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The 27th GTI Workshop Makes Its Online Debut

Given the COVID-19 global pandemic, the 27th GTI Workshop was shifted online for the first time during 22nd-23rd April, 2020. The online debut has attracted nearly 300 industrial leaders and experts from over 20 global operators, such as Bharti Airtel, Vodafone, Deutsche Telecom, Orange, Sprint, KDDI and SoftBank, industry partners as well as international organizations or institutes, to discuss and share their insights into key issues on 5G development and its commercialization, and into hot topics like 5G global device and enterprise network.

Outlook of GTI Technical Work in 2020

4G & Evolution
- Continue to improve **4G network capacity and capability**
- Promote **4G/5G collaborative evolution**

5G eMBB
- **Accelerate Sub-6GHz industry maturity:** release NSA recommendation whitepaper, learn key lessons from NSA/SA deployments and further focus on SA key issues such as IODT, MEC, network slicing, 4G/5G interworking, VONR, etc.
- **Promote 5G global device maturity:** research on 5G device technology evolution and performance enhancement, GTI Certification of 5G chipset and device, exploration on S-Module application and 5G-enabled industry device
- **Strengthen intelligent network research:** specify the benchmark test and evaluation approach for classification of network intelligence level, sort out high priority intelligent network use cases and study the solutions from NE and MS aspect
- **Kick off mm-wave study:** research on mm-wave products and test solutions

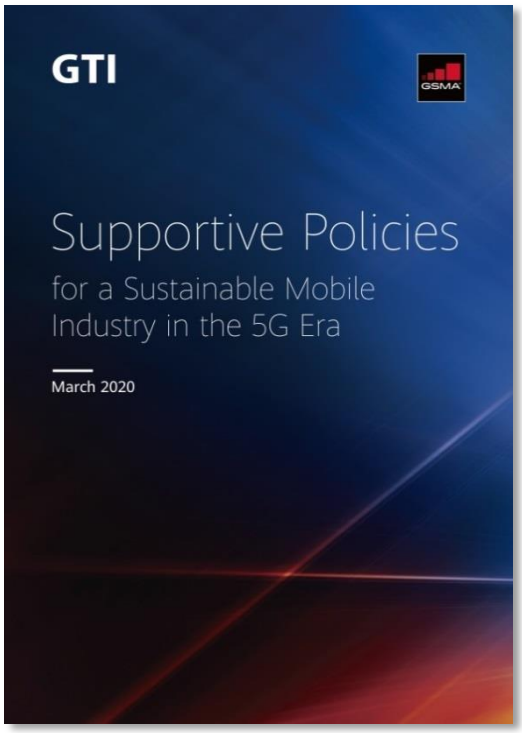
5G Enterprise Network Solution (5G ENS)
- **Promote operator-provided ENS** by synergy between GTI and other relevant ICT and OT organizations
- **Explore advantages and key technical capabilities** of ENS to fit in industrial value chain
- **5G S-Module and device solutions** in Greenfield and Brownfield verticals
- Investigate solutions for operators to cope with the global trend of allocating local licensed spectrum for verticals
- Research on **security** of 5G vertical industry service and device

Innovative Service & Application
- Explore 5G business models...
- Research on 5G applications such as 5G Cloud XR...
- Reach out to other vertical industry platforms for 5G joint innovation

Madam Huang Yuhong, the Secretary General of GTI, made a brief introduction to the key focus of GTI technical work and meeting plans in 2020, and disclosed that GTI will be considering options of "Offline+Online" or "Online" for the upcoming events, however, which may be subject to change depending on the global situation of COVID-19. She also stressed that GTI would step up its joint efforts with industry partners in fostering 5G to be better integrated into multiple industries and to better serve the public, while making its due contribution to the development of society and economy as well as to the improvement of people's livelihood.

The workshop not only shared the major progress and achievement of 5G end-to-end industry in areas of 5G network deployment and optimization, mm-Wave, intelligence network, and 5G device certification, but also made in-depth discussions about the requirements and solutions of 5G global device, and further called for joint efforts within the industry in speeding up the scaled development of 5G device and global roaming; probed into such most concerned issues as vertical requirements from 5G enterprise network, customized differentiated solutions, industry modules, operation and guarantee in a bid to provide valuable reference for operators in expanding their respective enterprise network. Furthermore, AR/VR cloud architecture and solutions were also discussed to boost the development of 5G cloud XR industry.

GTI & GSMA Joint Report Released: Supportive Policies for a Sustainable Mobile Industry in 5G Era



Countries must step up their efforts to facilitate the 5G era by backing more supportive policies, according to a new GTI study, produced in collaboration with the GSMA.

The Report, "**Supportive Policies for a Sustainable Mobile Industry in the 5G Era**", calls for governments to play their part in helping operators overcome the new challenges they are facing. These include the high costs incurred by the demands for more spectrum; the heavy financial barriers to network deployment; collaboration with diverse vertical industries as well as national broadband strategies and regulations.

By 2025, 5G will account for 20 per cent of global connections, with take-up particularly strong across developed Asia, North America and Europe. To support this growth, operators are expected to invest around $1.1 trillion worldwide over the next five years in mobile capex, roughly 80 per cent of which will be in 5G networks.

"5G will play a foundation role in the era of intelligent connectivity, supporting economic growth, transforming businesses and delivering innovative new services," commented Craig Ehrlich, Chairman of GTI. "There are, however, challenges facing the mobile industry in 5G's rollout and commercialization. We are happy to see proactive policies on national broadband strategy, spectrum prices, tax measures, supporting innovation and facilitation of infrastructure deployments, have been introduced in 5G pioneering countries. We believe government's support is vital to the success of 5G and to benefit the whole of society."

"Governments are essential partners for the mobile industry, facilitating the right conditions for operators to make the necessary investments in 5G and propel its commercial use," said John Giusti, Chief Regulatory Officer, GSMA. "As 5G pioneering countries have shown us, more supportive policies are key to 5G enabling the digital transformation of societies and economies. 5G technologies are expected to contribute $2.2 trillion to the global economy between 2024 and 2034, but only if policymakers play their part".

In the Report, several recommendations from the national plans of 5G pioneering countries are reviewed, including those from China, Finland, South Korea, Saudi Arabia, and Germany. Based on the learnings from 5G national plans, the report highlights the following elements for countries deploying 5G networks:

- ***More exclusive spectrum assigned to mobile operators at more reasonable prices***
- ***Lower taxes and tax reliefs to stimulate 5G investments***
- ***Positioning 5G as a critical enabler for national broadband ambitions***
- ***Policies to encourage innovation and industrial collaboration***
- ***Facilitate access to public infrastructure to accelerate 5G deployments***

※ To download the GTI & GSMA joint report, please *click here*.

Congratulations:
GTI Awards 2020 Winners Unveiled Online

After comprehensive evaluation on contribution to 4G evolution and 5G development, a total of 4 operators, 7 industrial partners and 3 individuals across terminal, chipsets, network infrastructures, test systems and verticals have stood out and won the GTI Awards 2020.

