

GTI Industry Briefing

July, 2019 | No. 35

*Edited by GTI Secretariat
July, 2019*

Contents

Top News

GTI Summit · Shanghai 2019 with Theme of “5G+X, Beyond Connectivity” Successfully Held	01
The 25th GTI Workshop Fully Accelerates 5G Development	03

Industry

Sprint Lights Up True Mobile 5G in Atlanta, Dallas-Fort Worth, Houston and Kansas City	04
Huawei 5G Outdoor CPE Wins Red Dot Award: Product Design 2019	05
ZTE and Orange Show Advantages of 5G in Automotive, Robotics and Entertainment Applications	06
Nokia Bell Labs and Amber Researchers Formulate New Battery Design for the 5G World	07
China Mobile and CICT Announced 5G Smart Factory and Smart Healthcare Solution in Hubei	08
Baicells Cost-Effective Indoor Solution Based on White-Box Hardware	09
Vodafone Goes Live with Ericsson 5G Technology in London	10
Huawei's Yang Chaobin: 5G is ON, Keep Innovating to Realize Large-Scale 5G Commercialization	11
Nokia & TIM Break European Record for Long-distance Data Transmission by High-speed Network	12
ZTE Wins Best Mobile Service for Connected Living in Asia Award by ATG Air Broadband Solution	13
Ericsson and SoftBank Corp. to Deploy Multi-band 5G Network	14
Huawei, China Mobile and Partners Released 5G Network Slicing Business Opportunities	15
Datang and China Mobile Completed the First 5G DAS RRU Test in Wuhan	16
Nokia to Help Ooredoo Qatar Take 5G Lead with Its Cloud Native Core Network	17
ZTE Launches Its Cybersecurity Lab Europe in Brussels	18
GTI, Huawei and Multiple Industry Partners Released TDD Spectrum White Paper	19

Market

TD-LTE & M-IoT Global Market Overview	20
---	----

GTI

GTI Breakthroughs and Achievements in 2019	21
GTI Members Updates and Activities in 2019	24

Appendix

Appendix 1 – Welcome to Join GTI (to operators)	25
Appendix 2 – Welcome to Join GTI Partner Forum (to non-operators)	26

GTI Summit · Shanghai 2019 with the Theme of “5G+X, Beyond Connectivity” Successfully Held

GTI Summit · Shanghai 2019, with the theme of “**5G+X, Beyond Connectivity**”, was successfully held on 26th June during MWC Shanghai 2019. Delegates from governments, organizations, operators, verticals and partners attended this summit to accelerate 5G commercialization, promote converged development of 5G and new tech/new ecosystem, as well as excavate new value of 5G+X.



Mr. Craig Ehrlich, Chairman, GTI

5G acts as a key enabler for innovative services and combines with AI, Big Data, Edge Computing and other trending technologies to unleash even more possibility to the verticals and our society. GTI will further accelerate 5G commercialization, promote converged development of 5G+ new technologies and the ecosystem, foster innovative business and service, and excavate new value of 5G+X through joint cross-industry innovation.



Mr. Liu Yulin, Vice Director General of Department of Information and Communication Development, MIIT of China

Chinese government attaches great importance to the development and application of ICT. Great efforts have been made to promote large-scale application of ICT, tap into consumption and production, as well as accelerate technology innovation to further drive 5G development.



Mr. John Hoffman, CEO, GSMA

It is the most exciting time for the mobile industry. The next generation industrial revolution will be greatly driven by the integration of 5G, AI, big data and IoT. The rapid development of 5G devices and more immersive contents will further accelerate the cross-industry cooperation.

Dialogue

Mr. Yang Jie, Chairman of China Mobile, introduced the development plans of 5G network and “5G +”, and put forward three suggestions:

- Accelerate the 5G development and maturity of Release 16 standard.
- Promote SA end-to-end maturity, and accelerate supply of multi-mode multi-band 5G devices supporting both NSA and SA.
- Explore extensive cooperation with global operators and partners to promote sharing in information, resource and achievements, and build a win-win global industry ecosystem.



Mr. Liang Hua, Chairman, Huawei

Addressed that it is the critical moment for China to lead the first wave of the largest 5G commercial network construction. The industry needs to take into account the way to build 5G network, support 5G industry applications, and create 5G ecosystem.



Mr. Börje Ekholm, President & CEO, Ericsson

Highlighted that 2019 will see an explosive growth momentum of 5G. As many countries are planning to deploy 5G networks, greater efforts should be made to promote spectrum allocation and spectrum sharing. Work on digital economy should also be strengthened to provide easier access to IoT and other network application.



Mr. Ming-kai Tsai, Chairman, MediaTek

As the core technology, IC enables development of mobile communication industry and the rise of SoC, bringing large number of diverse 5G applications in mobile terminal market. SoC/IC plays a more crucial role in the ecosystem of mobile communication services. More cooperation with cloud service providers will be encouraged to provide better user experience.

GTI Summit · Shanghai 2019 with the Theme of “5G+X, Beyond Connectivity” Successfully Held



Dialogue

Ms. Jing Ulrich, Vice Chairman of Global Banking and Asia Pacific and JPMorgan Chase & Co, remarked that personal consumption has become a key enabler in the rapid development of Chinese economy. 5G will be a game changer and play a key role in the further development of China. In the future, the Chinese enterprises must expand their view, turn their attention to international markets and explore more possibility in global cooperation.



Mr. Xu Jin, Director of Technical Management Center, China Central Television

The 5G and edge computing are expected to provide new transmission means for news live broadcast, achieve large-scale mobile production of integrated programs, and realize the interactive and smooth display of multiple types of terminals with 5G technology.



Mr. Prakash Sankaranarayanan, SVP Product Strategy & Partnership Development, Reliance Jio

5G is an era of everything connected, and data can be a new source of business revenue, therefore work on data connection and protection should be strengthened further. 5G connects sensors and the Internet of Things, and empowers automatic driving, robots, and Human machines, etc., which will create more value business and applications.



Mr. Peng Wei, CEO, China Merchants Life Insurance

The elderly care services will be integrated with 5G technology to promote smart elderly industry. The company will be more open and cooperative to create a smart ecological circle, and jointly explore the development path and new opportunities of the smart elderly care industry in the new era of 5G.



Mr. Xu Ziyang, Executive Director & CEO, ZTE Corporation

5G commercial use has entered the stage of network performance verification and initial service achievement. ZTE believes that collaboration, intelligence, openness, and security will be the key to sound development of 5G networks and innovation of the enabling industry.



Panel

Mr. Ji Xinhua, Co-Founder and CEO of Ucloud

5G empowers cloud computing, brings a large amount of data and provides driving force to AI. It also accelerates industrial innovation, and creates value for society.

Madam Chen Lan, President & CEO of DOCOMO Beijing Labs

Efforts to significantly improve user experience, productivity and innovative services will help to create more value and provide solutions for social issues.

Mr. Xu Li, Co-founder & CEO of SenseTime

AI+ 5G make it possible for individual intelligence to turn to group synergy. By empowering connection to terminals, 5G will bring complex synergies between different industries.

Madame Huang Yuhong, Secretary General of GTI, conducted an in-depth discussion with leading represents and experts on the new value enabled by integration of 5G with AI, cloud computing and other cutting-edge technology.

