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MBBF 2023: Connecting the World with 5G And Beyond

**Huawei's 5.5G Solutions:
Pioneering the Future of
Wireless and Business
Technology**

**The World's First 5.5G
Villa: The Home of the
Future**

**Unveiling Huawei's
MAGICSwave: Paving
the Way for 5.5G
Evolution**

Bring 5.5G into Reality

The 14th Global MBB Forum 2023

The Strongest Line-up

The Most Innovative Products

The Most Immersive Experiences

Industry as a whole needs to be ready for the future
That's why we're working so hard on 5G-Advanced."
-- Ken Hu, Rotating Chairman, Huawei



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Embracing Industry Opportunities to Maximize 5G Business Value

Huawei's annual Global Mobile Broadband Forum (MBBF) kicked off in Dubai today. The event began with a livestreamed discussion between Huawei's Rotating Chairman Ken Hu, and the Director General of GSMA, Mats Granryd, about the current state of 5G development and future projections.

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Huawei's Li Peng: Powering a Positive 5G Business Cycle and Embracing 5.5G

As Huawei kicked off the 14th Global Mobile Broadband Forum in Dubai, UAE, Li Peng, Huawei's Corporate Senior Vice President and President of the company's Carrier BG, delivered a keynote. In his speech, Li called on global carriers and industry partners to rise to the occasion, address increasing demands on networks, and make the most of the future trends.

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Huawei Unveils LampSite X to Revolutionize Indoor Digital Experience

At the Global Mobile Broadband Forum (MBBF) 2023, Huawei's Yang Chaobin, a Board Member and President overseeing ICT Products and Solutions, introduced LampSite X, an innovative 5G indoor digital solution set to usher in a new era of indoor connectivity and intelligence.

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Huawei Introduces Comprehensive 5.5G Solutions for Making 5.5G a Reality

During the 2023 Global Mobile Broadband Forum (MBBF 2023), Huawei's President of Wireless Solution, Cao Ming, introduced the inaugural comprehensive suite of solutions for 5.5G in the industry. Cao emphasized the timeliness of 5.5G in facilitating new experiences, connections, and services.

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Year 18 | Issue S107



MBBF 2023: Connecting the World with 5G And Beyond

The 14th Global Mobile Broadband Forum (MBBF), hosted by Huawei, supported by industry partners GSMA, GTI, and SAMENA Telecommunications Council, redefined traditional boundaries this year by seamlessly blending both virtual and in-person experiences. This unique fusion provided a dynamic platform for stakeholders in the mobile and related vertical ecosystems to delve into the intricacies of 5G business success, nurture ecosystem maturity, and expedite the commercialization of 5.5G technologies.

The event featured an impressive lineup of speakers and introduced innovative products, reaffirming its status as the epicenter of the mobile industry. It offered a vibrant arena for discussions on how mobile broadband technology is not only shaping the future but also continuously shaping lives and industries.

On October 10 and 11, 2023, tech industry leaders and enthusiasts converged in Dubai, UAE, for this exceptional event. The two-day hybrid gathering delved into the world of 5.5G, exploring the untapped potential of this cutting-edge technology, emphasizing its transformative impact, current challenges, and the collaborative solutions necessary to unlock its vast benefits. Diverse speakers from various sectors of the industry shared global best practices in 5.5G deployment, underlining the importance of nations, organizations, industries, and businesses leading the charge in 5.5G adoption. Their collective outlook remained firmly optimistic, driven by the boundless opportunities and novel capabilities of 5.5G technology that continue to fuel global innovation.

For this, Li Peng, Huawei's Corporate Senior Vice President and President of the company's Carrier BG, emphasized, "We are already on the right path towards 5G business success, and 5G-Advanced is the natural next step in 5G's evolution. Let's start today, build tomorrow's networks for future services, and unleash 5G's infinite potential for continuous success."

5G's Rise: A Global Landscape in Rapid Transformation

The 5G deployment landscape has witnessed a swift evolution over the past four years. By June 2023, the world had observed the proliferation of more than 260 operational 5G networks, serving an astonishing 1.2 billion 5G users and enabling



over 50,000 diverse 5G industry applications.

Notably, China has emerged as a global leader in 5G adoption, with remarkable statistics. According to data from China's Ministry of Industry and Information Technology in March, the nation boasted an impressive record of 630 million 5G users and had successfully deployed over 2.64 million 5G base stations, accounting for over 60% of the total global installations. An extraordinary achievement includes the implementation of gigabit networks in 110 cities across China, ensuring comprehensive 5G connectivity coverage in key venues.

The future of 5G in China, the world's largest 5G market, continues to appear promising. The GSMA predicts that by 2025, China is poised to become the first market worldwide to achieve an astounding 1 billion 5G connections, highlighting the rapid transformation of the global digital landscape.

RedCap: Pioneering the Next Era in 5G Connectivity

In a momentous revelation at the Global Mobile Broadband Forum 2023, Huawei unveiled the global commercialization of RedCap, a



Huawei's
commitment to a
seamless transition
from 5G to 5.5G is
evident in its full-
series, full-scenario
5.5G products,
with continuous
innovations across
five categories of
basic capabilities





groundbreaking 5G technology with the ambition of connecting 100 million devices within the next three years, heralding a transformative era in digital connectivity.

RedCap, celebrated for its unique blend of cost-effectiveness and high performance, is poised to revolutionize multiple industries, offering a tenfold increase in network capacity compared to its 4G predecessor while simultaneously consuming 20% less power. It fully supports critical 5G features, including ultra-reliable low-latency communication, network slicing, and cellular IoT, simplifying 5G infrastructure with a unified network approach. The rapidly maturing RedCap ecosystem is experiencing collaborations with global carriers and industry partners, with expectations to introduce over 50 industry-specific devices by the end of 2023. This innovative 5G technology's collaborative and forward-looking approach is set to usher in a new era in connectivity and technology.

Unleashing the Potential of 5G: A Bright Future in Guangdong's U-Joy Cities

On the first day of the Huawei Global MBB Forum 2023, Telecom Review participated in the 5G Industry Summit, which centered on "Unleashing 5G Potential for Industry

Acceleration and Business Success." The summit featured a distinguished lineup of speakers who explored various topics, from policy-making to ecosystem and business aspects. Regulators and industry leaders engaged in discussions about 5G spectrum release policies to expedite spectrum license issuance in emerging markets, shedding light on fostering a positive 5G business cycle. The summit showcased success stories, emphasizing experiences that facilitate service growth and business monetization.

Among the speakers, Pan Guixin, Chief Innovation Officer and General Manager of the Network Product Innovation Center at China Unicom Guangdong, shared updates on the U-Joy Cities program. Launched in May 2022, this program - a collaborative venture between China Unicom Guangdong and Huawei - aims to customize 5G to the unique characteristics of the Greater Bay Area and cities in Guangdong. The program's goal is to establish a 5G ecosystem with industry partners, driving industry digitalization.

Guangdong stands out with the world's largest 5G standalone (SA) network, creating an ideal environment for 5G application innovation, featuring 147,000 5G base stations and 300 MHz of 5G C-Band spectrum, offering extensive

5G coverage across 21 cities, major counties and towns.

China Unicom Guangdong has been a pioneer in propelling 5G innovation. The U-Joy Cities project, encompassing the Guangzhou Gigabit City, Yangjiang Marine City, Foshan Manufacturing City and Shenzhen Pioneer City, has played a pivotal role in unlocking 5G's potential for smart living and industry. Pan highlighted real-world use cases and China Unicom's contributions in these scenarios.

Under the U-Joy Live Broadcasting initiative, China Unicom Guangdong leads in 5G live broadcasting, with plans for further expansion in the coming year. In the field of education, they have established 5G educational private networks to promote equal access to educational resources. The U-Joy at Sea initiative enhances safety and profitability in the fishing industry through 5G innovation. Additionally, China Unicom is driving digital transformation for small and medium-sized enterprises (SMEs), resulting in significant improvements in productivity and cost reduction.

Pan also emphasized the cost-effectiveness of 5G RedCap and its role in digitalizing manufacturing. China Unicom Guangdong is well-prepared for the large-scale commercial deployment of 5G RedCap, with a particular focus on various sectors, including AGV control and intelligent video. In fact, the U-Joy Cities program in Guangdong is poised for a bright future with 5G-Advanced business as the industry accelerates toward innovation in 5G standards, networks, industries and ecosystems.

