

Transforming Coverage: The High-Density Solution with Hexa-Beam Mid-High Band Antenna

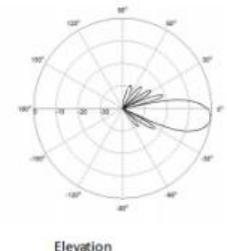
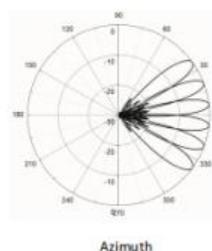
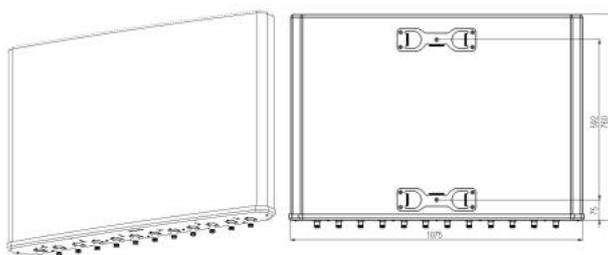
As smartphones and data-intensive applications proliferate is driving an insatiable year-on-year demand for network capacity and coverage, this challenge is universal for operators worldwide and persists despite the deployment of new technologies and spectrum. The extraordinary growth in wireless data traffic such as video conferencing, media streaming and mobile-TV continually increase the demand for capacity in the cellular networks.

This issue is especially demanding in densely populated environments like urban centers, stadiums and squares, which are characterized by a massive concentration of users. In these severely congested areas, the network faces extraordinary strain, leading to dropped calls, buffering videos, and overall degraded experience. The operators need to deliver robust connectivity to meet the growing demands of large scale users.

Solution

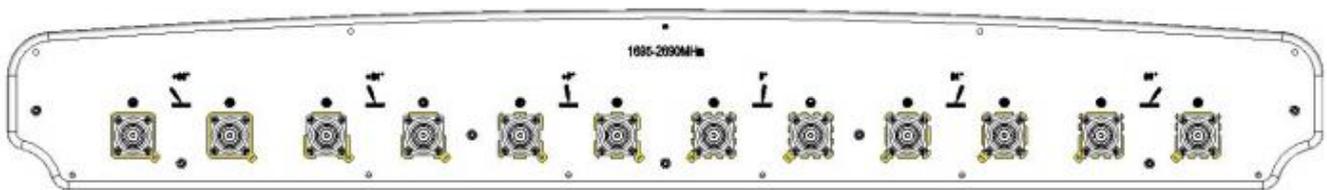
While the demand for capacity is clear, the traditional paths available to operators, such as adding more cells or purchasing additional spectrum, are fraught with physical and economic constraints, as they present significant cost and time issues.

In dense, high-traffic environments like stadiums and urban squares, the fundamental limitation lies with the conventional antenna, which is not well-equipped to handle a massive, concentrated number of users. Small cell deployment is also being seen as an excellent way to add network capacity. However, this approach could not satisfy service providers' immediate need for more capacity, which is no longer a optimal strategy. A paradigm shift in antenna technology is required.



The proposed solution is the BROADRADIO Hexa-Beam Mid-High Band Antenna, with each beam operating at 2T2R. It creates six independent, high gain beams within the same physical sector. Each beam functions as a virtual cell, with its own 2T2R configuration, precisely targeting a high density user zone, which is successful at delivering excellent performance.

This innovative design, featuring a total of 12 ports, is engineered to provide up to 23dBi of gain, representing a significant advancement over conventional antennas. This high gain ensures that the signal remains strong and clear across the entire intended coverage area, penetrating crowded spaces effectively and improving the experience for users.



Key features:

- Coverage improvement
- Increase site capacity through higher order sectorization
- Improve RSRP, SINR and other KPI
- Less number of antenna
- Less installation cost
- Quick implement

Validation & Results

The deployment of the Hexa-Beam Mid-High Band Antenna resulted in significant improvements in overall network performance.

Compared with the old cells, the new six cell configuration achieved:

- BH DL-PRB Utilization reduced from 97% to 45%, while BH UL-PRB Utilization decreased from 78% to 49%, significantly alleviating network congestion.
- DL-Traffic increased 79%, from 190 GB to 340 GB, while UL-Traffic increased 117%, from 17.5 GB to 38 GB, and no traffic decrease on NBRs, demonstrating a massive boost in capacity.
- Daily DL-IP throughput enhanced 59.1%, from 11Mbps to 17.5Mbps, while BH DL-IP throughput enhanced 30%, from 9.7Mbps to 12.6Mbps, directly enhancing user experience.
- The number of Connected UEs grew from 50 to 100 with increase by 82%, improving the service availability in high density area.