The 25th GTI Workshop Fully Accelerates 5G Development

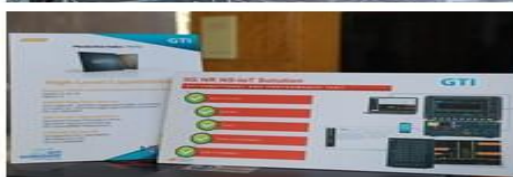
The 25th GTI Workshop was successfully held during June 24th-25th in Shanghai, China. A total of 200 industrial leaders and experts from 11 operators and nearly 60 partners/organizations around the world attended the workshop, to discuss and share their profound insights into key issues and latest progress in 4G evolution and 5G development.



Specifically, the workshop attached much focus on the industrial mostly concerned topics on 4G evolution, 5G Enterprise Network Solution, 5G eMBB and Innovative Business and Application.

During the workshop, experts from multiple companies worldwide shared their valuable experiences in network performance enhancement, 5G enterprise network solution, NB-IoT, 5G pre-commercial progress and key technology and issues research, 5G device certification and technology, 5G S-Module and vertical industry device as well as 5G innovative business and application.

In addition, the workshop demonstrated some of the latest technologies and devices on 5G function and performance test system, 5G protocol conformance test system, video demonstration of OTA test system, 5G protocol and RF conformance test system, 5G E2E Service demo and FOTA remote upgrade demo, which will be definitely accelerating the progress of 5G commercialization.



Sprint Lights Up True Mobile 5G in Atlanta, Dallas-Fort Worth, Houston and Kansas City

On May 30, Sprint's on-the-go customers are among the first in the world to experience the power and performance of true mobile 5G with the largest initial 5G coverage footprint in the U.S. The next generation of wireless service is now here, delivering blazing-fast download speeds in areas of Atlanta, Dallas-Fort Worth, Houston and Kansas City. In the coming weeks, Sprint also expects to launch service in areas of Chicago, Los Angeles, New York City, Phoenix and Washington, D.C., covering approximately 2,180 square miles and 11.5 million people total across all 9 market areas.

Sprint 5G will power new experiences for wireless customers, from gaming and entertainment services, to IoT and business applications.

At the foundation of Sprint 5G is Massive MIMO, a breakthrough technology that dramatically improves network capacity. Sprint is using 64T64R (64 transmitters 64 receivers) 5G Massive MIMO radios from Ericsson in Atlanta, Dallas-Fort Worth, Houston and Kansas City. These radios support split-mode, enabling Sprint to simultaneously deliver LTE Advanced and 5G NR service. Sprint's 5G Massive MIMO radios run on its 2.5 GHz mid-band spectrum, and they are deployed on Sprint's existing 4G cell sites, providing a nearly identical footprint for both 2.5 GHz LTE and 5G NR coverage.

The Hottest 5G Devices

Sprint is building one of the largest 5G device portfolios in the U.S. to give customers more choice in how they access 5G. Customers can experience 5G mobility and blazing-fast download speeds with [LG V50 ThinQTM 5G](#), [HTC 5G Hub](#), and this summer, [Samsung Galaxy S10 5G](#).



Unleash the Power of 5G with Unlimited Premium and Hatch



Unlimited Premium is the plan of choice for Sprint's 5G-enabled phones with Unlimited data, talk and text nationwide, Hulu, Amazon Prime, Twitch Prime, Tidal HiFi and 100 GB LTE mobile hotspot. Sprint is collaborating with cloud gaming pioneer Hatch to deliver an unrivalled game-streaming experience. Gamers on Sprint 5G will be among the first in the U.S. to experience Hatch's mobile 5G cloud gaming service.

Sprint Lights Up True Mobile 5G in Chicago

Sprint's on-the-go customers can now experience the power and performance of True Mobile 5G across the heart of Chicago.

Chicago is one of nine markets where Sprint is launching True Mobile 5G. In addition to the Windy City, Sprint 5G is currently available in areas of Atlanta, Dallas-Fort Worth, Houston and Kansas City and the company is expected to launch service in areas of Los Angeles, New York City, Phoenix and Washington, D.C. in the coming weeks.

True Mobile 5G from Sprint is available from the historic IL-64 in the north to Stevenson Expressway in the south, and as far as California Avenue in the west to the periphery of Lake Michigan in the east. Sprint 5G covers popular destinations such as Magnificent Mile, River North, Millennium Park, River Front, The Loop and Grant Park, as well as the neighborhoods of Gold Coast, Old Town, West Loop, Ukrainian Village, Medical Village, University of Illinois at Chicago, South Loop and more.

Huawei 5G Outdoor CPE Wins Red Dot Award: Product Design 2019

Huawei's 5G outdoor customer-premises equipment (CPE) wins Red Dot Award: Product Design 2019 recently. Huawei's 5G CPE 2.0 won the award for its cutting-edge design concept and unparalleled innovation that is breaking new ground in the development of 5G.

Product Design of Red Dot Award is considered as the world's most renowned product design award and is an established symbol of excellent design worldwide.

Huawei's 5G outdoor CPE2.0 is designed by Huawei's CPE team in China and the Huawei design team in Munich, Germany, based on the concept of "Ridge", which symbolize Huawei's dedication to providing optimal 5G experience for users, and Huawei's spirit of continuous self-challenge. The CPE 2.0's unique Ridge design also integrates indoor and outdoor devices, users, and the environment. The top of the indoor unit tilts forwards and faces users, representing its user-friendliness. The outdoor unit faces the base station and presents a neat and elegant appearance to users.



Huawei Places the World's First 5G VoNR Video Call



Huawei recently completed the world's first voice over NR (VoNR) call. The voice and video call service was made using two Huawei Mate 20X 5G phones on a 5G standalone (SA) network. The test call was organized by the IMT-2020 (5G) Promotion Group and was part of its China 5G enhanced technology research and development tests. The success of the call lays a solid foundation for optimizing 5G commercial devices' user experience, and marks the maturity of the 5G end-to-end ecosystem.

VoNR is a voice and video solution using in the 5G SA network architecture. The test call was based on a 5G network that Huawei built under the auspices of the IMT-2020 (5G) Promotion Group. One of the mobile phones was placed in a 5G test field at the China Academy of Information and Communications Technology while the other was placed in a 5G test field at the University of Chinese Academy of Sciences. Both sites are in Beijing, but the distance between them is over 60 km, which better simulates commercial application scenarios. Multiple voice and video calls were made, and the call completion rate was 100%. During the call, voice was clear and video was uninterrupted. Operators, Ministry of Industry and Information Technology, and China Academy of Information and Communications Technology officials who witnessed the experience were impressed, and expressed confidence in 5G's commercial deployment.

The Huawei Mate 20X 5G mobile phone used for the call is equipped with Huawei's Balong 5000 5G multi-mode chip. The Balong 5000 is the world's first single-core, multi-mode 5G cellphone baseband processor. It is the first baseband processor compatible with SA and NSA network architectures and that fully supports 2G, 3G, 4G, and 5G networks. The Balong 5000 supports peak downlink speeds of 4.6 Gbps on the sub-6GHz frequency band, 6.5 Gbps on the mmWave frequency band, and 7.5 Gbps in 5G NR+LTE dual-connection mode.

ZTE and Orange Show the Advantages of 5G in Advanced Automotive, Robotics and Entertainment Applications

Orange, the second largest mobile network operator in Spain and one of the leading telecoms in the world, and ZTE, telecommunication equipment maker and provider of network solutions and smartphones, are demoing a number of applications for the new 5G technology at the Global 5G Event and the European Conference on Networks and Communications (EuCNC).