Pioneering 5G Innovations: Unveiling the GigaGreen Revolution

In the rapidly evolving realm of telecommunications, the pursuit of 5G technology has taken center stage, captivating the attention of industry leaders and innovators. At the heart of this transformation are the visionary concepts of GigaGreen and GigaVerse, both poised to

redefine the 5G connectivity experience. Fang Xiang, Vice President of Huawei's Wireless Network Product Line shed light on Huawei's trailblazing approach to full-band evolution in 5G and its comprehensive suite of solutions aimed at forging GigaVerse and GigaGreen 5G networks.

Fang Xiang elucidated the driving force behind Huawei's GigaGreen initiative, emphasizing its origins in close collaboration with network operators during the transition from 4G to 5G. This approach revolved around a meticulous analysis of the evolving demands and requirements of these operators. The result, GigaGreen, is a concept with dual connotations, "Giga" encapsulating both "Gigaband" and "Giga experience." "Gigaband" addresses the intricate task of harmonizing the fragmented spectral bands during the transition from 4G to 5G, ensuring the seamless and efficient operation of the network. Conversely, "Giga experience" centers on optimizing the end-user experience and extending network coverage.

Fang elaborated on the "Green" facet of GigaGreen, underlining the significant concern of energy consumption for network operators, often constituting a substantial portion of their operational expenses. Operators face the challenge of anticipating a three to four-fold increase in network traffic during the transition to 5G while aspiring to maintain energy consumption at current levels. To tackle this, Huawei has devised innovative products that substantially reduce energy consumption, with an emphasis on "0 bit, 0 watt" energy-efficient solutions.

Huawei's commitment to sustainability extends beyond energy savings. GigaGreen's product portfolio prioritizes the reduction of equipment size and weight. This streamlined design not only helps operators save deployment space but also lessens the reliance on supporting materials, contributing to the broader sustainability goals of both operators and society at large.



GigaGreen embodies Huawei's response to the evolving landscape of 5G, one that anticipates a diverse array of services and applications, encompassing cloud gaming, cloud-based augmented reality (AR) glasses, 3D connected cars and a multitude of interconnected devices. These innovations necessitate networks with new capabilities, and green technology stands at the heart of achieving these requirements. Huawei's mission is to maximize the value of every hertz of the spectrum, enabling operators to extend their network coverage, enhance downlink and uplink capacity, minimize latency and create more energy-efficient 5G networks.

LampSite X Solution: Revolutionizing Indoor Connectivity

During the Huawei MBBF 2023, Eric Bao, Huawei's President of Wireless Digital Indoor System (DIS), shared invaluable insights, shedding light on the imperative role of indoor network solutions in the era of 5G. He began by highlighting the staggering pace of 5G development, noting that it has amassed 1.5 billion users worldwide in just three years, a feat that took 3G a decade to achieve. With over 260 5G networks and approximately 4 million 5G base stations globally, the rapid 5G evolution presents both an opportunity and a challenge for network operators.

Eric underlined the emergence of new services, particularly the

surging demand for advanced video streaming experiences and the role of AI in driving immersive services like AR/VR and glass-free 3D. In response to these trends, he pointed out a critical statistic: roughly 80% of 5G traffic is generated indoors, despite indoor network speeds being only 1/10 of their outdoor counterparts, highlighting a significant disparity that needs to be addressed.

To meet the growing demand for better experiences and enhanced capacity from 5G, Eric emphasized the necessity of prioritizing indoor network infrastructure. He elaborated on four key principles for indoor networks in the 5G era: prioritize on high-value areas for a more significant return on investment, 4T4R on NR for a seamless indoor and outdoor experience, all-optical networking for superior capacity and ultra-low transmission loss, and diversified capability to better tailor the needs of various industry verticals and to unlock new business opportunities.

Eric also discussed the limitations of Distributed Antenna Systems (DAS) and drew a sharp contrast with the advantages of Digital Indoor Systems (DIS), exemplified by Huawei's LampSite X. He articulated four significant bottlenecks inherent to DAS technology. First, typical DAS implementations offer a mere 1T1R configuration, leading to



a substantial speed deficiency compared to DIS, which supplies 4T4R on NR, effectively aligning with the 5G terminal requirements. Second, DAS systems fall short when it comes to supporting the high-frequency bands imperative for 5G, while DIS solutions, like LampSite X, exhibit the capacity to cover a broad spectrum of frequency bands ranging from sub-1GHz to mmWave. Third, DAS lacks the critical support for measurement and locating capabilities, a feature widely demanded by business customers. Lastly, DAS heavily relies on an abundance of passive components, rendering it challenging to manage and control remotely. In stark contrast, DIS systems provide more streamlined, manageable, and maintainable solutions to these issues, presenting a superior choice for modern indoor network requirements.

Eric concluded by highlighting Huawei's LampSite X, an innovative indoor digital system connected via fiber. LampSite X stands out with its compact and lightweight design, supporting various frequency bands, precision positioning, low latency, large uplink capacity, and energy-saving features. With LampSite X's three-layered optical architecture, the upgrade and evolution of indoor networks beyond 5G are streamlined, offering a promising solution for operators to build cutting-edge indoor networks. Eric expressed confidence in the competitive products Huawei offers

to work collaboratively with operators in achieving the optimal network experience in the 5G era and beyond.

Huawei's 5.5G Solutions: Shaping the Future of Wireless and Business Technology

Huawei's President of Wireless Solution, Cao Ming, unveiled their visionary strides in 5.5G technology at MBBF. In a fast-paced wireless world, staying ahead is imperative, and Huawei has been a frontrunner. Cao described how 5G was just the beginning, and the future holds even more promising prospects with 5.5G.

In the Middle East, where 5G deployment is rapidly advancing, Huawei collaborates with regional

operators to push the boundaries. Notably, at the MBBF, du partnered with Huawei, signifying significant progress toward 5.5G. With the world's first 5.5G villa, users can enjoy glasses-free 3D gaming and passive IoT innovation, all powered by 5.5G.

Huawei's commitment to a seamless transition from 5G to 5.5G is evident in its full-series, full-scenario 5.5G products, with continuous innovations across five categories of basic capabilities: broadband, multi-band, multi-antenna, intelligent, and green, safeguarding telecom operators' long-term investments.

Africa's journey to embrace 5G is ongoing, with varying progress across the continent. Huawei tailors solutions to meet diverse scenarios and markets, ensuring a smooth transition when the time is right.

As Huawei leads in 5.5G development, they emphasize collaboration and regulatory support. Industry partners and regulatory authorities are urged to facilitate the growth of 5.5G ecosystems and applications. Financial incentives from local governments can play a pivotal role in accelerating the adoption of 5.5G, bridging the digital divide, and transforming industries worldwide.





In conclusion, the MBBF hosted by Huawei served as a testament to the rapid 5G revolution, firmly grounded in the theme of "Bring 5.5G into Reality." This year's forum underscored the pivotal role 5.5G technology plays in the ongoing transformation of the telecommunications industry. Huawei's innovative initiatives are geared not only towards enhancing 5G but also towards setting the stage for the successful integration of 5.5G and beyond.

The focus on sustainability, energy efficiency, and seamless connectivity at the MBBF reflects the evolving demands of 5G applications and beyond. The introduction of 5.5G technology represents a significant leap forward, promising to revolutionize the way we experience wireless connectivity. With its full-band and multi-channel capabilities, 5.5G is well-equipped to meet the ever-increasing data demands of the digital age.

The breakthroughs unveiled at the forum are pivotal in establishing the foundation for a future where 5G and 5.5G technologies continue to reshape our digital landscape. They extend their impact beyond telecommunications, leaving no facet of our lives untouched. From powering smart cities to enabling groundbreaking medical advancements, 5.5G's reach is boundless.

As we embrace this era of unprecedented connectivity and technological advancement, it's clear that both individuals and global businesses stand to benefit immensely. With 5.5G becoming a reality, we can expect faster and more reliable connections, driving innovation in sectors such as autonomous vehicles, augmented reality and the Internet of Things. The MBBF was a reflection of the collaborative efforts and visionary thinking that will guide us into this exciting future, where 5.5G takes center stage in the evolution of our digital world. **TR**



The 5G deployment
landscape has
witnessed a swift
evolution over the past
four years





Fang Xiang, Vice President of Wireless Network Product Line, Huawei

Tech Breakthroughs Behind GigaGreen: Paving the Way for Best 5G Network

In the ever-evolving world of telecommunications, the race towards 5G technology has become the central focus for industry leaders and innovators. At the heart of this transformation are the concepts of GigaGreen, that seek to revolutionize the way we experience 5G connectivity. Fang Xiang, Vice President of Huawei's Wireless Network Product Line, sat down for an exclusive interview with Telecom Review to discuss the company's groundbreaking all bands evolution to 5G and the next-gen GigaGreen series of solutions designed to build best 5G networks.

