Analysis of Serial Data streams using Jitter Peak and Eye Contour plots

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An Important element of qualifying serial data streams is determining the level of Jitter present in the signal in a clear and unambiguous manner.

Such measurements have traditionally been performed using Histogram plots obtained from either real time or sampling oscilloscopes. While these methods permit extensive analysis and insight into many aspects of the Jitter elements embedded in a signal they both fail to measure the impact of very rare events or low probability Jitter in the region of one part in 10^{-8} *to* 10^{-12} *and beyond.*

Many new test standards now require that devices and subsystems perform in environments where such rare events exist, and therefore demand a more precise measurement and qualification process where the impact of such rare events can be precisely measured and qualified.

Bit Error Rate Testers that sample information at the bit rate of the data stream in stead of the traditional KHz rates of sampling scopes, and have no memory length limitations such as those found in Real Time scopes, are ideally equipped to make such measurements. The presentation outlines their applicability to this task and reviews the methods deployed for realizing this goal along with some of the intrinsic performance issues related to making these measurements accurately and in the minimum length of time . The impact of Deterministic and Random jitter functions is explored along with the need to make such measurements while running frequency rich test patterns of up to 2^{-31} *bits long.*

The Jitter Peak measurement techniques outlined, can be expanded to not only establish Jitter at the crossing point of the eye, but to fully characterize the eye opening of a serial data stream using Bit Error Contour Maps. Here the measurement system is used to make a series of radial measurements around the eye and plot lines of common BER confidence. This technique is utilized to qualify device performance and to verify mask test compliance to a known BER level (ie 10^{-12} *).*

Utilising the Synthesys Research BERTScope, a demonstration of these measurement techniques on 10G data signals will also be performed.