The first test, **#ConnectedVehicleCampus5G**, shows a remote-driving application based on 5G technology. In it, ZTE worked jointly with Orange and the Universitat Politècnica de València (UPV).

In the test, several high-definition cameras are installed in a vehicle to get multiple images of the car's surroundings and send them over the Orange 5G network to the remote driver in real time. The 5G network provides the ultra-low latency needed for the driver to effectively control the vehicle at all times.

In the second test, **#5GRobotControl**, ZTE and Orange demo one of the applications of 5G to Industry 4.0: industrial robotics, also developed together with UPV. The integration of 5G wireless communication technology provides the low latency required for real-time remote control of robotic arms.

In this test, ZTE and Valencia Polytechnic University use a high-resolution camera that captures the movements of the human arm that controls the robot. These movements are recognised, interpreted and transformed into commands that are instantly sent to the robot over the Orange 5G network. The movements are reproduced by the robot in real time with no delay, thanks to the super-fast, ultra-low-latency 5G technology.

The third project is an innovative experience powered by ZTE and Orange: **#3DHolograms**. Visitors will be amazed at the hologram call with transmission of voice and images in real time.

In the fourth test, **#5GNews**, Orange, ZTE and RTVE, together with UPV, broadcast a real-time news show using an HD camera connected to 5G. The content is sent over the Internet from the Valencia Conference Centre to RTVE's regional news outlets in Toledo and Valencia.

Finally, **#ExperienceLasFallas5G** uses 5G to improve extended reality (virtual/augmented reality). In the Orange stand, visitors can watch a live video recorded with a 4K 360-degree camera outside the Valencia Conference Centre, connected to Orange's 5G pilot network. They can see first-hand how 5G can help extended reality applications evolve to the next level.

In addition, there will be a genuine 360-degree immersive experience of the Fallas, courtesy of the 8K content recorded by Visyon and Prensa Ibérica in this past edition of the Valencia festival. Visitors will feel they are actually part of one of the most popular festivals in Spain.

Through all the experiences briefly described here, ZTE and Orange, EuCNC 2019 sponsors, will be the stars of the event, showing innovative projects that help Valencia take centre stage in the global 5G scenario.

Nokia Bell Labs and Amber Researchers Formulate New Battery Design for the 5G World

Researchers at Nokia Bell Labs and AMBER, the SFI Centre for Advanced Materials and BioEngineering Research hosted at Trinity College Dublin, announced they have created a new, innovative formula for battery composition that makes batteries more powerful by packing 2.5 times the battery life than anything currently on the market. As the world transitions to 5G, ushering in a new era of consumer and industrial Internet of Things (everything from wearable technologies, pervasive sensors, to industrial robots), this new, game-changing battery design has the potential to help power the connected world of the future.

The increasing power requirements of connected devices such as smartphones, drones, electric cars and robots necessitates greater battery performance for both new applications as well as longer battery lifetimes. The new battery design also has far-reaching implications for 4G and 5G networks where conventional power may not be available for network equipment, or where emergency backup battery systems are essential to keep systems running.



"By packing more energy into a smaller space, this new battery technology will have a profound impact on 5G and the entire networked world," said Paul King, one of the lead investigators on the project and Member of the Technical Staff, Nokia Bell Labs. "The combination of Nokia Bell Labs industry and device knowledge and AMBER's materials science expertise allowed us to tackle an extremely difficult problem involving multiple disciplines. Our results were achieved through the deeply collaborative mode in which we work, underscoring the value of engaging with AMBER as part of our global research strategy."

"The significant advancement in battery technology outlined in this research is a testament to the strong collaboration between AMBER and Nokia Bell Labs. Bringing scientists together from industry and academia with a common research goal has resulted in a substantial scientific breakthrough," said Dr. Lorraine Byrne, AMBER Executive Director. "AMBER's partnership with Nokia Bell Labs through their Distinguished Academic Partners Program has been a hugely positive experience and clearly illustrates the benefits of industry-academic engagements. I look forward to AMBER's collaboration with Nokia Bell Labs continuing to break new boundaries in science creating impact for society."

An additional benefit to this new technology is its potential to improve the performance of large-scale energy grids powered by renewable energy. The demand for reliable power relies on storage technologies, such as the battery technology described here, to manage the high fluctuation in energy generation in today's wind and solar renewable technologies. A new study from Wood Mackenzie shows that the energy storage in 100 percent renewable systems will likely be 25 times higher as compared to today's systems. This will pose issues as the need for efficient, fast charging and compact energy storage becomes even more imperative.

A patent has been filed to protect this new technology design and help bring it to the marketplace. A study discussing the battery research performed by Nokia Bell Labs and AMBER has been published in *Nature Energy** a leading international science journal.

China Mobile and CICT Announced 5G Smart Factory and Smart Healthcare Solution in Hubei

5G Smart Factory

“4G changes the life, 5G changes the society”, CICT and China Mobile held the conference of “5G smart factory” solution on 10th April in Wuhan successfully.



“5G smart factory” is the first internet industry demonstration application in Hubei province, built by CICT and China Mobile, and the 5G smart product line had been set up, too. Through “5G wireless+5G MEC+ mobile cloud platform”, applications including product management center, product delivery, HD video had been online. It can implement the functions like equipment P2P communication, data cloudification, multi-factories cooperation and supply chain interconnection. Achieve the target like online life cycle management, visible PO delivery, operation data monitoring and decision making. The 5G industries interoperation will be possible during the factory smart management. Product efficiency can increase by 30%.

In this project, Datang Mobile Communications Equipment Co., Ltd provides product and technical service including 5G SA, core network, MEC, 5G Pico, and etc. to help China Mobile successfully build the trail network with hundred 5G NR sites.

5G Smart Healthcare

9:20 AM, 6th June, 2019 represented the most important moment of issuing 5G license in China. At the same time, using new generation 5G technologies, an online medical operation (Laparoscopic cholecystectomy) began in Shennongjia forest zone hospital in Hubei province. Meanwhile, 200 kilometers away, the experts from TaiHe Hospital in Shiyan City, through real-time online remote video was guiding the doctor to finish the operation at 10:15 AM. The operation lasted 55 minutes, and was successful.



Remote medical care, especially smart medical care, can promote to share the medical resource with high efficiency; improve regional medical service level and range; and solve the difficulty of rural people’s medical treatment. As a 5G leading enterprise, CICT positive explore the way of telecom development. This 5G remote operation is the most important practice of 5G applications.

This 5G remote medical operation base on 5G network which is “High speed, low latency and big capacity.” Under the coordination of China mobile Hubei branch and Datang Mobile Communications Equipment Co., Ltd, 5G network deploy from delivery, implementation, debugging, till rollout lasted nearly one month. 5G signals had covered the whole building including the operation room. The operation live use 1080P camera, bring clear and fluent picture and no delay. Provide the “face to face” environment for the expert and doctor real-time communication and guidance.

Baicells Cost-Effective Indoor Solution Based on White-Box Hardware

The research and development of current mobile communication network equipment is mainly based on the private software and hardware platform of CT manufacturers. It has a certain degree of closure and takes a long period for function upgrade. Especially in the 5G indoor scenario, it cannot flexibly adapt to the market demand. Moreover, the overall cost is pretty high.

