celebrated by the Information Technologies and Communications Authority. World Telecommunication and Information Society Day, celebrated under the leadership of the International Telecommunication Union, the only globalization body, was organized this year with the theme of Telekomünikasyon Closure of Standardization Küresel. Speaking at the opening of the program, Deputy Minister of Transport and Infrastructure. Prof. Dr. Ömer Fatih Sayan stated that especially the developing countries are focused on the theme of standardization and aim to encourage the Union to take a more active role in standard setting activities. ITU 5G roadmap to see that start in the standardization work in 2016 and voicing anticipated completion in 2020, this work Sayan, 5G technology of the countries participating in the study in the area to impose its own standards as a world standard

that intensive efforts, Turkey's adoption of the standard by BTK reported that it supports all domestic stakeholders. Erişim ITU needs to set standards in this regard, for example, in the recent days the news coverage on WhatsApp has appeared in national and international press, according to these reports, access to all data by infiltrating a software company's WhatsApp exploiting the vulnerability in WhatsApp. We have learned where to get this opportunity to upgrade our voices, we will continue to ask them. We are making all our references about it. We wanted information from WhatsApp officials at this point, "he said. Public institutions and organizations, as well as citizens of this kind of security vulnerabilities that could lead to the victimization of what kind of officials demand information and clarification, Sayan, "This is officially an indication of how people's privacy is trampled by global firms," he said. Emphasizing the importance of increasing

domestic messaging applications, Sayan underlined that citizens, especially public institutions and organizations, are now obliged to prefer domestic and national communication applications instead of the applications that are created from foreign sources and security weaknesses. (May 17, 2019) [btk.gov.tr](#)

13th International Conference on Electronic Communications Regulators held a closing meeting. Hosted dozens of guests from different countries and important shares of the sector was held on the second day of the meeting of the Information Technology and Communication Agency Chairman of the second moderated by Figen Kılıç began with the session. In her speech, Kılıç referred to the Girls' Day at ICT said that they aim to increase the number of young women in education and business life in the ICT sector and to increase their numbers. Because women's employment in the sector as well as decision-making positions are very important. Because the gender mainstreaming in the ICT, which guides the future of the world, will play an important role in making our sector more successful and more creative with the spirit and idea

of women. Zira Thanks to the Girls in the ICT, Kılıç said that the seeds thrown around the world started to spread, adding, dü When we think that every profession of today has a technology-related aspect, we have to ensure that our girls' skills in information and communication technologies are increased even if they will not work in the ICT sector. This will give them more advantages in their field and enable them to have career mobility to do the job of their dreams. the last 17 years in Turkey; I am pleased to see that in many sectors, especially information and communication technologies, positive discrimination against women has increased and women's rights have been reformed. Turkey will continue to be an example to other countries in this regard, will support all initiatives to increase the presence of women in the international arena. As we enter the 100th anniversary of our Republic, we have targeted ourselves to employ millions of women and take part in decision-making mechanisms in line with our 2023 targets. We will work hard as our other partners in ITU and contribute to ensuring gender equality in our sector.

(May 3, 2019) [btk.gov.tr](#)



United Arab Emirates

The Telecommunications Regulatory Authority (TRA), represented by the Computer Emergency Response Team (aeCERT), held a workshop on information security aimed at raising awareness on e-penetration using DNS hijacking. The workshop was held in TRA office, in the presence of 31 participants representing a number of government and private entities from the UAE and the Kingdom of Saudi Arabia (KSA). The workshop aimed to increase readiness of the teams and experts of information security in the UAE and KSA, in addition to increase the experience of the participants by providing them with technical training in the fields of cyber security in general and the workshop subject in particular. It also introduced best practices in fields of cyber security, cyber penetration, and activation of partnerships between cyber security teams in the UAE and KSA. Mohammad Al Zarooni, Director Policies and Programs Department in TRA, said: "This workshop is part of TRA's efforts to ensure a safe and secure cyber space, through enabling human cadres to deal with online risks, ensure its safety, and respond to security breaches, control them and defeat hacking attempts to violate the privacy of others in this open space, which is the nerve of modern life. In this workshop, we highlighted the latest techniques used in cybersecurity. We addressed the main points that security officials and specialists should focus on. We also discussed the latest methods used by hackers, how to deal with them, as well as their impact on systems and institutions". The participants were briefed throughout the workshop on the international piracy groups that target the Arab region in general and the UAE in particular. They were also introduced to DNS Hijacking, and the results of these modifications of security vulnerabilities that may be exploited by hackers to penetrate security systems. The workshop discussed techniques to detect these vulnerabilities, resolve them and ensure

the highest degrees of protection. The workshop also discussed the best practices in the field of cybersecurity, in order to meet the requirements of digital transformation and the Fourth Industrial Revolution. aeCERT has been established to improve information security standards and practices, protect and support UAE ICT infrastructure against online risks and breaches, and build secure and protected ICT culture. The team aims to strengthen the UAE law on combating cybercrimes, assist in the development of new legislation, raise awareness about information security on national level, build national expertise in information security, emergency management, and computer evidence analysis.

(May 12, 2019) [zawya.com](#)

Hamad Obaid Al Mansoori, the Director General of the Telecommunications Regulatory Authority (TRA), presented the successful UAE experience in employing the ICT sector to achieve digital transformation as an example to follow and develop upon in other countries. This took place during Al Mansoori participation in a panel discussion held by a number of senior officials and experts as part of the Africa IT & Telecom Forum, hosted in Abidjan, Ivory Coast. The Panel discussion included H.E. Hamad Obaid Al Mansoori, TRA Director General, H.E. Claude Isaac Dé, Minister of Digital Economy and Post, Ivory Coast, H.E. Bocar Ba, CEO Samena Telecommunications Council, and H.E. Karim Sy, Digital Africa. The discussion focused on key issues related to digital transformation and meeting the future requirements of ICT sector to ensure sustainable development and peoples' aspirations. On this participation, H.E. Al Mansoori said: "This participation is part of our efforts to interact with international experiences as well as to showcase the Emirati experience for the benefit of others according to the directives of our wise leadership to make

the UAE an expertise hub for those who want to benefit from our experiences that we have applied throughout the Union's journey, particularly in the field of e-government and ICT sector." During the discussion, H.E. Al Mansoori reviewed the UAE's successful experience in the field of digital transformation and smart service. He said: "The UAE has achieved leading position in the ICT sector, through several factors, the most important of which is leadership, enhancing national competencies and team spirit. Within a few years, several creative initiatives have been implemented in the country. Our leadership established the foundation for digital transformation in 1999 by establishing Dubai Internet City. In 2000, we launched the first electronic payment portal, the "e-Dirham". In 2001, The Prime Minister launched the first e-government in the region; Dubai e-Government, which was followed by the other emirates who launched their own initiatives and e-government projects, starting with the Abu Dhabi e-Government." Al Mansoori added: "In 2017, the UAE Cabinet announced the convening of an annual meeting at the national level for representatives of all UAE government entities to discuss the challenges and strategies related to the country's five-year national development plan known as the "UAE 2071 Centennial", resulting in 120 initiatives, covering health, education, environment, digital transformation, community happiness, and others. Some of these initiatives are fast, such as Bashr, Mabrouk Ma Yak, and others are long-term,

