New improved methods to measure digital DTH signals.

With the booming DTH market, it's important to understand what type of measurements one need in order to achieve the best installation result.

First of all, we can read the traditional measurements as in the analogue days i.e. RF level and Carrier to Noise (signal to noise) CNR or SNR.

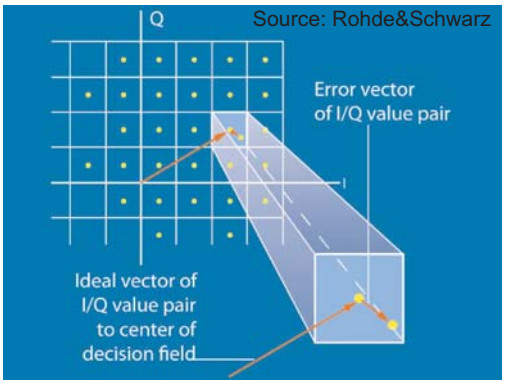
The problem here is that RF level shows the received energy of the satellite signal together with other irrelevant signals in the air. These could be interference, reflections and other signals. Hence this is of no use for finding out if the digital signals are any good.

CNR / SNR were very important withanalogue signals as the narrow carrier needed to be clean e.g. have a good CNR / SNR. However on a wide DTH signal, a reading at the edges of the carrier is less important as there could be interference inside the carrier that the readings of the CNR /SNR at the edges will not show. Also, to get this reading, the demodulator sends this information only as an estimate, once it has read the digital signal.

Some meter manufactures have then insisted that MER (Modulated Error Rate) is the digital alternative to CNR. However, MER is identical to CNR but it also takes phase fault into consideration. This is common in digital terrestrial signals, but not in DTH satellite signals. There could be some minor element of phase-noise in the dish and lnb but that is it.

The true meaning of MER is that it summarizes all errors indicated by a constellation diagram. So to display the MER in dB the following formula is used:

MER (dB) = 20 x log (Ideal vector of I/Q value pair to center of decision field/Error vector of I/Q value pair)



Due to the complexity of this calculation, it is too difficult for most meter manufacturers to accommodate, as it takes time and requires power. Therefore most manufactures simply take the reading of CNR and then rename it MER.

The Maxpeak range of meters has a 32 bit processors that is fast enough to do TRUE MER readings. However, these are read from the demodulator which is limited in its range of at most 20 dB. The resolution, normally 0.5 dB, gives a range of 40 steps (20/0.5). However most readings will most likely be less e.g. over only a 10 dB range so this gives a resolution of no more than 20 steps.

Another reading that is used is the post BER e.g. the BER after FEC. This is adequate to confirm an installation but not good enough in supporting the installing and peaking of dishes as the FEC applies the error correction so the signal is not responsive nor tells what margins there are.

A far better and reliable way than to measure the MER or post BER is to read the pre BER (Bit Error Rate). This is read first in the demodulator prior to the FEC (Forward Error Correction). This will show up faults anywhere in the carrier, not only at the edges like CNR /SNR /MER. In addition it's far more responsive, as it comes first in the demodulator. It also has a larger range.

BER is read as a fraction so for instance 1.2 E-2 means there is 1.2 errors in 100 bits received and 2.3E-5 means there is 2.3 errors in 100,000 bits in other words a much better signal.

What Maxpeak has done is to incorporate this fast, far more accurate measuring method in its meters and with a far greater range to simplify the peaking of the dish.

Instead of using fractions like the BER rate, we have taken a % of the reading and reversed this as a Quality bar graph. E.g. 98 % signal means there is a 2 % error in the signal.

Conclusion, a Quality bar graph based on pre BER readings offers a faster, simpler and far superior way of measuring modern DTH signals and gives the best chance of avoiding rain fade.

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