Innovative Breakthrough in Mobile Technology Award

- Ericsson - RAN Compute Products Portfolio
- Huawei - Balong 5000
- Keysight - E7515B Network Emulation Solution
- Optus - Dual-Band 5G
- Qorvo - Fusion 5G Chipset Solution
- Samsung - Galaxy S10 5G, W2020 5G

Innovative Mobile Service and Application Award

- Optus, Nokia - 5G FWA Home Broadband Solution and Service
- STC - The Hajj Digital Bracelet System
- Turkcell - Location-based Smart Deployment Digital Service
- ZTE - 5G Smart Retail Application

Market Development Award

- Bharti Airtel
- Huawei

Honorary Award

- Kevin Walsh (Skyworks Solutions)
- Xie Feng (Rohde & Schwarz)
- Zhang Yuan (vivo)

China Mobile and Huawei Deliver World's Highest 5G

The new 5G site on the altitude of 6500 meters shows capability to deliver the network to the peak of Everest.

China Mobile and Huawei have jointly taken 5G connectivity to a new height by bringing the network to the summit of Mount Everest upon the completion of the world's highest 5G base station on the altitude of 6500 meters. Together with the launch of the Gigabit optical fibre network at the altitude of 6,500 meters, Huawei enables China Mobile to run its dual Gigabit network on Mount Everest.

On the occasion of the 60th anniversary of the first successful arrival at Mount Everest from the northern slope, and the 45th anniversary of China's first official accurate measurement and announcement of Mount Everest, the 5G network on Mount Everest will provide communication services for this 2020 Mount Everest re-measurement is of great significance.

Huawei has offered its end-to-end solutions in the construction of China Mobile's Everest dual Gigabit network, where base stations were built in Mount Everest Base Camp at the altitude of 5,300 meters, the Transition Camp at 5,800 meters, and the Forward Camp at 6,500 meters. Huawei's 5G AAU and SPN technologies are applied at these base stations, where network maintenance and optimization are done by a dozen of network specialists who station 24/7 in regions at altitude of 5,300 meters and above to ensure smooth network operations.

ZTE and China Mobile Collaborate to Send China's First 5G Message

ZTE Corporation has helped the Zhejiang Branch of China Mobile send China's first 5G message based on GSMA UP2.4 standard in Hangzhou, China, thereby making China Mobile the first Chinese operator to implement the 5G Message Center (5GMC).

It is expected that China Mobile's 5G message will enter into commercial use by the end of June 2020, which represents a formal countdown to the commercial use of 5G messages in China.

This first 5G message has realized the interconnection between the 5G message system and Chatbot or the existing network equipment, implementing point-to-point transmission of rich media messages such as pictures, videos, locations and files.

The communication between the terminal and the new-generation industrial application Chatbot is implemented by leveraging the MAAP platform, thereby greatly improving the multimedia service experience of terminal users and accelerating the commercial use of 5G messages.

The Zhejiang Branch of China Mobile is the first pilot unit of China Mobile's 5G messages. Its 5GMC system, which is constructed by ZTE, employs a full cloud-based NFV architecture and a built-in lightweight solution.

In addition to the downward compatibility with 2G/3G/4G short messages, the 5GMC system also provides brand-new 5G messaging services, which feature enhanced messages and business messages, and short message upgrade to rich media messages, card messages, and Chatbot applications.

As a consequence, 5G terminal users and industry users can experience one-stop services, such as search, dialogue, interaction and payment in the message window, without the need to install any APP, thereby directly accessing the applications of the operators and third parties.

ZTE has been committed to China Mobile's 5G messaging services for a long time. As a world-leading messaging service provider, ZTE has been working closely with China Mobile to guide and promote the establishment of international 5G messaging standards. For instance, ZTE has assisted China Mobile to complete the GSMA UP certification for the first time in the world, and organized the 5G message interworking test for the three major Chinese operators, thereby laying a solid foundation for the development of 5G messages.

To date, ZTE has obtained 46 commercial 5G contracts in major markets, such as Europe, Asia Pacific, Middle East and Africa (MEA). ZTE commits 10 percent of its annual revenues to research and development and takes leadership roles in international standard development organizations.

Airtel and Nokia Sign Multi-year Deal to Boost Network Capacity and Customer Experience

Nokia and Bharti Airtel ("Airtel") on 28 April announced a multi-year agreement to deploy Nokia's SRAN solution across 9 circles in India, helping Airtel to enhance the network capacity of its networks, in particular 4G, and improve customer experience. The rollout, which will also lay the foundation for providing 5G connectivity in the future, will see approximately 300,000 radio units deployed across several spectrum bands, including 900 Mhz, 1800 Mhz, 2100 Mhz and 2300 Mhz, and is expected to be completed by 2022.

These Nokia supplied networks will give Airtel the best possible platform for when 5G networks launch across the country, with their low latency and faster speeds. Independent network performance testing company, RootMetrics, recognized Nokia as market leader in LTE in terms of performance including network speed, network reliability and data performance.

India is the second largest telecoms market in the world and is expected to reach 920 million unique mobile customers by 2025, which will also include 88 million 5G connections according to the GSMA. The country is experiencing a massive increase in demand for data services with traffic increasing by 47 per cent in 2019 alone, according to Nokia's MBiT Index 2020. Nokia's SRAN solution will help Airtel to address this growing demand by adding network capacity and ensuring a superior quality of experience to its customers.

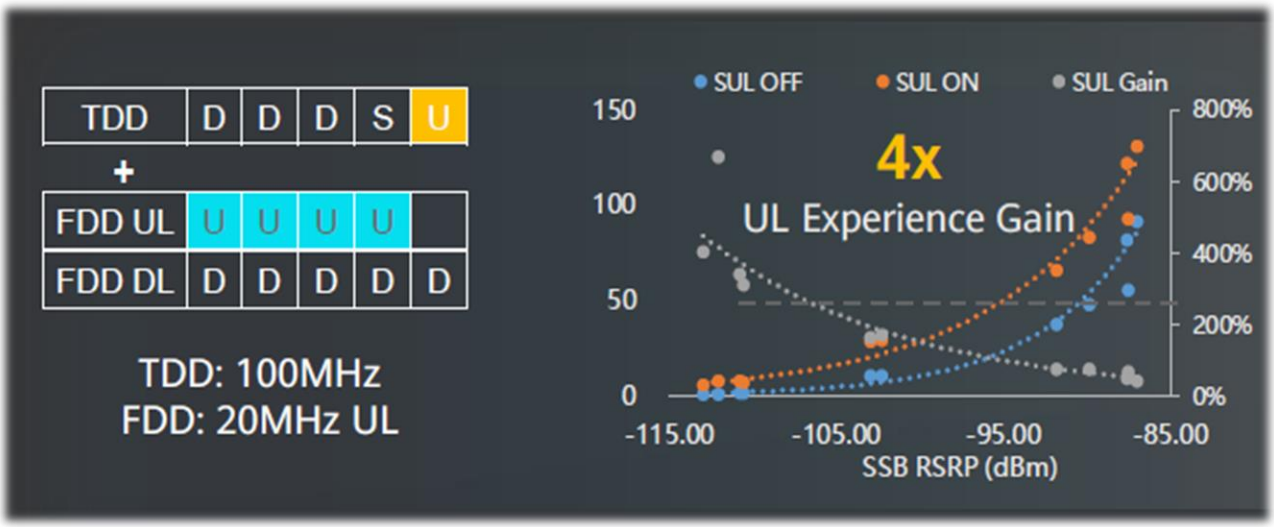
Nokia's SRAN solution helps operators to manage their 2G, 3G and 4G networks from one platform reducing network complexity, increasing cost efficiencies and future-proofing investment. Nokia will be the sole provider of SRAN in these 9 circles. The deal will also include Nokia's RAN equipment, including its AirScale Radio Access, AirScale BaseBand and NetAct OSS solution, which will help Airtel to monitor and manage its network effectively. Nokia Global Services will also play a crucial role in the installation, planning and deployment of the project, which will be executed via the cloud-based Nokia Delivery Platform.