Hexa Beam Main Observations

DL PRB Utilization
 ~54%
 97% to 45%

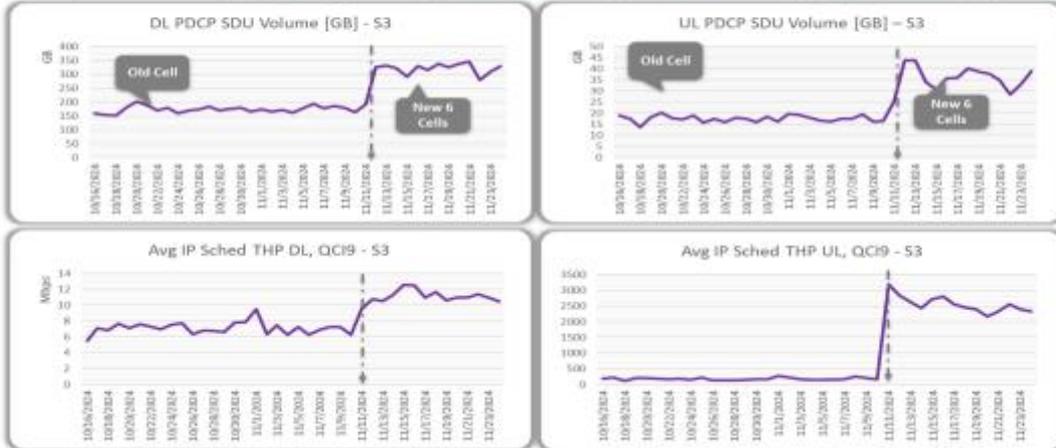
UL PRB Utilization
 ~37%
 78% to 49%

DL Traffic
 ~79%
 190GB to 340GB

UL Traffic
 ~117%
 17.5GB to 38GB

Daily DL THP
 ~59%
 11Mbps to 17.5Mbps

Connected UEs
 ~82%
 50 to 100

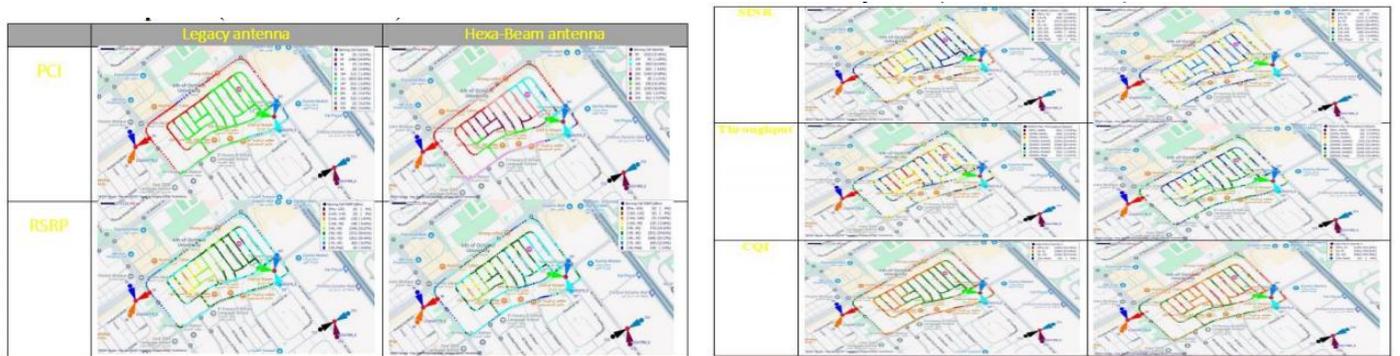


Comment

- Daily and BH UL-IP throughput almost have the same trend with enhancement on the max throughput.
- We have ~150GB DL fresh traffic.
- We have ~20GB UL fresh Traffic.
- No negative impact has been observed on the NBR cells.

These results demonstrate that the Hexa-Beam Antenna effectively enhances both network capacity and user experience. Moreover, the statistics confirm no negative impact on neighboring cells, proving the antenna's excellent interference suppression and compatibility with existing network deployments.

To validate the OSS KPI assessment, a comprehensive field assessment was conducted on the L1800 band with both Legacy and Hexa-Beam antenna. The results consistently confirmed significant improvements in coverage, signal quality, and user throughput performance.



Since 2010, Broadradio has been at the forefront of advancing global telecommunications. Through a fully integrated approach that combines R&D, manufacturing, and sales, we provide innovative full-scene wireless solutions for governments, operators, and enterprises worldwide. Our global team is passionate about building reliable networks, guided by the belief that a seamlessly connected future is within reach.