such as Mars Science City on 1.9 million square feet making it the largest city to simulate life on the Red Planet." Moreover, a lunch has been organized courtesy to the UAE, during which H.E. the TRA Director General and a number of ministers and officials discussed the opportunities of cooperation between the UAE and African countries in the field of ICT, through sharing experiences and knowledge, particularly in relation to the Center of Digital Innovation (CoDI), the Computer Emergency Response Team (aeCERT), and the Virtual Academy. H.E. Al Mansoori expressed the UAE's readiness to open the registration opportunity in the Academy to the African countries wishing to benefit from the programs available on this platform, with the possibility of adding new programs to meet their needs. Furthermore, TRA has signed a Memorandum of Understanding (MoU) with the National Agency for International Telecommunications Services (ANSUT) of the Ivory Coast to enhance the existing friendly relations between the two countries, on the sidelines of the ITU Plenipotentiary Conference (PP18) held in Dubai from 29 October to 16 November 2018. The MoU aimed at exchanging information, documents, exchange of experts, bilateral consultations, and joint organization of technical workshops, seminars, study visits and training courses, and dissemination of best practices in telecommunication development. 📍

(May 1, 2019) tra.gov.ae

REGULATORY ACTIVITIES BEYOND THE SAMENA REGION



Argentina

The National Communications Agency (Ente Nacional de Comunicaciones, ENACOM) has distributed 450MHz spectrum covering eleven locations in the provinces of Santiago del Estero, Tierra del Fuego, Rio Negro, Santa Fe and Santa Cruz, as it seeks to improve rural connectivity. The spectrum award was conducted under the auspices of the Plan de Conectividad Rural

(Rural Connectivity Plan), and while the identities of the recipients have not been divulged, ENACOM previously stated that the frequencies in question would be made available to small/medium-sized local providers who wished to provide broadband and fixed line telephony in underserved areas.

(May 14, 2019) telegeography.com



Australia

The proposed merger between TPG Telecom and Vodafone Hutchison Australia (VHA) has sailed into choppy waters with the revelation that it has been opposed by the Australian Competition and Consumer Commission (ACCC). In a press release outlining the reasoning behind its position, the competition watchdog stated that it considered the tie-up would 'substantially lessen competition in the supply of mobile services because the proposed merger would preclude TPG entering as the fourth mobile network operator in Australia.' Speaking on the decision to oppose the merger deal, ACCC chairman Rod Sims was cited as saying: 'Given the longer term industry trends, TPG has a commercial imperative to roll out its own mobile network giving it the flexibility to deliver both fixed and mobile services at competitive prices. It has previously stated this and invested accordingly ... Vodafone has likewise felt the need to enter the market for fixed broadband services. These moves by TPG and Vodafone are likely to improve competition and future market contestability.' TPG had previously started rolling out mobile infrastructure using Huawei equipment in 2017, though in January 2019 the operator announced that it was halting the network deployment as a result of the Federal Government's 5G security guidance. Despite this, with the ACCC suggesting that TPG faces reducing margins in fixed home broadband due to the NBN rollout, and arguing it has the capability and commercial incentive to resolve any technical and commercial challenges, Mr Sims suggested: 'After thorough examination, we have concluded that, if this proposed merger does not proceed, there is a real

chance TPG will roll out a mobile network.'

(May 8, 2019) telegeography.com

Australia's domestic Mobile Terminating Access Service (MTAS) for voice services will be regulated for a further five years, the Australian Competition and Consumer Commission (ACCC) has proposed. Publishing a draft report released for consultation today (2 May), the regulator noted that it has also proposed that regulation of the MTAS for SMS services will not continue, due to what it sees as increased competition from messaging services such as iMessage and WhatsApp. In August 2018 – four years after the ACCC began MTAS regulation – the watchdog launched a public inquiry examining whether the current regulation of voice and SMS MTAS should be revoked, extended or varied after it expires on 30 June 2019. Now, with the release of its proposals interested parties have been given until 31 May to submit feedback, and the regulator has said it will take any submissions into account in preparing its final access determination (FAD). Commenting, ACCC Chair Rod Sims said: 'Our decision to regulate SMS appears to have had the desired effect. We are therefore proposing to remove regulation of MTAS for SMS services as we do not think continued regulation is necessary to promote competition ... However, over-the-top voice services are not yet substitutes for mobile voice calls as they do not offer the same quality or access to services such as Triple Zero ... We are therefore proposing to continue declaration of MTAS for voice services.'

(May 2, 2019) telegeography.com



Belgium

The Belgian Institute for Post and Telecommunications (BIPT) telecoms regulator, has begun a public consultation to assess interest in using the 26GHz band for 5G services. Interested parties have until 31 May to offer views on using the 26GHz band, proposals for migrating its current users and a future regulatory framework for the spectrum. The BIPT believes it possible to assign six blocks of 200MHz without migrating the band's existing users, while a further

ten blocks would be available once the spectrum is vacated. European Union member states are required to authorize the use of at least 1GHz of the 26GHz band by 31 December 2020 in order to facilitate the rollout of 5G, subject to demand and the absence of significant issues migrating existing users. The 26GHz band is currently home to 850 two-way radio links, with blocks awarded to Telenet and Orange Belgium.

(May 1, 2019) telegeography.com



Brazil

Felipe Roberto de Lima, the Deputy Superintendent of Planning and Regulation at Brazil's National Telecommunications Agency (Agencia Nacional de Telecomunicacoes, Anatel), has informed the Chamber of Deputies (Camara dos Deputados) that the watchdog is preparing to stage an auction of 5G-suitable spectrum in the first quarter of 2020. The official told the public hearing that the frequencies scheduled for sale include the 700MHz, 2.3GHz and 3.5GHz bands, as well 26GHz millimeter wave (mmWave) spectrum. A public consultation will be forthcoming, he added.

(May 17, 2019) telegeography.com

The National Telecommunications Agency (Anatel) has published the new prices for the Right of Use of Radio Frequency (PPDUR) and the Right of Exploitation of Telecommunications and Satellite Services (PPDESS). This follows the resolutions from July and November of last year, which established deadlines for the new prices to take effect. The resolution establishes that the PPDESS for all services of collective interest will be BRL 400. Services of restricted interest will cost BRL 20. In the case of the public price for the Exploitation Right for the Brazilian Satellite and use of associated radio frequencies, the price will be BRL 102,677.

