

Signal level comparison between ISS old and new ARISS stations

The signal level has been measured during a pass over central Europe on April 26th, 2011
Astronaut Paolo Nespoli was operating NA1ISS FM phone on the Columbus station, while
the old station was transmitting in packet radio. For each Nespoli's transmission I measured the
received RF levels, and the packet radio signal levels at approx the same time.

The signal level plotted is the equivalent signal level in a 0 dBi antenna, taking in account the gains and losses in my system.

Operating conditions: antenna 2x 9 el. DK7ZB, horizontal polarization, vertical stacking
1 dB NF preamplifier
Home made 144 - > 28 Mhz converter
Perseus SDR receiver in IF

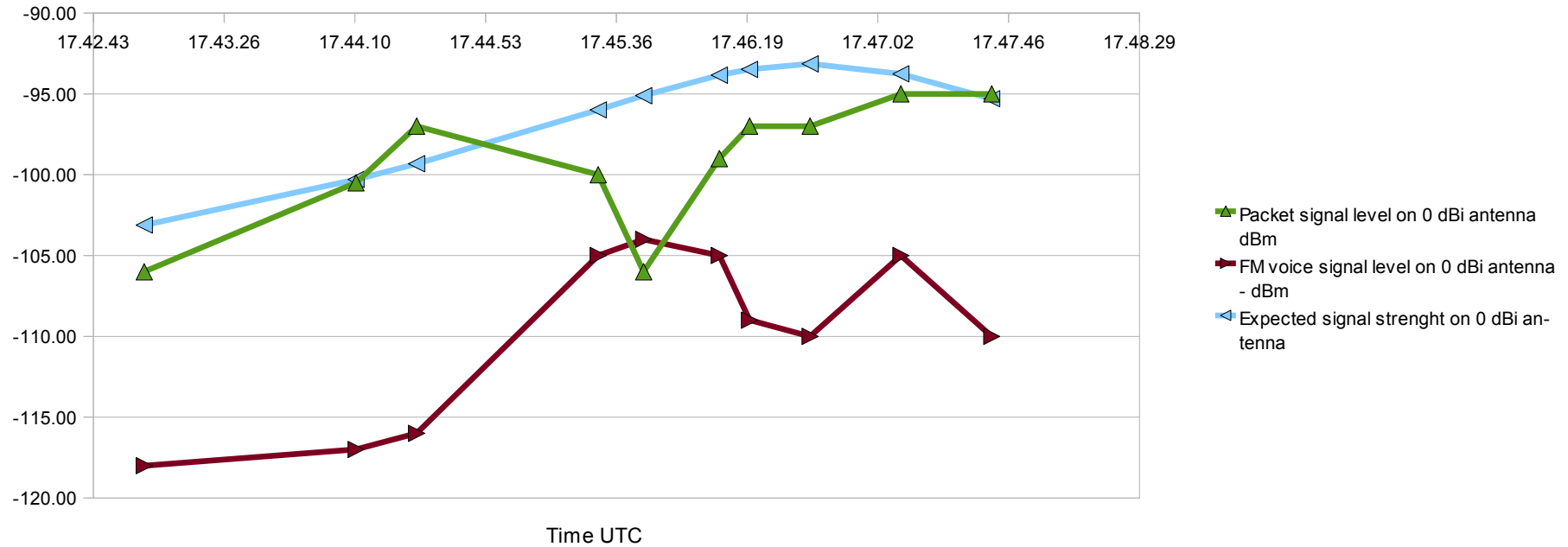
Parameters:

| | |
|----------------------------|-------|
| Transmitted power (dBm) | 37 |
| TX antenna gain (dBi) | 0 |
| Frequency (MHz) | 145.8 |
| LNA + antenna + cable (dB) | 30 |

| TIME UTC | QRB (range) in km | Measured packet signal level – dBm | Measured FM voice signal level - dBm | Packet signal level on 0 dBi antenna dBm | FM voice signal level on 0 dBi antenna - dBm | Expected signal strenght on 0 dBi antenna | notes |
|----------|----------------------|------------------------------------------|--------------------------------------------|------------------------------------------------|----------------------------------------------------|-------------------------------------------------|------------|
| 17.43.00 | 1667 | -76.00 | -88.00 | -106.00 | -118.00 | -103.11 | |
| 17.44.10 | 1204 | -70.50 | -87.00 | -100.50 | -117.00 | -100.29 | |
| 17.44.30 | 1077 | -67.00 | -86.00 | -97.00 | -116.00 | -99.32 | -85 to -88 |
| 17.45.30 | 734 | -70.00 | -75.00 | -100.00 | -105.00 | -95.99 | |
| 17.45.45 | 663 | -76.00 | -74.00 | -106.00 | -104.00 | -95.11 | |
| 17.46.10 | 573 | -69.00 | -75.00 | -99.00 | -105.00 | -93.84 | |
| 17.46.20 | 550 | -67.00 | -79.00 | -97.00 | -109.00 | -93.48 | Deep QSB |
| 17.46.40 | 529 | -67.00 | -80.00 | -97.00 | -110.00 | -93.14 | |
| 17.47.10 | 568 | -65.00 | -75.00 | -95.00 | -105.00 | -93.76 | |
| 17.47.40 | 678 | -65.00 | -80.00 | -95.00 | -110.00 | -95.30 | |

The plot depicts the relative signal strength and the QRB during the passage

The blue line is the expected signal level, calculated from link budget data, not accounting for slant angle and polarization mismatch.



The signal from Columbus transmitter is almost always approx. 10-15 dB lower than the packet signal from the “old” station. Not having a circularly polarized antenna installed I can't tell if the signal difference is due to the polarization mismatch, or it is inherent to the antenna installation in Columbus.

73 – Marco IK1ODO – Turin, Italy JN35SA