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A10 Helps SKT Build Leadership in 5G

Sponsored by A10 Networks

HardenStance combined written questionnaire answers from SK Telecom's Manager of Core Engineering, Se Wook Kim, with public information sources for this Briefing on SKT's achievements and goals with 5G, and A10 Networks' role as a vendor partner.

- With more than two million 5G customers and early evidence of an uptick in mobile service revenues, SK Telecom (SKT) is a world leader in 5G.
- A10 Networks is a core enabler of SKT's 5G services. SKT rates the performance of A10's CFW product for CGNAT and Gi/SGi firewall across 4G and 5G very highly.
- Telcos and other ecosystem players should capitalize on SKT's extensive efforts to share its cutting edge experience and grow the global market in 5G services.

Deploying in the 3.5GHz band, SKT has rolled out more than 72,000 gNode Bs throughout South Korea.

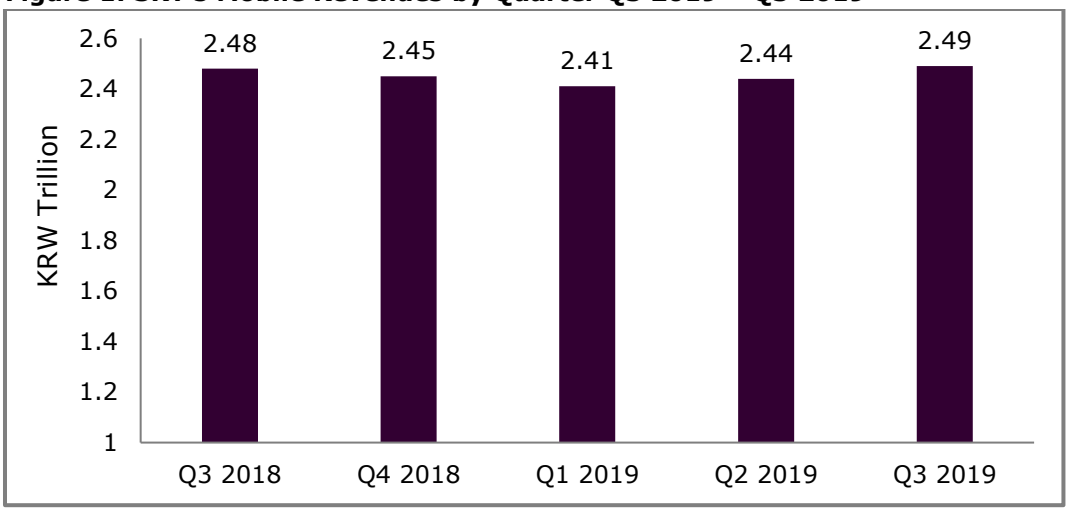
SKT launched its first commercial 5G Non-Stand Alone (NSA) network in South Korea in December 2018 and opened it up to the mass market with the launch of its first 5G smartphone in April 2019. Deploying in the 3.5 GHz band, SKT has now rolled out more than 72,000 5G gNode Bs throughout the country.

5G Users Consume Four Times More Data

SKT went through the 1 million 5G subscriber milestone in August 2019 and reached 2 million with more than 40% market share at the end of 2019. The vast majority of these customers are using 5G NSA smartphones.

At the end of 2019, SKT reported that its 5G customers were consuming an average of four times as much data as 4G users as well as twice as much traffic in the case of both game usage and media consumption. As shown in **Figure 1**, the initial business impact of 5G appears to be positive for SKT in so far as ARPU has shown a small upward tick following the launch of 5G.

Figure 1: SKT's Mobile Revenues by Quarter Q3 2019 – Q3 2019



Source: SKT Investor Briefing, Q3 2019

SKT developed its own '5GX' sub-brand for promoting the unique value proposition of its 5G services. This comprises the following four distinct components:

- **Speed**: up to 1.5 Gbit/s speeds were available at launch. Applying aggregation across SKT's current 4G spectrum and 100 MHz of new 3.5 GHz spectrum, 2.7 Gbit/s download and 150 Mbit/s uplink speeds are achievable. Once 800 MHz of 28 GHz spectrum assets are added, still higher speeds will be possible.
- **Latency:** a target of getting latency down to a round trip time (RTT) of around 10 milliseconds in what SKT calls the 'near edge' (between the central cloud and the access network) and ultimately to 3 milliseconds at the 'edge' (the access network).
- **Stability**: through AI-assisted automated operations.
- **Security**: including the goal of building what it calls "an un-hackable network".