Gopal Vittal, MD & CEO (India and South Asia) at Bharti Airtel, said: "Airtel has consistently topped network performance charts in studies conducted by multiple global experts. We are committed to continuously invest in emerging network technologies to provide a best-in-class experience to our customers. This initiative with Nokia is a major step in this direction. We have been working with Nokia for more than a decade now and are delighted to use Nokia's SRAN products in further improving the capacity and coverage of our network as we prepare for the 5G era."

Rajeev Suri, President and Chief Executive Officer at Nokia, commented: "This is an important agreement for the future of connectivity in one of the world's largest telecoms markets and solidifies our position in India. We have worked closely with Bharti Airtel for many years and are delighted to extend this long-standing partnership further. This project will enhance their current networks and deliver best-in-class connectivity to Airtel customers but also lay the foundations for 5G services in the future."

MediaTek and Huawei Complete 5G Super Uplink Interoperability Testing

Huawei and MediaTek reached a new big milestone of completing the 5G NR Interoperability and Development Testing for the Super Uplink solution in the lab environment. Based on the Super Uplink standard updated in 3GPP, this testing has verified in full scale the solution performance regarding user access, dynamic carrier switching, uplink and downlink throughput, mobility, and feature interoperability. Overall, this trial success will significantly advance the industry's development.



Conventional mobile technologies focus on downlink transmission for people. As 5G continues to develop rapidly, industrial digitalization is gaining momentum, placing high requirements on uplink services in terms of capacity, latency, and other aspects. 5G Super Uplink improves uplink capability and shortens latency through spectrum coordination, high- and low-spectrum complementation, and time- and frequency-domain convergence.

This testing is performed on terminals equipped with the MediaTek 5G M70 baseband chipset and Huawei's latest 5G base station. The time division multiplexing technology of the uplink channel of terminal antennas has been verified, which is a major breakthrough for both MediaTek and Huawei. Also, this testing verified the feasibility of dynamic switching of the terminal's uplink channel across frequency bands. This means that with the Super Uplink solution, the terminal can flexibly utilize uplink resources of different frequency bands, converging and thereby improving uplink capabilities. Additionally, based on the latest 3GPP standard, this testing has proved that terminals' switching latency requirement of uplink transmission can be further lowered. This lifts constraints on terminal technologies, so that Super Uplink will be supported on a much wider range of terminals. This will create a favorable condition for operators to provide an improved experience for both common and enterprise users.

Currently, the 5G Super Uplink industry chain is maturing quickly, with end-to-end capabilities ready in terms of the radio access network, core network, and terminals. The successful testing by MediaTek and Huawei lays a solid foundation for the scale commercial adoption of Super Uplink. In the near future, it will enable differentiated and high-quality services for end users in the mobile broadband and industry fields.

ZTE and China Mobile Jointly Build the Communication Lifeline for Wuhan Lei Shen Shan Hospital

ZTE Corporation announced on 27 January that ZTE helps China Mobile with the network construction in Lei Shen Shan Hospital in Wuhan, to improve the capability to address new coronavirus pneumonia. This hospital was named Lei Shen Shan Hospital.

After receiving the notifications of the hospital's location selection, ZTE and Hubei Branch of China Mobile have quickly and carefully analyzed the current network situation. ZTE has developed a network construction solution, and arranged for technical personnel to carry out network expansion and construction on site on 26 January. The hospital will meet the communication and video transmission requirements of tens of thousands of people once it will be completed.

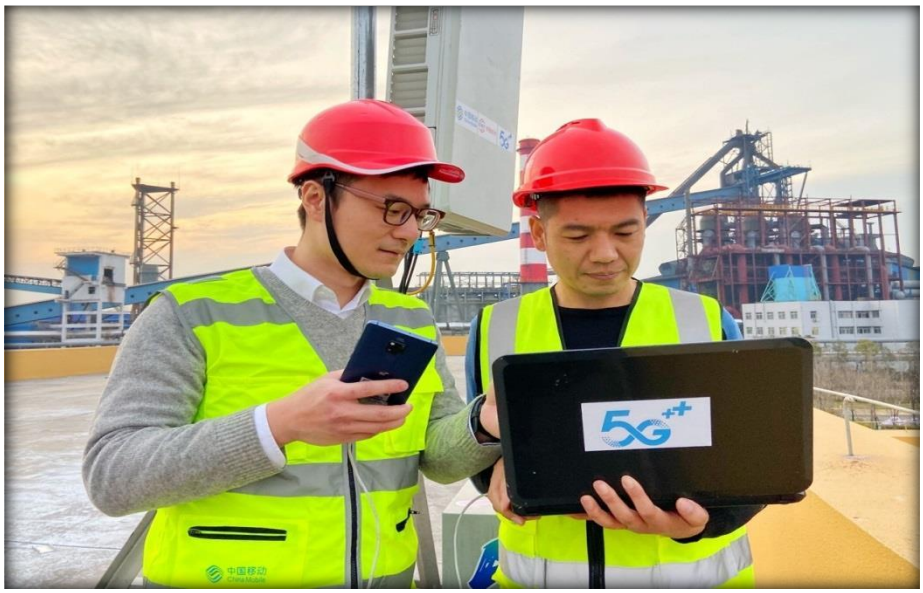
In this project, the 5G network has been also commissioned, which can be used for telemedicine support and improve patient treatment efficiency. In the future, capacity expansion and 5G indoor distribution will be carried out simultaneously with the construction of the Lei Shen Shan Hospital. It is estimated that more than 25,000 people can communicate with each other at the same time.

In the Wuhan epidemic control battle, ZTE has attached great importance to providing comprehensive support for the supply chain, communications support, and on-site services. ZTE has arranged hundreds of professionals to support operators and for emergency delivery of key equipment spare parts from Shenzhen to ensure the secure and stable operation of the communications network.

With great commitment to the epidemic situation in Wuhan and China, ZTE fully supports operators in guaranteeing communications in the critical period, building an information bridge for life treatment.

CICT Has Deep Cooperation with Ezhou "Echeng Iron and Steel" on 5G + Intelligent Manufacturing

CICT, China Mobile Hubei Branch, China BAOWU group Echeng steel Co., Ltd (Echeng steel) have conducted in-depth cooperation to complete the connection between 5G network and information business platform. This successful cooperation marks the arrival of the "5G + Smart Manufacturing" era.



Steel industry has complex application scenarios in the industrial manufacturing field, and it is a typical representative of complex process industry. It also requires a reliability and stability network. 5G technology provides support for the precise control of the system, it is possible to improve the level of safety production in the field of industrial manufacturing.

As the largest construction steel production base in Hubei Province, Echeng Steel realized the centralized monitoring of steelmaking, cast steel, steel rolling and warehousing logistics data through the construction of a dedicated network platform for the 5G industry, and realized the use of mobile phone APP for factory management and business data query. This technology meets the requirements of the steel industry for unmanned control and intelligent production. Especially in terms of data security, data confidentiality, local unloading of data streams and priority processing of local services can be achieved.