To solve this problem, Baicells proposes a white-box indoor solution based on general hardware. And during 2019 MWC Shanghai, Baicells has showed its cost-effective products for indoor solution which attracted many attentions.

Baicells cost-effective indoor solution consists of white-box pRRU, white-box Fronthaul Gateway and general-purpose processor based BBU pool with white-box FPGA accelerator.

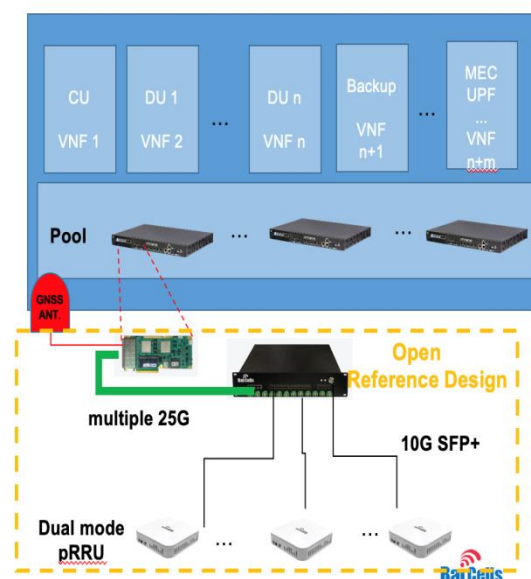
pRRU: It adopts white-box RRU reference design carrying 4G LTE and 5G NR sub-6GHz dual modes. The maximum transmission power supported by the air interface is the sum of LTE 2*250mw and NR sub 6GHz 4*250mw, the maximum bandwidth is 150MHz and the peak rate is more than 2.3Gbps. The physical interface supports both RJ45 PoE++ and SFP+ opto-electric hybrid cable forwarding with both option 7-2 intra-PHY functional split with eCPRI and option 8 with CPRI.

Fronthaul Gateway: Fronthaul Gateway is also developed based on white box reference design, which supports different combination of fronthaul transmission standards such as eCPRI and CPRI.

Central unit: It is based on general-purpose processor, such as x86 platform. White-box FPGA based accelerator is also deployed on this platform for specific functions offloading, such as forwarding and FEC functions. BBU functions are virtualized and modularized as virtual BBU functions (vBBU). It can support RAN information sharing by opening interfaces to MEC platform. MEC platform and Central Unit can be deployed on the same platform allowing to allocate resources.

FPGA Accelerator Card: It adopts the general extended hardware form of PCIe cards and is compatible with general-purpose server. And thus it improves the processing efficiency of RAN and MEC applications, and integrates the forwarding optical interface and synchronization function to reduce the additional network card and synchronization source requirements, which simplifies the deployment and reduces hardware costs.

This solution aims at the future 4G/5G indoor distributed pico-cell station solution scenario. It is the world's first low-cost quasi-commercial case achieved by 4G/5G dual-mode pico RRU and carrier-based cloud platform to implement virtual BBU. The pico RRU supports RAN Option 7-2 functional split and eCPRI open forwarding standard as well as RAN option 8 split with CPRI. This solution innovatively proposes the design idea of the virtual BBU network element based on the cloud computing technology. The development of a cloud based accelerated virtual device based on a white-boxed hardware card solves the problem of insufficient performance and real-time performance of the virtual BBU network element, overcomes the bottleneck of the virtualization technology, and promotes the pace of the virtual BBU network element to be commercialized.



Vodafone Goes Live with Ericsson 5G Technology in London

Ericsson's 5G technology leadership was at the heart of Vodafone UK's launch of 5G for consumer and business customers on July 3 in London. The spectacular cityscape views of London's Sky Garden hosted a dedicated launch event powered by Ericsson 5G technology, including a virtual demonstration with highlights from the latest Ericsson ConsumerLab Report: 5G Consumer Potential.



In London, Ericsson will provide comprehensive 5G coverage based on the latest Ericsson Radio System portfolio. This includes the latest Baseband 6630 and Massive MIMO 6488 products to enable 5G on the 3.5GHz frequency. Combined with LTE, this will achieve speeds up to 10 times faster than 4G for 5G users with much lower latency.

Ericsson Radio System's unique dynamic spectrum sharing functionality will also enable Vodafone to extend 5G coverage over a wide area, leveraging 4G spectrum on existing Ericsson Radio System infrastructure.

In accordance with the 5G Consumer Potential report findings, access to 5G connectivity is hotly anticipated by UK consumers, who expect to use 10-12 times more mobile data on average on new 5G devices. Vodafone UK's 5G launch will be welcomed by the four out of every ten subscribers identified by the research who face issues caused by network congestion in crowded and dense urban areas.

Scott Petty, Chief Technology Officer, Vodafone UK, says: "Today, we are switching on 5G in seven UK cities, including London. Backed by our largest ever investment in the capital and new unlimited data plans, in partnership with Ericsson we are enabling Londoners to access an ultra-fast 5G and 4G network without any limits."

Arun Bansal, President and Head of Europe & Latin America, Ericsson, says: "As the recognized leader in driving 5G in Europe, we are delighted to launch Vodafone UK's 5G network in London. We have a history of working in close partnership with Vodafone and we have done so again in 5G with fast, efficient and customer-focused delivery of Ericsson Radio System 5G technology. Our unique spectrum sharing abilities will also enable Vodafone to extend the scope of 5G in its network."

Huawei's Yang Chaobin: 5G is ON, Keep Innovating to Realize Large-Scale 5G Commercialization

On the 5G is ON summit held by Huawei during this year's MWC Shanghai, Yang Chaobin, Huawei 5G Product Line President, delivered a keynote speech titled 5G is ON, Keep Innovating to Realize Large-Scale 5G Commercialization.



With 5G spectrum being quickly allocated to operators around the world, 5G has started on the fast-track to commercial use. Huawei has successfully launched commercial 5G networks in a couple of countries, including South Korea, the UK, and Switzerland. With excellent network performance, Huawei's commercial 5G networks offer more than 10-times the speeds of existing 4G networks, causing user traffic to increase exponentially.

5G shares 4G macro sites to maximize value without adding new sites

2.6GHz and C band make up the foundational layer that offers 5G network coverage. In macro sites, the cost of main wireless equipment is far less than site rental and accounts for only 20% of the total site construction costs. Therefore, we can maximize investment efficiency of macro sites by expanding C band coverage and allowing 5G to share 4G macro sites, avoiding the need to add new sites.

64T64R and 32T32R antennas are similar in size to 16T16R antennas, and can be installed and deployed in the same way as 16T16R. However, the new antennas have four times the capacity and increase network coverage. This makes 64T64R and 32T32R antennas the optimal solutions for deploying 5G macro sites.

Pole sites can supplement macro sites to ensure network coverage in hot and blind spots

In densely populated areas, the demand for mobile network traffic varies, and the network experience in high-traffic areas can be affected. In residential districts and commercial areas with large populations, as well as in some scenic spots where the environment is highly protected, macro sites are hard to acquire, leaving pole sites as the major sites that can be acquired.

Pole sites are light and compact, easy to obtain power, and are adaptive to multiple scenarios. They can be quickly deployed on power poles, traffic poles, surveillance poles, or even walls, and thus become an essential supplement to macro sites to ensure network coverage in hot and blind spots.