(May 6, 2019) telecompaper.com



Colombia

On 25 April 2019 Colombia's Ministry of Information Technologies and Communications (Ministerio de Tecnologias de la Informacion y las Comunicaciones, MinTIC) published Resolution 925, inviting national and international telecoms operators to register their interest in its imminent multi-band spectrum auction. The long-running on-off auction process has been on the cards since 2015. Previously, on 24 March 2017 MinTIC published Resolution 585, inviting interested parties to express their interest in an

auction of frequencies in the 700MHz and 1900MHz bands, but the process was later postponed. The auction was earmarked to comprise spectrum in the 703MHz-748MHz and 758MHz-803MHz bands, alongside a supplementary 2x2.5MHz block of 1900MHz spectrum, made up of frequencies in the 1865MHz-1867.5MHz/1945MHz-1947.5MHz bands. The 2500MHz band is a new addition to the auction. Interested parties are invited to contact the regulator between 2 May and 6 May 2019. (May 2, 2019) telegeography.com



Czech Republic

Mobile network operators (MNOs) in the Czech Republic will be given until 2024 to roll out fifth-generation networks, pending completion of the government's auction of 5G-suitable frequencies planned for later this year, reports Radio Praha, citing the country's prime minister Andrej Babis as saying. Speaking at a conference on 5G security in the capital Prague, Babis said: 'I expect the spectrum for 5G will be awarded and divided in 2020 after an auction in 2019. These carriers will have until 2024 to roll out 5G for commercial use'. The PM said he expects the switch to a new generation of advanced wireless technology to be 'even more revolutionary than the onset of mobile phones', stimulating economic growth, innovation and overall prosperity in the country. However, and in reference to recent concerns in other countries involving Chinese vendors, he also stressed the importance of ensuring

the new network system's security. In February this year the Czech regulator, the Czech Telecommunication Office (Cesky telekomunikacni urad, CTU), revealed its intention to kick off the auction of 5G-suitable frequencies in early November 2019, seeking to attract bids from a new fourth MNO to tackle the long-standing problem of high mobile rates in the country. The regulator plans to auction off blocks of spectrum in the 700MHz and 3.4GHz bands and in an attempt to smooth the way for a new entrant it is reserving one block in the 700MHz band for newcomers, preventing existing MNOs from driving up prices. It will also put in place stipulations to protect the newcomer in the set-up phase, including the requirement that MNOs allow it access to their networks while building its own, provided the entrant initially covers 10% of the population itself. (May 3, 2019) telegeography.com



Chile

The telecoms watchdog the Department of Telecommunications (Subsecretaria de Telecomunicaciones, Subtel) has launched a public consultation for a planned auction of 5G spectrum. The regulator intends to make available for sale the following spectrum: 20MHz in the 700MHz range;

30MHz in the 1700MHz (AWS) band; 50MHz in the 3.5GHz range; and 850MHz in the 28GHz range. Subtel's initial consultations will run until 10 June 2019 and will focus on service quality requirements and cybersecurity, whilst another round of consultations will follow afterwards to examine technical issues.

(May 14, 2019) telegeography.com



Denmark

The Ministry of Energy, Power and Climate has announced that it is now accepting applications for subsidies under the project aiming to provide download speeds of at least 100Mbps to all households and businesses by 2020. The Ministry has allocated DKK100 million (USD15 million) to the Broadband Fund, administered by the Danish Energy Agency (DEA, or

Energistyrelsen), for 2019, mainly targeting households in underserved and sparsely populated areas of the country with down/uplink of less than 10Mbps/2Mbps. Successful candidates need to deploy networks with minimum download speeds of 100Mbps. The ministry awarded grants to a total of 91 projects in 2018, with 98% of these located in sparsely populated areas.

(May 1, 2019) telegeography.com



Ecuador

The Minister of Telecoms and Information Society, Andres Michelena, has unveiled plans to enhance e-government services and extend high-speed internet connectivity to 98% of the country by 2023. The government intends to provide 80% of services online and will set up more than 1,000 Wi-Fi hotspots across towns and cities. The government believes digital transformation will enhance productivity and competitiveness in both the public and private sectors. 'I am convinced that the country's development must go

hand in hand with ICT,' said the Minister. 'Technology is a great engine for development, entrepreneurship and education.' Currently 35% of households have access to broadband connectivity, while 7.5 million people have signed up for 4G LTE services, according to Ecuador's National Institute of Statistics and Censuses (INEC). The government plans to reduce internet costs and roaming fees in order to increase subscriber numbers.

(May 23, 2019) Xinhua



European Union

The European Commission (EC) adopted an Implementing Decision to harmonize the 24.25GHz-27.5GHz (26GHz) radio spectrum band for 5G usage. Under the Decision, EU countries should set common technical conditions to support 26GHz 5G systems by 31 December 2020 in line with the European Electronic Communications Code, which asserts that EU member states must allow the use of at least 1GHz of the 26GHz band by end-2020 to facilitate 5G rollout 'provided that there is clear evidence of market demand and of the absence of significant constraints for migration of existing users or band clearance'. The harmonized technical conditions seek to ensure spectrum usage by multiple 5G networks while mitigating interference risks and ensuring compatibility with incumbent radio services (such as satellite services) within the 26GHz range and in adjacent bands. Member states must report to the EC on their implementation of the Decision by 30 June 2020. An EC press release adds that the 26GHz band will be a key discussion at the

2019 World Radiocommunications Conference in October-November, where EU members 'can take a common position based on EU-harmonized technical conditions'. The 26GHz band offers the largest capacity of the three 'pioneer bands' (700MHz/3.6GHz/26GHz) earmarked for initial 5G deployment under the EU '5G Action Plan'. According to a study undertaken on behalf of the Commission (report to be published in the coming weeks), the first 26GHz-based services are expected to focus on Enhanced Mobile Broadband (eMBB) for high capacity fixed-wireless access (FWA), high-definition video communications, plus virtual, augmented and mixed reality (VR/AR/MR) applications. It is expected that progressive adoption of this band by 5G operators will initially be focused on 'congested hot spots, major transport paths and industrial sites'. UHF Decision (EU) 2017/899 and Implementing Decision (EU) 2019/235 (both in force) foresee availability of the 700MHz and 3.6GHz bands across the EU by mid-2020 and end-2020, respectively. (May 15, 2019) telegeography.com



Ghana

The Minister for Communications, Ursula Owusu-Ekufu, has awarded Lebara Ghana a ten-year contract to manage and commercialize e-Government infrastructure. The government's fiber and LTE networks were previously managed by the National Information Technology Agency (NITA). Speaking at a ceremony to mark the handover, the Minister indicated the government is committed to partnering with the private sector to deliver efficient and cost-effective services to the public, and she called on Lebara to explore opportunities to narrow the digital divide and promote financial inclusion. The Ministry is hopeful its rural telephony project and accelerated backbone and last mile connectivity programmes will 'shortly' enable services to be delivered in every part of the country. The government has warned Lebara that it will demand accountability and strict compliance with the quality of standards outlined in the Service Level Agreement.

(May 8, 2019) GhanaWeb

The National Communications Authority (NCA) has drafted a new bill regulating the quality of services provided by telecoms operators. The 'Quality of Service Act' aims to establish a legal framework to ensure customer satisfaction and standardize and improve service quality in terms of network availability, accessibility, service retain ability and integrity. The draft legislation includes proposals that network availability for calls should be 95 decibels per milliwatts (dBm) indoors, 85dBm inside vehicles and 75dBm outdoors in cities, while operators will need to ensure at least a 95% connection rate and reduce call drop rates from the current 3% to under 1%. Director General of the NCA, Joe Anokye, explained that new laws had become necessary to correct some outmoded provisions in the Electronic Communications Act (2008) currently guiding the operations of the telecommunication service providers. The draft legislation is expected to be passed before the end of 2020.