In the future, CICT with Echeng steel will further explore the relevant applications of “5G + industrial Internet” in steel industry. The next step will be to develop the complex operation of electric unmanned cranes. Low-latency remote monitoring through 5G network improves production efficiency and working environment. Through combination of 5G network with material taking devices and material delivering devices, all equipment can automatically run under the control of the system after obtaining the operation plan, greatly improving the production efficiency, and providing a safe environment. With the help of the 5G MEC industrial dedicated network platform, all equipment data of the steelmaking production line and the working status video of the entire plant area can be displayed in real-time and smoothly on the factory dedicated network. Through AR remote identification, monitoring and diagnosis, robot inspection, it can further improve the intelligent production, reduce costs and increase efficiency.

Huawei's Outdoor CPE Lite Wins Red Dot Award: Product Design 2020

Huawei's outdoor CPE Lite won the Red Dot Award: Product Design 2020 for its high-quality design, high integration, and simple and intuitive installation experience.

It is the second time in a row that Huawei outdoor CPE products have won this prestigious award, which is widely regarded as the "Oscar" of the design industry. This demonstrates the unwavering pursuit of Huawei's outdoor CPE family in achieving a high quality and user-friendly design that enables perfect adaptation into its surrounding environments, as well as strong R&D commitment.

CPE Lite incorporates low-profile, directional, and dual-polarized antenna technology that provides a high gain and supports 4R transmission and FDD/TDD full bandwidth. This also enables the product to come in small dimensions while delivering high performance. An excellent anti-interference capability is further achieved to ensure high spectral efficiency in complex channel environments. Combined with these innovative designs, CPE Lite is a powerful tool to provide users with stable and high-speed network experience.

About Red Dot Award

The Red Dot Design Award was established by Design Zentrum Nordrhein Westfalen, the most prestigious German design association in Europe, in Essen, Germany in 1955. It is the most authoritative design award in the global industrial design industry. It is also the greatest honor in design for Apple, IBM, Porsche, and other top international companies to compete for every year. The award is known for its strict selection criteria and it consists of three awards: Product Design Award, Communication Design Award, and Design Concept Award. The entries must have innovative features that differ themselves from other similar products and represent the world's highest industrial design level in the field.

Nokia and Vodafone Hutchison Australia Unlock Low-band 5G Spectrum

Nokia and Vodafone Hutchison Australia (VHA) in early May announced that they are complementing their 3.5Ghz 5G rollout, with the first deployment of low-band NR700Mhz spectrum in a field test environment in a 5G network in Australia and the Asia-Pacific region.

Once live, the use of 700Mhz spectrum will enhance VHA's 5G network coverage, improve the indoor coverage experience and deliver high-speed 5G connectivity to customers where it is being made available. Combined with its 5G spectrum in the 3.5Ghz band, VHA will be equipped to deliver a compelling combination of speed, capacity and coverage to its customers.

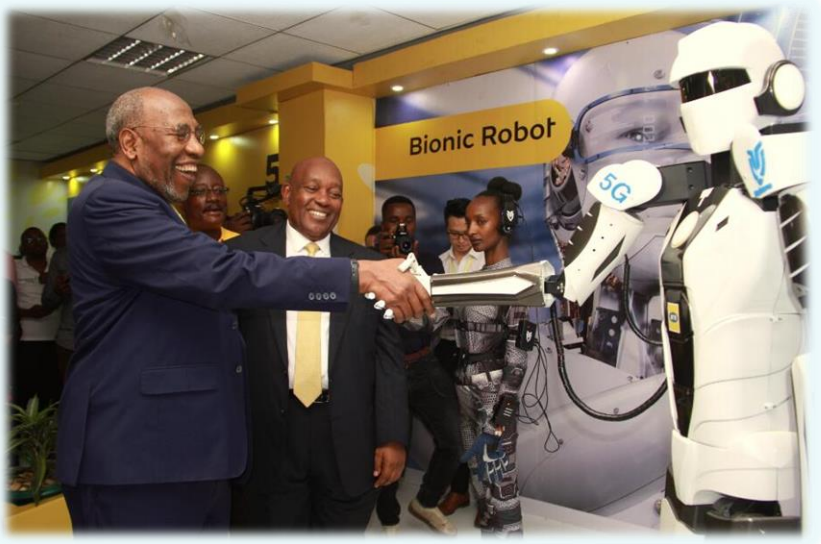
The solution utilizes Nokia's AirScale product range and is being tested on some of VHA's 5G sites in and around Parramatta in Western Sydney. The 700Mhz spectrum will be rolled out to selected areas as part of VHA's 5G rollout. Nokia Global Services will play a crucial role, providing project planning, installation, and network optimization services. Where it optimises network performance, Nokia and Vodafone experts will repurpose the 700MHz spectrum to 5G 700Mhz enabling the delivery of new 5G services, whilst maintaining the performance of the existing 4G network.

Iñaki Berroeta, Chief Executive Officer at Vodafone Hutchison Australia (VHA), said: "We are proud to be showcasing this innovative use of the lowest band spectrum available in Australia with the first live test deployment of 5G on low-band 700Mhz spectrum in our region. Our partnership with Nokia has enabled us to deliver an innovative solution with our customers' experience front of mind. Incorporating 700Mhz spectrum will complement our existing 5G network plans and help deliver the benefits of 5G's speed, capacity and coverage."

Tommi Uitto, President of Mobile Networks at Nokia, commented: "We have worked closely with Vodafone Hutchison Australia to achieve this important milestone. This demonstrates Nokia's continued commitment to delivering innovative services across our 5G portfolio, while meeting Vodafone's requirement for widespread 5G coverage. We look forward to continuing this incredible partnership moving forward."

ZTE and MTN Launch the First 5G SA Network in East Africa

ZTE Corporation announced on 21 January that ZTE and MTN Uganda had jointly launched the first 5G SA network in East Africa, demonstrating 5G use cases at an event themed "Experience the Future Together", taking place in the Nyonyi Garden, Kampala, Uganda.



ZTE and MTN Uganda have showcased a high-speed 5G SA network under the 60 MHz spectrum bandwidth with an actual rate of more than 1.494 Gbps, which can support a variety of applications, such as Gigabit without Fiber Connectivity, Cloud XR, ultra-HD live broadcast, automatic driving and remote surgery.

It is the first 5G SA network in East Africa. Its deployment and operation adopts ZTE's end-to-end 5G equipment, including Common Core, to achieve the complete separation of the signaling plane and the data plane without relying on the existing LTE core network EPC. Furthermore, the network can further support typical 5G applications, including uRLLC and mMTC, through smooth upgrade.

Underpinned by the SA 5G network, the demonstration also featured the real-time communication of an on-site fixed-wireless access network, bionic robot, Cloud VR and other vertical industries, fully showcasing the 5G network's capability as the foundation of an intelligent society as well as ZTE and MTN's commitment to exploring 5G development in Africa.

In addition, ZTE also presented its end-to-end commercialized 5G solutions, including the 5G Common Core, Beyond 100G Transmission, 5G Flexhaul, 5G New Radio and Big Video, as well as its 5G terminal devices, such as Axon 10 Pro 5G smartphones, 5G indoor and outdoor routers.

"ZTE is very keen on sharing new technologies with MTN," said Bill Yi, Vice President at ZTE. "We have been constantly enhancing our 5G capabilities and have become a core supplier of end-to-end solutions in the global ICT industry."

As South Africa's largest telecom operator and the largest multinational telecom company in Africa, MTN Group is currently operating in 21 countries in Africa and the Middle East. To date, the number of MTN users has exceeded 230 million. ZTE has been a partner of MTN since 2009, involving the fields of wireless, core network, transmission, energy infrastructure, terminals, and O&M services. ZTE has collaborated with the 11 branches of MTN in different projects.