Huawei's GigaGreen Initiative in the 5G Evolution

Fang Xiang shed light on the driving force behind Huawei's GigaGreen initiative. He explained that this concept was born out of their deep collaboration with network operators during the transition from 4G to 5G. Huawei's approach involved analyzing their evolving requirements and needs. The result was GigaGreen, a concept that carries a dual connotation. "Giga" encompasses both "Gigaband" and "Giga experience". Gigaband focuses on helping operators address the fragmented spectral bands when transitioning from 4G to 5G, enabling united collaboration, scheduling and management, ensuring a seamless and efficient network. Giga experience, on the other hand, is all about optimizing the end-user experience and service coverage.

Xiang elaborated on the "Green" aspect of GigaGreen, emphasizing that energy consumption is a significant concern for network operators, often representing a substantial portion of their operational expenses. Operators anticipate a three to four-fold increase in traffic as they transition to 5G but aspire to maintain energy consumption at the same level. To meet this challenge, Huawei has developed innovative products that reduce energy consumption, emphasizing "0 bit, 0 watt" energy-efficient solutions.

GigaGreen is Huawei's answer to the evolving landscape of 5G, one that anticipates a multitude of diverse services and applications, including cloud gaming, cloud-based augmented reality (AR), glasses-free 3D, connected cars and an array of IoT devices. These innovations require networks with new capabilities, and GigaGreen technology is central to achieving these requirements. Huawei aims to maximize the value of every hertz of the spectrum, enabling operators to extend their network coverage, improve downlink and uplink capacity, reduce latency and create more energy-efficient 5G networks.

Enhancing Spectral Efficiency and Sustainability

When asked about the value that Huawei's GigaGreen brings to the industry, Fang Xiang highlighted two key aspects. First, the Ultra-wideband component focuses on aggregating the multitude of frequency bands used by operators to enhance spectral efficiency. Second, Giga experience is achieved by using all bands multi-antenna products and beamforming algorithms to significantly increase spectral efficiency and coverage.

Xiang also mentioned that Huawei's green philosophy goes beyond energy savings, as it also aims to help operators save space and reduce the need for supporting materials. The new generation of products has seen a 25% reduction in size and weight compared to current versions. This not only streamlines deployment for operators but also contributes to the broader goal of reducing carbon footprint.



Huawei's green philosophy extends to space and material efficiency



Advancing 5G Performance and Efficiency

In response to the question about the technical advantages of Huawei's GigaGreen radio products, and how they benefit operators in terms of performance and energy savings, Fang Xiang provided a detailed overview of the technological breakthroughs achieved.

Huawei's GigaGreen radio products incorporate ultra-wideband and multi-antenna technology, but what truly sets them apart is the innovation in raw materials and architecture. The true ultra-wideband offer a range of models to support service-load-based RF power management similar to the 'Tidal' effect, enabling power sharing between bands, cells, users and time slots. This dynamic power allocation leads to a 30% improvement in user experience performance and a 30% reduction in energy consumption compared to the competitors.

Additionally, Huawei's FDD Massive MIMO offering, which integrates active and passive elements, stands out. This integration of RF and antenna creates a synergy that surpasses what individual components can achieve independently "1 + 1 > 2". The breakthroughs in antenna array, filter, and power amplifier materials which also enable massive components can be installed in a small box. With rich commercial practice in more than 100 global operators, massive scenarios and applications, Huawei develops the world-leading FDD beamforming technology. All these FDD Massive MIMO beamforming innovations result in at least 40% better performance than industry competitors.

Xiang emphasized the uniqueness of Huawei's GigaGreen radio products of tri-band 8T8R RRU and the tri-band FDD Massive MIMO just released on MBBF2023, these products offer a remarkable up to 10 times capacity, 7 to 10 dB more coverage compared to traditional 4T4R products.

In conclusion, Huawei's GigaGreen initiative represents a bold step forward in the evolution of 5G networks. These state-of-the-art innovations adhere to the integrated, collaborated, and flexible concepts, helping operators maximize the spectrum value of every hertz, adapting to more service scenarios and new applications, promising to create more sustainable and powerful 5G/5.5G networks, driving the industry towards an era of greater connectivity, reduced energy consumption and enhanced user experiences. **TE**



U-Joy Cities in Guangdong: A Brighter Future With 5G-A

During the Day 1 of the Huawei Global MBB Forum 2023, Telecom Review attended the 5G Industry Summit, which focused on the theme of “Unleashing 5G Potential for Industry Acceleration and Business Success.”

In a lineup of exquisite speakers, topics on policy-making, ecosystem and business were discussed. Regulators and industry leaders talked about 5G spectrum release policies to accelerate issuing spectrum licenses in emerging markets. They also shared guidance on how to expedite a positive 5G business cycle. Moreover, success stories showcased optimal experience that enables service growth and business monetization.

Included in this session is Pan Guixin, Chief Innovation Officer and General Manager of Network Product Innovation center at China Unicom Guangdong. His presentation focused on sharing the latest developments on the U-Joy Cities program, a joint-innovation program between China Unicom Guangdong and Huawei launched in May 2022. This program is designed to adapt 5G to the characteristics of the Greater Bay Area and cities in Guangdong, as well as build a 5G ecosystem with industry partners to drive industry digitalization.

China Unicom Guangdong: Largest 5G Shared SA Network

Starting off his presentation, Pan gave an overview of how 5G innovation is implemented in the Guangdong province. Having the world's largest 5G shared standalone (SA) network, this has provided China Unicom with “very good conditions for 5G application innovation.”

“Our strategy is clear. We will be a leader in digital and intelligent transformation. We have a community

rich R&D experience in MEC slicing and 5G private networks," Pan explained.

In the Guangdong province, there are 147,000 5G base stations and 300 MHz 5G C-Band spectrum powering a 5G smart network. This continuous 5G coverage benefits 21 cities, and other major counties and towns.

Leading 5GtoB innovation, China Unicom Guangdong powers 300 5G private networks deployed for 260 key customers.

U-Joy Cities: Fully Unleashing 5G Value for Smart Life and Industry

Pan pointed out that Guangdong is a pioneer of China's reform and is the number one contributor in China's GDP. China Unicom Guangdong and Huawei have implemented the U-Joy Cities project including the Guangzhou Gigabit City, Yangjiang Marine City, Foshan Manufacturing City and Shenzhen Pioneer City.

He specified various real-life use cases within the Guangdong province, and where China Unicom is positioned in these scenarios.

- **U-Joy Live Broadcasting: 5G Delivers More HD and Smoother Experience**

Pan proudly stated that after research, China Unicom Guangdong is leading in 5G live broadcasting. "Live broadcast users have more than 100 gigabytes traffic per month with a slicing guaranteed, especially in the upcoming traffic."

This year, they plan to develop another 500,000 users, following the growth of 115,000 users in the last year – this exhibits a 2-3x ARPU increase versus a normal package.

- **U-Joy Study: 5G Promotes Equalization of Higher Education Resources**

Responding to the unbalanced high education environment in Guangdong, China Unicom emerged as an industry leader in 5G educational private network.

"In cooperation with the Ministry of Education, we have successfully shared high-level educational resource among 168 universities and educational institutes in Guangdong via 5G private network," Pan remarked. Instead of using VPN, students can safely and directly access resources directly through the 5G network.

"With a high bandwidth and low latency of 5G, we also developed a new package which combines 5G private network with all our cloud computing capability, especially for the professors and the postgraduate students," Pan added.

- **U-Joy at Sea: 5G Makes Fishing Safer and More Lucrative**

Digital fishing system guarantees safety, and Pan highlighted that in Guangdong, there are 6,000 serving 5G fishing boats. These utilize location visualization, grid-based management and intelligent alarm, powered by 5G innovation with enlarged eMBB coverage.

"We have also innovated 5G network technologies such as MetaAAU and 2.1 Ghz transceivers to continually update our mobile broadband access capability. This 5G package offered to the fisherman is only 1/60th of the cost of the satellites."

China Unicom is promoting high-quality development of Guangdong's marine economy with 5G-requirement exploration, 5G marine coverage technology innovation and 5G application platform building.

