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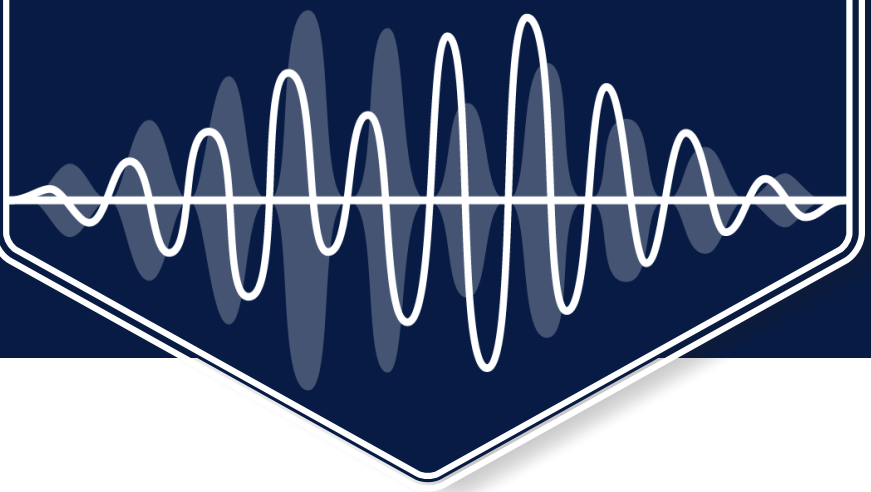
White Paper



White Paper #6

Measurement speed of E-field probes:

How to read Measurement speed specifications of E-field probes

How to read Measurement speed specifications of E-field probes

How to define speed in E-Field Probes

Most E-field probe datasheets show the specification about speed. But in practice, speed is often defined in different ways, for example as measurement speed or sampling rate. As this could lead to confusion, this edutorial explains the different expressions related to measurement speed and how to interpret these terms and specifications correctly.

sample speed is defined as:
The expression “sample speed” normally refers to the sampling speed of an analog-digital (AD) converter. This speed parameter defines the maximum achievable (internal) sampling speed of the E-field probe. Some manufacturers use the sum of the sample speed of all individual axis (X, Y, Z) multiplied by the number of frequency ranges of the probe (for example high- and low band). Although this represents the maximum speed of the samples that are taken inside the probe, it gives an unrealistic picture of the real measuring speed of a field probe. Especially if one considers most probes use internal averaging to achieve stable low field strength measurements.

Sample Speed is defined as:
This refers to the same definition as ‘sample speed’ but with the exception that the samples are stored into an internal memory in the field probe, so that the values can be evaluated at a later moment in time. The total (maximum) number of samples which can be taken (stored), depends on the size of the internal memory. This ‘Burst mode’ method is useful to evaluate transients and radar pulse signals. But, due to the inherent non-continues mode, it is not possible to perform real time measurements. Apart from this, the time required for data transfer from the field probe to the PC and the time needed to achieve the correlation which is required for field levelling, will reduce the overall measurement speed by multiple factors slower compared to the sampling speed itself.

Measurement speed in Streaming mode is defined as:
The measurement speed (streaming mode) is defined as the maximum number of isotropic and / or X, Y, and Z axes field strength measurements per second that the probe can measure. Unlike the sample rate, the sample rate gives a reasonable indication of how fast the probe can measure the field strength. However, it should be noted that in streaming mode, a probe can give multiple identical measurements due to internal buffering in the probe interface of the probe driver. This also means that when the EMC measurement software requests a new field strength sample from the probe, one can get a result that was measured before the question was asked! This may lead to incorrect measurements and longer measurement times due to unstable leveling algorithms.

Sample speed in burst mode is defined as:
The measurement speed (trigger mode) is defined as the maximum speed a probe can achieve to take a unique, accurate (corrected) isotropic field measurement AFTER the probe is requested (triggered) to give a new measurement reading. In this mode, it is assured to get a measurement reading which is taken AFTER the field strength request is issued, leading to accurate test results. Obviously, the measurement speed in the triggered mode will result in lower speed values. However, in applications where field levelling or time correlation is required, this should be the only specification to look for!

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