In the 5G era, indoor digitization must go hand in hand with macro sites

As industries go digital, scenarios like smart factory, smart health, and remote education will require higher indoor bandwidth, lower latency, and more connections. This means we must develop indoor digitization in parallel with macro sites.

4T4R antennas will be the preferred choice for 5G devices. The 4T4R DIS offers a peak rate of up to 1.6 Gbps, twice or even four times that of traditional indoor distributed antennas. It also allows 5G sites to share 4G sites, enabling 5G sites to be deployed in just one site visit, and improving the experiences of both 4G and 5G network users.

In China, indoor digitization and macro sites are being deployed simultaneously in large indoor areas, including in Beijing airport, the Shanghai Hongqiao traffic hub, the Shanghai World Expo Exhibition & Convention Center, and the InterContinental Shenzhen.

Nokia and TIM Break European Record for Long-distance Data Transmission over High-speed Network

TIM (Telecom Italia), in collaboration with Nokia, has achieved a wavelength speed of 550 Gigabits per second (Gb/s), a new European record for data transmission over a long-distance backbone network. The trial covered more than 350 kilometres on TIM's operational network between Rome and Florence using the new Nokia Photonic Service Engine 3 (Nokia PSE-3).



In addition to this milestone, TIM and Nokia also reached a transmission rate of 400 Gigabit/s over 900 kilometers between Rome and Milan, and 300 Gb/s over 1,750 kilometers.

The PSE-3 is the first coherent DSP to implement a sophisticated signal processing algorithm known as Probabilistic Constellation Shaping (PCS), which maximizes data transport capacity over any distance. This speed triples the bandwidth of the current network, and with the arrival of 5G, will offer customers the most efficiency and connectivity in support of the ever-increasing ultrabroadband traffic, as well as ensuring reliability and security.

The TIM backbone is a Wavelength Division Multiplexing (WDM) network based on the latest generation of Nokia's 1830 Photonic Service Switch. The network is fully automated and currently carries optical signals with a capacity of 100 Gb/s over distances of up to 1,800 kilometers, and 200 Gb/s up to 800 kilometers. The backbone, with a coverage of over 16,000 kilometers of fiber, and connecting to 65 national POPs (Point of Presence), has carried over 9,000 petabytes of data traffic in the last year, equivalent to the content of 2 billion DVDs.

Elisabetta Romano, Chief Technology & Innovation Officer at TIM, said: "We are proud of this European record which confirms TIM's technological leadership, the high quality of our network, our commitment to develop innovative solutions in order to guarantee the best experience to our customers. Today's result, which triples transmission speed compared to the current one, confirms that TIM's network is the most advanced infrastructure capable of offering new digital services and platforms, also with a view to developing 5G."

Sam Bucci, Head of Optical Networking at Nokia, said: "We are proud of the partnership we have built with Telecom Italia over the years, and of the opportunity to demonstrate the capability of our PCS technology on their most important transport infrastructure."

ZTE Wins Best Mobile Service for Connected Living in Asia Award by virtue of Its ATG Air Broadband Solution

ZTE Corporation announced in late June that it has won Best Mobile Service for Connected Living in Asia Award at Mobile World Congress (MWC) Shanghai 2019, by virtue of its Air to Ground (ATG) Air Broadband Solution.



ZTE Wins Best Mobile Service for Connected Living in Asia Award

ZTE's Air to Ground (ATG) uses the mature land mobile communication technology to construct a three-dimensional ground-to-air broadband coverage network, providing on-board entertainment, on-board office, customized services and extensive industrial application services. ZTE's ATG solution supports 1200 km/hour ultra-high speed with 300 km coverage radius, so that users can enjoy stable and high-speed service experience above the air.

ZTE has stepped into the ATG field since 2009. By means of its accumulation of ground communication technologies, ZTE has overcome a series of difficulties, such as applications in special scenarios, special area coverage and ground network interference.

ZTE has been leading in the ATG field for many years. In 2009, ZTE developed the first 3G ATG network. In 2014, ZTE conducted the first LTE ATG test in industry along with Air China and opened two pre-commercial air routes. In 2017, the first plane equipped with 4G air-to-ground common frequency ATG technology successfully took off. Now, ZTE is committed to developing and researching on 5G ATG solution, so as to provide an aerial 5G experience.

Ericsson and SoftBank Corp. to Deploy Multi-band 5G Network

Ericsson has been selected by SoftBank Corp. as a primary 5G vendor for the deployment of a multi-band 5G network in Japan following a series of successful joint proof-of-concept activities that began in 2015.

Under the agreement, Ericsson will provide SoftBank with radio access network equipment, including products from the Ericsson Radio System portfolio. This will enable SoftBank to launch 5G services on their newly granted 3.9-4.0 GHz and 29.1-29.5 GHz bands for 5G New Radio (NR).



Ericsson will reinforce SoftBank's existing LTE network while optimizing its 5G network. Ericsson Radio System products for this purpose will be deployed in several regions. With Ericsson Radio System, SoftBank can boost its spectrum assets.

Chris Houghton, Senior Vice President, Head of Market Area North East Asia, Ericsson, says: "SoftBank and Ericsson have been partners since the 2G era and we are thrilled to support them on this latest part of their technology journey. With the help of our advanced product portfolio, SoftBank can unlock the potential of 5G for Japanese society and we look forward to building on our long-standing partnership."

Ericsson and SoftBank initiated joint proof-of-concept activities in 2015 and have successfully expanded their collaboration to include 5G testing of multi-bands, including 28 GHz and 4.5GHz.

Both companies will continue to jointly explore 5G use cases, reinforce SoftBank's existing LTE network while optimizing its 5G network and commit to realize 5G commercial services within this fiscal year.

Huawei, China Mobile, GSMA, 5MII, 5GSA and Partners Release 5G Network Slicing Business Opportunities for Multimedia White Paper and 5G Multimedia Industry Promotion Initiative

Huawei, China Mobile Research Institute, Migu Co. Ltd., GSMA, 5MII, 5GSA and IHS Markit have jointly released the 5G Network Slicing Business Opportunities for Multimedia White Paper at the 5G Service Innovation and Network Slicing Summit & 2019 Annual Conference of Information Communication Network Technology Committee of China Communication Society. This white paper is the first in the industry to elaborate on how 5G network slicing enables business model transformation in the multimedia sector and facilitates deep collaborations among operators, cloud service providers, content owners, as well as application developers for creating greater benefits.



To further implement the research outcomes of the white paper and promote the synergies between the multimedia and 5G industries, multiple units including Huawei, China Mobile, CAICT, GSMA, 5MII, and 5GSA etc., jointly launched the 5G Multimedia Industry Promotion Initiative at the summit. Dr. Huang, on behalf of the units, read out the initiative and put forward three major measures:

First, promote business practices. The union will abide by the white paper to continuously promote the 5G network slicing applications, industry pilots, and business model implementation in the multimedia sector.

Second, continuously innovate. The union will verify multimedia technology and commercial feasibility, and quickly replicate successful applications.

Third, Collaborate for a prosperous future. The union will launch a platform to promote win-win cooperation between upstream and downstream partners in the multimedia ecosystem, so as to build a prosperous 5G multimedia industry.

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. It expanded the application scope and scenarios of 4K live streaming, and takes another step towards 5G commercial use.

The real 4K video has 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.



