

SAMSUNG

Optimized 5G Solutions that deliver on the Promise of 5G

5G in Korea (Vol. 3)

5G



In South Korea, three network operators are seeing significant subscriber growth, having recently reached the 6.34 million 5G subscribers in April 2020, according to South Korea Ministry of Science and ICT (MSIT)¹.

5G data traffic today accounts for 24 percent (152.7 PB) of the total mobile data traffic, whereas the number of 5G users accounts for about 10 percent of the total number of mobile subscribers.

This significant growth in customers and the high percentage of data traffic proves that 5G commercialization, which started just over a year ago, is a success.

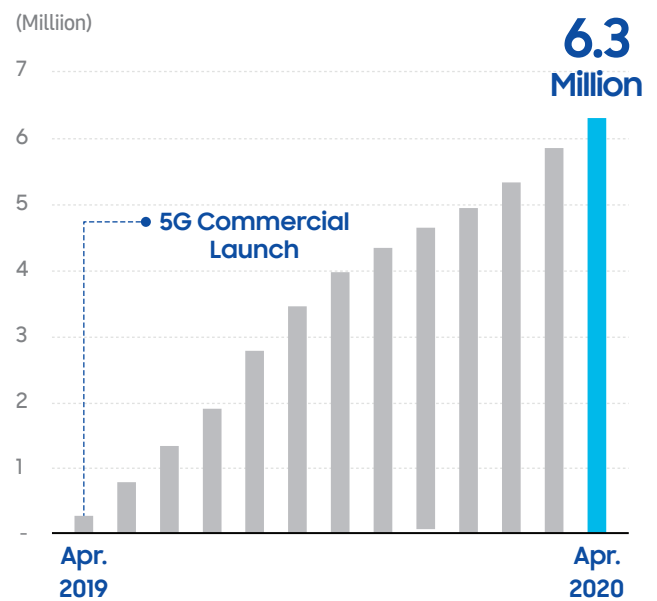
During this past year, the three mobile network operators not only enticed users to migrate to 5G, but the operators also deployed and are now operating more than 115,000 5G sites in the 3.5GHz band across 85 cities, which includes all major cities nationwide².

With new technology, mobile network operators often encounter unforeseen challenges that can delay deployments and subscriber acceptance, but that wasn't the case in South Korea.

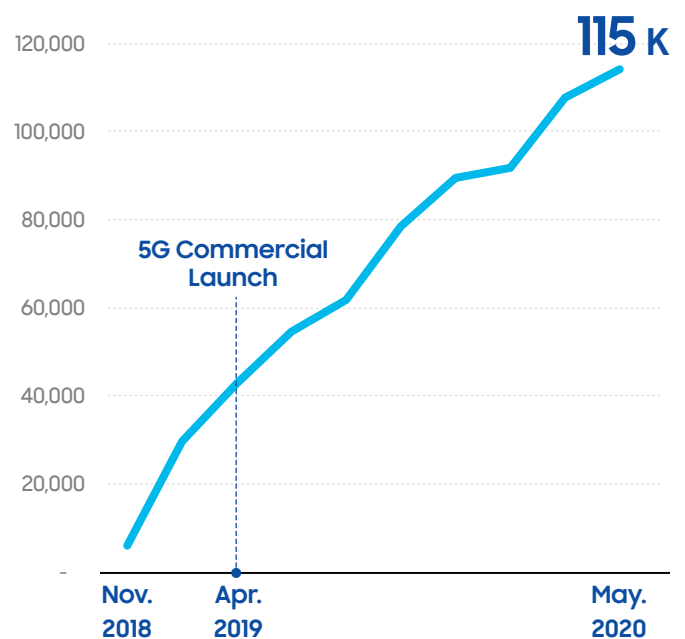
5G deployments in South Korea are progressing faster than expected.

As depicted in the figure below, the operators have increased the number of 5G site deployments by 3.3 times over sites deployed at launch and each operator had deployed about 100 sites per day during the first 5 month, marking an impressive path for 5G commercialization.