(May 3, 2019) telegeography.com



Greece

The Ministry of Digital Policy, Telecommunications and Information has launched a tender worth EUR870 million (USD970.6 million) to find partners for the rollout of its Ultra-Fast Broadband (UFBB) project. The government is looking to form public-private partnerships (PPP) to deliver broadband connectivity to rural areas. EUR300 million of the funding will come from the government and the EU, with the remainder coming from the private sector. The state expects the UFBB scheme to cover some 2.5 million Greek citizens who are not included in existing telco rollout plans, with networks offering connectivity at speeds of between 100Mbps and 1Gbps. The country will be split into seven regions, with the winners of the regional tenders committing to deploy high speed networks and then leasing these on a wholesale basis to third-party service providers such as Cosmote and Vodafone.

(May 20, 2019) telegeography.com

Greek telecoms group OTE has reported a 0.9% drop in first-quarter adjusted EBITDA to EUR310.6 million (USD348 million), with growth in its home market failing to offset a slowdown at its operations in Romania. Revenues were up 0.2% year-on-year at EUR908.6 million, as a solid top-line performance in Greece, up EUR11.5 million, more than offset a EUR9.9 million drop in revenues in Romania. The results regard OTE's mobile business in Albania as discontinued operations, with the EUR50 million sale (to Albania Telecom Invest) having been completed on 8 May. OTE's Greek unit Cosmote had 7.68 million mobile subscribers at the end of March 2019, down 4.6% from a year earlier, while fixed broadband customers were up 6.5% to 1.92 million. Telekom Romania reported a 0.8% fall in mobile subscriptions to 4.65 million, with fixed broadband users dropping 4.5% to 1.12 million.

(May 10, 2019) telegeography.com



Guatemala

Cristian Aguilar, Guatemala's Vice Minister of Communications, has informed Prensa Libre that the country's planned auction of 1700MHz AWS frequencies in June 2019 will be delayed by the country's general election, which will take place on 16 June 2019. The Superintendencia de Telecomunicaciones (Superintendencia de Telecomunicaciones, SIT) had been expected to auction a total of 90MHz of spectrum in the AWS band this year, but has now sidelined the sale process so that it can 'leave the table clean' for the incoming government. (Note: incumbent President

Jimmy Morales is constitutionally prohibited from running for a second four-year term.) The AWS band was earmarked as being suitable to support 4G technology back in 2011, but attempts to distribute the band have been hamstrung by a number of post-2015 appeals, which have sought to exploit various legal loopholes in the General Law of Telecommunications, which came into force back in 1996. An overhaul of the dated legislation is expected to be high on the agenda for the new government.

(May 3, 2019) telegeography.com



India

The Indian government is considering selling up to a 25% stake in state-owned infrastructure provider RailTel via an initial public offering (IPO) and has invited bids from banks to manage the listing process, the Economic Times reports. RailTel operates a pan-India fiber network on exclusive Right of Way (RoW) along railway tracks, spanning 45,000 route kilometers and connecting over 4,500 towns and cities. No price range has been suggested for the listing, but the paper claims that RailTel's paid up share capital currently stands at around INR32.1 billion (USD4.59 billion).

(May 21, 2019) telegeography.com

Sector watchdog the Telecom Regulatory Authority of India (TRAI) has proposed that the Department of Telecommunications (DoT) conduct an audit of spectrum use, to identify the frequencies being used by government departments and agencies and to ensure

the airwaves are being used efficiently. The Economic Times quotes TRAI Chairman Ram Sewak Sharma as saying: 'In order to ensure the availability of spectrum and appropriate utilization, the DoT should carry out studies on its usage and necessity so that various departments holding a scarce resource can use it in a right manner.' The regulator noted that various state bodies use spectrum for FM radio, direct to home (DTH) TV, satellite and space communication, aeronautical navigation and defence communication. If these airwaves are not being used optimally and efficiently it would represent a financial loss to the government and also hinder the country's social and economic growth, the TRAI added. The regulator is aiming to identify and potentially free up spectrum that was allocated in the past but has been left unused or under-utilized with the intention of making the frequencies available to telecom service providers.

(May 3, 2019) The Economic Times



Ireland

The Irish government has appointed a preferred bidder for the National Broadband Plan (NBP), which aims to bring high-speed broadband to 1.1 million people across rural Ireland. The long-awaited decision follows several years of discussion and all but one candidate withdrawing from the tender. Granahan McCourt has established a new Irish registered company called National Broadband Ireland (NBI) to build, operate and maintain the network. The total cost to the state will be EUR 3 billion over 25 years, including EUR 545 million for conditional and contingent subsidy, and EUR 354 million in VAT which will be paid to the Revenue Commissioners as subsidy is spent. The contract includes a wide range of protections and legally binding obligations, including a set of key performance indicators to ensure service is maintained appropriately. No subsidy will be paid to the NBP company until the milestones have been achieved. The appointed bidder is setting up a wholesale open access company to roll out the mainly FTTP network in the designated areas.

This will initially provide broadband services of 150 Mbps to the majority of households, and up to 1 Gbps for heavy data users and SMEs. Consumer broadband will be upgraded to 300 Mbps by year 6 and 600 Mbps by year 10. Business products will be upgraded to 2 Gbps by year 11 and incrementally after that. The network infrastructure will re-use existing poles and ducts as much as possible, which NBI will lease from existing infrastructure owners. Roll-out of the network will start in Q4, with most of the targeted premises passed within the initial five years and the overall roll-out completed within 7 years. The NBP will benefit around 540,000 premises (including 56,000 farms and 44,000 non-farm businesses), 1.1 million people (23% of the population) and 674 schools. Regulator ComReg welcomed the government's decision to appoint a preferred bidder for the provision of high-speed broadband in rural areas. ComReg said it would support oversight of the program by advising the Department of Communications.

(May 8, 2019) telecompaper.com



Japan

Japan's bicameral legislature The National Diet enacted a legal revision of the telecoms law designed to lower mobile phone fees and spur competition in the country's saturated telecom market. With Japan's mobile carriers NTT DOCOMO, KDDI (au) and SoftBank Corp drawing criticism for maintaining high charges compared to other countries, the Diet passed a Bill to amend the Telecommunications Business Law, banning them from offering plans that bundle both the price of a mobile phone and connection fees in one package. For many years, Japanese carriers have discounted mobile device purchases in exchange for relatively high data usage fees, which critics note make it harder for

consumers to compare fees charged by operators. The new law will take effect as early as autumn 2019, after the Ministry of Internal Affairs and Communications (MIC) compiles guidelines for fee plans. Other changes include a registration requirement for mobile phone retailers that would give authorities greater oversight, and new penalties for companies that use misleading sales tactics. The government approved the legal amendment in March this year and on 15 April Japan's leading mobile network operator by subscribers NTT DOCOMO announced plans to cut some of its current mobile communications fees by up to 40% – and to introduce the new plans in June which will separate

out the cost of the handset from the communications fees. SoftBank Corp and KDDI have also confirmed they will comply with the new rules, with the latter 13 May confirming that next month it will introduce new mobile communication fee plans up to 40% cheaper than current ones. (May 13, 2019) [telegeography.com](#)