China Mobile and Huawei Release "Categories and Service Levels of Network Slice White Paper"

China Mobile, Huawei, Tencent, China Electric Power Research Institute, and Digital Domain have jointly released the “Categories and Service Levels of Network Slice White Paper” to introduce the industry’s first classification of network slice levels. The new white paper dives into the definitions, solutions, typical scenarios, and evolution that make up the five levels of network slices. It serves as an excellent reference to provide guidance in promoting and commercializing network slicing, and lays a theoretical foundation for the industry-wide application of network slicing.

Network slicing is a key 5G technology aimed at building customized 5G industry virtual private networks over the same physical network to accommodate applications with widely diverse requirements. Industry customers have increasingly high recognition and expectations for 5G network slicing as 5G unlocks a new wave of B2B marketplaces. Defining levels of 5G network slices from the perspective of resource and network capabilities will undoubtedly enable operators to better plan and deploy 5G network slicing and help industry customers fully understand the capabilities of their 5G network slices to select the most appropriate level of slicing service.

China Mobile, Huawei, Tencent, State Grid, and Digital Domain co-founded the 5G Slicing Association (5GSA) at the beginning of 2018 to advance the research and commercialization of slicing technologies. Led by 5GSA, member organizations issued the Categories and Service Levels of Network Slice White Paper to share their views on the definition, industry progress, and vertical requirements of network slicing.

The white paper points out that 5G networks can fall into public networks and industrial networks to meet the service, isolation, deployment, and operation requirements of public and industry users. The paper defines five levels of network slices: common and VIP network slices for public applications, common and VIP network slices for common industrial applications, as well as special network slices for dedicated industrial applications. The paper also analyzes the capabilities of wireless, transport, and core networks and details security, operation, O&M, and cost aspects of each network slice level to act as a reliable reference for network slice design, application, and promotion.

The development of E2E network slicing cannot be accomplished overnight. It will ultimately mature over several iterations. As different network slices serve at varying service levels, the resulting costs will inevitably differ. Customers from different sections are expected to select and customize the most appropriate network slice levels for their applications and requirements to avoid excess demands. According to the paper, 5G network slicing development will go through three phases and gradually iterate and evolve to E2E slicing supporting dynamic closed-loop SLAs and network self-optimization.

Nokia, Telenor and Telia Create the World's Most Advanced Shared Wireless Network in Denmark

Nokia, along with leading operators Telenor and Telia, announced in early March that it has deployed the world's most advanced shared wireless network supporting a Multi-Operator Core Network (MOCN) feature, enabled for wireless technologies spanning 2G to 5G.

The 5G MOCN feature was deployed on a trial network in Denmark and verified with successful end-to-end test calls. MOCN, the most advanced network architecture model allowing for network sharing, enables distinct mobile operators with their own core network to share a common radio access network infrastructure as well as spectrum resources.

This is the first network to include live MOCN capabilities for 2G, 3G, 4G and 5G simultaneously. The live trial utilized Nokia's end-to-end 5G technology, including 5G RAN and 5G cloud core.

Network sharing is an efficient and cost-effective way for two or more mobile operators to build and roll out a network at scale without having to duplicate efforts. It is an important strategic consideration for operators that helps them to quickly deploy 5G networks to consumers and businesses while keeping costs to a minimum. As 5G networks require a higher density of radio equipment, such as small cells, to deliver the right performance and coverage, network sharing results in overall lower power consumption compared to individual networks.

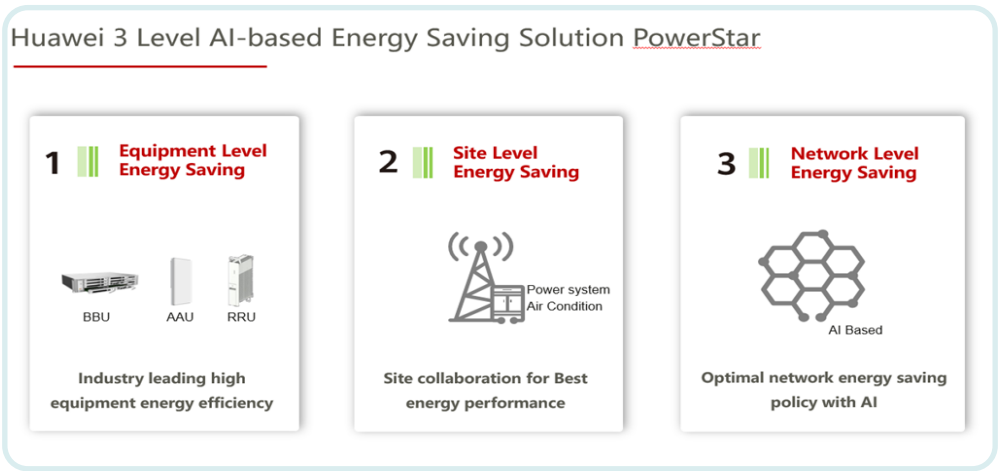
Tommi Uitto, President of Mobile Networks at Nokia, said: "Deploying 5G networks independently can be an expensive undertaking for mobile operators in the most competitive markets. This trial highlights that through network sharing, operators can drive efficiencies, lower costs and bring the myriad benefits of 5G to businesses and consumers quickly. We hope that this trial demonstrates to operators around the world that there are multiple options open to them to get their 5G networks up and running quickly and at the lowest possible cost."

Georg Svendsen CTO at Telenor, said: "We were among the first operators in the world to use MOCN on our network, and I am very pleased that we also are among the first ones to use the technology in our 5G-pilot as well. Network sharing is a clear strategic priority for Telenor to continuously deliver one of the best mobile networks in the world, supporting safe and reliable connectivity to our private and business users."

Henrik Kofod CTO at Telia Denmark, said: "This is a major step on our 5G journey, and I really look forward to start testing with real customers and understanding how 5G can provide true value for them. I hope this will inspire other operators in the Danish market to move in the same direction. Network sharing is a great choice when it comes to building sustainable 5G networks. When we maximize our resource utilization, we lower our carbon footprint and optimize our investments."

Bits Drive Watts: Huawei PowerStar 3 Level AI-based Energy Saving Solution

In the 27th GTI Workshop, Huawei has made a report on its PowerStar solution to address the challenges. This solution aims to help operators meet their energy saving goals without compromising network performance and user experience. Its three-level energy saving scheme enables the first-class energy saving performance. On the basis that there will be 6.5 million 5G sites by 2025, theoretically, Huawei's solution will decrease 43 million tons of carbon dioxide (CO_2) emissions. In total, this amounts to 55 billion kilowatts of electricity saved, or 380 million newly planted trees.



Utilizing AI and other innovative technologies, Huawei's PowerStar solution achieves end-to-end (E2E) comprehensive energy saving for 2G, 3G, 4G, and 5G networks at the equipment, site, and network levels. Thanks to AI-powered platforms while referring to expert experience, it supports a full series of energy saving features and enables energy saving parameters to be accurately configured. This ensures the maximized energy saving simultaneously maintaining stale KPIs for operators.

With the E2E PowerStar solution, energy saving strategies and real-time monitoring and optimization can be automatically implemented through using automated tools. This ensures that the energy saving features can be efficiently deployed at the network level. In addition, AI-powered platforms support accurate co-coverage identification. This enables coordinated energy saving among networks of different RATs operating on multiple bands, maximizing the energy saving performance. Based on the real-time monitoring of energy-saving performance and impact on network KPIs, energy saving parameter configurations are iteratively optimized. As a result, user experience will be not affected due to energy saving.