"We are planning to extend our 5G marine coverage to the whole Guangdong province, with more than 3,000 5G sites deployed."

- **U-Joy for Manufacturing: 5G Drives Digital Transformation for SMEs**

Pan also shed light on the challenges within enterprises due to the lack of capital, tech and talent. In Guangdong, there are

more than 9,000 enterprises, with SMEs accounting 95% of this total.

With its extensive efforts, China Unicom's 5G network application and business model innovation resulted in a 40-60% increase in labor productivity; 15-25% overall equipment effectiveness; 25-25% decrease in direct manufacturing costs; and 5-8% decrease in total energy consumption.

"However, these are not enough. We have heard many enterprises complain to us that 5G terminals are too expensive, which limits the large-scale application of 5G," said Pan. "Therefore, the 3GPP R17-compliant RedCap technical solution last year was regarded as the key last mile of manufacturing digitalization."

5G RedCap is much cheaper in this very early stage, and "we can achieve 60-70% of the terminal cost reduction for customers."

Unicom Guangdong Is Capable of RedCap Large-Scale Commercial Use

Pan is affirmative that they are now ready for the large-scale commercial use of 5G RedCap. "Firstly, we have a community to experience the deployment of large-scale continuous coverage of 5G RedCap network." They have also incubated 20+ 5G RedCap modules in the terminals with industrial partners.

Together with major enterprises such as Midea, FAW-Volkswagen, and China Southern Power Grid, they have successfully put 5G RedCap into commercial use in several fields such as AGV control and intelligent video.

"This year, we plan to deploy 10,000 5G RedCap sites to better serve the digital transformation of the whole society, including SMEs."

In the end, Pan reiterated that U-Joy cities in Guangdong has a brighter future with 5G-A. "Now the industry is accelerating toward 5G-Advanced business, and China Unicom Guangdong is focused on the innovation of the 5G standards, network, industry and the ecosystem." **TR**



RedCap: Pioneering a New Era in 5G Connectivity

In a groundbreaking announcement at the 5G Industry Summit during the Global Mobile Broadband Forum 2023, Huawei unveiled that RedCap, the revolutionary 5G technology, is officially embarking on its global commercialization journey with a connection forecast of 100 million connections in 3 years.

In the coming three years, it is anticipated that RedCap connections will surpass the 100 million mark, laying the groundwork for a fresh era of digital connections that will catalyze the evolution of innovative 5G applications.

This milestone marks a significant step forward for the telecommunications industry, promising to redefine the landscape of connectivity and technology. As RedCap gains momentum, it is clear

that this innovative technology is set to transform various industries while delivering numerous benefits to the sector. Let's delve into the world of RedCap, understanding what it is and how it's poised to revolutionize the 5G era.

RedCap: Bridging the Gap

RedCap, a lightweight 5G technology, has emerged as a game-changer in the world of telecommunications. With a primary focus on balancing cost-effectiveness and high performance, RedCap caters to an array of industries,

including manufacturing, electric power, home broadband, vehicle-to-everything (V2X) and smart wearable. What makes RedCap even more appealing is its cost-efficiency.

This innovative technology offers a tenfold increase in network capacity compared to 4G, while consuming 20% less power than 4G devices. Moreover, RedCap supports critical 5G features such as ultra-reliable low-latency communication (URLLC), network slicing, edge computing and 5G local area network (LAN). It caters to the diverse network requirements of various



RedCap Introduction

industries, paving the way for a new era of cellular IoT.

Where there's 5G, there's RedCap

RedCap's introduction brings the promise of a single network; a 5G standalone network that encompasses both Radio Access Network (RAN) and the core network. This unified network can address a myriad of use cases, enabling industry digitalization and business transformation. Furthermore, RedCap extends the 5G ecosystem by connecting a significantly larger number of devices to 5G networks, including the upgrading of existing LTE-based networks for global IoT coverage.

One of the key advantages of RedCap is its ability to facilitate a smooth transition to New Radio (NR) for supporting diverse use cases without necessitating the deployment of multiple Radio Access Technologies (RATs). This streamlined approach simplifies network management and enhances the overall efficiency of 5G networks.

RedCap Devices: Complexity Reduction and Enhanced Efficiency

The introduction of RedCap devices is poised to transform the IoT landscape. RedCap offers an optimal balance between cost and performance. Regarding cost, RedCap is expected to reduce 80% of the 5G module cost. In terms of performance, RedCap is capable of accommodating a broad spectrum of industrial connections, encompassing all operators' businesses,

including toB/toH/toC, by harnessing the features of 5G such as large network capacity, URLLC, network slicing, and more. These enhancements are achieved without compromising support for even most demanding IoT use cases, bringing more IoT connections and enabling more scenarios.

Efficient energy consumption is also a priority for RedCap devices. The introduction of extended discontinuous reception (eDRX) cycles and relaxations for radio resource management (RRM) monitoring, in addition to the features introduced in Release 16, significantly reduce complexity and extend the battery life of RedCap devices. This results in a technology capable of addressing a broad spectrum of broadband IoT use cases, ranging from factory automation and Industry 4.0 to low-end augmented reality (AR) and virtual reality (VR) applications.

RedCap: A Global Endeavor

In collaboration with operators in China such as China Mobile, China Unicom, China Telecom, Huawei has already implemented the end-to-end commercial deployment of RedCap in over 10 cities. These deployments span industries such as manufacturing, electric power, city management and V2X. The next step is to establish a series of commercial RedCap benchmarks.

This success story isn't confined to China alone. Leading global carriers, including e& UAE, STC Saudi Arabia, Zain KSA, STC

Kuwait, Zain Kuwait, STC Bahrain, and AIS Thailand have either completed technical verifications or initiated commercial pilots for RedCap. This widespread adoption reflects the global appeal of this innovative 5G technology.

A Mature Ecosystem

The RedCap ecosystem is maturing rapidly. At the MBBF, Huawei and its industry partners showcased more than 10 products, including RedCap modules, Data Transfer Unit (DTU), IP Cameras (IPC), and Customer Premises Equipment (CPE). It is projected that by the end of 2023, over 50 industry-specific RedCap devices will be launched. This surge in product availability will accelerate the deployment of RedCap applications and drive the expansion of its connections.

In the future, Huawei plans to collaborate with global carriers, industry customers, and device and module vendors to facilitate large-scale RedCap network deployments and enrich its applications. This collaborative effort aims to create a flourishing ecosystem, enhancing network capacity and supporting various capabilities, moving forward to the world of 5G technology. **TR**





The World's First 5.5G Villa: The Home of the Future

Along the sidelines of the 2023 Global Mobile Broadband Forum (MBBF), Huawei, in collaboration with du, unveiled the world's first 5G Advanced (5G-A) demonstration villa, which featured innovative use cases and improved real-life experience by utilizing 5G-A's technological innovation.

Telecom Review was invited to witness the marvels of what the households of tomorrow will look like through an exclusive villa tour, and joined the 5G-Advanced roadshow where the live network deployment of 10 Gbps peak speed was demonstrated around the vicinity of the Jumeirah Islands.

"This latest showcase is a testament to Huawei and du's enthusiasm and commitment to the 5G evolution," stated May Li, VP of Solution Marketing at Huawei Middle East and Central Asia during the opening of the launch event. She emphasized that achieving the 10 Gbps top speed in the live network environment is a pioneer in the 5G industry.

Dubbed as the "Home of the Future," the idea is a fruition of the MoU signed during the MWC 2023.

Speaking at the launch, Fahad Al Hassawi, the CEO of du stated that they are "always committed to bringing the latest innovation to the market," and that the 5G-A villa is a proof that they "chose the right partner."

Echoing this sentiment, Li Peng, Huawei's Corporate Senior Vice President and President of the company's Carrier BG, remarked that the launch of the 5G-A powered villa is the "result of du's continuous pursuit of a better digital experience."

"Moving forward, Huawei will continually support du in its effort to build the best 5G networks and explore the commercial use of 5G-Advanced networks, while championing du's leadership in this transformative era," Peng concluded.

5G-Advanced Roadshow

With a live presentation onboard, Telecom Review learned how 5G-A enables 10x capability compared to 5G. According to the bus tour's expert, 5G-A will bring connected people, home, things, industries and vehicles together.