5G Subscriptions



Number of 5G Sites



1. Source: 5G subscribers statistics in Korea from MSIT (June, '20)

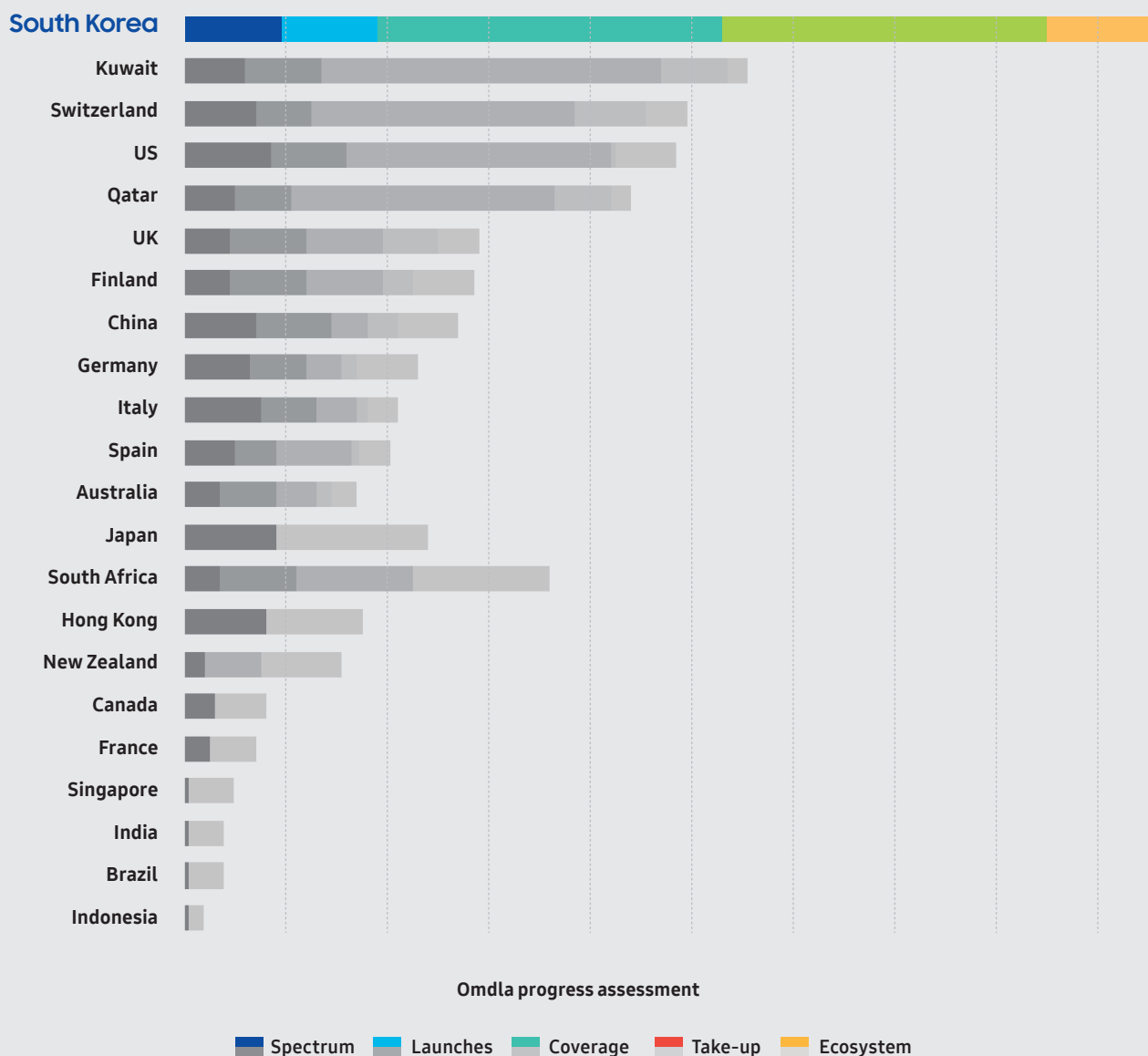
2. Source: 5G deployment sites in Korea from MSIT

According to “5G Market Progress Assessment” by OMDIA, South Korea’s 5G progress ranks at the top of the progress assessment.

The rankings use a relative assessment, effectively assigning South Korea a score of 100% for the fourth quarter of 2019. Korea led all deployments in all five of the assessment criteria:

- Spectrum – 2,680 MHz across the 3.5 GHz and 28 GHz bands
- Network coverage – A population coverage of about 90%
- Service launches – The three South Korean service providers made commercial offerings available to the mass market, and MVNO services have launched.
- 5G uptake – 4.67 million 5G subscribers or 7% of the mobile market (ss of Dec. 2019)
- Ecosystem – Strong government support and a leading local vendor ecosystem

Comparison of 5G progress by country



One of the major drivers behind the success in Korea is Samsung's flexible, scalable 5G solution portfolio , which includes equipment that both easily fit into a variety of deployment scenarios and are cost-effective to deploy.