"Addressing climate change is one of the UN's most important sustainable development goals (SDGs). The telecom industry must make concerted efforts to reduce energy consumption of mobile networks to honor the promises of SDG goals," said Ma Hongbo, President of Huawei's SingleRAN Product Line. "Huawei's PowerStar solution has been deployed at more than 100,000 sites on more than 20 commercial networks in China, South Africa, Ukraine, and many other countries. It allows operators to achieve coordinated network-wide energy saving across network RATs, equipment, and sites through AI-powered platforms. Huawei will continue to further innovate on energy saving and help operators run their networks with the maximal energy-saving effect."

ZTE Partners with KDDI to Unveil New 5G Smartphones in Japan

ZTE Corporation announced in late March that it will unveil the new product series ZTE a1 in Japan, in cooperation with the leading local operator KDDI in 2020. The new 5G smartphone will be compatible with both SA and NSA modes, featuring 6.5-inch display, AI quad shooting system and a 32MP selfie camera.

In the 5G era, the two parties will team up to develop the consumer-centric 5G smartphones in a bid to meet the emerging personalized demands of the local users along with the 5G network deployment in Japan. In 2020, ZTE will launch nearly 10 5G smartphones worldwide, and a total of over 15 5G terminal devices.

In addition to KDDI, ZTE has also cooperated with SoftBank in Japan to launch the ZTE Axon 10 Pro 5G in March 2020. ZTE Axon 10 Pro 5G has been available in more than 10 countries on a global scale, and is recognized as the first 5G smartphone commercially available in Northern Europe, Middle East and China.

“ZTE is committed to meeting the diverse requirements of operators, enterprise users and consumers in multiple service scenarios, and empowering hundreds of industries with a complete 5G terminal devices portfolio,” said Xu Feng, SVP of ZTE Corporation and President of Mobile Device Division. “We’re in close cooperation with top operators worldwide, including KDDI and SoftBank, to find out and meet the true needs of consumers in the local market.”

Following the launch of the new 5G smartphone ZTE Axon 11 5G in China on March 23, ZTE has further extended its product portfolio and its global presence in the 5G terminal devices segment. To date, ZTE has been in cooperation with more than 30 global operators in the 5G terminal field.

Huawei Unveils 10 Key Enablers for Accelerating Global Commercial Adoption of 5G (1/2)

Yang Chaobin, President of Huawei Wireless Product Line, unveiled Huawei's 10 key enablers of 5G, including the full-series all-scenario ultra-broadband products and solutions to facilitate all frequency band evolution to 5G, and the innovative end-to-end super uplink and slicing solutions to help operators build full-service capabilities. These offerings are intended to better cater for end users, home users, and industry users to secure business success in the 5G era.

1# Extensive 5G Commercial Experience to Accelerate 5G Scale Deployment

“Our 5G products and solutions have been favored by the majority of worldwide telecom operators. All these commercial deployment experiences will be utilized to improve product performance to meet customer expectations and help telecom operators deploy 5G commercial networks more economically and efficiently," said Yang Chaobin.

2# Comprehensive Portfolios to Provide Consistent 5G Ultimate Experience

From the very onset of 5G construction, both capacity and coverage must be planned carefully in order to provide a consistent user experience. Huawei has the comprehensive product portfolio for all kinds of scenarios. The three-layer networking architecture, including macro base stations for basic coverage and capacity, Easy Marco deployed at pole sites for coverage supplement, and LampSite for indoor digital systems, enables seamless coverage and a consistent, enjoyable experience for end users. In addition, Huawei has released the industry's lightest Massive MIMO AAU. It weighs only 25 kg and can be transported and installed by a single person, but delivers a guaranteed performance. It greatly improves operators' network construction efficiency.

3# Industry's Only Ultra-Broadband Solution, Simplifying Network Deployment

In the 5G era, continuous large-bandwidth TDD spectrum is the optimum choice for achieving an ultimate 5G experience. However, a significant number of telecom operators only get discontinuous segments of spectrums due to satellite occupation or discrete allocation. Huawei has launched the industry's only full series of ultra-broadband solutions, which support a maximum bandwidth of 400 MHz. With just one module, all discrete spectrums within 400 MHz can be used. It saves modules and simplifies site deployment, greatly slashing site rental and hardware cost for telecom operators.

4# Exclusive Blade AAU, All in One for Simplified Deployment

As Yang Chaobin said, "In the process of mobile communications development, telecom operators have been using greater numbers of antenna units as a solution for insufficient sites and poles. Now they have to deal with insufficient antenna installation space. Huawei's unique Blade AAU, which prides itself on ‘ultimate simplicity’, aims to reduce operators' TCO and investment in hardware and sites." Blade AAU integrates the active 5G AAU and passive 2G/3G/4G antennas into one box, and constrains the total height around 2 meters to support all sub-6 GHz frequency bands. Operators can use it to replace 3G/4G antennas to facilitate 5G deployment with single antenna space. In addition, the integrated design greatly simplifies site installation, which in turn improves 5G construction efficiency, accelerating overall deployment. Favored by operators since its release, this product has been put into commercial use on commercial networks in Switzerland and China.

5# Industry's First Commercial DSS Solution, Enabling Fast FDD NR Deployment

2020 will see large-scale 5G deployment worldwide. Apart from the mainstream 5G deployment on mid-band spectrums, operators can also deploy 5G networks on sub-3 GHz FDD to achieve fast 5G coverage. For new FDD spectrums, Huawei's suggestion is direct 5G deployment on them to significantly improve the FDD spectral efficiency with NR technologies. It is proven that NR operating at an FDD frequency can deliver an impressive improvement in user experience compared to that of LTE. For existing FDD spectrums, Huawei's 1 ms dynamic spectrum sharing (DSS) solution can be adopted. This technology dynamically allocates spectrum resources in milliseconds based on LTE and 5G service and traffic requirements, maximizing spectral efficiency. "In November 2019, Huawei DSS was put into commercial use in Europe. Until now, our customers have 100 million legacy FDD RRUs that can be adapted efficiently to 5G using this solution," said Yang Chaobin.

Huawei Unveils 10 Key Enablers for Accelerating Global Commercial Adoption of 5G (2/2)

6# Cutting-Edge Algorithm Enables Leading Network Performance

"Huawei has undergone extensive R&D, innovation, and commercial adoption in Massive MIMO. We have complete product portfolios and state-of-the-art algorithms to keep our Massive MIMO performance unrivaled. In terms of software algorithms, Huawei has MU-MIMO, SRS, full-channel beamforming and more to provide optimal capacity, coverage and user experiences. In 2019, Huawei helped LG U+ in South Korea, EE in the UK, and Sunrise in Switzerland to deploy 5G commercial networks. In the third-party network performance tests conducted by RootMetrics and Connect, Huawei helped its operators rank No.1 in user experience, with an average downlink rate of 1.5 to 2 times higher than that of competitors' networks, which further demonstrates Huawei's superior Massive MIMO performance in actual commercial use," said Yang Chaobin.

