

SAMSUNG

Experience the Promise of 5G

with Samsung's 5G mmWave solutions



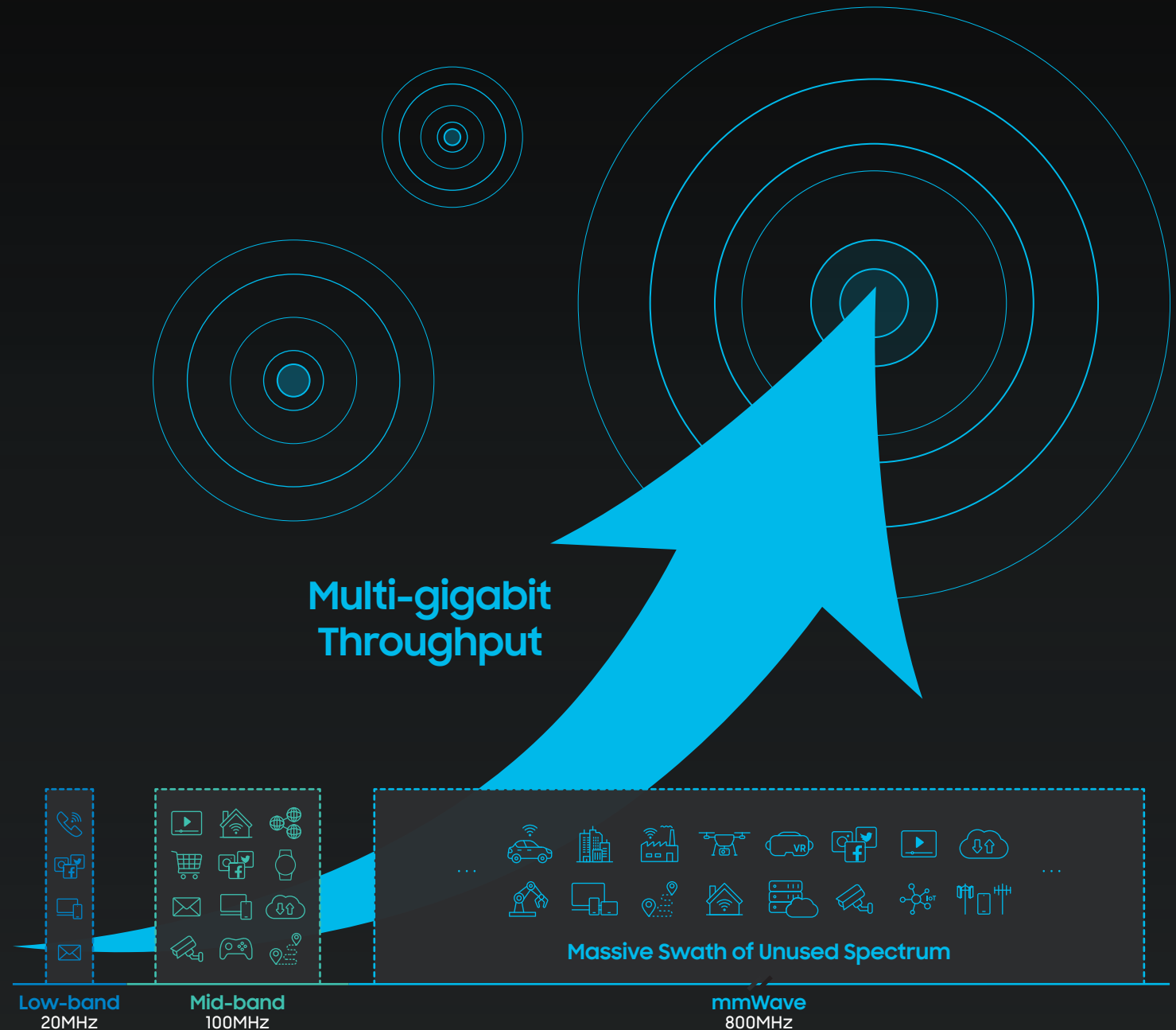
Realizing Ultimate Speed

Based on Massive Swath of Unused Spectrum

With 5G commercialization happening in many regions around the world, global operators are quickly trying to upgrade their wireless technology from 4G to 5G.

5G promises to bring super fast speeds, low latency, instantaneous communications, massive connectivity with billions of things and act as the catalyst for industrial transformation. It will transform industries by bringing wireless connection to dozens of previously unconnected or under-served industries from autonomous driving, to smart homes, smart cities, public safety and more.