The 5G-A villa epitomizes the seamless integration of cutting-edge technologies, powered by fixed wireless access (FWA), offering an unparalleled smart home experience in applications



The evolution to premium 5G-A network will result in a prosperous business, with network performance powering the ultimate experience of 10 Gbps download speed and 1 Gbps upload speed.

As shown around the vicinity of the Jumeirah Islands, the Huawei high-frequency solutions are ready for eMBB commercialization, with higher EIRP and ELAA, realizing optimal coverage. This innovation builds continuous experience in mobility scenarios.

Exclusive Villa Tour

The 5G-A villa epitomizes the seamless integration of cutting-edge technologies, powered by fixed wireless access (FWA), offering an unparalleled smart home experience

in applications such as 8k viewing, 3D displays and designs, naked-eye 3D, virtual reality (XR) gaming.

Harnessing Huawei's innovative FWA solution, it illustrates how, in the 5G era, FWA became an operator's powerhouse tool for rapid user expansion. As we transition to 5G-A/5.5G, Huawei's FWA Pro is engineered to bring the home of the future into reality and supporting an "all-scenario" family life.

Reimagining the smart home living, the living room can support 8k resolution viewing and 3D pictures. This is an upgrade to the experience of homes, allowing more immersive encounters. Additionally, in one of the rooms, art appreciation and product design are extended to the next level with 3D displays. With a 10 Gbps network like 5G-A, residents can have a smooth and surreal experience.

For both work and study purposes, the whole process will be elevated with 3D, powered by the next era of 5G network.

Home owners can also find better ways to relax and play with 5G-A as it supports the 8k experience, virtual reality and cloud gaming, as well as naked-eye 3D games. These are anticipated to grow more adoption in smart homes in the near future.

With more flexible, wireless experience, the 5G-A Villa exhibits what soon will be the reality for more homes in the modern era. Requiring low latency and high throughput, applications within the homes of the future will undeniably benefit from the 5G-A network. **TR**



Zain KSA and Huawei Forge Green Technology Partnership at Global Mobile Broadband Forum 2023

The Global Mobile Broadband Forum 2023 witnessed a groundbreaking moment in the telecom industry as Zain KSA and Huawei joined hands to sign a memorandum of understanding (MoU). Telecom Review had the opportunity to participate in the signing ceremony and witness a significant step in the collaborative efforts towards green technology.

The partnership underscores Zain KSA's unwavering commitment to environmental sustainability, focusing on combating climate change and adopting eco-friendly energy solutions. It aligns with ESG (environmental, social, and governance) practices and the UN Sustainable Development Goals, with

the goal of accelerating the adoption of green technology in Saudi Arabia.

A Pioneering Partnership for Green Technology

The signing of the MoU between Zain KSA and Huawei has piqued significant interest in the telecom industry. It signifies a substantial step towards a more sustainable and eco-friendly future for the sector. To shed light on this, Zain KSA and Huawei offered insights into the foundation

of their green and energy-saving collaboration.

When asked about its commitment to sustainability, Zain KSA expressed its dedication to achieve this goal, stating that it had initiated numerous actions since 2022 to reduce CO2 emissions. These initiatives include the adoption of electric vehicles (EVs), recycling of waste and implementing green management practices throughout their core business operations. By



focusing on energy-efficient solutions such as LED lighting and offering power-efficient solutions, Zain KSA aims to counteract the increasing power requirements associated with 5G technology.

The commitment to sustainability, as expressed by Zain KSA, is rooted in the need to take a long-term perspective on reducing CO2 emissions. By adopting advanced and innovative solutions, it seeks to support green network recession and work towards a more sustainable and greener 5G network.

The Three Pillars of Zain KSA's Sustainability Efforts

The MoU with Huawei reinforces Zain KSA's sustainability initiatives in three crucial areas:

1. **Transitioning to a 5G Green Network:** As the demand for 5G technology grows, Zain KSA recognizes the need to minimize the environmental impact. Their efforts in transitioning to a 5G green network prioritize efficient resource usage and reduced power consumption.
2. **Optimizing Resource Efficiency:** Advanced AI systems play a pivotal role in optimizing resource efficiency. By leveraging AI technology, Zain KSA can make better decisions, reduce waste and enhance sustainability across their operations.
3. **Pioneering a Zero-Emission 5G Network:** In collaboration with Red Sea Global (RSG), Zain

KSA is working on a pioneering project at the Six Senses Desert Dunes resort in the Red Sea. This initiative involves powering a 5G network with a staggering 760,000 solar panels. This not only exemplifies Zain KSA's commitment to clean energy but also aims to minimize visual disruption in the region.

Huawei's Perspective on Green Development

Huawei, a key player in this partnership, shares a similar vision for green development. In response to climate change, Huawei has identified energy conservation and carbon dioxide reduction as essential focus areas. Zain KSA's goal of achieving zero carbon emissions by 2050 aligns with Huawei's approach to incorporating green development throughout the entire lifecycle of their products.

Huawei's commitment extends beyond merely making network operations green. They aim to integrate green principles into the entire network maintenance lifecycle, reducing their dependence on natural resources. By doing so, they contribute to low carbon development throughout their network.

Innovative Technologies for Achieving Strategic Goals

During their innovative cooperation, Huawei and Zain KSA outline two key directions to help Zain achieve its strategic goals:

1. **Reducing energy consumption:** Huawei is committed to helping Zain KSA reduce energy



This partnership represents a significant milestone in the telecom industry



consumption in its wireless network operations. Through criteria such as Network Energy Efficiency Indicator System (NEE 2.0) and five energy-saving technologies, it aims to achieve optimization of both network performance and energy conservation.

2. **Reducing energy consumption across the network lifecycle:** In addition to network operation, Huawei focuses on energy reduction during equipment manufacturing, transportation and equipment recycling. This includes using energy-efficient materials, reducing equipment weight and implementing innovations to minimize energy consumption throughout the product lifecycle.

By addressing these aspects, Huawei and Zain KSA aim to accelerate Zain's journey toward achieving its green development strategic goals. This partnership represents a significant milestone in the telecom industry, one that showcases the power of collaboration in building a more sustainable and environmentally conscious future for Saudi Arabia and beyond. **TR**



John Gao Quanzhong, President of 5.5G Domain, Huawei

5.5G Takes the Lead: What's Next in Wireless Evolution?

Telecom Review attended an exclusive media roundtable organized during the second day of Huawei's Global Mobile Broadband Forum (MBBF) 2023, discussing 5.5G technology, and how this empowers an infrastructure for a digital-intelligent society.

5

5G, or also known as 5G-Advanced (5G-A) has gone from potential to reality and is about to be commercialized on a large scale in many cities. [John Gao] Gao Quanzhong, President of Huawei's 5.5G Domain shared his expert views on the technology's key innovative features and major directions.

When asked by Telecom Review about the differences between the latest 5.5G FWA showcase and the previous solution, John Gao emphasized that 5.5G is the evolution and enhancement of 5G. It will fully use existing 5G network facilities and increase the overall 5G capability by ten times.

"First, faster throughput is a big difference. The peak speed of 5.5G FWA is from 100Mbps to 10Gbps, improving personal user experience significantly," said Gao. "The average speed is also increased from 100 Mbps to 500 Mbps, or even 1Gbps, with 5.5G."

5.5G supports the deterministic user experience and could ensure bandwidth and lower latency, enabling XR applications and satisfying the immersive user experience of multiple people in a family scenario.

"Before 5.5G, 100Mbps is shared for family members. Now, family members will enjoy Gbps with a fiber-like user experience. I believe with 5.5G technology, we can offer fiber-like experience in the scenario of FWA," pointed out Gao.

He also highlighted the substantial increase in uplink speed that 5.5G brings, which can help a lot of IoT applications.

"We can also provide a larger bandwidth with 5.5G for enterprise private lines, whereby the capacity for each section can increase by tenfold," Gao further noted with regards to 5.5G's enhancement compared to previous generations.

5.5G Technology: Fast-Tracking the Future in Four Key Directions

As part of the discussion, Gao also shared the four major directions that 5.5G has already been used, including connectivity for people, vehicles, things, industries and new sensing services for diverse scenarios supported by 5.5G's harmonized communication.

When it comes to connecting with people, whether it is glass-free 3D, XR or smartphones, "we believe that 5.5G can offer a better experience to users."

Moving towards connecting things, RedCap and passive IoT will also pave the way to enormous opportunities. In this domain, Huawei cooperated with carriers in the Middle East, Europe, Asia Pacific and China.

