China Unicom Beijing showcases how 5G-Advanced enables scenario-based deployments and business models

5G-Advanced empowers new experiences at a stadium with a long history

On November 16, 2024, the 2024 King Pro League (KPL) Grand Finals concluded at Beijing Workers' Stadium, attracting over 30,000 spectators to the venue in addition to millions of online viewers. The successful event not only indicates a surging esports market in China but also demonstrates the robust communication infrastructure of the stadium, which has a long history.

Beijing Workers' Stadium is the home base of Beijing Football Club. The stadium was built in 1959 and completely rebuilt in 2020. Currently, the stadium is one of the most popular football stadiums in not just China but across Asia. During the last season, the average number of spectators per game exceeded 46,400. The stadium also hosts various activities, such as pop music performances. On top of that, the stadium operator has developed metaverse applications to provide online viewers with immersive experiences.

All these activities require a robust communication infrastructure inside and outside the stadium. For example, when more than 30,000 esports fans gather in the stadium, the network can be expected to

face heavy traffic loads. Therefore, China Unicom Beijing is working with the stadium operator to deploy 5G-Advanced to improve user experiences and support new applications for the stadium.

China Unicom Beijing leveraged high- and low-band coordination to deploy a layered 5G-Advanced network inside and outside the stadium with macro and small cells. 5G-Advanced in high-frequency bands aggregating four 200MHz bandwidth carriers can provide 15Gbps capacity for 10,000 spectators with a single cell. A 5G-Advanced network with multiple frequency bands can also enable flexible downlink and uplink timeslot configurations to meet the demand for user-generated content and support the live broadcasting of immersive video services. With 5G-Advanced's precise indoor positioning feature, the stadium operator could develop location-based services to further improve the user experience.

The stadium is located in Beijing's core area and has been integrated into the local community's daily lives, so China Unicom Beijing also enhanced the network over the entire area to provide a seamless experience to users moving from outside to inside the stadium or vice versa.

3D network coverage supports new use cases and local economic developments

China Unicom Beijing has achieved seamless 5G-Advanced coverage on Beijing's 4th Ring Road. The 5G-Advanced network camping ratio is higher than 85% across the entire area, which totals 300 square kilometers. The live network's peak and average downlink data rates have reached 6.1Gbps and 3.4Gbps, respectively, indicating a significant improvement in user experience.

In parallel with the network enhancement in central urban areas, China Unicom Beijing also introduced 5G-Advanced features in remote areas within the Beijing municipality to support local economic development.

Yanqing is a district 74 kilometers from Beijing's city center. It is well-known for its highly popular Badaling Great Wall, a tourist attraction, and the remote villages in the mountain areas. The local government is trying to improve the local economy by offering more attractive tourism activities and enhancing the accessibility of the remote villages. The mountainous terrain limits traditional transport, so the local government is eyeing the sky to develop drone-based logistics for remote villages and provide air tourism services over the Great Wall attraction area.

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Figure 1: China Unicom's 5G-Advanced base station for low-altitude coverage

Source: Omdia

Collaborating with the local government, China Unicom Beijing deployed a 5G-Advanced network with integrated sensing and communication (ISAC) features as well as a drone traffic management platform. The 5G-Advanced network provides 3D coverage over the ground and low-altitude airspace with uptilted, wide-angle antennas. The ISAC features and the management platform can accurately track and manage drones flying in 30-to-300-meter airspace to guarantee air traffic safety and improve delivery efficiency. The 5G-Advanced network can also provide mobile broadband connectivity to tourists who take helicopters to tour the Great Wall attraction area. Those on the helicopters can experience a data rate of over 5Gbps with the 5G-Advanced base stations deployed in high-frequency bands, enabling tourists to share their photos and videos in real time and supporting live broadcasting while in the air.

The 5G-Advanced network, with its air traffic sensing and management platform, has become a critical digital infrastructure for the district, enabling it to offer tourists value-added services and improve the daily lives of remote villagers.

Intelligent networks enable scenario-based deployment models

The deployments at Beijing Workers' Stadium and the Yanqing District underscore the value of a scenario-based deployment model for communication service providers (CSPs). The deployments can meet the specific requirements of targeted scenarios and create opportunities for CSPs to develop new business models, such as event-based or location-based tariffs. With these new business models, CSPs could explore new growth potentials.

However, scenario-based deployment and business models require a more flexible, agile, and intelligent network. The network's installation and deployment should be fast enough to respond to market dynamics. The network should also be able to identify traffic patterns to perform automatic optimization and guide CSPs' network expansion and service developments.

China Unicom Beijing joined Huawei to establish an end-to-end self-provisioning process for 5G-Advanced sites in lightweight scenarios, shortening provisioning times from days to minutes, which can effectively support scenario-based deployments. The two companies also joined forces to develop an AI-based distributed intelligent network solution to enable accurate fault location, fast self-healing, and self-optimization. With computing power at base stations, the solution can also help build a digital and intelligent ecosystem powered by cloud-edge collaboration.

In summary, China Unicom Beijing's 5G-Advanced deployment not only provides an enhanced mobile broadband experience in Beijing's central urban areas but also targets specific scenarios, such as a stadium that requires ultra-high capacity or remote districts that require 3D coverage. Scenario-based deployments will enable CSPs to develop new business models and explore new revenue opportunities while raising new requirements for the network's flexibility, agility, and automation. Huawei's 5G-Advanced solution with intelligent network operation features has fully met these requirements. With the success in megacities like Beijing, more CSPs are expected to adopt scenario-based deployments and relevant solutions.

Appendix

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