7# Low Energy Consumption Makes Green 5G

Energy efficiency is another prerequisite for sustainable and healthy development of mobile communications networks, particularly for 5G. Huawei provides complete energy-saving solutions. They leverage innovative product technologies, new site forms, and AI-based network-wide coordination to reduce per-bit 5G power consumption. Huawei resorts to innovative chip process design and algorithms, high-quality hardware materials, and advanced heat dissipation technologies to deliver 50 times larger cell capacity with the same energy consumption for 5G AAUs in comparison to 4G RRUs. In addition, the AI-based coordinated energy saving solution maintains satisfactory KPIs in different scenarios, whilst leveraging symbol, channel, or carrier shutdown across network modes and frequency bands based on service requirements to achieve more refined and accurate energy saving at the network-level.

8# E2E NSA/SA Converged Solution for Future Industry Digitalization

"5G is not only about providing a better experience for all end users. It is also pivotal for industry digitization, which sets 5G apart from its previous generations. 3GPP Release 16 is about to be finalized this year, and by then 5G will have more comprehensive capabilities for ultra-reliable low-latency communication (URLLC). It has become a common understanding in the industry that SA is the ultimate architecture of 5G network. Huawei supports both NSA and SA from end-to-end in terms of the radio access network, core network, chipset, and terminal, which will further help operators build full-service capabilities for consumers, homes, and all industries," said Yang Chaobin.

9# Unique E2E SUL to Unlock UL Experience and Latency for Industry Needs

The traditional TDD system design focuses on eMBB requirements, of which the downlink capability is much higher than the uplink capability, thus it would fail to meet the requirements of large uplink capability and low latency for industry applications, such as a 4K/8K live broadcast. To address this issue, Huawei has launched the innovative end-to-end Super Uplink solution. It coordinates TDD and FDD spectrums to unlock the uplink capabilities and significantly reduce latency. In addition, it can enable TDD system to work with Full SUL bands to significantly improve uplink capabilities. The test results on telecom operators' networks show that, it reduces latency by 30% and increases the uplink rate by up to four times. The 3GPP organization has officially accepted this innovative technology.

10# E2E Network Slicing Solution Facilitates Industry Digitalization

To better support industrial digitalization, Huawei has launched the end-to-end slicing solution that spans the radio access network, core network, transport network, and terminals. Telecom operators and industry customers can enable diversified services on demand and provide guaranteed high bandwidth and low latency to secure business success. The solution can be applied to a variety of industry scenarios, such as telemedicine, smart port, smart factory, and cloud AR/AR. Overall, this allows industry users to reduce costs and improve efficiency, whilst simultaneously enabling telecom operators to explore new markets.

ZTE and Qualcomm Achieve Industry's First Voice Over NR Call in the 700 MHz Band

ZTE Corporation, together with Qualcomm Technologies, Inc. achieved the industry's first 5G-enabled Voice over New Radio (5G VoNR) call over the 700 MHz band, which was completed using commercial products at the Xi'an Test Base.

The call was performed in compliance with 3GPP Release 15 specifications over the 700 MHz spectrum band (n28) by utilizing ZTE's 5G NR base station and a 5G smartphone form factor test device powered by a Qualcomm® Snapdragon™ 5G Modem-RF System. The test validated the full functionality and high quality of the end-to-end VoNR services, laying a solid foundation for the industry to achieve large-scale commercial rollouts in the 700 MHz band.

700 MHz is an optimal frequency band to provide wide coverage, strong penetration and service continuity, which are important aspects not only for traditional mobile users but also new vertical enterprise customers. The utilization of the 700 MHz band for 5G networks supports cost-effective network construction and operation.

ZTE and Qualcomm Technologies are well positioned to enable the commercialization of 5G in the 700 MHz band, working together to develop the necessary end-to-end capabilities for networks, devices and business platforms to allow operators to deliver a full service offering including voice and data.

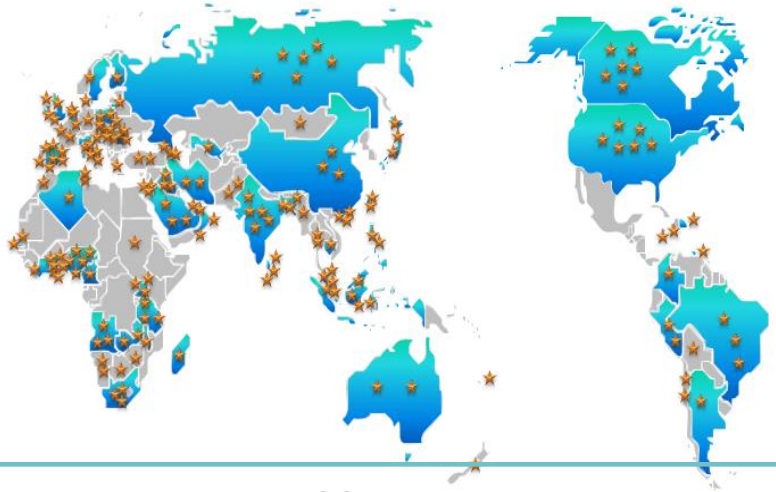
To fully support the commercial rollouts of 700 MHz in China, ZTE has stepped up its research and development efforts related to the 700 MHz band, and introduced a full range of end-to-end products, while working in tandem with Qualcomm Technologies in device development and interoperability tests of 700 MHz services to meet early demand for its commercialization in China. The industry's first VoNR Interoperability Development Testing (IoDT) utilizing commercial systems over the 700 MHZ band has removed a key barrier to its scalable commercialization.

"We at Qualcomm Technologies have achieved a series of milestones with industry leaders to support the progression of 5G, and this collaboration with ZTE showcases the Snapdragon 5G Modem-RF System's leadership in supporting all key 5G spectrum bands as specified by 3GPP, a landmark in the evolution of 5G," said Durga Malladi, senior vice president and general manager, 4G/5G, Qualcomm Technologies, Inc. "The success of VoNR over 700MHz shows how we can enable global OEMs and operators to deliver high-quality voice services without having to rely on VoLTE (Voice over LTE) or an LTE anchor, unlocking 5G's ability to power worldwide connectivity capabilities."

"We have been working closely with Qualcomm Technologies to drive the technical verification and commercialization in the development of 5G for a long term," said Bai Yanmin, vice president and general manager of RAN products, ZTE. "ZTE has always maintained an industry-leading position in 5G networking solution. "The success of the 5G VoNR call over the 700MHz band has removed a key barrier to its full-scale commercialization and thus strongly supports the construction of 5G 700 MHz SA networks and helps offer more comprehensive 5G capabilities to more service providers, enterprise users and consumers."

TD-LTE & 5G Global Market Overview

Global Deployment as the Mainstream Mobile Broadband Technology



- **178** TD-LTE commercial networks in **86** countries have been launched
- **168** TD-LTE commercial networks in **81** countries are in progress or planned
- **2.48** million TD-LTE base stations (By Q4, 2019)
- **2.8** billion TD-LTE subscribers

Source: GTI, TDIA, GSA, GSMA
By Q1, 2020

5G Commercialization is Accelerating

73 5G Commercial Networks Launched

386 Operators in the world have deployed, tested or trialed 5G

Europe: 40 Operators in 21 Countries

- Sunrise: 5G covered 426+ cities&towns in Switzerland
- BT/EE: 5G expanded to parts of 71 towns and cities
- Vodafone: 5G available in 100+ towns and cities in the UK

Korean: First 5G Commercialization in 2019
Japan: 5G was launched in March 2020

China: Largest 5G Commercial Network with over 600,000 Sites, covering 340+ cities in China at the end of 2020

US: Major 4 Operators have launched 5G in compliance with 3GPP standard

Australia: Optus and Telstra Launched 5G Commercial Service in mid-2019

South Africa: Rain launched 5G in Oct. 2019, covering major cities

Middle East: Totally **12** operators launched 5G in Qatar, Kuwait, UAE, Bahrain and Saudi

GTI Breakthroughs and Achievements in 2020

5 New Released Whitepapers and Technical Reports

5G Enterprise Network Solutions (5G ENS)

GTI Security Consideration for 5G Smart City Whitepaper
This whitepaper focuses on the potential security threats and challenges brought by the application of 5G technologies to Smart City, and the security capabilities required to address these threats.