Ultimately, these products are enabling the network operators to continue to accelerate the 5G deployments to sustain the high user growth in South Korea.

With the need to provide coverage to the country with the 13th highest population density in the world, South Korean operators face an enormous challenge in deploying 5G. Many mobile users enjoy unlimited mobile data plans, and 4G users are consuming an average of about 10GB of internet activity per month on their mobile devices. To meet this high capacity model with 5G, operators are deploying a high-density 5G network to provide the level of 5G service expected.



Currently, most radio network equipment is installed on rooftops, as most citizens live in urban areas where there is most often not adequate space to build new cell towers.

Therefore, South Korean mobile operators placed tight requirements on 5G equipment so that they could leverage existing sites for deploying 5G.

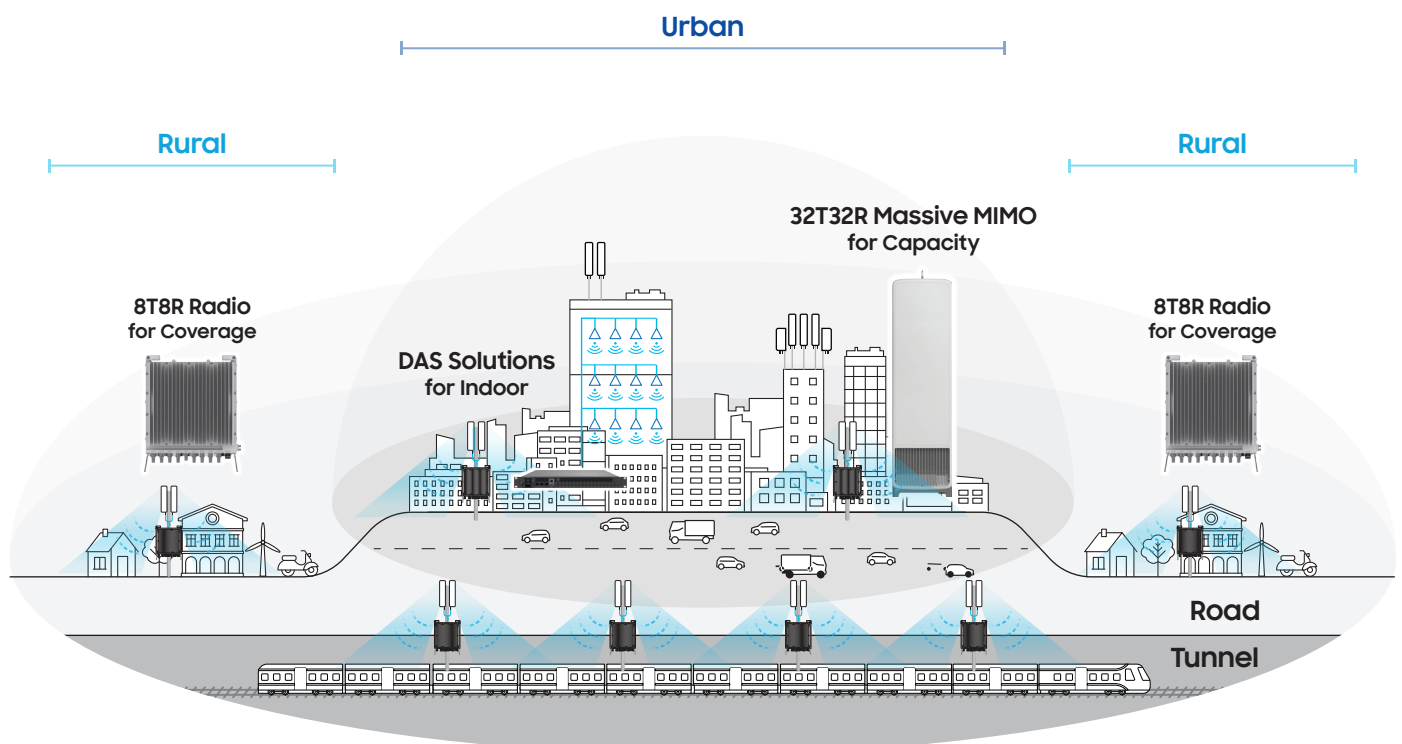
**Samsung successfully
designed and delivered
slim and compact
solutions**

to meet the carrier's
demands within the required
timeframe that also met their
coverage and capacity
needs cost-efficiently.