The B2C value proposition centres on interactive, immersive multi-media, AR/VR and cloud gaming services. B2B services are centred around smart office and smart factory use cases as well as AI camera and surveillance-assisted security use cases.

SKT decided to deploy A10's Thunder CFW because of what the operator refers to as its "superb" performance.

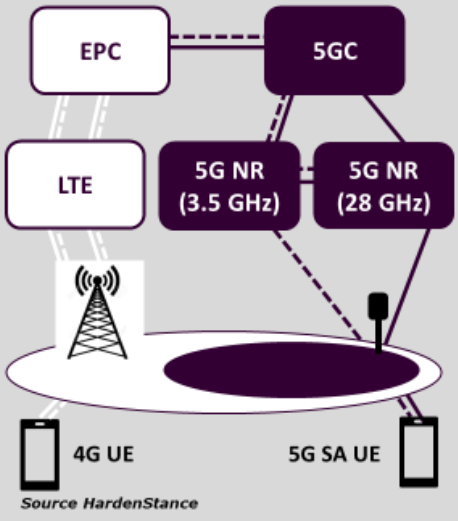
SKT built the foundations of its 5G NSA network from scratch. It invested in brand new Virtual Evolved Packet Core (vEPC) and edge routing infrastructure rather than upgrading its installed base. As a world leader in Multi access Edge Computing (MEC), SKT has built out twelve MEC nodes to complement the 5G NSA network. This will support the low latency needed for applications like smart factories, Augmented Reality (AR) and video game streaming.

As shown in **Figure 2** below, 5G SA will be launched in the first half of 2020. SKT is using 5G SA + LTE interworking according to 3GPP's 5G SA Option 2. Data calls on the company's pre-commercial 5G SA network were carried out successfully in Busan, South Korea's second largest city, in January 2020.

A10 Networks products play a central role in both enhancing performance and providing security at the heart of SKT's core network for 4G and 5G:

- Building on their presence in SKT's 4G network going back five years, the Thunder Convergent Firewall (CFW) devices now serve in the 5G Service Core. CGNAT and Gi/SGi Firewall functions are deployed to support and protect SKT's 5G services.
- Thunder Application Delivery Controllers (ADCs) for application performance.
- The Harmony Controller manages all of Thunder devices in the network.

Figure 2: 3GPP's 5G SA Option 2



Source HardenStance

SK Telecom allocates 100% IPv6 addresses for all 5G mobile subscriptions. All incoming traffic goes to the CFW Gi/SGi firewall. In SKT's tender, vendors had to demonstrate the ability to consistently deliver 200 Gbit/s throughput, simultaneously support a million subscribers per square kilometer, and handle more than 135 million sessions per second. Vendors also had to be able to support stringent low latency targets. According to Se Wook Kim, SKT's Manager of Core Engineering, A10 was the only vendor that met 100% of SKT's requirements. He states directly: "we decided to deploy A10 Networks Thunder CFW because of its superb performance, functionality and highest reliability."

In the case of the MEC infrastructure, SKT is implementing a range of security measures including additional features from A10's ADCs. Consideration is also being given to using A10's Global Server Load

Balancing (GSLB) and DNS caching solutions. With MEC, one of the biggest challenges SKT anticipates is managing the risk associated with providing open API access to third parties for directly accessing MEC network resources. In the broader 5G context, another security requirement that SKT is likely to encounter as a 5G leader is the protection of 5G roaming services. The first of these is already live with Swisscom. 5G roaming is due to be extended to up to twenty countries by the end of this year.

With 5G SA, SKT anticipates particular risks with respect to the interfaces supporting the new Service Based Architecture (SBA) and the migration to Cloud Native technologies more generally. As South Korea does not plan to allow 5G spectrum to be released to enterprises to build their own private 5G networks, the country's telcos are very well-placed to exploit the potential of 5G network slicing. SKT is therefore likely to be at the forefront of navigating the many complex performance and security challenges around 5G network slicing. It will likely want to draw on the capabilities of its vendor partners to help deliver compelling, customized, 5G solutions to enterprises.