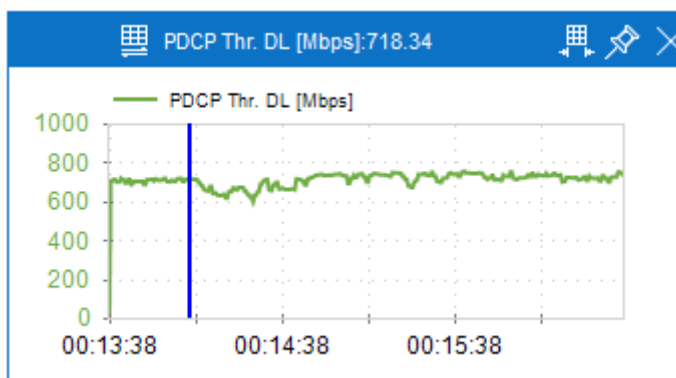
The test route passed through the Beijing Mobile Building in Dongzhimen to the Meihui Building covered by multiple 5G gNodeBs. It verifies that the 5G network of China Mobile can effectively support 4K UHD live streaming of CCTV at a rate of 40 to 60 Mbit/s in mobility scenarios.

During the test, the three parties proposed the innovative "5G dual-band networking+live streaming package" solution. It helps transmit 4K UHD live video signals to the CCTV headquarters through 2.6 GHz and 4.9 GHz frequency bands.

Datang and China Mobile Completed the First 5G DAS RRU Test in Wuhan

Recently China Mobile Hubei Branch and Datang Mobile Communications Equipment Co., Ltd. under CICT jointly upgraded the existing 4G DAS system to 5G, in which the test case such as peak speed has also been done. Test results comply with the technical standard. The system has commercial use ability and represents the first 5G commercial DAS system in the industry.

During upgrading, Part of 4G DAS system had been reused. The 5G RRU with high-power amplifier was used to 5G signals access. And the old antenna has been swapped by smart DAS antenna with integrated Bluetooth module. Online test verified the Uplink/Downlink peak speed and coverage abilities. As 2TR deployed, uplink/downlink speed can reach to 95Mbps/718Mbps, based on reusing all 4G antenna, 5G signals can cover the whole building. Meanwhile, the test also verified smart DAS antenna performance and fault monitoring abilities.



During 4G to 5G evolution, most of data traffic comes from indoor scenarios; DAS system will play a very important role. Datang 5G DAS solution has the characteristic such as high-power signal source, reusable network, less engineering, support monitoring and positioning. As the 5G signal source, the 2.6G RRU can directly access to the existing DAS system, reduce the 5G TCO and deployment difficulties.



Compared with the traditional DAS system no NMS, CICT uses the Smart-DAS solution, changes the antenna to smart-DAS antenna, which can provide the indoor location service to the end users.

Currently most 5G NRs are mainly deployed in outdoor scenes. The successful deployment of the 5G DAS system by China Mobile Hubei branch and Datang means that 5G continuous coverage in various scenes comes to reality. It is the important milestone of 5G commercial use.

Nokia to Help Ooredoo Qatar Take 5G Lead with Its Cloud Native Core Network



Ooredoo Qatar has selected Nokia to build a 5G cloud native core network to support delivery of enhanced mobile broadband services. Nokia's solution will be deployed in Ooredoo's state-of-the-art datacenters in Qatar's capital city Doha.

The cloud-based architecture for core network is scalable, agile and flexible, making it reliable and suitable for extreme mobile broadband and massive/critical machine communication services. Nokia AirFrame, CloudBand, voice and Cloud Packet Core VNFs, and Nuage Networks Software Defined Network (SDN) are being deployed in the core network.

Ooredoo Qatar has emerged as a leader in the global 5G ecosystem and has already tested a number of exciting 5G use cases, including 5G aerial taxis and drones. The company is waiting for the availability of 5G devices to roll out commercial 5G services in the near future. This initiative with Nokia takes Ooredoo Qatar closer to bringing innovative 5G use cases to its customers.

Yousuf Abdulla Al Kubaisi, Chief Operating Officer, Ooredoo Qatar, said: "The modernization of our core network will enhance our capabilities to innovate with new services. It will also help us to meet additional demands for high-speed data services in general as well as bursts in demand, particularly in upcoming mega sporting events. Our 5G network will open the flood-gates for machine learning, automation and micro-services use-cases for consumer and business customers in the country."

Bernard Najm, head of the Middle East Market Unit at Nokia, said: "We are excited to partner with Ooredoo Qatar to set up a 5G core network that is truly 'cloud native' from the ground up, not just an evolution of current core solutions. Our solution supports all flavors of mobile access network technologies and enables our customers to bring new 5G services to market rapidly. The solution provides the low latency, high throughput and content-rich services that will support Ooredoo Qatar's business goals immediately and well into the future."

ZTE Launches Its Cybersecurity Lab Europe in Brussels, Furthering Its Commitment to the ICT Industry Security

ZTE Corporation has furthered its commitment to improving security for the ICT industry by opening its Cybersecurity Lab Europe in Brussels, Belgium.

Located in the administrative and political heart of the EU, the Cybersecurity Lab Europe will provide a much wider range of access to the external security verification of ZTE's products, services and processes, and will facilitate the external cooperation in security field with stakeholders.



The opening of the lab is another important part of a transparency initiative of ZTE. Under such an initiative, the company has launched two other cybersecurity labs in Nanjing, China and Rome, Italy in May.

As the platform for transparency and cooperation, the lab provides four essential functions including source code review, document review, black box testing and penetration testing. In addition, ZTE will conduct in-depth researches of the security field in the lab, in partnerships with industry-leading security organizations. Moreover, the lab will play a significant role of guaranteeing the security of the company's 5G solutions in 5G era.

Representatives of the European Commission and of the European Council, as well as telecoms operators, GSMA and other industry associations have attended the opening ceremony.

"ZTE's original intention of the Cybersecurity Lab Europe is to provide global customers, regulators and other stakeholders with great transparency by means of verification and communication," said Mr. Zhong Hong, ZTE's Chief Security Officer. "The security for the ICT industry cannot be guarded by one sole vendor, or by one sole telecoms operator. ZTE is willing to play an important role in contributing to the industry's security along with its customers and all other stakeholders."

ZTE has been committed to providing customers with end-to-end secure products and services, integrating security considerations and controls into every aspect of the product life cycle. Confronted with cybersecurity challenges and opportunities as well in the 5G era, the company will keep adhering to its vision of "Enabling Connectivity and Trust Everywhere" to bring trustworthy cybersecurity capabilities worldwide.

GTI, Huawei and Multiple Industry Partners Released TDD Spectrum White Paper

GTI, together with Huawei and multiple industry partners, released the TDD Spectrum White Paper during the 25th GTI Workshop held in Shanghai, China. As the organizer and main content contributor of the project, Huawei deeply interprets the white paper and shares the trend of TDD spectrum development, which attracts great attention from the industry.

In the white paper, GTI said that facing with business drivers such as unlimited packages and wireless home broadband WTTx, TDD spectrum can effectively improve capacity and experience and meet evolution requirements. Therefore, TDD network construction is accelerating.

To provide information and suggestions for facilitating the efficient utilization and fast deployment of TD-LTE globally and smooth evolution to 5G NR, this white paper summarizes the advantages of TDD spectrum, driving forces of rapid TDD network deployment and fast TDD spectrum allocation for 5G.