"Based on our knowledge, all carriers have this urgent demand to connect things. They hope to see applications in this regard," Gao expressed.

Additionally, the rising trends on renewable energy usage and smart development in vehicles bring forth the commercialization of autonomous driving cars, buses, taxis and delivery vehicles.

Those vehicles have three requirements: high throughput in uplink, low latency and high reliability. 5.5G can expand the capabilities of basic connectivity services, which can be used to collect vehicle-related data; cloud and vehicle collaboration or synergy applications; as well as network coverage, which should be everywhere the vehicles will go to, including parking lots.

Gao also mentioned that AI capacity, training and inference should be put in the cloud. Some carmakers announced that they will stick to single car intelligence, which is insufficient for road traffic. Coupled with 5.5G, the move to the cloud can reduce accidents and increase efficiency.

Lastly, when connecting industries, 5.5G can support network requirements of up to one millisecond

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The rising trends on renewable energy usage and smart development in vehicles bring forth the commercialization of autonomous driving cars, buses, taxis and delivery vehicles

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at six-nine reliability, and can be applied in the production system to rely on one 5G network.

In the FWA scenario, 5.5G can support applications that require large uplink and high precision positioning, with the implication that Wi-Fi and Bluetooth technologies will no longer be needed.

By introducing 5.5G, the total power consumption can also be stabilized and result in a greener network. Operators' 5.5G networks are becoming integral to core production lines and creating business value by improving production capacity, efficiency and sectorial competitiveness. **TR**



Unveiling Huawei's MAGICSwave: Paving the Way for 5.5G Evolution

In the ever-evolving world of telecommunications, Huawei maintains its commitment to innovation and leadership in the microwave industry. During the 2023 Global Mobile Broadband Forum, Huawei introduced its latest microwave technology, MAGICSwave, which paves the way for a smooth transition to 5.5G with full-band and multi-channel capabilities. The new-generation MAGICSwave supports ultra-wide multi-channel transmission to enhance backhaul efficiency, offering increased capacity for urban areas and longer transmission distances for suburban areas. It boasts a high level of integration, allowing networks to adapt and evolve over the next decade.

This groundbreaking platform represents a significant advancement in the industry, heralding a simpler and more environmentally friendly microwave landscape.

What is MAGICSwave?

Huawei's new MAGICSwave platform, an ultra-wideband multi-channel microwave solution, is designed to create a cost-effective 5G foundation. Its capabilities extend to 5.5G, making it a long-term investment for operators. The

platform encompasses several key advancements:

In urban areas, E-band technology boasts impressive upgrades, achieving hardware capabilities of 10 Gbit/s to 25 Gbit/s. In suburban areas, the 2T CA ODU introduces



Carrier Aggregation Instantaneous Bandwidth (CA IBW) ranging from 224 MHz to 800 MHz at maximum, making CA deployment ubiquitous. Meanwhile, MAGICSwave LH solution offers a more straightforward setup with four-band antennas and 4-channel RFUs, simplifying tower installations. This all-scenario MAGICSwave platform covers a spectrum from 6 GHz to 80 GHz, and has 25GE service interfaces, supporting a smooth evolution over the next decade.

Reasons for Huawei's Continuously Leading Microwave

For nine consecutive years, Huawei has maintained its position as the top player in the microwave industry. Its commitment to continuous investment and innovation has led to the development of the MAGICSwave platform, which is poised to guide networks for the next decade.

Urban Scenarios: New 2T E-band

Huawei introduces groundbreaking advancements in urban scenarios. The 80 GHz high-frequency band, for the first time in the industry, supports 2T2R. Single E-band hardware capabilities have increased from 10 Gbit/s to 25 Gbit/s, resulting in a 150% capacity boost. The industry's only commercial high-power radio with a transmit power of 26 dBm, combined with the 2D intelligent

beam tracking capability of the 2D IBT antenna, extends the E-band transmission distance by 50%, allowing for widespread deployment in urban areas. E-band can efficiently replace high-cost frequency bands, reducing operator TCO by up to 70%.

Suburban Scenarios: New 2T2R True Wideband CA ODU

The new-generation ODUs extend to traditional frequency bands (6–38 GHz) with an impressive 800 MHz CA IBW, nearly three times higher than the industry standard. This broader IBW allows for genuine CA deployment. The innovative software and hardware innovations result in a 4.5 dB increase in system gain, offering the highest CA gain in the industry. Moreover, Huawei's solution allows for a 50% reduction in antenna size or a 30% increase in transmission distance in new deployment scenarios. This advancement resolves the challenge of limited CA instantaneous bandwidth and simplifies deployment.

Backbone Network Scenarios: New Long-Haul Upgrade

MAGICSwave LH introduces four-in-one multi-band antennas, which cover a broad frequency range from 6 GHz to 11 GHz. Besides, the new four-channel-in-one CA RFU is used in the new solution, with the bandwidth

quadrupled for a single RFU. When the HGSD feature is used in SD scenarios, the system gain can be increased by 7 dB. This enhances the transmission distance by 30%, while maintaining consistent antenna sizes. Furthermore, the four-band-in-one multi-band antenna, combined with the four-channel-in-one CA RFU, reduces the required number of antennas by 75% in high-bandwidth scenarios, leading to significant hardware cost savings. A single link can now reach 20 Gbit/s at a 50 km distance, offering coverage for all suburban scenarios.

Unified Architecture of All Frequency Bands: Smooth Evolution Over the Next 10 Years

IDUs are normalized across all scenarios and frequency bands, from 10GE to 25GE, improving integration by 60%. The MAGICSwave platform supports 25GE and facilitates the delivery of 25 Gbit/s to various sites. The 2U height IDU offers 24 directions, a significant improvement over the 5U IDU offered by the industry. This 60% increase in integration leads to reductions in equipment room space and power consumption. With full-band normalization capabilities covering a spectrum from 6–80 GHz, smooth upgrades from traditional frequency bands to E-band are supported, making it suitable for urban, suburban and backbone microwave scenarios.

The new MAGICSwave platform revolutionizes microwave technology, offering an optimal Total Cost of Ownership (TCO) and facilitating the creation of a simplified and energy-efficient network. Operators can expect to reduce hardware requirements by 50% to 75%, power consumption by 30% to 50%, and overall TCO by 30% to 70%. This cutting-edge platform paves the way for a fiber-like service experience in the forefront of telecommunications networks. Huawei's commitment to innovation and leadership remains unwavering, ensuring that MAGICSwave continues to shape the future of microwave technology and 5.5G evolution. ■



Eric Bao, President of Wireless Digital Indoor System (DIS), Huawei

LampSite X: Small box, big power, bigger business

During the Huawei Global Mobile Broadband Forum (MBBF) 2023, the concept of small box, big power and bigger business was presented via the LampSite solution.

Eric Bao, Huawei's President of Wireless Digital Indoor System (DIS) shared to Telecom Review his expertise on the importance of indoor network, why digital indoor system matters and the competitive edge of the LampSite X product.

Consumer Expectations Soar, Urging Indoor Network Investment

Starting off with an overview for 5G development, Eric stated that 5G is developing much more rapidly compared to 3G and 4G. It currently has 1.5 billion users around the world.

"For 3G, it took three to 12 years to accumulate 1 billion users. For 5G, it

only took three years to accumulate 1 billion users. Now it's the fourth, and nearly fifth year, into the 5G deployment and we are already seeing 1.5 billion of users around the world."

5G is gathering a lot of momentum, with more than 260 5G networks and around 4 million 5G base stations globally. The rapid 5G development is both an opportunity and also a challenge for operators.

Along with this, new services are emerging. Eric used the higher demand for advanced video streaming experience as an example of why operators must build an enhanced network.

"Videos are now turning into 3D format for consumers. And we also

see that the usage and engagement for videos like Tiktok and others would require higher data rate as people spend more time on video applications now."

As AI is fast developing, with its highly efficient content creating capability, it can drive the immersive services like AR/VR, glass-free 3D more and more popular among the consumers.

According to the global insight of Huawei, about 80% 5G traffic generated indoor, while indoor speed is only 1/10 of the speed outdoors, which showcases a gap to fulfil people's demand.

"Operators have fulfilled many massive MIMO base stations outdoors but the 5G network or construction indoors is lagging behind. This is a problem that should be solved to satisfy the society's needs for better experience and more capacity from 5G." and that's why "we need to be prepared in terms of indoor network."