For example, when a site needs a high-capacity solution, like in an urban area, Samsung's 32T32R Massive MIMO provides a solution that has a slim and compact hardware design that can fit into existing cell site deployments.

To reduce total cost of ownership, Samsung's 8T8R radio offers a cost-effective coverage solution that is well-suited for roads and tunnels, as well as rural areas.

Network operators can now quickly deploy Samsung's optimal 5G solutions to offer ubiquitous, high-quality user experience promised by true 5G.





Slim, compact 32T32R Massive MIMO Radio fits and provides high capacity in conventional sites

In the era of 5G, customers expect faster speeds than those provided by the previous technology, 4G LTE. However, it is not easy to satisfy these expectations using legacy equipment and technology.

In response to these new requirements, Samsung developed the Massive MIMO Radio, which supports cutting-edge technologies like Multi-User MIMO (MU-MIMO) communications and beamforming.

MU-MIMO is a technology that allows multiple users to access the high-speed system simultaneously.

The new Radio integrates a massive number of antennas into the Massive MIMO Radio, making it possible to support beamforming technology. The beamforming capability enhances horizontal and vertical coverage to minimize interference among users. Thus, it maximizes both user quality of experience and network performance.

The company's 32T32R Massive MIMO radio is in fact, one of the smallest and lightest units in the industry, weighing less than 25kg (55lbs), and requires less manpower during installation.

Of all the 5G radio solutions Samsung provided to the Korean operators, the Massive MIMO Radio accounts for nearly 90% of the total.

This easy-to-deploy system plays a critical success factor that is enabling fast 5G commercialization in South Korea.