Rakuten, the parent of Japan's would-be fourth mobile network operator (MNO), Rakuten Mobile, is actively considering a 'radical model for wannabe telecom disruptors'. Ahead of Rakuten Mobile's planned launch in October this year, the USD15 billion Japanese e-commerce firm is said to be planning to use simpler, off-the-shelf telecoms equipment and expand faster. The newcomer claims to have government backing too, given that politicians are keen to get mobile bills

down to allow consumers to spend more elsewhere. Nonetheless, Rakuten Mobile's commitment to invest some USD5.4 billion by 2025 on its new 4G LTE network is seen as 'conservative' by industry watchers who consider Rakuten's cloud-based model still requires significant infrastructure which will require high levels of CAPEX and exert stress on operating costs. Reuters claims that Rakuten aims to shake up local telecoms in Japan as Reliance Industries has done in India – thanks to a USD40 billion investment there – but while it can cause a dent in the fortunes of Japanese incumbents NTT DOCOMO, Softbank Mobile and KDDI (au), skeptics note that the group lacks the financial clout of billionaire Mukesh Ambani's highly cash-generative core business, which helped bankroll a sustained attack in India. (May 2, 2019) [reuters.com](#)



Kosovo

Sector watchdog the Regulatory Authority for Post and Electronic Communications (Autoriteti Rregullator i Komunikimeve Elektronike dhe Postare, ARKEP) has approved plans to open more frequency bands for use by telecom service providers as it looks to update its spectrum allocation process and as part of its efforts to align more closely with EU standards. Under the plans, ARKEP has outlined a three-stage program that would see it first renew the 900MHz and 1800MHz licenses previously awarded to IPKO and Kosovo Telecom, several of which are due to expire in July this year. The second phase would take place in the second half of 2019 and would see the regulator

auction or tender currently unused spectrum in the 800MHz, 900MHz, 1800MHz, 2100MHz and 2600MHz bands. Finally, the third phase would be launched after 2022 and would comprise the allocation of frequencies in the 3400MHz-3800MHz range, whilst the potential allocation of 700MHz and 26GHz spectrum would also be considered. Regarding the allocation and renewal the regulator said it was considering offering licenses for ten to 20 years, but its preferred duration for the concessions was 15 years. ARKEP also said it would consider imposing limits on spectrum holdings, as well as rollout obligations and the potential entry of a third operator. (May 13, 2019) [telegeography.com](#)



Latvia

Latvian telecoms watchdog the Public Utilities Commission (Sabiedrisko Pakalpojumu Regulesanas Komisija, SPRK) has extended the duration of Tele2's 3.5GHz spectrum license until 31 December 2028, following a request from the cellco last month. The

authorization covers spectrum in the 3500MHz-3550MHz range. The regulator warned, however, that it would revoke the license if the spectrum was not used effectively by the operator.

(May 23, 2019) [telegeography.com](#)



Mozambique

The Communications Regulatory Authority (ARECOM, formerly INCM) has awarded state-backed fixed and mobile operator Mocambique Telecom (TMCEL) a new unified telecommunications license. The unified concession enables TMCEL to provide services regardless of the technology used, relaxing the rules covering areas such as spectrum usage and

numbering. TMCEL executive Mohamed Jusob was quoted as saying that the operator 'is committed to be, within the next four years, the largest and best telecommunications company in the country'. Rival operator Vodacom Mozambique received its own unified license in July 2018.

(May 16, 2019) [telegeography.com](#)



The Netherlands

The Commerce Commission is seeking feedback on preliminary proposals for a new regulatory regime for fiber networks, which aims to ensure a competitive market and prevent Chorus and three other contracted local fiber companies – Northpower Fiber, Ultrafast Fiber and Enable Networks – from earning excessive profits at the expense of network and service quality. In addition to the price-quality regulation, the four companies will also be required to publicly disclose information about their profitability, quality of service and capital expenditure. According to Telecommunications Commissioner Stephen Gale: 'We

want to make sure we design a robust and enduring regulatory framework for fiber networks that have become an important part of New Zealanders' daily lives. Consumers and businesses increasingly demand ubiquitous, high speed connections to support an ever-expanding range of activities, so it's important we get it right.' The government's ultra-fast broadband initiative was launched in 2009 and currently aims to provide FTTP to 87% of New Zealand's population by 2022 through the building of new fiber networks in major towns and cities across the country.

(May 21, 2019) telegeography.com



Norway

The National Communications Authority (Nasjonal kommunikasjonsmyndighet, Nkom) has revealed that more than 720,000 premises were connected to a broadband service offering downlink speeds of 100Mbps or more by 31 December 2018, up from 224,000 a year earlier. According to the regulator's most recent data, only 135,000 households were connected via a broadband service that offered less than a peak 10Mbps connection at end-2018, down from 203,000 a year earlier, while at the other end of the scale there were no fewer than 16,000 premises on gigabit-capable connections at the same date, up from 10,000 at end-2017. Meanwhile, in terms of access numbers, Nkom reported 2.040 million residential fixed broadband accesses in the country at the end of last year, of which almost half – or 1.012 million, up from 887,000 at end-2017 – were hooked up via a fiber-based service. By comparison, the number of cable broadband accesses declined marginally to 601,000 from 623,000, while

xDSL accesses tumbled from around 560,000 to 427,000. Business broadband accesses totaled almost 127,000 at end-2018, broken down as follows: xDSL, 62,400; fiber 55,700; and 'other', 8,700. With regards to the residential broadband segment, Nkom confirmed that Telenor Norge remains the largest provider, serving 38.1% of all users at the end of 2018, down from 39.5% a year earlier, although in the residential fiber broadband market it played second fiddle to Altibox, with it having a 22.1% market share (Dec-17: 21.2%). The latter company accounted for almost half of all of Norway's fiber-based broadband accesses at end-2018 – 48.3%, down from 50.3% – while in overall market terms Altibox served 23.7% of Norway's private broadband users (Dec-17: 22.1%). Only Telia Norge claimed a double-digit share in terms of the overall residential broadband market, with it serving 17.7% of users at the end of last year, broadly unchanged year-on-year.' (May 15, 2019) telegeography.com



Poland

The government has implemented a bill which amends the Act on Supporting the Development of Telecommunications Services and Networks, or the so-called Mega-Act. The amendment is designed to make it easier for telcos to expand services to areas where it would currently be unprofitable to roll out infrastructure by eliminating some of the administrative and legal

barriers. A Broadband Fund will be established with an annual budget of PLN140 million (USD36 million) which will be used to co-finance network deployments in rural areas. The amendment also gives more power to local authorities to help spur development of networks on a regional scale.

(May 17, 2019) telegeography.com



Romania

Romania's telecom market grew by 1.3% in 2018 and was worth RON16.1 billion (US\$3.77 billion), according to the latest data published by the regulator ANCOM. The figure was equivalent to 1.7% of the country's GDP. ANCOM adds that on average each Romanian generated a monthly income of nearly RON60 for companies providing electronic communication services, or 2% more than in the previous year. Meanwhile, ARPU per household stood at RON179, up 1.3% on the 2017 figure. The biggest growth was seen in the fixed and mobile and internet sectors,

where revenues rose by 12% to reach 4.8 billion. The rebroadcasting of services accounted for RON2.1 billion, fixed telephony RON1.5 billion (-10%) and mobile telephony RON6.5 billion (-3.4%). ANCOM notes that the market leader in the telco sector had a share of 27%, with its two closest competitors claiming 24% and 21% respectively and other suppliers a combined 28%.

