# Expand FDD Coverage with Next-Generation Antenna Systems

## Extending coverage can radically improve network availability, application reliability, and customer perception of value.

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Mobile customers—enterprises and consumers—value coverage above all else. The ability to send a message, update a line-of-business application, query a sensor, make a call, look up information, or use an app defines the mobile experience.

The workhorse of mobile coverage in every market globally is FDD low-band and mid-band spectrum. Advances in FDD antenna system design and manufacturing enable operators to meaningfully extend coverage in these bands across geographic landmass, along highways, deep into urban areas, and for outside-in service to indoor devices. These capabilities create several strategic benefits, such as the following:

- **Enhanced coverage in FDD spectrum will add immense value to 5G standalone (SA).** FDD combined with the capacity of TDD mid-band creates a baseline for strong 5G SA networks. This combination is a starting point for a differentiated connectivity strategy that can serve different device types and customer groups, as well as underpin monetization. FDD coverage is critical for strong 5G SA.
- **Multiple innovations in R&D, engineering, and manufacturing combine to extend passive FDD antenna performance.** Enhancements include beam efficiency, optimized radiation patterns, and reduced PIM interference. Deployment tools such as digital twins, secure remote tilt, and optimizations for antenna weight and wind load support low cost deployment and operations.
- **An antenna refresh should future-proof the tower or rooftop for advances in RAN technology.** Due to long antenna lifespans, it is essential for any refresh strategy to consider emerging RAN innovations. Examples include supporting superior uplink coverage with 4T8R, maximizing the impact of AI RAN features (such as link adaptation), or creating space at the tower for future 6G systems.

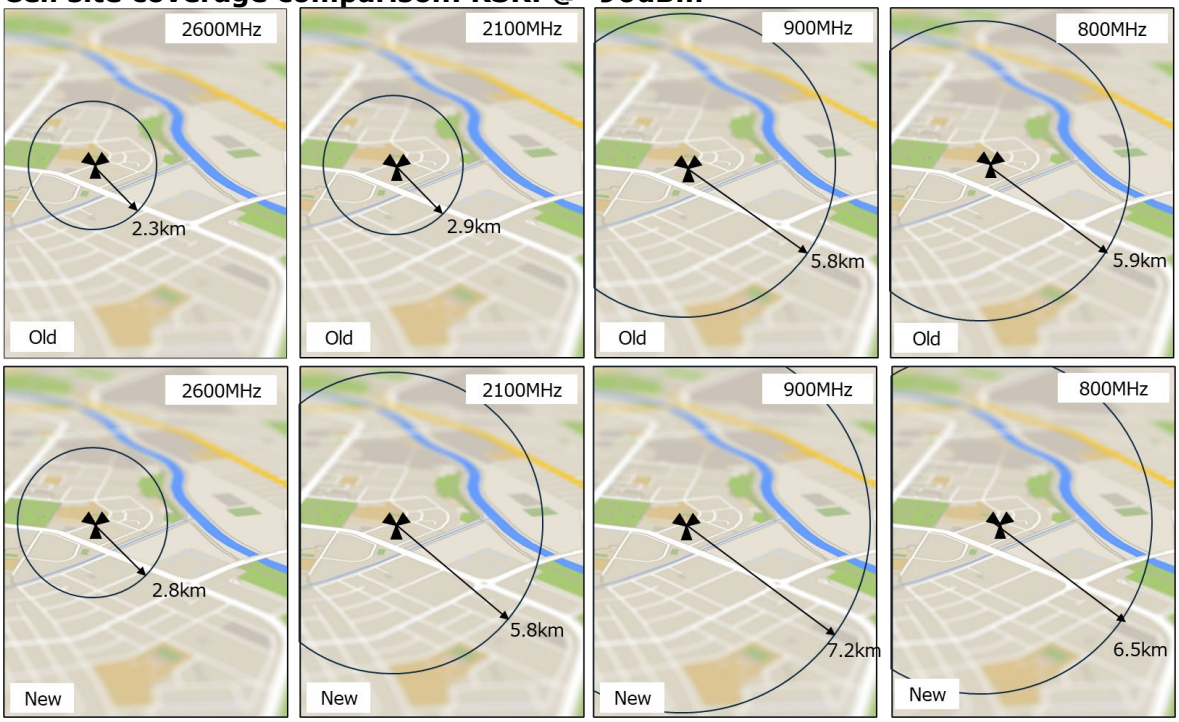
### Extended cell footprint in all frequency bands

The diagram below shows how new antennas can improve coverage across commonly used FDD bands. Based on measurements from a trial, this diagram shows the distances at which devices achieve a Reference Signal Received Power (RSRP) of -90dBm (a rule-of-thumb indicator of a "good" signal strength)—with just an antenna swap and without upgrading

other parts of the base station. As expected in a new-for-old swap, meaningful coverage gains occur across all frequency ranges.

In this benchmark trial, the old and new antennas both covered the 800MHz–2600MHz frequency range needed by the network. To make it a like-for-like comparison, the antennas were a similar size, and no other optimizations to RF (tilts, azimuths) or other parameters (mobility thresholds) were performed for the trial.

**Cell site coverage comparison: RSRP@ -90dBm**




*Source: Ericsson, Heavy Reading (now part of Omdia)*

The coverage gains seen in this trial are shown relative to the reference antenna and frequency bands. The gains are, therefore, implementation-specific. In a multiband passive antenna deployment, the operator can decide which frequencies to optimize based on the network requirement. In this case, the mid-band part of the antenna is centered on 2100MHz (known as Band 1 and one of the most used bands worldwide), which accounts for the exceptional coverage gain of 100%. In another case, the operator may prefer to focus on a different band, according to their network plan. Relative coverage gains are, of course, impacted by higher path loss at higher frequencies.

**Get in touch:**

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