GTI Wireless Solution for 5G ENS Whitepaper
This whitepaper summarizes differentiated network requirements of industry customers, proposes three types of wireless enterprise network solutions, and describes and analyzes the network architecture, network performance (coverage, performance, reliability, and isolation), application scenarios, and industry conditions.

GTI 5G Network Architecture and Capability Customization for ENS Whitepaper
This whitepaper indicates that as 5G technologies mature, an increasing number of vertical industries are becoming aware of the fact that industry-specific private 5G networks will aid their digitalization and industry upgrade, helping the enterprises meet the needs of a faster and more diverse market.

GTI URLLC Evaluation Whitepaper (Phase II)
Phase II involves more vertical, such as differential protection in electrical power distribution and motion control in factory automation. And more simulation assumptions are adopted, such as FDD, new frequency band (700MHz), new frame structure, etc.

GTI Breakthroughs and Achievements in 2020

5 New Released Whitepapers and Technical Reports

5G Network

GTI NSA Commercial Network Deployment Whitepaper (v2.0)
This whitepaper will serve as a platform to share and present the results of the test and strategies of the 5G NSA commercial network deployment, parameters and performance optimization experience, thus providing a reference to industry partners, so as to jointly promote the 5G industry maturity, accelerate its scale commercialization and evolution to SA, and embrace property of 5G ecosystem.

※ To get the full version of GTI Whitepapers,
- View on the GTI website http://gtigroup.org/Resources/rep/
- Scan the QR code to download GTI APP to view

GTI APP

36 **GTI Device Certification Achievements**
On 5G and M-IoT

GTI CERTIFIED

5 **Test Specifications**

GTI 5G Device Function and Performance Test Specification V3.0.0
GTI NB-IoT Module Test Specification
GTI NB-IoT Interoperability Test Specification
GTI Test Solution for MIoT Terminal -Smart Smoke Detector V1.0.0
GTI 5G Device Function and Performance Test Specification (v3.0)

4 **Certified Test Labs**

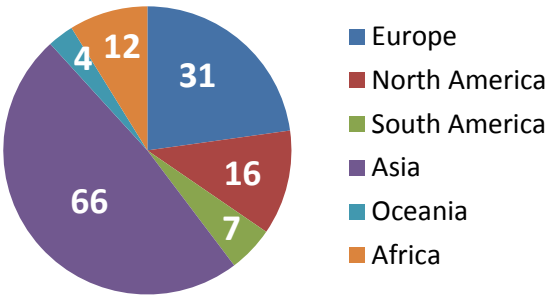
中國泰爾實驗室 | 中国移动 China Mobile | GERI Gumi Electronics & Information Technology Research Institute | TesTime

27 **Certified Products**
Chipsets, modules and devices http://www.gtigroup.org/e/action/ListInfo/?classid=610

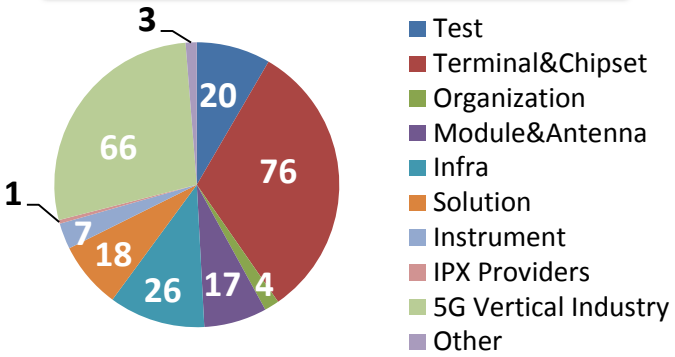
GTI Members Updates and Activities in 2020

136 Operators and 238 Industry Partners Joined GTI by Q1, 2020

136 Operators



238 Industry Partners



66 Vertical Industry Partners

Including IoT, IoV, Communication Capability, Industrial Internet, Cloud Robot, VR/AR

BAIC	Changhong	China AVIC	EVE Energy	Feitian	BOCO
GAEI	Goertek	Haier	Hisense	IESLab	Ehang
Jinan Towngas	LeAutolink	Neusoft	Oviphone	Canny Robot	Ecaray
Philips Lighting	SAFT SA	Shougang Automation Information		iStaging	Skymind
Taiyo Yuden	WapWag	Wireless Car	Xiaomi	Bettershine	SIASUN
iQIYI	Hongyu	Holoview Lab	UISEE	CEPRI	G7 Networks
Pico	HiScene	Cyber Cloud	Shitian	3Glasses	Phansion
IDEALENS	7D Vision	ChipEsthesia	AEE	LIESMARS	KuangChi
AIpark	HUYA	DeepRobotics	JD Logistics	.....	

GTI Activities

2020	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec
Summit			*Time: Jun.* *Online* **GTI Summit 2020 Online Edition**			
Workshop	*Time: 22nd-23rd Apr.* *Online* **The 27th GTI Workshop**		*Time: July* *Online* **The 28th GTI Workshop**	*Time: TBD* *Online* **The 10th Spectrum and Technology Workshop**		*Nov.* **The 29th GTI Workshop**

Welcome to Join GTI

GTI, *founded in 2011 by Bharti Airtel, China Mobile, Sprint (Clearwire), SoftBank and Vodafone, has been dedicated to constructing a robust ecosystem of TD-LTE and promoting the convergence of LTE TDD and FDD. As 4G evolves to 5G,* ***GTI 2.0*** *was officially launched at the GTI Summit 2016 Barcelona, aiming not only to further promote 4G evolution and expand its global market, but also to promote 5G development and cross-industry innovation. After years of joint efforts, GTI has become one of the most influential global cooperation platforms with 136 operators and 238 partners.*

How to Join GTI

Join as GTI Operators (with TDD Spectrum)

1. Fill out the application form (download from http://gtigroup.org/about/join/2013-11-11/1419.html), and return to GTI Secretariat: admin@gtigroup.org;

2. Sign the Accession Form and return the signed copy to 5 initiators;

3. Once the participation process finishes, a GTI website account and associated password will be assigned to the new participant.

Join as GTI Observers (without TDD Spectrum)

1. Fill out the application form (download from http://gtigroup.org/about/join/2013-11-11/1419.html), and return to GTI Secretariat: admin@gtigroup.org;

2. Sign the declaration form and return the hard copy to GTI Secretariat;

3. Once the participation process finishes, a GTI website account and associated password will be assigned to the new participant.

Join as GTI Partners (GTI Partner Forum)

1. Fill out the application form (download from http://gtigroup.org/about/join/2013-11-11/1422.html), and return to GTI Secretariat: admin@gtigroup.org; GTI Secretariat and Working Group Chairmen will review;

2. Sign the Declaration Form and return the signed hard copy to GTI Secretariat;

3. Once the participation process finishes, a GTI website account and associated password will be assigned to the new participant.

GTI

CONTACT GTI:

If you have any questions, comments, suggestions regarding 4G, 5G or general enquiries regarding GTI, please contact: admin@gtigroup.org