(May 20, 2019) broadbandtvnews.com

The telecoms regulator, the National Authority for Management and Regulation in Communications

(ANCOM), has announced that 4G connections accounted for 51% of the total mobile market in 2018, following a 27% rise in 4G subscribers to 10.1 million. The number of fixed internet connections rose 7% last year to 5.1 million, while connections offering download speeds of at least 100Mbps grew 16% and now represent 69% of the market. The fixed internet penetration rate stood at 62% in 2018 following 13% annual growth in rural areas and a 4% increase in urban connections. Around 40% of rural internet connections enable speeds of above 100Mbps.

(May 15, 2019) telegeography.com

The government plans to launch the auction for 5G licenses in autumn, despite higher taxes imposed this year to telecom operators, according to telecom regulator (ANCOM) president Sorin Grindeanu, cited by Mediafax. According to ANCOM head, the implementation of 5G technologies in Romania will not only benefit communications but many other sectors, from the service sector, to finance, agriculture and transport. "All this, combined, 5G with the Internet of Things, will lead to a new industrial revolution.

Implementing 5G on all market studies will lead to the creation of around 250,000 jobs. We are talking about intelligent industries that will grow as turnover, now they are around EUR 3.7 billion in Romania and will go up to 9 EUR bn," said Grindeanu. "There are investments that will be made for the implementation of 5G on private studies, somewhere until 2023-2024, around EUR 9 billion, of which EUR 1.5-1.6 billion in the field of communications. The difference is in all the other industries we mentioned earlier because all these things connected, beyond technology, to the Internet of things will lead to a new industrial revolution," he added. In December 2018, the Romanian government introduced new fiscal regulation and taxes for banking, telecom, energy and the private pensions sector through OUG 114, which caused backlash from players in these markets and led to the decision that the government would pass another OUG to amend some of the most controversial provisions. For the telecom groups, the special tax of 3 percent of annual turnover was maintained and some players in the market suggested that 5G investments could be postponed.

(May 11, 2019) business-review.eu



Singapore

The telecoms regulator is proposing that mobile operators deploy standalone 5G networks, paving the way for enterprises in the city-state to tap the full potential of 5G connectivity. In a public consultation document released last week to seek industry feedback on 5G regulatory policies, the Infocomm Media Development Authority (IMDA) said it will support the adoption of standalone 5G specifications, which are expected to be harmonized internationally in early 2020. The 5G deployments in many countries today are based on non-standalone specifications, which support enhanced mobile broadband services by using large bandwidths and hardware improvements, but still rely on existing 4G networks for connectivity. Such deployments are limited to higher speeds and will not support the full suite of 5G capabilities. Standalone 5G networks, on the other hand, are independent networks and will offer more advanced capabilities, such as ultra-low latency and higher density of connections to support the internet of things (IoT). These networks will be based on a new architecture that includes a virtualized core network to fully realize the capabilities of 5G, including network slicing which will allow telcos to offer critical service providers their own private 5G networks for secure and real-time connectivity to the cloud. Network slicing will also enable operators to carve out segments of their 5G infrastructure for customers with differing quality-of-service (QoS) requirements. For example, they could offer a "hospital slice" with the bandwidth and QoS needed to conduct remote surgeries and charge more for it. Quah Mei Lee, industry principal

for ICT practice at Frost & Sullivan Asia-Pacific, said that although many early 5G deployments are likely to be non-standalone, telcos that launch standalone networks will still need to test the technology using non-standalone deployments. For Singapore, which has a residential wired broadband penetration rate of more than 90%, the IMDA noted that 5G's value lies in helping the industry and enterprises to exploit market opportunities and to develop innovative applications and services in a wide range of sectors, including manufacturing, transport, media and healthcare. "Singapore seeks to leverage 5G to spearhead innovation, and develop differentiated offerings in 5G applications," said the IMDA. "Globally, as the business case and economics of 5G are still nascent, IMDA will nurture the 5G ecosystem by focusing our development efforts in selected areas. "These include enabling the deployment of 5G networks, partnering industry to build sustainable business use cases, and developing strong human capabilities to exploit the technology to spur innovation and adoption. "For a start, the IMDA is looking to enable the deployment of at least two nationwide 5G networks, and will encourage network sharing and services-based competition among Singapore's mobile network operators, which include Singtel, StarHub, M1 and the latest market entrant, TPG Telecom. In June 2018, M1 and Huawei tested the use of 5G connectivity to transmit virtual reality content at M1's headquarters, while Singtel and its Australian subsidiary, Optus, successfully made one of the first 5G video calls in the Asia-Pacific region earlier this year. The IMDA expects the first commercial networks to

be introduced in or after 2020. Some industry players have noted that later deployments after 2020 would allow "Singapore to reap the economies of scale from commercially available 5G equipment, learn from the experiences of overseas markets and take advantage of the increasingly mature 5G mobile ecosystem".

(May 13, 2019) computerweekly.com

The Infocomm Media Development Authority (IMDA) in Singapore has called on interested telcos to submit detailed proposals on their 5G deployment plans, suggesting that by 2020 at least two networks will be rolled out in the city-state. The regulator intends to assign 5G-suitable spectrum to 'two winning submissions' through a Call For Proposal (CFP) regulatory instrument, rather than conducting an auction of spectrum, with telcos' proposals assessed instead on the quality of their deployment schedules. It is understood that these include hitting 50% 5G network coverage by 2023, an agreement to allow MVNOs to access the new network to provide resell services and fulfilling the watchdog's financial capability requirements to support the rollout. IMDA plans to allocate spectrum in the 3.5GHz, 26GHz and 28GHz bands for 5G in the initial tranche of spectrum allocation to telcos. This will be sufficient for at least two nationwide 5G networks, the authority confirmed. IMDA has opened a public consultation on the CFP which lasts until 19 June 2019 and also seeks feedback from the public on its 5G spectrum assignment proposals and the annual fees to be paid by successful operators. IMDA chief executive officer Tan Kiat How said: 'Insights [from the public consultation process] will guide our regulatory approach and industry development efforts

in ensuring Singapore's connectivity infrastructure remains globally competitive in support of our digital economy ambitions'. However, the CEO stopped short of ruling out involvement from the likes of Huawei Technologies, noting only that: 'Singapore encourages vendor diversity in our telecommunication systems to mitigate risks from dependency on any one vendor'. Singapore's three incumbent mobile network operators, Singtel, StarHub and M1, have been actively testing 5G technology for a while now. For example, in January this year Singtel and Ericsson revealed plans to open a 5G test-bed facility – dubbed '5G Garage' – using the 3.5GHz band to further the adoption of the next generation technology by enterprise and business. Previously, in November 2018, Nokia and StarHub 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. These announcements were predated by M1 and Huawei's June 2018 disclosure that they would continue joint tests of 5G technology for the remainder of the year, including working to complete an end-to-end live broadcast of virtual reality content over a next generation mobile network. The joint trial used the 28GHz millimeter-wave (mmWave) spectrum band, in what they claimed was the first live end-to-end 5G trial of Huawei's equipment in the city-state in the 28GHz band. IMDA has said that with 5G-ready smartphones coming on sale this year, it will continue to waive the airwave fees for telcos that are keen to continue with 5G trials after this 2019.

