Tech Tip

Testing Power Levels for DOCSIS 3.1

Testing power levels for DOCSIS 3.1 is different than with DOCSIS 3.0 and requires new testing equipement designed for this purpose. As operators turn on OFDM carriers, technicians will be faced with a totally new carrier that spans up to 192MHz in width. To compound matters, Cable Labs has specified that the power should be referenced back to a 6MHz bandwidth.

Because of this, OFDM carriers should be set up so that they have the same POWER PER HERTZ as the QAM carriers. This is why they are referenced back in terms of Average Power per 6MHz. For example, if SC-QAM's have an average power of 5dBmV, and the AVERAGE POWER of the 96MHz wide OFDM carrier in a 6MHz Bandwidth is set to 5dBmV, then it hits the amplifier with the same Total Integrated Power as 16 256-QAM carriers. In effect, this means that a 96MHz wide OFDM looks the same as 16 SC-QAMs to the amplifiers.

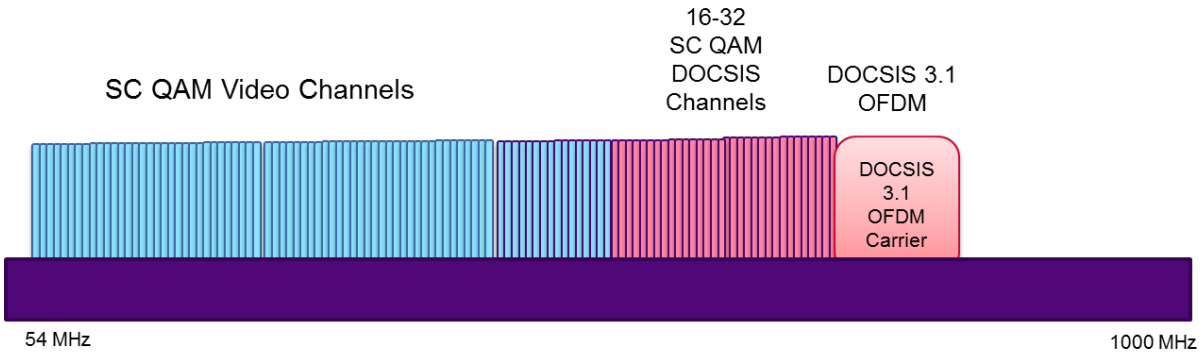

Figure 1 - OFDM Channels added to SC-QAMs at same power level

So how should a technician measure and translate this? The simplest way is buy a Signal Level Meter (SLM) designed and calibrated for measuring DOCSIS 3.1 OFDM carriers. This does all the work and a reputable meter vendor will calibrate the measurements to the golden standard of a thermocouple power meter and guarantee them over time, including temperature and varying network loading conditions.

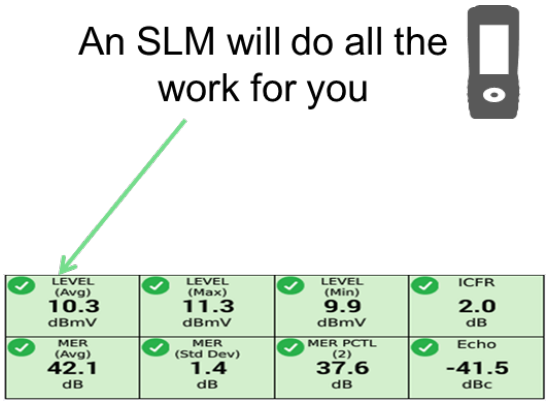

Figure 2 - OFDM average power measurement

Technicians can also measure across the carrier in stepwise 6 MHz steps for finer granularity than the overall average of an OFDM carrier, and to see what is happening across the spectrum. For each measurement, the power should be measured, averaged, and calculated to 6MHz bandwidth. Looking at the power in 6MHz steps across the OFDM carrier provides an insight into any frequency response issues that are occurring.

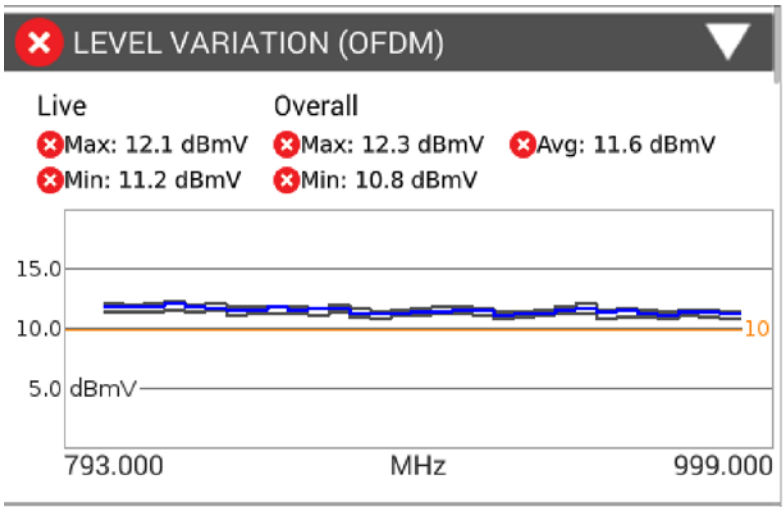

Figure 3 - Power across carriers in 6MHz Bandwidths

If a technician doesn't have access to an SLM designed for DOCSIS 3.1 OFDM carriers, they can use a spectrum analyzer. For more information on using a spectrum analyzer and a SLM, please read Testing and Turn-up of DOCSIS 3.1.

Don’t have time to read a paper? Get the DOCSIS 3.1 reference poster.

Products Used for Testing:

OneExpert CATV

VSE-1100