The TDD spectrum white paper is jointly developed by multiple partners, which means that the industry continues to pay attention to the reasonable utilization and value realization of TDD spectrums. Fast provisioning of LTE TDD continuous large-bandwidth spectrums will further accelerate the development of the global wireless industry.



Huawei Shared Smart Massive MIMO Research Achievements at the 25th GTI Workshop

At the 25th GTI Workshop held in Shanghai, China, Huawei shared Smart Massive MIMO research achievements, which is the key technology in 4G evolution, including commercial and technical progresses.

TDD Massive MIMO is now accepted by both Developed Market and Emerging Market, it has mature industry chain and full band support (2.3G/2.6G/3.5G). It had been deployed on a large scale and had proven performance in many commercial scenarios.



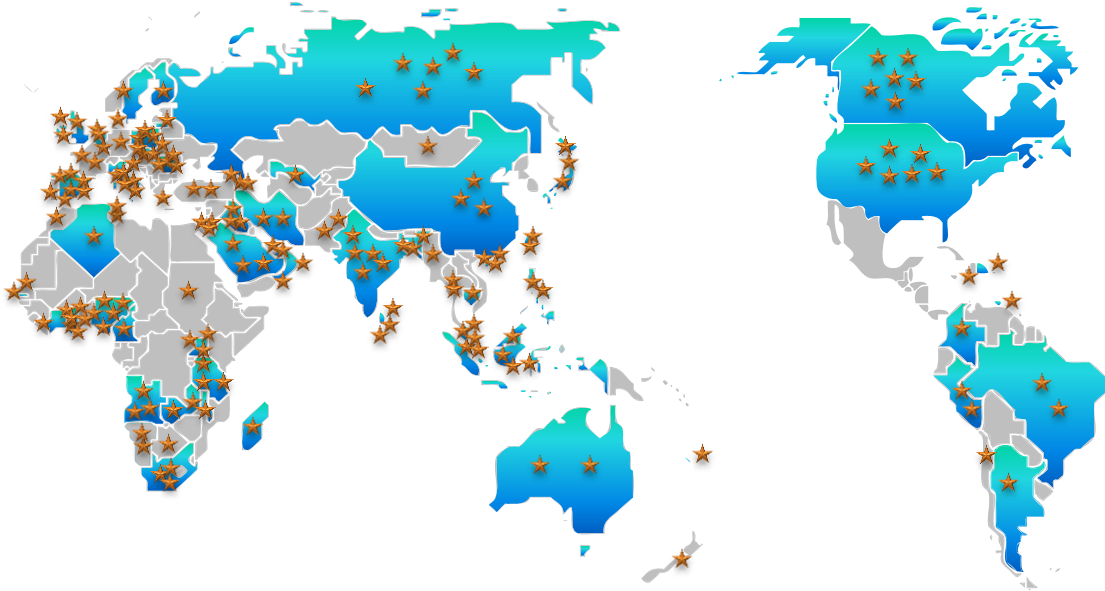
In MBB market, Massive MIMO “one deployment for 4G & 5G, benefiting both RATs” boosts the network capacity and meets customers' requirements for traffic operation. For example, in Tiananmen Square, Beijing, China, the 2.6GHz 160MHz Massive MIMO deployment creates the ultimate 4G experience. TOP Cell Traffic increases by 2-3 times and User Experience Rate increases by more than 1 times than traditional 8T8R cell. In fast growing India market, Massive MIMO had been large-scale commercially deployed to alleviate capacity pressures, improving 18% of the 720p proportion.

In WTTx market, 4G/5G concurrent Massive MIMO meets customers' ROI requirements by reducing 40% of the ROI period.

On the key challenge of Massive MIMO large-scale deployment. Huawei shared the research achievements on mobility and networking interference. Indicating the SRS capability improvement is the key solution of Massive MIMO mobility performance. And the Inter-cell SRS Interference control is very important for the contiguous coverage of Massive MIMO.

TD-LTE & M-IoT Global Market Overview

Global Deployment as the Mainstream Mobile Broadband Technology



- ◆ **172** TD-LTE commercial networks in **82** countries have been launched
- ◆ **159** TD-LTE commercial networks in **80** countries are in progress or planned
- ◆ **3.98** million TD-LTE base stations (By Q1, 2019)
- ◆ **2.4** billion TD-LTE subscribers

Source: GTI, TDIA, GSA
By Q2, 2019

Maturing M-IoT industry facilitates M-IoT commercial launches on a global scale



Source: GSMA
By April, 2019

GTI Breakthroughs and Achievements in 2019

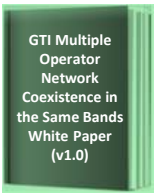
7 New Released Whitepapers and Technical Reports

5G Network



GTI TDD Spectrum Whitepaper (v4.0)

This white paper summarizes the advantage of TDD spectrum, the driving force of TDD network rapid deployment, the acceleration of 5G-Oriented TDD spectrum allocation and some recommendations and suggestions for operators/standardization organizations/regulators.



GTI Multiple Operator Network Coexistence in the Same Bands White Paper (v1.0)

This white paper introduces the issues of multiple operators coexistence in the same 5G frequency bands and targets to study the coexistence conditions and requirements for multiple operators in adjacent TDD 5G bands without interference to each other.



GTI 5G mmWave Spectrum Whitepaper

This whitepaper updates the global situation regarding the 5G mmWave spectrum, promotes a GTI view on proper technical requirement for coexistence with the existing services. We conclude a GTI proposal of the future 5G mmWave spectrum strategy for developing the products and deliver our view towards WRC-19 AI 1.13.



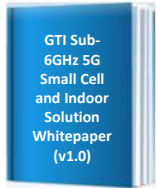
GTI 5G MEC Deployment Strategy Whitepaper

This whitepaper will serve as a platform to share the latest MEC industry progress, initiate 5G MEC deployment strategy discussions and provide key solutions, finally introduce the current use cases and trails that will be continuously updated.



GTI Network Slicing Solution Whitepaper

This whitepaper describes network slicing conceptual architecture. Focus on end-to-end network slice and provide the related key technologies and deployment strategy. Finally share foresight technologies, the trends and use cases of network slicing.



GTI Sub-6GHz 5G Small Cell and Indoor Solution Whitepaper (v1.0)

This whitepaper describes some typical indoor scenarios in 5G era. According to these scenarios characteristics, requirements and challenges are abstracted and corresponding solutions with necessary key technologies are also provided. Finally provide some indoor deployment options to industry for reference.



GTI 5G E2E Test Instrument Map Whitepaper

This whitepaper summarizes the typical application, stages and test scenarios for Devices, Base station and Core network, regarding these test requirement, and shows corresponding test instrument, solution to the 5G industry.

New release during MWC Shanghai 2019

Released during MWC Barcelona 2019

GTI Breakthroughs and Achievements in 2019

5G Device

GTI Sub-6GHz 5G Device White paper (v4.0)

GTI Sub-6GHz 5G Device Whitepaper (v4.0)

The white paper defines technical requirements and focuses on the discussion about key research points of 5G Device. Version 4.0 adds the discussions on more 5G key technology, including 4G-5G Spectrum Sharing, NSA/SA Mode Switching, Dynamic Power Sharing, USIM application and UE Function and Performance Enhancement in Rel-16.