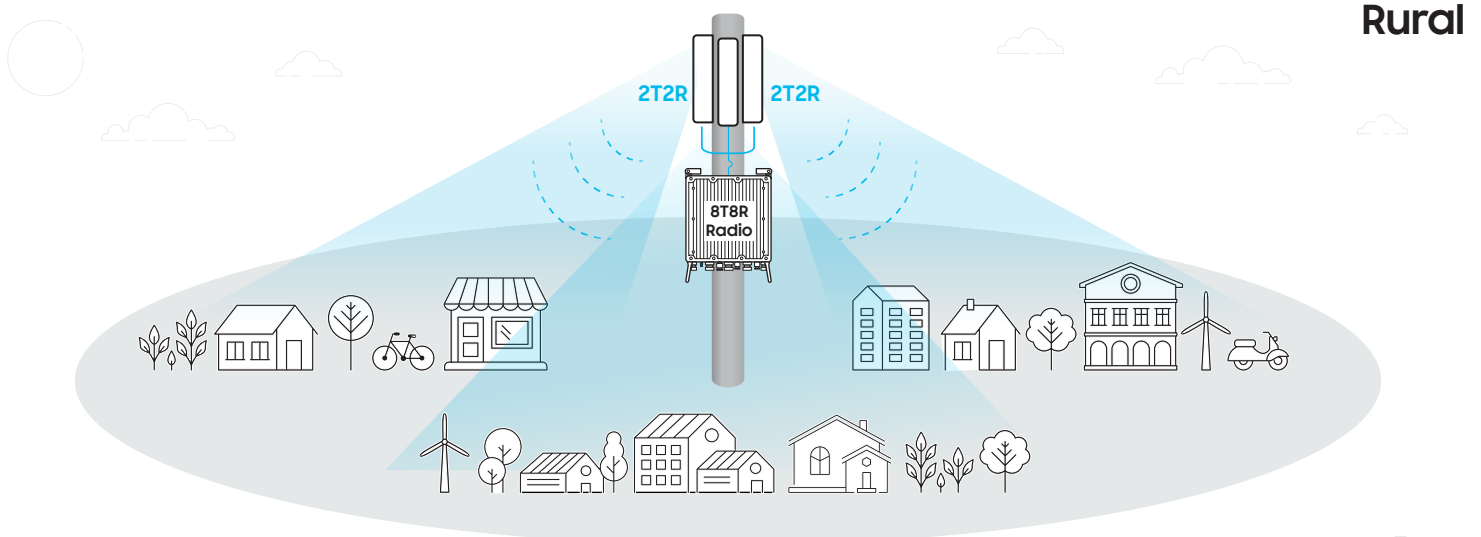
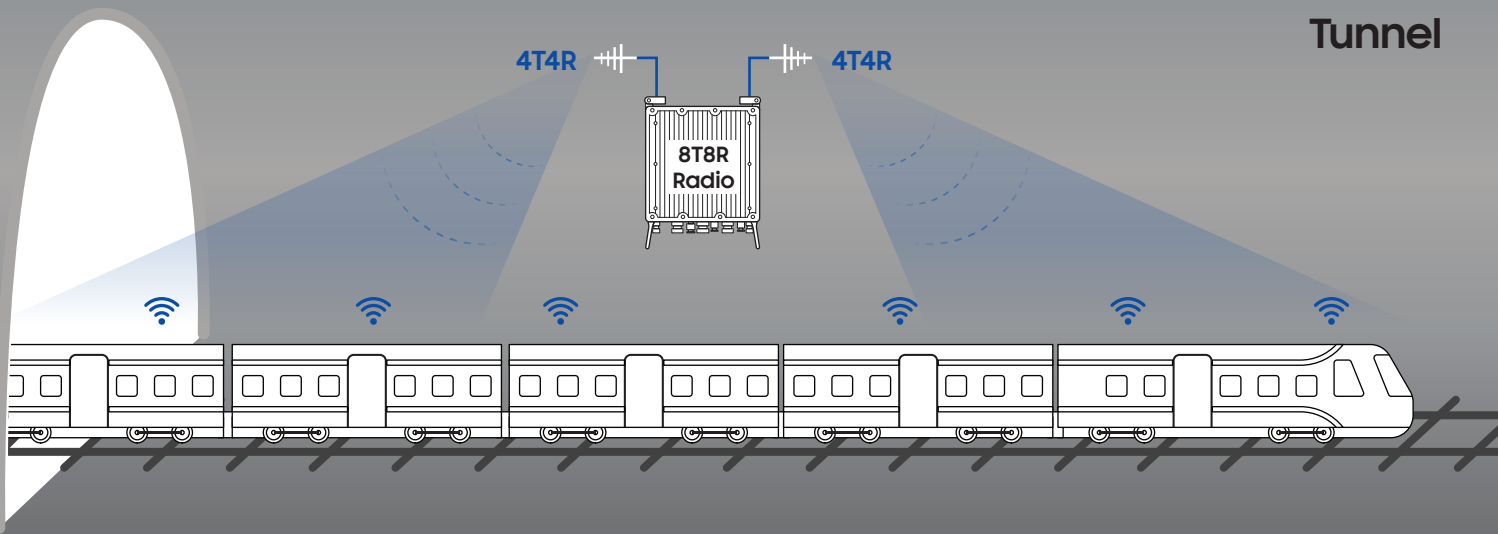


Flexible 8T8R Radio for roads, tunnels and rural area saves costs

The 8T8R Radio is a highly cost-efficient solution for 5G when high capacity is not required. Samsung 8T8R Radio supports a variety of configurations to meet cost-effective deployments.