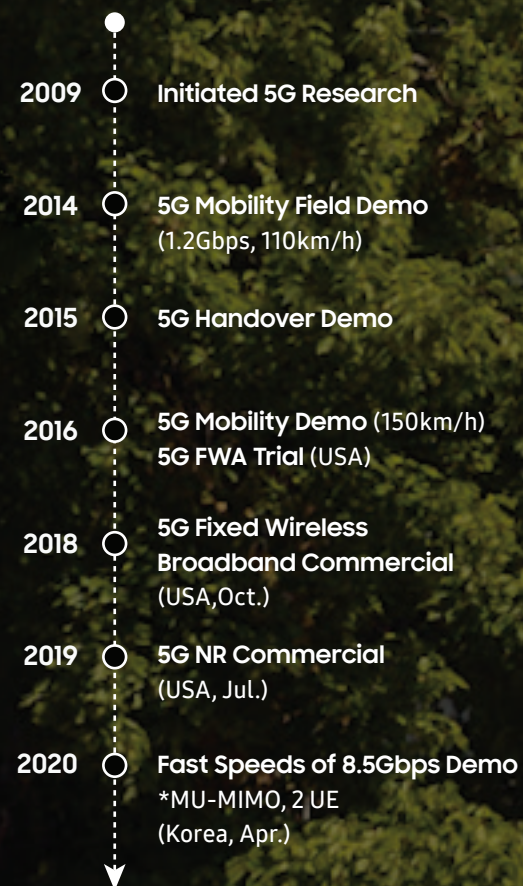
We believe that this is best enabled by leveraging synergy between mid-band and mmWave spectrum together. There are still massive amounts of unused or under-used mmWave spectrum and when they are made available by each country, they will open a new era of connectivity.



Samsung's 10 Year Journey with mmWave

Before Samsung's research & development of mmWave, the existence of this vast resource was largely unconsidered by the industry and was thought to be too difficult to use because it has a unique set of characteristics and challenges. For example, mmWave has a difficult time penetrating solid objects and is easily absorbed in the air when compared to low and mid-band frequencies.

Despite the challenges, Samsung has been pioneering research and development in this area for more than a decade. Samsung aimed to enable mobile communication in the mmWave spectrum bands, and as a result of our commitment, we have contributed to the industry's first 5G commercialization of this spectrum. Samsung now offers a broad mmWave product portfolio to meet the diverse needs of operators.



Samsung mmWave Series

Quick & Simple Deployment

Streetlamps, Utility Poles, etc.



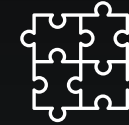
Powerful Performance

with a Small Form-factor



Alluring yet Discreet

Fits Well with the Surrounding Environment



AT1K01

Antenna+Radio+Baseband



HT1K01

Antenna+Radio



HT1K03

Antenna+Radio



HT5H01

Antenna+Radio

Quick & Simple Deployment

A fast, simplified way to build out 5G networks

We've made our mmWave products compact and light for quick and simple deployment which is ideal for installation by a single technician. Samsung's mmWave radios are integrated with antennas, and our Access Units include baseband functionality as well. This allows it to be deployed with minimal real-estate space.

The driving force to make our products compact, in-house chipset

One of our core competencies, and a key factor in our ability to develop small, compact products, comes from our ability to design and manufacture key components in-house, including our modem and Radio-Frequency Integrated Circuits (RFICs). Our Access Unit is made possible, in part by Samsung's first 5G NR System-on-a-Chip (SoC) modem. This chipset enables an approximately 25 percent reduction in size, weight and power consumption, when compared to its predecessor. This fundamental differentiator has enabled Samsung to create powerful products. The in-house chipset is one of Samsung's biggest advantages coming into play for 5G.

The industry's first integrated solution

One of our main products – the Access Unit (AU) – brings together the radio, antenna and baseband into one compact box, making it a first-of-its-kind integrated radio for mmWave spectrum, compliant to the 3GPP NR standard. The integrated hardware is still light, compact and easy to deploy. Improved cost-efficiency is achieved by eliminating the need for 'fronthaul' fiber connections, thanks to its built-in baseband. Thus space is saved through elimination of a separate baseband rack or mount, as well as the various cabling typically required between baseband, radio and antenna. This will help accelerate infrastructure deployments by easing installation on streetlight poles, building walls and other common deployment locations, ultimately optimizing the overall cost of deployment.

Powerful Performance

Performance boost with advanced antenna technology

Through mmWave technology leadership, Samsung was able to concentrate a massive number of antenna elements within a small product, enabling our mmWave solutions to create precise, sharp beams for better performance. With over 1,000 antenna elements and cutting edge in-house chipset technology, Samsung's AU maximizes mmWave 5G capacity and beam scan range to set a new benchmark for the industry's best-in-class.

It supports a wide degree of coverage: 120 degrees horizontally, 40 ~ 60 degrees vertically and vertical beam range can be increased up to 120 degrees with e-tilt function.

Maximizing the full potential of mmWave spectrum

Samsung's mmWave radios unlock the full potential of the massive swathes of spectrum available. We have been building and leading the mmWave ecosystem through our long journey of research & development in mmWave since 2009. Samsung designs and manufactures high-performance RFICs in-house, which support all mmWave candidate bands from 24-47GHz, providing operators with greater choices when selecting solutions for different deployment scenarios.

Our integrated products, in particular, are capable of delivering an industry-leading capacity of 10Gbps throughput, enabling operators to deliver faster 5G speeds to a larger number of users.