(May 7, 2019) telegeography.com



Slovenia

The Agency for Communications Networks & Services (Agencija za komunikacijska omrežja in storitve, AKOS) says it has taken the first steps towards the award of 5G mobile spectrum. Earlier this month the regulator published a draft of its new Radio Frequency Spectrum Management Strategy and invited public comments.

Once finalized, the plan will be submitted to the government for approval and this will then be followed by an auction of 5G licenses. In accordance with the Government Plan for the use of the 470MHz-790MHz band in Slovenia, AKOS intends to complete the whole frequency assignment procedure by 30 June 2020.

(May 21, 2019) telegeography.com



Thailand

Thailand's National Broadcasting and Telecommunications Commission has finalized the proposed terms of next month's 700-MHz auction, and has briefed the prime minister on the progress with the sale. The regulator plans to commence the sale of three slots of 700-MHz spectrum on June 19. The three slots will each have a base price of 17.584 billion baht (\$555.05 billion) for 10MHz of bandwidth, which can be payable in up to 10 instalments. Last month the NBTC announced relief measures for the

three owners of 900-MHz licenses by agreeing to split the license fees into 10 instalments instead of the current four. But a condition of taking advantage of the larger number of instalments will be purchasing one of the 700-MHz slots. According to the report, the three 900-MHz license holders - AIS, TrueMove and dtac – have expressed an interest in taking advantage of the relief measures, but are waiting on more terms of the 700-MHz allocation before making a decision. But True Move has previously indicated it does not

plan to take part in the 700-MHz auction, although it has been pushing for an extension on its 900-MHz license payments. Proceeds from the sale will be used to compensate six digital TV broadcasters which have agreed to return their licenses to the regulator. A public hearing on the draft terms of the 700-MHz allocation will be held next week. (May 19, 2019) telecomasia.net

The National Broadcasting & Telecommunications Commission (NBTC) plans to sell three 700 megahertz spectrum licenses for a total of about 53 billion baht as part of an effort to develop fifth-generation wireless services. The sale at a fixed price of 17.6 billion baht each will take place on June 19, Takorn Tantasith, the secretary general of the NBTC, said at a briefing Tuesday in Bangkok. The goal is for each of the top operators to buy a permit, he said. Thailand's military government has offered to delay about 150 billion baht of payments due from next year for 900 megahertz licenses if operators take part in the 700 megahertz sale. Mr Takorn said while some people may view the price for the latter as high, the regulator had to use previous auctions as a guide. The nation's top three providers of wireless services, Advanced Info Service Plc, True Corp and Total Access Communication Plc, have filed for payment extensions but are seeking more clarity on the 700 megahertz sale. Carriers have long been struggling under the weight of spectrum costs and a fight for market share. Their shares declined in the past five years even as the overall stock market climbed. (May 14, 2019) bangkokpost.com

The telecom regulator plans to announce the initial reserve price for 700-megahertz licenses before May 10 to help the boards of the three major mobile operators decide whether to purchase them before the submission deadline of May 22. The reserve price will be based on the International Telecommunication Union's evaluation of the 900MHz range in 2015, as well as recent auction prices from the 700MHz range in Sweden. The National Broadcasting and Telecommunications Commission (NBTC) originally planned to announce the reserve price on May 22, but moved the date to speed up the process. NBTC Secretary General Takorn Tantasith said Sweden has several

similarities to Thailand including population size and number of mobile users. The NBTC sent its academic team to meet with Sweden's telecom regulatory office in early April to use its auction as a reference for Thai spectrum prices. The details of the 700MHz license allocation sale, including an alternative to license term payments, are scheduled to be released on the NBTC's website on May 14. The agency plans to hold a focus group hearing with the operators to unveil the 700MHz license conditions by May 22, he said. After the hearing, a draft of the 700MHz allocation sale is expected to be approved by the NBTC board in June, and operators wanting to buy licenses would be awarded them by June. "One important condition is the payment terms for the licenses may be divided into three categories, such as four-, 10- and 15-year instalments, though we need to hear opinions on these options during the hearings," Mr. Takorn said. The NBTC plans to allocate 45MHz of bandwidth on the 700MHz range, divided into three licenses, each containing 15MHz. The 700MHz licenses will have a 15-year validity. The move is in line with Section 44, which was invoked by the government on April 10, providing assistance to the three major mobile operators and existing digital TV operators. Through Section 44, the three telecom operators each can extend their 900MHz license payment terms for another five years, but only if they agree to buy 700MHz licenses. Additionally, Section 44 will waive the remaining two terms for all digital TV operators' license payments at a combined cost of 13.6 billion baht, as well as subsidies their rental fees for broadcasting networks worth 18.7 billion for the remaining nine years of the digital TV licenses. Money from the planned allocation of the 700MHz sale will be partly used for assistance to digital TV operators. Previously, Mr. Takorn said each license on the 700MHz range may cost around 25 billion baht. The three major mobile operators that want extensions on their 900MHz license payments must submit proposals to the NBTC by May 10. After the NBTC finishes the 700MHz allocation conditions, the mobile operators can still choose not to buy 700MHz licenses if they are not satisfied with the terms and conditions. However, if they withdraw, they will have to pay the 900MHz license payment on the original schedule. (May 4, 2019) bangkokpost.com



Ukraine

Ukraine's President Petro Poroshenko signed a decree on 17 May 2019 to initiate the process for rolling out 5G mobile network services in the country, setting a 'deadline' of 2020 for the technology's launch. Mr. Poroshenko stated: 'Understanding that most of the European Union countries will have 5G working by 2020, I'm signing this decree ... It will clearly schedule the launch of the fifth-generation data network for 2020 in Ukraine.' The decree, however, does not contain any details regarding conversion/freeing up of

new frequencies for 5G, whilst the Ukrainian regulatory authorities are yet to draft a 5G plan for cabinet approval. (May 20, 2019) The Kyiv Post

Ukrainian regulator NKRZI plans to carry out the first tender for the distribution of 5G bands in 2020, reports media citing Vladimir Omelyan, the minister of infrastructure. The Ministry of Infrastructure support the watchdog's plans. The ministry has not specified which bands will be auctioned. The Ministry has

launched a pilot IoT project for the monitoring of one of the country's motorways. The project was being carried out in cooperation with mobile operator Vodafone Ukraine and Nokia. LTE will be used at the initial stage, with the switch to 5G taking place later on.

(May 7, 2019) BizLigaNet

Ukraine is launching its long-awaited mobile number portability (MNP) system as scheduled, reports

Liga.net quoting the director of the Ukrainian State Centre of Radio Frequencies, the overseer of the MNP implementation project. The official noted, however, that mobile users submitting applications to port their telephone number to another network today will not see their number transferred until 6 May. The standard number porting completion period is three working days, but due to 1 May being a public holiday, the first ports will not be completed until after the weekend.