Indoor Target Network in 5G era: Different with what we have done in 4G

5G is expected to change the society, exceeding what 4G has brought to the table. This means that 5G must provide much better user experience than 4G to the consumers. Not only that, 5G is also expected to serve and help business customers and various industries to digitalize.

With this regard, Eric shed light on four key points of indoor target network in 5G era.

Prioritize high-value areas: The construction of indoor networks is not accomplished overnight. Operators can consider identifying high-value areas based on dimensions such as high-value terminals, high-traffic users and high user density, and prioritize indoor network roll out in these areas to increase return on investment.

4T4R on NR: As wireless networks evolve from 2G to 5G, outdoor macro

stations have evolved from 1T to 64T. Now mainstream 5G terminals on the market support 4R, these terminals can only enjoy 1/4 of the experience on a 1T1R network, which is equivalent to 4G and not true 5G. In order to ensure a consistent indoor and outdoor experience, indoor networks should also build 4T4R to ensure that end users can enjoy the experience advantages brought by 5G technology.

All-optical networking: As we all know, the copper feeder of DAS will produce different attenuation for different frequency bands, which will lead to inconsistent coverage on the antenna. Moreover, as more spectrum resources with higher frequency bands are adopted in 5G era, feeder losses will increase sharply, making it difficult for DAS to evolve towards 5G, or even 5G-A, which have even more higher bands, such as 6GHz and millimeter wave. Instead, Optical fiber can provide relevant higher capacity, and its ultra-low transmission loss in high-frequency application scenarios is unmatched by copper feeders as well, so all-optical networking will be a better choice.

Diversified capability: The network shall support versatile capabilities which required by industry verticals, network with more add-on values will surely uplift new business success not only for operators but also for enterprises.

Digital Indoor Systems: Breaking Free from DAS Limitations

Eric also pointed out the four bottlenecks of using distributed antenna systems (DAS) to build the indoor network.

First, typical DAS only has 1T1R and that's why it has a big gap in terms of speed. Comparing with this, DIS has 4T4R on NR, which matches the requirement for 5G terminals.

Secondly, unlike DIS, DAS does not support high frequency bands. For the power splitters and couplers of DAS, they cannot support the high frequency bands above 3.5GHz,

which are expected to be used for 5G.

Another problem with DAS is the lack of support for measurement or locating capabilities, which are widely required by business customers.

Last but not least, DAS uses a lot of passive components, which makes it difficult to manage and control remotely. If there are faults in the components, it's hard to repair and maintain.

Huawei LampSite: Brilliant Solutions for Indoor Coverage

The LampSite digital system is connected using fiber, making it possible to uphold the evolution to 5G and 5G-Advanced technology.

"The LampSite X is the lightest and most compact product of its kind in the industry, the smallest module is only 1L and 1kg; you can hold this device with only two fingers," mentioned Eric.

"It's also easy to access the buildings, as it has a very unobtrusive appearance that blends well in the environment."


Unlike DAS, the LampSite X can support a very wide range of frequency bands. It supports the frequency bands of sub1GHz, sub3GHz, C-band and mmWave, with the ultra-wideband and ultra-high integration design, LampSite X can bring indoor network from Gbps to 10Gbps with one box.

"LampSite X also has the features that are much needed by industry customers, including the capability of precision positioning, low latency, large uplink capacity and the support of RedCap. These capabilities will make us very attractive in the industrial segment, particularly suitable for deployment in settings like factories," added Eric.

LampSite X also boasts a major innovative feature on energy saving. In indoor scenarios such as stadiums and shopping malls, the traffic can be quite different at daytime and nighttime.

"LampSite X can identify these different traffic scenarios and activate the deep energy saving when there is no traffic, resulting to a decreased power consumption that can be as low as 1w," Eric remarked.

Without a doubt, LampSite X's three-layered optical architecture is highly simplified, making it very easy to smoothly upgrade and evolve in the future.

"We need to work together with operators to build the optimal experience of networks beyond 5G. With such competitive products from Huawei, we are confident that we can help operators to build leading indoor networks," concluded Eric. 



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Huawei's 5.5G Solutions: Pioneering the Future of Wireless and Business Technology

Telecom Review participated in a media roundtable organized on the sidelines of the Global Mobile Broadband Forum 2023, where Cao Ming, President of Huawei Wireless Solution, elaborated on Huawei's cutting-edge advancements.

Huawei's Leap into 5.5G
In the ever-evolving world of wireless technology, staying ahead of the innovation curve is a necessity. Cao Ming stated that Huawei has been at the forefront of this movement. He unveiled the company's plans for 5.5G.

He explained that while 5G has already brought remarkable

improvements in user experiences, this is just the beginning. Effectively, the future holds even more exciting possibilities with the advent of 5.5G.

Accomplishments in the Middle East

In the context of the Middle East, Telecom Review raised pertinent questions regarding the region's progress.

Cao Ming shed light on the Middle East's proactive engagement in 5G deployment and Huawei's collaborations with leading operators

in the Middle East. He added that the Middle East's proactive approach to 5G technology is driving rapid progress in the region. With networks maturing and infrastructure growing, 5.5G is on the horizon.

"Leading operators in the region have been actively engaged in discussions with Huawei regarding the development and deployment of 5G and 5.5G." Indeed, during the Mobile World Congress in February this year, du and stc, signed memoranda of understanding (MOU) with Huawei,

marking significant strides in the region's 5G journey towards 5.5G.

He also mentioned that du and Huawei unveiled the world's first 5.5G villa at this year's MBBF, enabling users to experience glasses-free 3D gaming and more, all powered by 5.5G connectivity. Furthermore, stc collaborated with Huawei to verify passive IoT, the key innovation that brought by 5.5G, in July.

With its full-series, full-scenario 5.5G products, Huawei is committed to ensuring operators a seamless transition from 5G to 5.5G and that the long-term investments of telecom operators are protected.

Paving the Way for Africa: Bridging the Digital Divide

The president of Huawei Wireless Solution stated that Africa is on its journey towards adopting 5G technology, but progress varies across the continent. Different countries are at different phases of development, with some still relying on 2G and 3G technologies, and some have already benefited from 5G networks. The decision to embrace a specific generation of mobile technology depends on factors like service needs, economic development and ecosystem maturity.

"South Africa serves as a prime example, with 5G networks deployed in major cities, while 3G still dominates in certain rural areas. Huawei has been working to provide diverse solutions for different scenarios and markets. In hotspot areas, they've deployed FDD massive MIMO for high capacity while offering lightweight solutions for remote rural areas. All of these solutions are designed to be ready for 5G technology."

Huawei recognizes that the commercial availability of 5G or 5.5G in a given region is determined by the maturity of the ecosystem and market development. The company's commitment to providing a diverse set of solutions ensures that countries and industries can smoothly



transition to the latest mobile technology when the time is right.

The Pillars of Huawei's 5.5G Solutions

For Huawei's cutting-edge solutions, Cao Ming explained five main pillars to achieve the promised capabilities of 5.5G networks:

1. **Ultra-Wideband:** Huawei's solutions support a wide range of frequency bands, eliminating the need for telcos to deploy multiple pieces of equipment to accommodate non-contiguous bands.
2. **Multi-Band:** Huawei's solutions offer multi-band support, enabling telcos to use one piece of equipment to support different bands. This approach reduces deployment costs and alleviates the burden on antenna space.
3. **Multi-Antenna:** Huawei continues to innovate and integrate multiple antennas into their solutions, significantly increasing spectral efficiency and improving user experiences. This can potentially reduce spectrum licensing costs for telcos.
4. **Green Technology:** Huawei pays a lot attention on energy efficiency. Since the network is increasingly complex, Huawei's approach of "0 bit 0 watt" achieves energy consumption on demand, ensuring that the network consume less energy when no traffic is low. This is vital to reducing environmental impacts and operational costs.

5. **IntelligentRAN:** Huawei's autonomous driving network, also known as IntelligentRAN, aims to simplify network management and maintenance, making 5.5G networks more cost-effective and efficient.

The Road Ahead: Collaborative Efforts and Regulatory Support

As Huawei takes the lead in developing 5.5G solutions, it emphasizes the importance of industry collaboration and regulatory support to ensure success. To make 5.5G a reality, Huawei encourages industry partners and regulatory authorities to facilitate the development of 5.5G ecosystems and applications. This support includes mechanisms to engage device manufacturers, application developers and ecosystem partners in the 5.5G development journey.

