

Case Study

Detecting and Identifying Uplink Interference with CellAdvisor

Reducing tower climbs in the Himalayas saves time and increases safety

A service provider in India prepares to launch LTE services with VoLTE in select areas. With thousands base stations installed and in the process of commissioning, the provider needs excellent RF performance at their base stations, from the start, to reliably delivery VoLTE.

The Critical Business Challenge

The provider faced acute uplink interference issues at multiple sites, many close to the mountainous Nepal border. There was as much as a 25% total capacity degradation in uplink, and throughput was also below benchmark threshold values. Their existing tools were unable to point out the root causes of the problem. As a result, they could not furnish credible proof to the spectrum regulatory organization to resolve the issue.

Just as important, to record uplink interference, field technicians had to climb towers with directional antennas (50 m above ground). This method was risky, time consuming, and full of errors, as tower technicians are often not fully skilled at using spectrum analyzers. Moreover, in the foggy Himalayan winter, climbing 40 or 50 meters up a tower in low visibility is nearly impossible.



Finding an Answer

To solve the issue quickly, the team invited VIAMI Solutions® to investigate, find interference sources, and provide the proof needed to initiate regulatory action on the problem.

VIAMI CellAdvisor™ base station analyzers offer cable, antenna, spectrum, interference, and signal analysis as well as RF/optical power meters and fiber inspection in a rugged, portable instrument. For this application, VIAMI used the CPRI Interference Hunting feature along with an AntennaAdvisor directional antenna to monitor CPRI, spectrum, and RSSI.

To avoid dangerous tower climbs, the CellAdvisor RFoCPRI feature enabled, connecting CellAdvisor to Uplink CPRI cables, by tapping UL CPRI fibre, at BBU ground level. One interfering source turned out to be nearby radar beacon signals that had not migrated to a different allocated frequency. Interestingly, the interference was undetectable at ground level, and could only be recorded at antenna height. Other interference came from far-away Nepalese towers, presumably transmitting WiMAX in the 2310-2315 MHz band.

The team recorded clear uplink spectrum, RSSI, and spectrograms that not only showed high RSSI in the entire 20 MHz Channel bandwidth, but also clearly showed risen noise-floor peaks. This was the clear and credible proof the provider needed for the regulations.

The VIAVI Solution

Eliminating the interference improved uplink network capacity by at least 20%. VoLTE call-setup success rates increased substantially and uplink throughput was raised by at least 50% in the TD-LTE band.

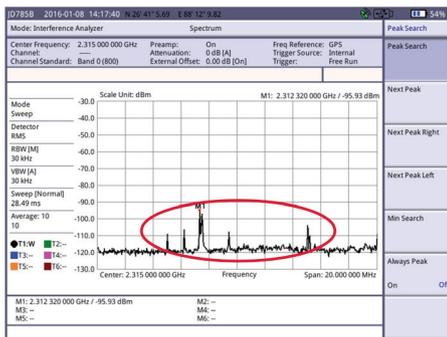
The provider found these CellAdvisor 785B features critically important:

- RFoCPRI uplink interference analysis with spectrum, RSSI, and spectrogram
- Interference analyzer with AntennaAdvisor DF handle
- RFoCPRI TD-LTE signal analysis
- TD-FD LTE signal analysis (regular mode)
- Spectrum recording

Another vital benefit was avoiding tower climbs by monitoring the uplink spectrum from the ground with RFoCPRI.



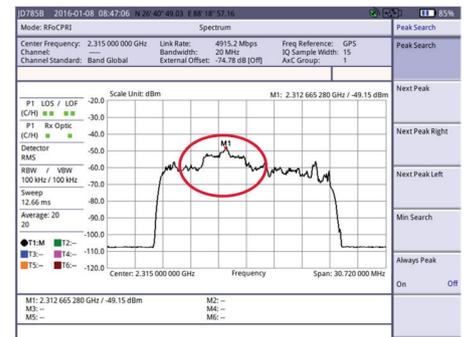
CellAdvisor tapping the BBU-RRH CPRI link — all measurements are at ground level



Interference observed at ground level



Interference observed at nearby rooftop



Interference observed using RFoCPRI at ground level



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