



Less PIM, more performance

Passive intermodulation, or PIM, is a type of interference that can reduce network performance but is virtually nonexistent in CellMax antennas due to the way they are designed and manufactured.

One of the keys to increasing base station range and capacity is to minimize sources of interference like PIM, because interfering signals from PIM raise the noise floor and reduce receiver sensitivity. Consequences include increasing the dropped call rate, and reduce system capacity, data rates, and mobile devices' battery life.

Finding PIM can come at significant cost, since doing so requires teams to visit base station sites to test them for PIM and replace antennas when necessary. And often PIM can be stealing capacity and making subscribers unhappy for a long time before operators realize PIM has become a problem.

Where does PIM come from?

PIM can come from the antenna itself or from an external source. It is a result of an RF current passing a non-linear medium. Such media include many metal oxides, some metal junctions and magnetic materials. Also non-conducting materials can generate PIM through non-linear dielectric properties. The greater the current density the more PIM, and the more non-linear the medium, the more PIM.

CellMax antennas are designed and built in a way that minimizes PIM. The antennas' unique, patented design goes back to the beginning of the company in 2001, when there was a large demand for a very high gain (21 dB) UMTS antenna. The only way to achieve that with existing technology was to make the antenna extremely long. CellMax engineers decided to increase efficiency and decrease losses instead.

A totally different approach

The main idea was to use an extruded aluminum profile as both reflector and, at the same time, act as the outer conductors in the antenna's feed network. The inner conductors are machined aluminum rods of large dimensions inserted into the aluminum profile. With large dimensions of the center conductors, the losses go down. And this makes CellMax antennas the lowest loss antennas in the world, with effectively the highest gain.

Together with the careful manufacturing, the large dimensions in the feed network, and the elimination of other critical PIM sources such as solderings, cables and dissimilar materials, CellMax also greatly reduces the risk for PIM. With PIM levels typically less than -160 dBc, CellMax antennas can be said to be virtually PIM-free.

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Improved performance and KPIs

Not only are CellMax antennas virtually PIM-free, the high quality of the antenna and the precision of the manufacturing process increase the longevity of the components. This offers mobile operators higher and more consistent performance in any environment and timeframe compared to competitors.

CellMax high-gain antennas also increase base station range and usable network capacity and improve load-balancing. This allows carriers to get the most value from their investment in network and spectrum. Carriers typically see improvements in such KPIs as drop call rate, call set-up success rate, data throughput, total traffic and more.

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