Moreover, financial support and incentives, such as subsidies and tax benefits, can be provided by local governments to encourage businesses to embrace 5.5G technology. These initiatives can play a pivotal role in promoting the rapid adoption of 5.5G, reducing the digital divide and transforming industries across the globe.

"With Huawei's commitment to innovation and collaboration, 5.5G is on the horizon, promising remarkable advancements in wireless technology and a more connected world. As the digital era continues to evolve, Huawei remains at the forefront, dedicated to pioneering the future of wireless communication," concluded Cao Ming. **TR**



Cao Ming, President of Wireless Solution, Huawei

From Vision to Reality: Innovations Shaping 5.5G Connectivity

Under the theme of 5.5G enabling superior network experience and driving sustainable development, an impressive lineup of speakers shared their expertise and insights during the second day of Huawei's Global Mobile Broadband Forum (MBBF) 2023.

Among the distinguished speakers was Cao Ming, President of Wireless Solution, Huawei. Expounding on the leading vendor's latest 5.5G innovations, he shed light on 5G's accelerated industry.

Latest statistics show that globally there are over 260 5G networks, more than 4 million 5G sites and 1.5 billion 5G users. With scaled applications, 5G is powering the digital economy.

Mr. Cao explained that 5G contributed over \$400 billion in the economy, a 50% increase when compared to 2022. There are also more than 65,000 industry applications of 5G at present, which is 3 times higher than last year's record. In a similar growth rate, private networks deployed reached beyond 17,000.

In sample use cases, 5G changes different industries, including healthcare, mining, manufacturing and logistics. In healthcare, telemedicine reaches 90% of Thai villages. In mining, 60% of underground operations are now done remotely aboveground. In factories, quality inspection has become 50% more efficient. In ports, loading and unloading are transformed into 75% efficiency.

Moreover, Mr. Cao mentioned that "5.5G is well timed to support new experiences, connections and services," highlighting that "Huawei's full-series 5.5G solutions will help operators deliver full-scenario tenfold capabilities and enable ultra-high energy efficiency, spectrum utilization and O&M efficiency."

The 5G Revolution: Connecting a World of New Experiences and Services

- **Connecting People:** 5.5G backs fully-interactive, holographic and fully sensed experiences from HD videos, glasses-free 3D and immersive XR.

- **Connecting Homes:** From 100 Mbps network requirement for large screen entertainment, there's a need for 5.5G to bring 1 Gbps at 20 ms and even 5-10 Gbps, for HD livestreaming, cloud gaming, 8K large-screen 3D, work from home and 4K/8K VR fitness.
- **Connecting Things:** 5G IoT technology continues innovating to enhance capabilities and reduce costs, paving the way towards fully-connected 100 billion-level connections.
- **Connecting Industries:** 5.5G will expand into core processes for flexible manufacturing. 5G flexible car production results in 80% less downtime and over \$100 million worth of extra orders delivery.
- **Connecting Vehicles:** Vehicle-road synergy on commercial 5G networks can lead to 60% fewer

accidents, 20% less congestion and 20% higher speed.

5.5G is Well-Timed: Huawei Full-Scenario Full-Series 5.5G Solutions

Mr. Cao emphasized that 5.5G network consists the capabilities of 10 Gbps downlink, 1 Gbps uplink, 100 billion connections and native intelligence. With “applications, networks and industry chains are ready” and Release 18, the first 5.5G standard, will be frozen next year, “the time to act is now.”

Presenting the newest lineup of Huawei full-scenario full-series 5.5G solutions, Mr. Cao showed how these broadband, multi-band, multi-antenna, green and intelligent solutions achieve two main objectives: optimal network efficiency and 10x capabilities improvement.

Deliver Tenfold Capabilities

- **TDD ELAA with more bands and channels for 10 Gbps experience.** The industry's first TDD 128T MetaAAU integrates 500+ antenna elements and employs multi-dimensional high-resolution beam algorithms, resulting in a 50% improvement in user experience. Furthermore, the industry's first dual-band 64T MetaAAU can operate with dual-band converged elements to enable the co-coverage between high and low bands.
- **FDD full-series beamforming to upgrade basic experiences.** The inaugural FDD triple-band Massive MIMO and triple-band 8T8R modules support gigahertz-level bandwidth, accommodating 1.8+2.1+2.6 GHz bands in a single unit. They seamlessly integrate with high-precision beamforming, resulting in significant enhancements in FDD spectral and energy efficiency.
- **mmWave AAU for continuous 10 Gbps coverage.** Featuring the largest scale antenna array (over 2,000 elements), the inaugural mmWave AAU addresses mmWave co-site co-coverage limitations with C-band. By coordinating between high and low bands, mmWave networks achieve peak throughput of 10 Gbps, averaging 5 Gbps. This

AAU also facilitates intelligent beam management, overcoming mmWave limitations in high-speed mobility and NLOS transmission.

- **DIS full-scenario leap boost experience and energy saving.** The LampSite X series integrates five bands and mmWave in a single unit to provide full bandwidth for all radio access technologies. It features super deep dormancy, reducing off-peak power consumption to just 1 Watt. For flexible deployment for underground parking and other similar areas, the unique multi-band medium-power LightSite module guarantees a 35% improved user experience and lower total cost of ownership (TCO) compared to standard DAS solutions.
- **Full-series green antennas are new benchmark for energy efficiency.** Green antennas use direct injection feeding (SDIF) and Meta Lens for 25% improved energy efficiency.
- **MAGICSwave platform bring efficient backhaul.** MAGICSwave enhances backhaul efficiency through ultra-wideband multi-channel transmission, offering higher capacity in urban areas and longer reach in suburban regions. It features a high level of integration, supporting networks to sustain evolve over the coming 10 years.

Ensures Optimal Network Efficiencies

Mr. Cao has pointed out that optimal network efficiency can be managed through spectrum pooling, energy on demand and O&M L4 automation.

- **iHashBand2.0 spectrum pooling maximizes multi-band usage.** The Multi-band serving cell (MB-SC) allows the flexible combination of discontinuous spectrum for virtual large bandwidth, enabling speeds of 10 Gbps with a 40% boost in spectral efficiency. Moreover, flexible spectrum access (FSA) also offers full uplink band access, achieving Gbps uplink speeds.
- **Full-scenario “0 Bit 0 Watt” for green and efficient 5.5G.** The

full-series equipment supports “0 Bit 0 Watt”, pioneering super deep dormancy with a 99% shutdown depth, quick on-demand wakeup and millisecond-level shutdown at both carrier and channel levels. With an intelligent site coordination, energy efficiency at the site level increases by 5-10%. Additionally, iPowerStar enables the implementation of site-specific energy-saving policies, tailored to varying traffic patterns throughout the day.

- **IntelligentRAN evolving to L4 automation.** 5.5G will advance high-level autonomy, as IntelligentRAN supports L4 intent-based intelligence. This means shifting networks from being reactive O&M to proactive prediction and prevention; from being KPI-policies driven to SLA-intent driven; and from single-objective to multi-objective optimization.

“The future has come. Huawei will continue to develop innovative products and solutions in collaboration with all industry partners to bring 5.5G into reality,” ended Mr. Cao.

Global Launch of 5.5G Network Pioneers

Bringing 5.5G to reality, GSA President Joe Barrett called on stage 13 different network operators who have been working tirelessly in bringing the 5G-Advanced network capabilities into the society. These include stc group, du UAE, Omantel, Zain KSA, Zain Kuwait, Ooredoo Kuwait from Middle East, and China Mobile, China Telecom, China Unicom, CMHK, CTM, HKT, Hutchison Telecom from Asia Pacific.

Notable speakers have also discussed indoor digitalization; 5G industry's new business potential and industry connection opportunities; creating a digitally sustainable Middle East through cross-industry 5G integration; 5G-Advanced development for business success; 5G+ glasses-free 3D enable ubiquitous immersive display experience; and RedCap ushering in a new era of cellular IoT and unleashing 5.5G's network potential, among other interesting topics. 

Bring 5.5G into Reality

The 14th Global MBB Forum 2023

The Strongest Line-up

The Most Innovative Products

The Most Immersive Experiences

Industry as a whole needs to be ready for the future
That's why we're working so hard on 5G-Advanced."
-- Ken Hu, Rotating Chairman, Huawei



**“Huawei’s full-series solutions for 5.5G
will help operators to deliver
full-scenario tenfold capabilities and
enable extremely high energy
efficiency, spectrum utilization and
O&M efficiency.”**

- Cao Ming, President of Wireless Solution, Huawei

