



ANSC-C63[®] Interpretation Request Form

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Submission Date 12/21/2021	Originator Name, Company Jeong Hwan Kim, SICT
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Standard	Clause/ Sub clause	Paragraph Figure/ Table	Type (General/ Technical/ Editorial)	Comment / Inquiry	Subcommittee Response <i>(to be filled in by Subcommittee Chair)</i>
ANSI C63.5 (2017)	M.4 Explanation of uncertainty contributor s	b)	Tech.	<p>M.4 Explanation of uncertainty contributors of ANSI C63.5 reads as 'Receiver signal to noise ratio: This contribution is to be considered when relatively small levels are measured. In principle, the receiving instrument always detects signal plus the superimposed noise. This error becomes very small when the measured signal amplitude is well above the system noise floor. If the signal to noise ratio is greater or equal to 20 dB the uncertainty is approximately 0.1 dB.'</p> <p>However A.8.1 Signal-to-noise ratio of CISPR 16-1-6 reads as 'This subclause supplements 6.2.4. There are two common definitions used to specify the noise level. The first is the displayed average noise level (DANL), which is found by averaging several noise traces. The DANL is widely used in the datasheets of spectrum analyzers. The second is the result of max-hold on several noise</p>	<p>Annex M is informative and intended as guidance, as is Annex A in CISPR 16-1-6, in the estimation of the uncertainty. The appropriate consideration on the uncertainty contribution from the SNR should be evaluated on the specifics of the instrumentation used on the specific site at which the calibration is being performed. This would include the specifics of the bandwidth settings of the instrumentation being used. The 20 dB, as referenced in C63.5, is based on the entire measurement system in use of which the DANL of an instrument could be a component.</p> <p>Dynamic Range is the ratio of the largest measurable power to the smallest measurable power. When discussing the SNR of an analyzer in regard to the quality of the measured signal, we are basically discussing the dynamic range of the measurement device more than anything. The dynamic range of a spectrum analyzer traditionally being defined as the ratio, in dB, of the largest to the smallest signals</p>

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				<p>traces, which gives a level 11 dB higher than the DANL. To keep the error caused by receiver noise in the range of 0,1 dB, the signal level to be measured shall be kept at least 45 dB above the DANL, or equivalently 34 dB above the max-hold noise level.'</p> <p>So I would like to ask your interpretation or kind explanation on this matter.</p>	<p>simultaneously present at the input of the spectrum analyzer that allows measurement of the smaller to a given degree of uncertainty. The largest portion being the signal and the smallest portion being system noise. With a dynamic range of 20 dB (a 100:1 SNR) we are saying that the uncertainty of measurement is about 2% (actually about +/-1%). Another way to look at it is that 0.1 dB would relate to an approximate 2.3% uncertainty in the measurement result. So, when a 0.1dB uncertainty is mentioned, it is saying the noise included in the signal measurement only constitutes about 1 to 2% measurement uncertainty for noise. These however do not consider the phase noise level factors.</p> <p>This is further supported in "Spectrum Analyzer CW Power Measurements and the Effects of Noise" by Francis Small as published in NCSLI Measure Vol. 7 No. 4 (2012).</p> <p>We cannot address the content of CISPR 16-1-6 and why it states the values it states. We will note your comment regarding Annex M and consider this for future editions of C63.5 and would direct you to CISPR for further comment on the DANL.</p>