SKT has developed its own Quantum Key Distribution (QKD) encryption solution to provide supplementary quantum-safe encryption.

Investing in an 'Age of Hyper-Innovation'

As a world leader in 5G, SK Telecom promotes the 5G technology and supporting ecosystem as ushering in "the age of hyper-innovation." SKT is differentiated from many of its telco peers by how deeply it is engaged in that ecosystem to help develop new revenue-generation applications on its 5G network.

In terms of innovation in the networking space, SKT's commitment to investments in stimulating the market in edge services stands out. Key examples include the following:

- Development of its own 'MEC Open Platform'. This is a type of micro data centre that can be co-located with 5G base stations or cell site routers for remote edge applications. SKT is designing it to allow developers to access it via open APIs.
- SKT is one of the first partners – along with Verizon, Vodafone and KDDI – to commit to partnering with AWS in deploying its AWS Wavelength solutions for edge services.
- Working with the Facebook-led Telecom Infra Project (TIP) to build an ecosystem for MEC developers.
- Collaboration with Deutsche Telekom's MobileedgeX, a Californian start-up creating a marketplace of edge resources connecting developers with mobile operators.

SKT has also invested in the following areas of 5G network development:

- SKT's goal of building "an un-hackable network" is supported by its own development of a Quantum Key Distribution (QKD) encryption solution. This is intended to provide supplementary quantum-safe encryption across 5G networks.
- An important aspect of the strategy for achieving network stability in 5G is through AI-assisted automated operations. Here SK Telecom leverages its own internally developed Telco Advanced Next Generation OSS (TANGO) operating system.

Partnering Global Leaders in 5G-Enhanced Apps, Devices and Content

SKT is also engaging in a lot of partnerships with leading players in the content, device and applications space. These include the following 5G-oriented partnerships:

- A comprehensive partnership with Microsoft in artificial intelligence, cloud computing and other 5G-related business areas.
- A partnership with China's Byton to jointly develop in-vehicle infotainment applications (announced at the CES show in Las Vegas in January 2020).
- An MoU with Samsung to co-develop and commercialize the world's first 5G 8K TV.
- Discussions on the application of MEC technology to new AR games with Niantic, the creator of Pokémon GO.

Exporting 5G Know-How Internationally

SKT is intent on capitalizing on its 5G leadership in South Korea to export that know-how to other operators throughout the Asia Pacific region and potentially beyond too.

Among examples of this are the following:

SKT is the first Chair of the Global MEC Taskforce

- SKT is the first Chair of the Global MEC Taskforce, announced in January 2020. Operating within the framework of the Bridge Alliance – an alliance of leading Asia Pacific operators – SKT is leading the Taskforce in driving adoption, sharing experience and developing new MEC use cases. Its partners are PCCW (Hong Kong); Taiwan Mobile (Taiwan); Singtel (Singapore) and Globe Telecom (Philippines).
- SKT has a strategic partnership to provide 5G SA build out know-how to Now Telecom in The Philippines.
- SKT is seeking to share its quantum-safe encryption technology with other operators and has already undertaken some deployments with Deutsche Telekom.

Telcos and other ecosystem players should do more than admire SKT's commitment to growing the 5G market. There is a wealth of learnings and partnership opportunities to be tapped into here too. ■

More Information

- This HardenStance Briefing was sponsored by A10 Networks
- Contact HardenStance's Principal Analyst: patrick.donegan@hardenstance.com

About A10 Networks

A10 Networks provides industry leading, highly scalable security solutions for 5G cloud-native network scenarios using automated intelligence and machine learning. The A10 Networks Orion 5G Security Suite includes carrier-class firewall, DDoS mitigation and detection, carrier grade networking and other functions which can all be deployed in physical, virtual, bare metal, and container form factors for 4G, 5G-NSA, MEC and 5G SA. Thunder CFW is a carrier-class firewall, providing exceptionally high firewall connection rates, low latency, throughput and concurrent sessions for the most demanding 5G use cases. Thunder TPS™ is an automated multi-vector DDoS detection and protection system with Zero-day Attack Prevention (ZAP) powered by machine learning. The solution ensures availability of business services at any scale or type of network. More information can be found at www.a10networks.com/5G

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