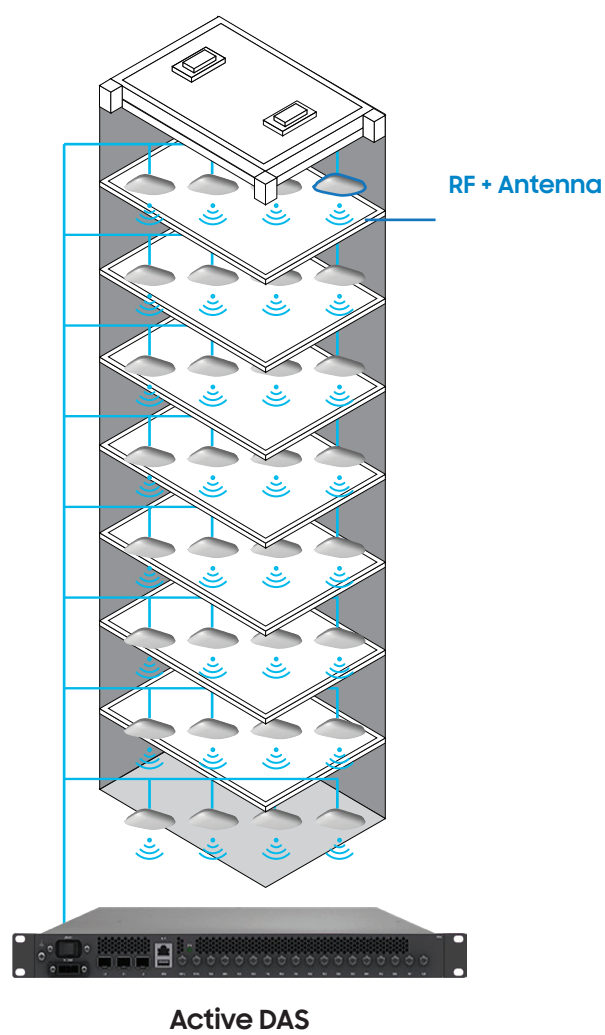
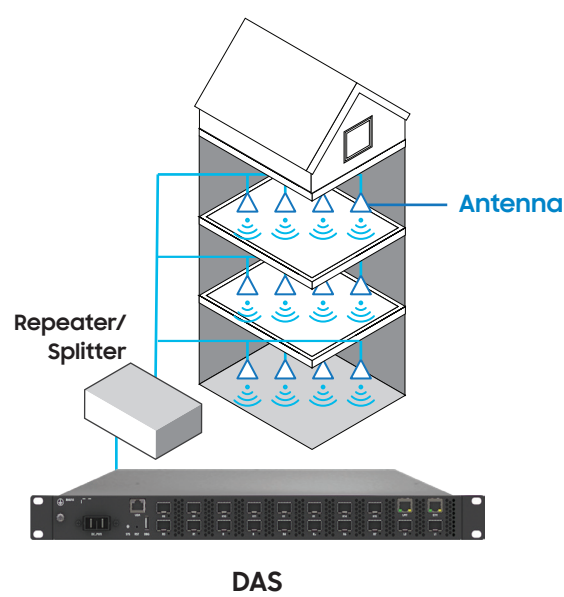
A single Radio can support two sector mode within 4T4R for use on roads, tunnels, and subways. For rural areas where coverage is vital, the 8T8R Radio has the flexibility of supporting four sectors within 2T2R for multi-sector coverage.

From a future-proof perspective, the 8T8R radio can be easily upgraded via software when mobile devices with eight antennas arrive in the market in the future. With this flexibility in the 8T8R Radio, Samsung believes it reduce an operator's total cost of ownership.



Various types of Indoor solutions

Indoor coverage is also a primary 5G challenge for which Samsung offers excellent solutions. To enhance indoor coverage quickly, Samsung provides two types of DAS solutions.



*DAS: Distributed Antenna System

| | DAS | Active DAS |
|-------------------------------------|----------------------------------|---|
| Transport Material | Coacial Cable | Optic/Etherent Cable |
| Carrier Agnostic | Yes | No |
| Scalability | Limited | Fully scalable |
| Signal reliability per each antenna | Unstable | Stable |
| Area | Small-Med Building/ Old building | Large Building /IT friendly building (i.e. Complex) |

Repeater Interface Unit (RIU) supports DAS deployments, providing an interface between the base station and repeaters. The RIU is cost-efficient and suitable for indoor environments that require extensive coverage. DAS makes for efficient installation in sites that do not have fiber optic and Ethernet cable at the ready.

Active DAS is suitable for heavy data traffic offloading in indoor deployments. The Samsung Radio Hub Unit (RHU) is located between baseband and RF-Antenna for active DAS. Compared to traditional DAS, active DAS has a simple structure comprised of RHU and RF/Antenna without any additional repeaters and splitters required

As such, it is suitable for IT-friendly buildings that are well-equipped with Ethernet or fiber-optic connectivity. Moreover, Active DAS provides a stable signal strength at each antenna point, and it offers sector expansion, not just coverage, to off-load cell capacity making it efficient enough to cover large buildings and areas such as an entertainment venue.

These products provide carriers with options for indoor solutions that overcome 5G indoor coverage challenges.

Deliver on the Promise 5G with optimized 5G solutions

Samsung's 5G solution portfolio meets the needs of a wide variety of deployment environments with unique traffic demands.

