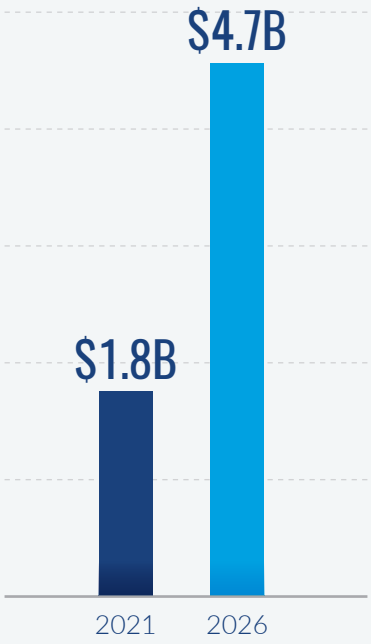
TeleWorld Solutions

Deploy, Optimize, and Manage mmWave 5G Networks with Confidence

5G networks will bring businesses and consumers fantastic new capabilities. The coming years will see highly automated and high-speed factories, more cars that drive themselves, AR (augmented reality) and VR (virtual reality) providing highly immersive learning experiences and games, and much more. As the number of **5G users globally is expected to grow from 200 million in 2020 to two billion in 2025**[1], 5G networks will have to support much higher capacities and much lower latencies than previous wireless standards.

Millimeter-wave (mmWave) cell sites can carry tremendous amounts of data, with channel sizes up to 400 MHz, allowing for the transmission of thousands of times as much data per channel compared to earlier wireless generations. This makes it extremely attractive for 5G networks, which promise throughput rates far beyond anything seen in wireless communications to date. **The global market for mmWave technology is forecast to grow from $1.8 billion in 2021 to $4.7 billion in 2026**, a CAGR of 20%[2]. A 2021 report by GMSA, "The economics of mmWave 5G", which details the financial implications for mmWave installations, concludes that mmWave sites are a sound investment, not only where high capacity and throughput are needed, but also where traffic will be high for short periods.

The global market for mmWave technology growth



5G Networks Needs Densification

To provide higher capacities and lower latencies, 5G networks will require densification. Network densification refers to placing more cell sites in each geographic area than existed in an LTE network. Although usable over far shorter distances than low-band and mid-band antennas, using mmWave technology to densify the network allows the transmission of much higher data rates. These ultra-high data rates will allow the full range of current and future speed-dependent 5G use cases.

While there are hundreds of thousands of cell sites in the US, hundreds of thousands more will be needed to provide full 5G coverage across the nation. mmWave cell sites, referred to as picocells or small cells, are an excellent strategy for densification as they usually operate in the US at the 28 or 39 GHz bands, allowing for much smaller antennas (higher frequency band → smaller wavelength → smaller antenna), and overall site footprint. Small cells provide less coverage but can be more easily placed, and hidden or camouflaged, where needed. **The global 5G small cell market size is expected to grow enormously from $175 million in 2019 to $15.9 billion in 2026**, at an annual CAGR of 81%[3].

The ability of the mmWave band to carry large traffic loads makes it appealing to mobile network operators (MNOs). Auctions for the right to use this band have already been completed in the US, South Korea, Japan, Taiwan, Italy, Russia, Germany, and other countries. mmWave can handle indoor and outdoor systems, Fixed Wireless Access (FWA), and the Internet of Things (IoT).

However, there are challenges to be met when deploying, optimizing, and managing these new networks.

Deployment

The placement of mmWave cell sites can be challenging. There are often city, county, or state regulations that define the site's appearance. These requirements include features such as the color of the enclosure, size limits in various dimensions, and the design, such as wood-like if going on a wooden pole. Neighborhoods want the equipment to blend into the area as much as possible, keeping their aesthetics, with desert colors seen in Arizona and painted-to-match colors found in suburban areas.

TeleWorld Solutions is a wireless engineering and consulting company that has installed thousands of small cell sites across the country, including 4G, 5G, and Wi-Fi nodes. Working from coast to coast, TeleWorld Solutions has perfected a flexible solution to manage their customers' specific network deployment needs. TeleWorld Solutions understands that the requirements change with every job – not only with equipment specifications but also with local regulations. TeleWorld Solutions manages projects from inception to completion – faster, smarter, and cost-effectively.

Optimization

Following deployment, new cell sites are brought online and integrated into the network in the Commissioning and Integration (C&I) installation phase. The next step is to optimize the network.

Optimizing a network refers to the improvement of coverage, capacity, and performance using various techniques. These are done to ensure that the coverage provided is maximized while at the same time making sure that interference is eliminated as much as possible. Reducing interference helps optimize throughput and performance.

To optimize networks, TeleWorld Solutions uses a turnkey, end-to-end approach that balances field measurements, data blending and analytics, and proprietary AI/ML-based tools and automated processes to improve spectral efficiency, network KPIs (key performance indicators), and the user experience.

For Non-Standalone sites (NSA) - 5G cell sites that use the 4G core network - the work needed is particularly critical. For NSA sites, which include the vast majority of mmWave installations, TeleWorld Solutions uses AI and ML algorithms to precisely map the connectivity between an mmWave site and the surrounding 4G sites to optimize correctly and dictate the interactivity between them.

Management

The management of cell sites takes place from a Network Operations Center (NOC). The NOC monitors various factors such as KPIs, alarms, number of users, dropped calls, and data volume usage.

TeleWorld Solutions runs a virtual NOC using innovative AI/ML algorithms, and automated procedures developed through years of experience, to manage hundreds of mmWave sites across the US and resolve issues quickly. The efficiencies gained through automation provide the flexibility to manage all the cell sites in a given geographic area or one type of cell over a larger area with a small team. For 5G mmWave NSA sites, the TeleWorld Solutions NOC manages standard events and the interaction with the 4G core and surrounding 4G sites. The TeleWorld Solutions NOC runs 24/7/365, and their nationwide team of experts ensures that any problem is addressed immediately.

Conclusion

Samsung and TeleWorld Solutions are in the midst of a nationwide deployment program with Samsung's line of 5G equipment and mmWave cell sites. Samsung's broad 5G portfolio and TeleWorld Solutions' innovative processes bring the wonders of 5G to the country quicker than ever.

Although TeleWorld Solutions is owned by Samsung, it is independently operated and vendor-agnostic, experienced in all OEM element management systems, and able to use and install equipment from any vendor. TeleWorld Solutions is relied upon by their customers to be a trusted advisor, helping in all aspects, from business case analysis to installation and management of large wireless networks.

1. https://data.gsmaintelligence.com/api-web/v2/research-file-download?id=59768858&file=210121-Economics-of-mmWave.pdf
2. https://www.marketsandmarkets.com/Market-Reports/millimeter-wave-technology-market-981.html
3. https://www.5gradar.com/features/5g-small-cells-everything-you-need-to-know

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