GTI 5G Device Function and Performance Test Specification (v2.0)

GTI 5G Device Function and Performance Test Specification (v2.0)

- Release 44 new test cases in Phase 2 spec . The total number of completed test cases has reached 110
- Introduce test cases for new features including Voice call, power consumption tests with DRX/BWP, mobility tests under Multi-mode cells...

GTI 5G Device Power Consumption Whitepaper (v2.0)

GTI 5G Device Power Consumption Whitepaper (v2.0)

This white paper focuses on the analysis of key components of power consumption/Factors of power consumption analysis- 5G features/Requirement of 5G terminal power consumption and Test method and instruments. This version we update Parameter configuration recommendation.

GTI 5G S-Module Whitepaper (v2.0)

GTI 5G S-Module Whitepaper (v2.0)

Based on "GTI 5G S-Module Whitepaper (v1.1)", which already includes "Basic Type" and "Smart Type", "All-in-one Type" has been newly introduced in Chapter 8 as well as the typical application scenarios for all the three types of GTI 5G S-Modules in Chapter 11.

GTI 5G Device RF Component Research Report (v2.0)

GTI 5G Device RF Component Research Report (v2.0)

The report is expected to help people to develop 5G devices and to promote industrial development. It may also help people to know more about the industrial status of 5G device RF components. Meanwhile, it may also help readers interested in 5G device RF components to gain from the further thinking.

GTI 5G Sky Office Whitepaper (v1.0)

GTI 5G Sky Office Whitepaper (v1.0)

This whitepaper provides an overview of 5G market status, focusing on laptop market and office software support. According to the observation of potential market demand, the concept and objective of sky office are given.

GTI 5G Sub-6GHz Device Test and Certification Whitepaper (v1.0)

GTI 5G Sub-6GHz Device Test and Certification Whitepaper (v1.0)

The whitepaper is expected to give an introduction on the test methodology and certification scheme for 5G chipset, module and device products.

GTI 5G Device OTA Performance Whitepaper (v1.0)

GTI 5G Device OTA Performance Whitepaper (v1.0)

This white paper provides a technical overview of the 5G device OTA performance. As we all know, OTA is the key method to evaluate the antenna performance and the OTA performance of wireless devices and reflect its access and throughput performance in real network.

GTI Breakthroughs and Achievements in 2019

M-IoT



GTI Best Practice for FOTA of NB-IoT Device Whitepaper

The white paper analyzes the FOTA requirements of NB-IoT devices, the challenges and chances for FOTA based on the NB-IoT network, and proposes an end-to-end FOTA solution and reference implementation of NB-IoT devices based on LwM2M, including the architecture and implementation of incremental image generation, firmware image download process, breakpoint continuation, state machine.



GTI Security Test Guide for IoT Device and Certified Devices

The purpose of this document is to enable the suppliers of IoT products, services and components to assess the conformance of their products, services and components to the GTI Security test Guide for IoT device. Completing a GTI Security Assessment will allow an entity to demonstrate the security measures they have taken to protect their products.



GTI IoT Device Solution Whitepaper

To accommodate the rapid development of M-IoT technologies (NB-IoT/eMTC) and give the guidance of M-IoT device development, this whitepaper will present the overview of M-IoT device solutions, which include cost-effective RFFE solution, M-IoT Chipset Requirements and Architecture, Optimized device solution on low power, eSIM based implementation solution, etc.



GTI IoT Network Performance Evaluation Whitepaper

In order to evaluate the condition of the NB-IoT network, the whitepaper describes a Network Performance Model. NB-IoT KQI includes RSRP Distribution Percentage, SINR Distribution Percentage, Attach Success Rate, etc. NB-IoT network KQI for Application includes Power consuming, Service Delay, Simultaneous Capacity, etc.

- ※ 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



33 GTI Device Certification Achievements

On M-IoT and Applications & Service

4

Test Specifications

GTI NB-IoT Module Test Specification
 GTI NB-IoT Interoperability Test Specification
 GTI Test Solution for M-IoT Terminal -Smart Smoke Detector V1.0.0
 GTI 5G Device Function and Performance Test Specification (v2.0)

4

Certified Test Labs



中國泰爾實驗室



中国移动



Gumi Electronics & Information Technology Research Institute



TesTime

25

Certified Products

chipsets, modules and devices

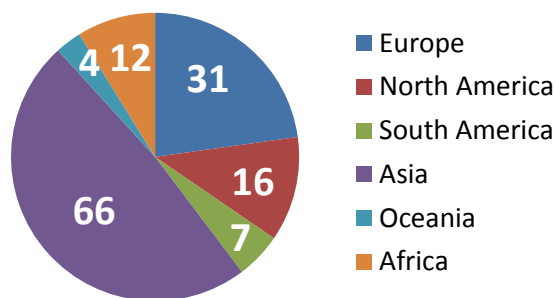


<http://www.gtigroup.org/e/action/ListInfo/?classid=610>

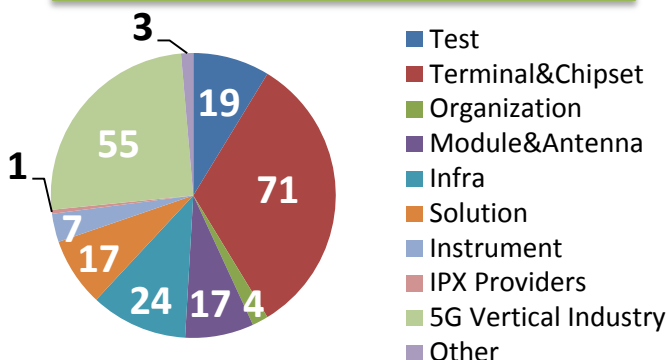
GTI Members Updates and Activities in 2019

136 Operators and 218 Partners Joined GTI by Q2, 2019

136 Operators



218 Industry Partners



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	✓

GTI Activities

2019	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec
Summit	Time: 26 th Feb (MWC 2019) Venue: Barcelona, Spain GTI Summit		Time: 26 th Jun (MWCS 2019) Venue: Shanghai, China GTI Summit			
Workshop	Time: 21 st -22 nd Feb (MWC 2019) Venue: Barcelona, Spain The 24 th GTI Workshop		Time: 24 th -25 th Jun (MWCS 2019) Venue: Shanghai, China The 25 th GTI Workshop		Time: 9 th Sep (During ITU Telecom World 19) Venue: Budapest, Hungary The 9 th Spectrum and Technology Workshop	Time: TBD The 26 th GTI Workshop
Exhibition	Time: 21 st -22 nd Feb (MWC 2019) Barcelona, Spain		Time: 24 th -25 th Jun (MWCS 2019) Shanghai, China			
Others	Time: 22 nd Feb (MWC 2019) Venue: Barcelona, Spain GTI Night (Including GTI Awards)					

Appendix 1 – Welcome to Join GTI (to operators)

More Information about GTI

*To find out more information about GTI,
please visit <http://gtigroup.org> or email us.*

How to Join GTI

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.

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.

Appendix 2 – Welcome to Join GTI Partner Forum (to non-operators)

More Information about GTI Partner Forum

*To find out more information about GTI and GTI Partner Forum,
please visit <http://gtigroup.org> or email us.*

How to Join 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.

CONTACT GTI:

If you have any questions, comments, suggestions regarding TD-LTE or general enquiries regarding GTI, please contact:

admin@gtigroup.org