Understanding the Dynamic Range Specification

In the midst of specmanship wars, the manufacturers of category 6 test tools are trying to top one another’s published specifications. And when it comes to creative specmanship, Dynamic Range is a convenient spec to exploit.

Suppose manufacturer A specifies the instrument noise floor or residual crosstalk to be 90 dB. The same manufacturer can then specify a Dynamic Range of the instrument to be 90 dB. But what does this specification really mean? If the instrument’s noise floor is at 90 dB and the signal being measured is at 90 dB, then the measured signal is drowning in the instrument’s own noise. How accurate can such a measurement be? How useful is it?

The accuracy specifications for category 6 field testers are defined by the TIA and ISO standards\(^1\) in the form of a Level III accuracy model. The accuracy model is an equation that sums up the errors contributed by certain intrinsic properties of the test instrument and produces the total error of the instrument. The accuracy model is a function of signal level and therefore takes into account the Dynamic Range of the tester. **Dynamic Range is meaningful only in the context of the accuracy model that also takes into account other relevant instrument properties when computing the total error.**

Specifying Dynamic Range by itself, out of the accuracy model context, is not very meaningful since the accuracy of the instrument cannot be defined at the limit of the Dynamic Range. To avoid misleading specmanship games, the TIA and ISO cabling standards define an objective method of specifying instrument accuracy. [This method – the Level III accuracy model – allows equipment manufacturers to compare their specifications unambiguously.](#) The WireScope 350 accuracy specification is published in the context of the accuracy model and we invite other test equipment manufacturers to compare specifications based on this objective standards-based model.

\(^1\)TIA TSB-67, TSB-95, ISO/IEC 61935, TIA-568A-5, TIA-568B.2