1,024
Massive Number of
Antenna Elements

120°
Horizontal

120°
Vertical
with e-tilt



Related Video:

5G Made Better, Faster, Easier with Samsung's Access Unit

Alluring yet Discreet

Blends well with the surrounding environment

Samsung mmWave Radios are light-weight, compact in size and designed to be less obtrusive, blending seamlessly into the surrounding environment.

It also comes with a shroud to cover the product, aesthetically camouflaging it when installed on a street lamp or utility pole. And, with two radios installed together, they provide full 360-degree coverage and can be used to effectively offload high data traffic for hotspots.

Samsung mmWave products utilize convection cooling to maintain appropriate operating temperatures and minimize environmental impact. Samsung specifically designs its radio units to use natural convection cooling under all loading conditions to dissipate the heat generated by the base station components. This avoids potential fan failure and corresponding base station overheating that can occur with active cooling systems, as well as the potential impact from noise generated by fans. With fan cooling, network operators may have to contend with permitting issues or the incremental costs associated with sound-abatement solutions, and must factor increased power and regular maintenance work into their costs of operations.



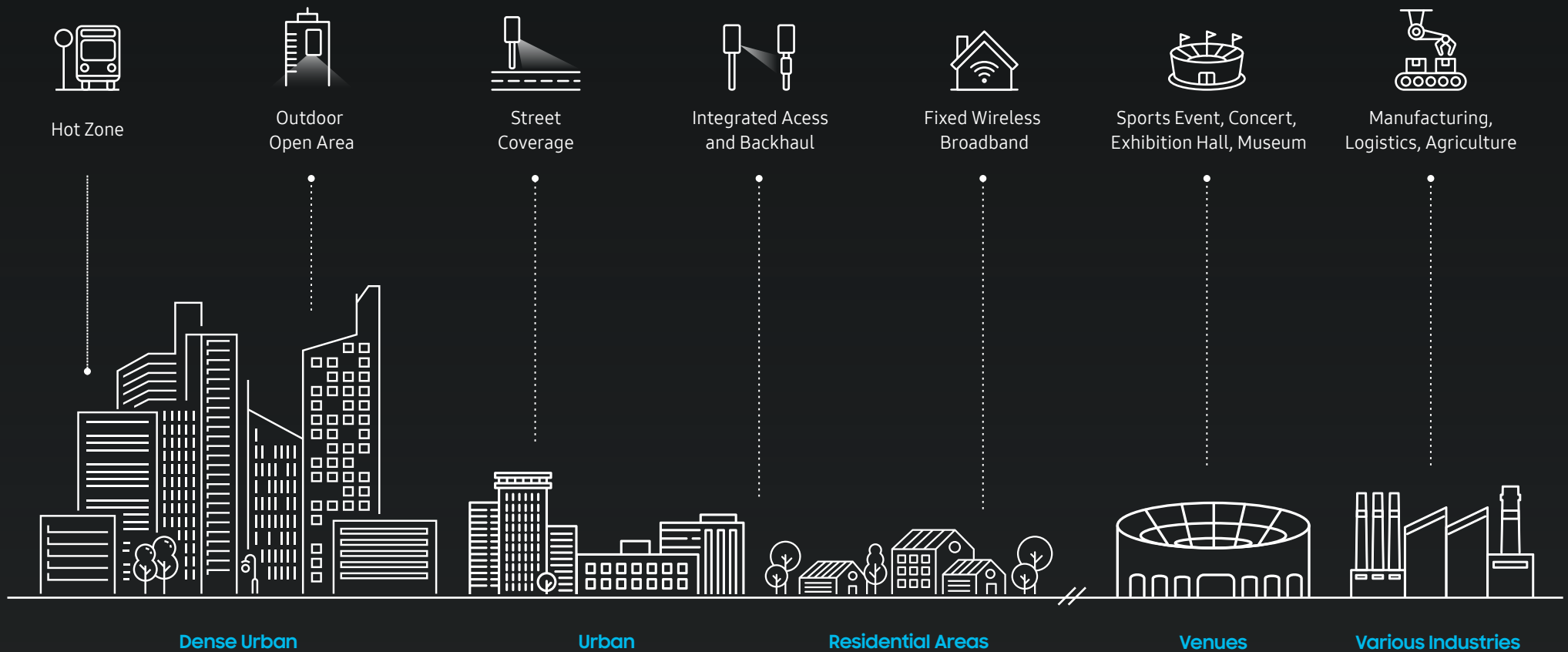
Related Video:

Full 5G Coverage Easily Created with Samsung's mmWave Radio



Use Cases

In general, mmWave products can be used in densely populated areas in the city to ensure 5G services. It can be used to provide 5G coverage and capacity in certain venues (e.g. down town areas, stadiums, malls etc.) where data usage is high. It can be used as an Integrated Access Backhaul solution that doesn't rely on fiber to deliver 5G service where there is not enough fiber backhaul availability. mmWave solutions can also be used in residential areas to provide wireless broadband connectivity to indoor residential users. Another deployment scenario involves industrial environments, where mmWave 5G is deployed to enable high speed and low-latency use cases including Robotics, Industrial IoT, AR/VR and more.



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About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

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