

TeliaSonera

scores another first with 4.5G



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On December 14, 2015, Norwegian telco TeliaSonera teamed up with Huawei to unleash the world's first 4.5G network in Oslo. The network – LTE-Advanced Pro – is the world's fastest, reaching outdoor peak rates of 1 Gbps. The leap from 100 Mbps to 1 Gbps seven years later is an impressive technological breakthrough that testifies to the telco's commitment to customer experience.

By Zhou Dongfei

Editor: Linda Hu hushenglan@huawei.com



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Why 4.5G?

With full coverage and a peak data rate of 300 Mbps thanks to LTE-Advanced technologies, TeliaSonera's 4G network was already impressive – so, why did they take the plunge with 4.5G? The answer can be found by a closer look at traffic jumps, user experience, the Internet of Things (IoT), and network evolution to 5G.

The global increase in data traffic is no secret. With the commercialization of its 4G network, TeliaSonera provided subscribers with layered tariff packages, fueling a 40 percent annual surge in network traffic, with video accounting for 40 percent of the total volume. Way above and beyond 4G, evolution to 4.5G provides a peak rate of over 1 Gbps. Moreover, tech like massive MIMO, massive CA, and 256 QAM vastly improves spectral efficiency and raises network capacity multiple times, satisfying user needs for the next three years and making 4.5G an attractive choice.

TeliaSonera was also attracted by the improvement 4.5G visited on VoLTE, which is

gaining in popularity. Compared with 2G and 3G voice services, VoLTE is great for users thanks to a call setup time of 1 to 2 seconds – down from 6 to 7 previously – coupled with HD voice quality enabled by the broadband voice codec.

Keep talking and keep watching

VoLTE deployment also helps TeliaSonera provide voice services on the 4G/4.5G network instead of on 2G and 3G networks. Refarming all spectrum resources to the 4G/4.5G network prevents costly maintenance on multiple networks; however, coverage enhancement and interference coordination technologies are needed to guarantee the availability of VoLTE services and voice quality consistency, and to meet the challenges caused by areas of weak coverage and at cell edges.

With 4.5G, TeliaSonera can distinguish itself in the full-HD space. Superior voice codecs such as enhanced voice service (EVS) can expedite evolution from HD to full-HD voice services to achieve real-time applications like face-to-face



conferencing.

4.5G also improves video services, which relies heavily on video source resolution, initial buffering time, and stalling times. This is important because the nascent popularity of HD and 2K videos on mobile terminals poses new challenges, especially at cell edges. The data rate of a moderately loaded 4G network is 5 Mbps, which doesn't fulfill the requirements of 2K and 4K video. 4.5G can improve the data rate at cell edges to give an unrivaled video experience.

Keeping an eye on things

4.5G is also an obvious choice for IoT as well as network evolution. TeliaSonera and other competing global telcos are looking for a competitive advantage in the machine-to-machine (M2M) era. Using advanced IoT technologies, the number of M2M connections in Northern Europe is in fact higher than the region's population, and the connection growth rate is twice the global average. But, existing cellular technologies will fail to meet the massive M2M connection requirements predicted for the future.

The incorporation of Narrow Band Internet of Things (NB-IoT) in 4.5G allows TeliaSonera to step confidently up to the plate. Easy to deploy, NB-IoT is based on existing cellular networks. Each cell can provide up to 100,000 connections, and the technology's embedded energy-saving mechanism extends battery life to a decade. Efficient, energy-lite, and cost effective, a single module is expected to cost 30 percent less than a GSM module.

Hello 5G

Unlike 5G and its need for a technological revolution over air interface, 4.5G is an all-around smooth, transition from 4G that can be realized with minimal software upgrades and new hardware. Deployment and service rollout are fast, and investment is protected.

4.5G also looks five years into the future by considering new terminals, services, and experience demands. It aims to support larger bandwidth, lower latency, and massive connections, paving the way for 5G commercialization. As 4G and 5G are expected to coexist for a long time, 4.5G technology can keep telcos an innovative force in the

marketplace – exactly at the time they need to be.

How's Huawei helping?

Huawei pioneered the 4.5G concept back in September 2014 from three angles: Gbps, Experience 4.0, and Connection+. From the dimensions of data rate, Experience 4.0, and number of connections, Huawei has fully tailored 4.5G to the needs and pain points of TeliaSonera.

By the end of 2015, more than 10 leading telecom operators had conducted pre-commercial tests and deployment of Gbps, NB-IoT, and LTE-based broadband trunking services. Huawei believes that 2016 will be a big year for 4.5G commercialization, opening the door to the next era of mobile telecom with telcos around the world deploying 4.5G on a large scale, with Huawei at the vanguard.

With industry-leading and proven key tech, Huawei helped TeliaSonera remove barriers to 4.5G commercialization. Huawei is the first enterprise to commercialize 2CC/3CC CA and launch relaxed-backhaul-based inter-eNodeB CA, significantly increasing the number of UEs using CA.

Huawei is also a leader in performing joint tests and verification of 4CC/5CC CA with telcos. Test results indicate that core 4.5G technology is mature and ready for commercialization. In the area of multi-antenna technologies, Huawei has developed integrated 4T4R blade RRU (Remote Radio Unit) and active antenna units (AAUs). Tests have been completed in Canada, Mexico, Saudi Arabia, and Turkey, all demonstrating big gains from multi-antenna technologies.

Huawei is pushing hard for the E2E maturity of the 4.5G industry chain. It's moving forward with partners in various verticals, and is thus able to provide E2E assurance for TeliaSonera's 4.5G commercialization scheme.

Huawei's HiSilicon and Consumer Business Group are promoting 4CC and four RR channels in the 4.5G commercial plans of mainstream chip vendors. Huawei is scheduled to launch 4.5G smartphones in the first half of 2016, with a lead time that will be much shorter than it was for 4G smartphones. To facilitate the growth of the NB-IoT terminal industry chain, Huawei has acquired the IoT networking firm Neul, and has already manufactured an inventory of HiSilicon chips ready for rapid distribution. Each of these milestones aims at accelerating the commercialization of NB-IoT.

4.5G represents the next step in the evolution of the entire wireless industry. NB-IoT in particular, will bring new business opportunities. But, it requires the concerted involvement of telcos, device vendors, chip and module vendors in terminals, and service vendors in verticals. Huawei is leading the charge to formulate NB-IoT standards, working with GSA and other international institutions to establish an industry alliance. It's also working with telcos to try out IoT pre-commercialization in all sectors. Examples include smart parking with China Unicom and smart metering with Vodafone.

Huawei's pioneering efforts with 4.5G will serve as a reference point to all global telcos as they digitally transform and seek to stay innovative in an increasingly cut-throat market. **uum**