(May 1, 2019) Liga.net



United Kingdom

Ofcom has published a Spring 2019 update to last year's Connected Nations 2018 report, which uses more recent data to provide the latest coverage statistics for UK mobile and fixed line broadband networks. The key change is that "full fiber" (FTTP) coverage has risen to 7% (i.e. over 300K premises in the last 4 months, nearly 1.8 million total). Just to clarify, today's report is actually based on coverage and service availability information received from ISPs and mobile network operators as of January 2019, which is thus four months more current than the data in their previous Connected Nations 2018 study (September 2018). The other key changes since Ofcom's previous report are that "ultrafast broadband" coverage (oddly defined by the regulator as speeds of 300Mbps+) has risen from 49% to 53% of UK homes and businesses, while "superfast broadband" (30Mbps+) coverage has edged up from 94% to 95%+. Remember that the Government's original definition of "superfast" is slightly lower at 24Mbps+, which was officially hit over a year ago. As usual most of the ultrafast coverage will be coming from the expansion of Virgin Media's cable network, although Openreach has also been very busy deploying both G.fast and FTTP technology. Meanwhile a growing number of alternative network ISPs are spreading FTTP at an increasingly rapid pace (see our 'Summary of Full Fiber Plans'), with Cityfibre and Hyperoptic being two of the biggest movers in that crowd. The improved fixed line broadband coverage also means that the number of premises that cannot get a "decent broadband" (10Mbps+) service has continued to fall. Around 619,000 UK premises (2%) cannot get broadband with a download speed of at least 10Mbps and an upload of at least 1Mbps, which is the specification for the UK Government's proposed broadband Universal Service Obligation (USO). Kim Mears, Openreach MD of Strategic Infrastructure, said: "This is great news for the UK and we're proud to be leading the build of faster, more reliable and future-proof broadband networks across the country. We want to be the national full fiber provider and we're convinced our technology can be a huge catalyst for productivity and prosperity post-Brexit. We're investing heavily in our network and people; in communities all over the

UK, and we're on track to hit our target of reaching three million premises by the end of 2020. But we want to go much further, and we will do if the conditions are right to invest." Meanwhile 4G mobile networks have seen their indoor coverage by all operators rise over the same period from 77% to 78% and geographic coverage from all operators has gone from 66% to 67%.

(May 4, 2019) ispreview.co.uk

British telecoms regulator Ofcom has revealed that more than half of the UK's premises can now access ultrafast broadband, which it defines as a connection offering downlink speeds of at least 300Mbps. Publishing its latest Connected Nations report, the watchdog said that 53% of homes and businesses now have access to ultrafast broadband, up from 49% in September 2018. Meanwhile, it noted that superfast broadband services – i.e. those offering downlink rates of at least 30Mbps – are available to 95% of premises, up from 94%. With regards to full-fiber deployments, Ofcom said such infrastructure now covered 7% of UK properties, up from 6% at September 2018. Finally, the number of people unable to get what the regulator referred to as 'decent' broadband, specifically a connection offering download speeds of at least 10Mbps and upload of 1Mbps, declined by a third, to 619,000, (or 2% of UK properties) at January 2019. Turning to mobile coverage, meanwhile, Ofcom said 78% of premises in the UK can now get indoor coverage from all four mobile network operators (MNOs) – BT subsidiary EE, O2 UK, Vodafone UK and Three UK – up from 77% at September 2018. Geographic 4G coverage across all four MNOs also increased, reaching 67% at January 2019, up from 66% previously. 4G 'not-spots' also continued to decline, with Ofcom saying that only 8% of the country's geographic area had no coverage from any operator, down from 9%. Ofcom is scheduled to publish its next data update 'in the summer' and follow up with a full annual report at the end of the year. Commenting, Ofcom chief executive Sharon White said: 'For the first time, a majority of homes and offices can now get ultrafast broadband – which allows people to work, stream and shop online at the same time ... We've also seen the number of homes that can't get decent

broadband fall by a third in the last year. I think that progress is really encouraging, but it's vital we keep it going. So we're working with the Government to bring in the new universal broadband service, which will give

everyone the right to request a decent connection. We'll announce who'll deliver the scheme in the summer.'

(May 3, 2019) telegeography.com



Zimbabwe

The Cabinet has approved the Broadcasting Services Amendment Bill which aims to merge the country's media and telecoms regulators. The Broadcasting Authority of Zimbabwe (BAZ) and the Postal and Telecommunications Regulatory Authority of Zimbabwe (POTRAZ) are to be combined as the Broadcasting and Communications Authority, in a move which the government says will improve accountability and

ensure there is no state interference in the country's media. A report from New Zimbabwe cites Information Minister Monica Mutsvangwa as saying that the new bill seeks to harmonize the Broadcasting Services Act with the constitution. She stated: 'All state-owned media ... must be impartial and free to determine independently the editorial content of their broadcast.'

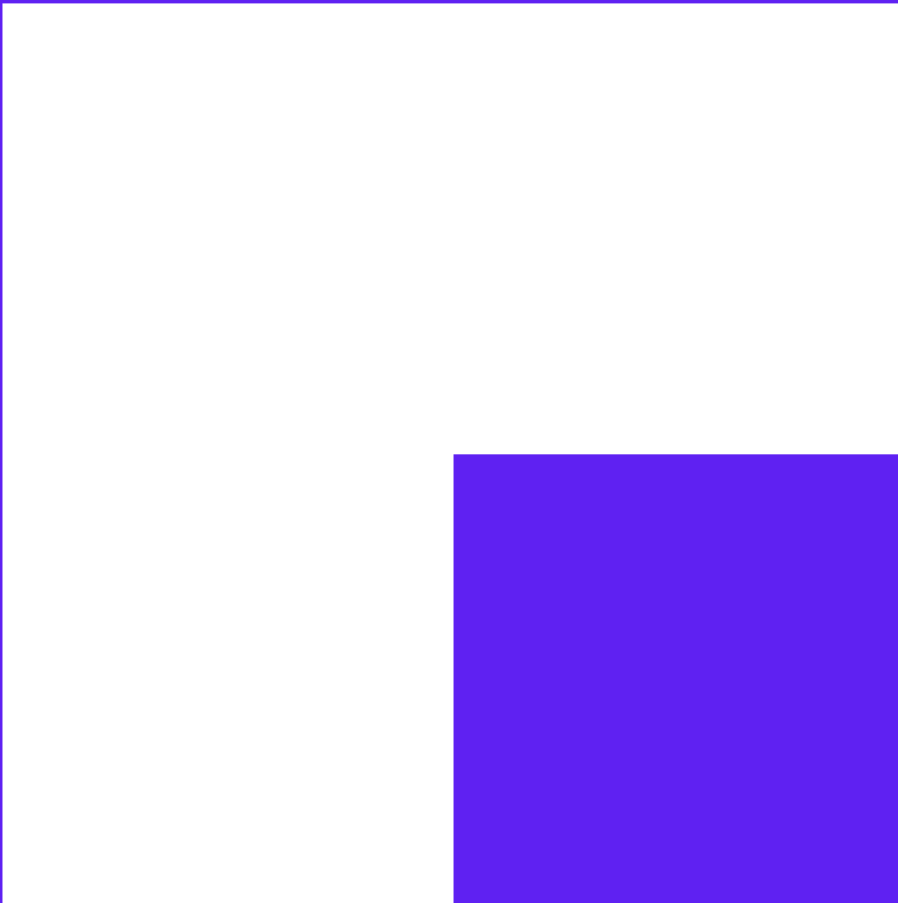
(May 16, 2019) telegeography.com

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