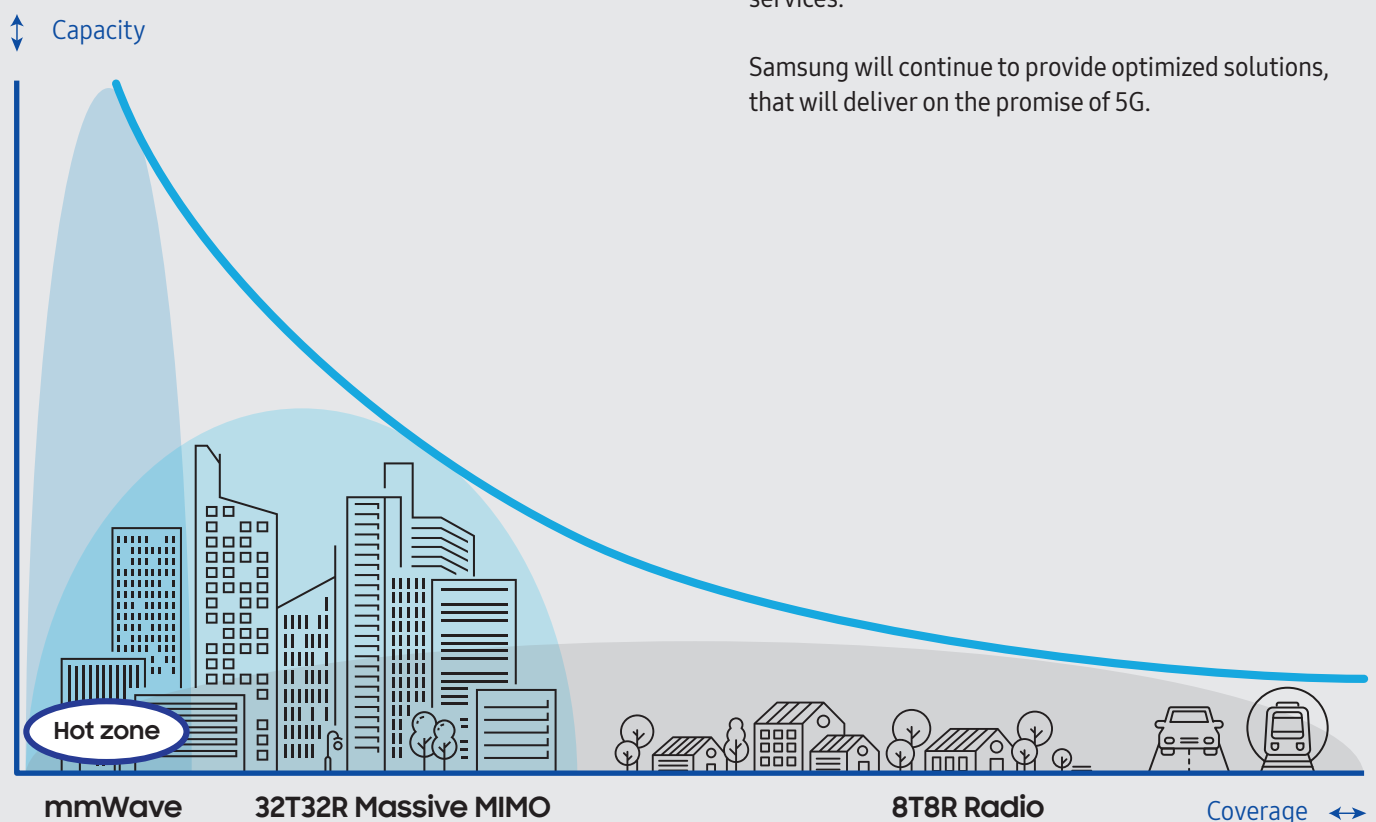
As a result, the South Korean network operators can develop highly successful strategies that deliver capacity demand and network coverage needs while being cost-effective to deploy and operate.

South Korean network operators are now preparing for the next wave of 5G commercialization: mmWave. 5G service in South Korea, will soon leverage the mmWave spectrum to provide ultra-wide bandwidth that delivers data throughputs more than 1Gbps per user.

Operating in this bandwidth will not only offload data from current hotzones, but it also will enable new B2B communications that support smart factories and smart offices.

Samsung is already delivering 5G mmWave products to US carriers as part of their high-speed 5G commercial services.

Samsung will continue to provide optimized solutions, that will deliver on the promise of 5G.



Related Contents

Whitepaper

5G in Korea - Volume 1: Get a Taste of the Future

5G in Korea - Volume 2: Korea's 5G Continues Exceeding Expectations

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