COMMSCOPE®

CASE STUDY / Sentinel® Antennas

The Case for Class 4 Antennas

Study verifies cost, performance benefits of ETSI Class 4 microwave antennas

Wireless data usage growth is placing increasing demands on spectrum, presenting network operators with mounting pressures to sustain quality of service (QoS). Integral to addressing that challenge is minimizing the risk of interference, which directly impacts network availability and throughput for link traffic.

When either of those is compromised, the effects reverberate to the bottom line: directly, lost traffic translates to a loss of potential revenue; and indirectly, customer satisfaction drops, leading to subscriber churn and, again, a loss of revenue.

It cannot be understated: Wireless users have little tolerance for low QoS.

Antennas by the numbers

The advancement of antenna technology has resulted in a marked improvement in the ability to reduce network interference. The radiation pattern envelopes (RPE) tighten with each successive movement between Class 2, Class 3, and Class 4 antennas, with the higher classes providing greater resistance to interference.

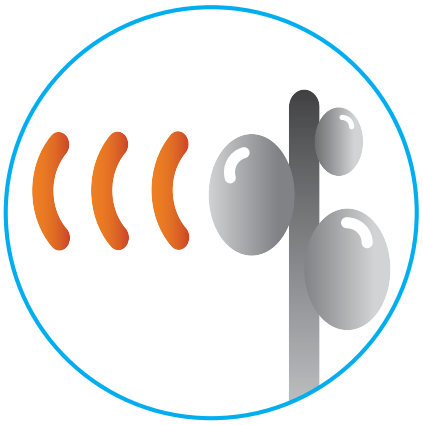
More recently, microwave antenna engineering advances—along with manufacturing enhancements—have produced high-performance Class 4 antennas at a cost-effective price point. The evolution is significant and provides compelling motivation for the operator to assess upgrading equipment. But commensurate with that assessment comes an analysis that moves beyond the theoretical. While Class 4 antennas offer a superior RPE, does the impact validate itself in real-world practical applications?

Class 4 network case study

CommScope set out to prove just that, as it conducted a study in Hungary comparing the network performance impact when Class 4 antennas replaced Class 3 antennas of equal size and frequency. Comsearch's® iQ.link® XG, an industry-leading microwave planning and optimization tool from CommScope was used to model and analyze the network.

The existing network included 38GHz Class 3 antennas and 1,048 microwave backhaul links. The study looked at performance changes when the Class 3 antennas were replaced with Andrew Solutions Class 4 Sentinel antennas. Everything else in the network—the operating frequency band and the radio equipment—remained the same.

The specific objective of the study was to determine what effect, if any, Class 4 antennas would have on reducing network interference levels and, consequently, network availability and throughput for link traffic.



Network challenges

The Hungarian network was chosen as it was considered typical, with challenges that are experienced in nearly every country:

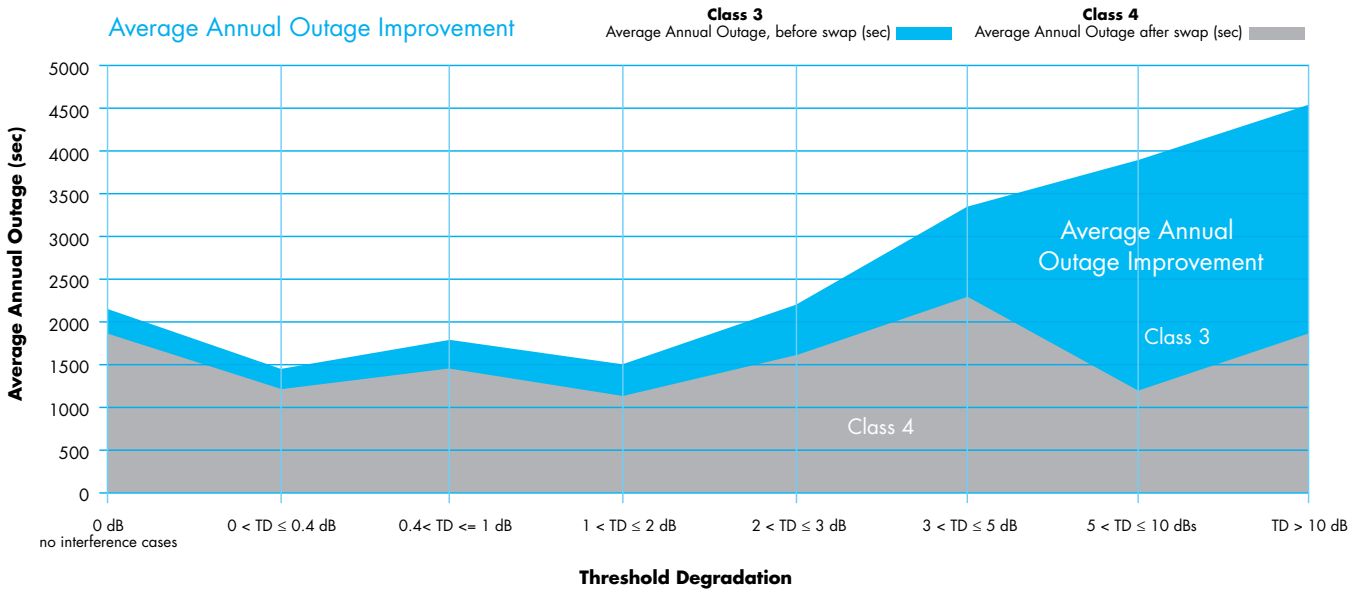
- Limited spectrum availability
- Strict spectrum management requirements
- High density of links within the network.

Results

The Class 4 antennas delivered marked qualitative performance improvements over their Class 3 counterparts **(Figure 1)**:

- Threshold degradation (TD) in the links improved, due to a significant reduction in interference
  - The number of links with no interference increased from 1,584 to 1,776
  - The average annual outage dropped across every grouping of TD
- The decreased interference boosted fade margins, causing a direct improvement in the outage seconds of a particular modulation
- Link availability increased, allowing the operator to maximize the size of backhaul pipe available from the existing radios.

Overall, 75 percent of the links realized a design traffic improvement from 5 percent to 20 percent, while 11 percent of the total links showed traffic gain between 20 percent and 100 percent—some even doubling the traffic for which they had been designed.



Average Annual Outage Improvement (sec)							
0 dB, no interference cases	0 < TD ≤ 0.4 dB	0.4< TD <= 1 dB	1 < TD ≤ 2 dB	2 < TD ≤ 3 dB	3 < TD ≤ 5 dB	5 < TD ≤ 10 dB	TD > 10 dB
255.7 s	243.2 s	329.4 s	382.3 s	596.0 s	1056.6 s	2710.4 s	2681.8 s

Figure 1: average annual outage improvement with Sentinel

Backhaul gains

Finally, as network availability increased, the backhaul design capacity increased—from 13 to 132 links, depending on the design traffic gain (TG) grouping. While the overall gain in backhaul design traffic was modest, its impact on increasing QoS is measurable and is likely to be much higher in a troublesome network.

Bottom-line benefits

New high-performance Class 4 antennas are now available at affordable price points that make their deployment practical, whether for a network upgrade or new installation. They reduce network interference while delivering significant gains in capacity and QoS, which are essential for the long-term success of your network.

Discover the impact Class 4 antennas can have on your network. Contact a CommScope representative for a complimentary analysis of your backhaul network.

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