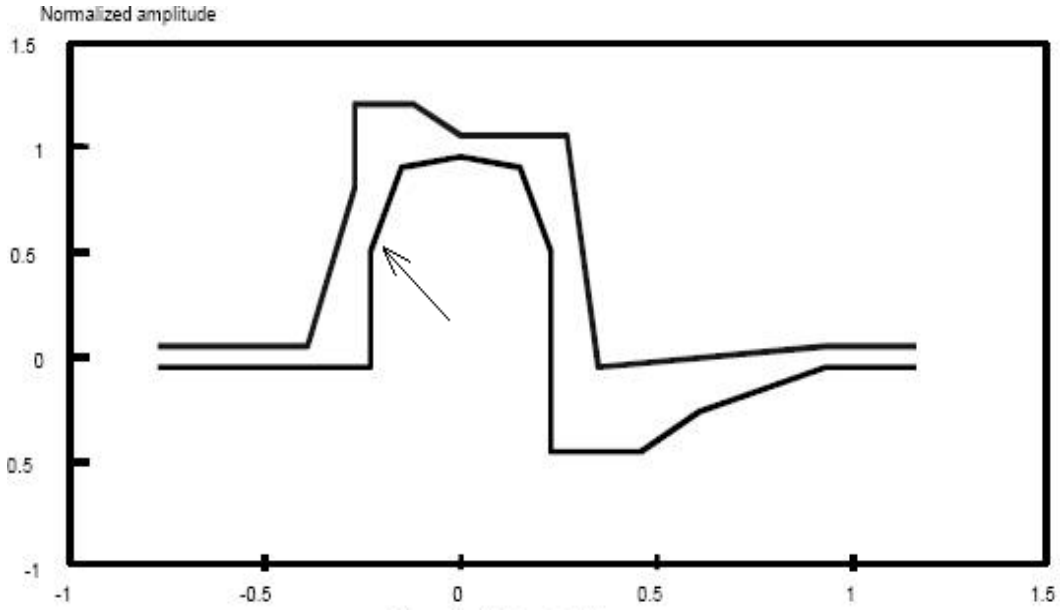
Introduction

Some customer applications have been discovered in which an excessive jitter is observed when 82P2288 T1 short-haul pulse shape is measured by ANT-20 (by Spirent Communications). The following paragraph introduces some details of the measurement and a suggested workaround to fix this seemingly false measurement. No problem of this nature has ever been reported in E1 mode. This application note only focuses on T1 mode.

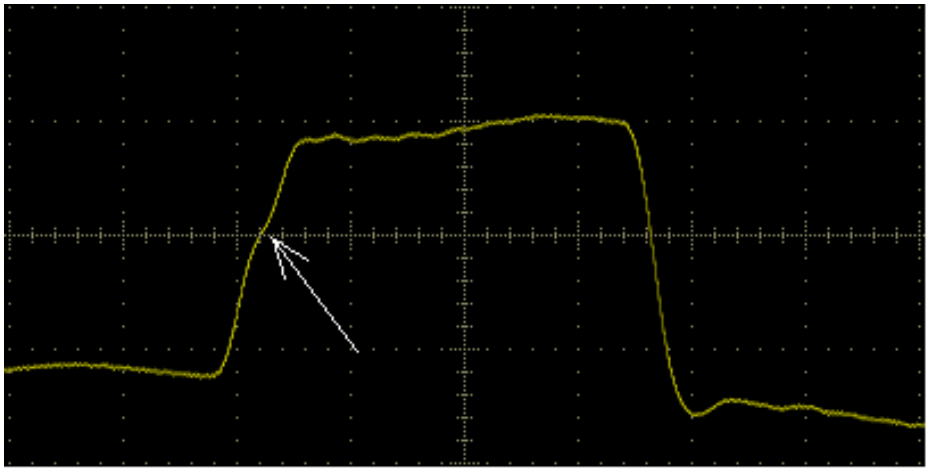
In G.703, T1 short haul pulse shape mask is specified as:

Figure 1. Normalized T1 Short Haul Pulse Shape Specified in G.703



In the rising edge of the defined pulse shape mask, there is a turn point (an “elbow” shape), as pointed by an arrow. 82P2288 transmitter constructs its pulse shape accordingly. Its built-in ROM-based pulse shape looks like the following:

Figure 2. ROM-based Transmitted Pulse Shape from an 82P2288 Port



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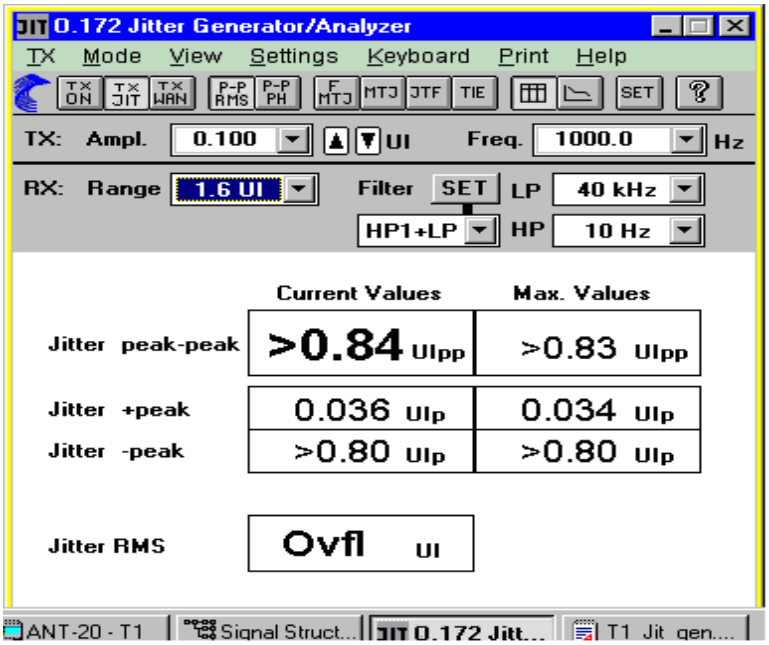
The transmitted pulse shape from 82P2288 meets G.703 specification mentioned above when the line condition are met (i.e., impedance matching is achieved). When an OmniBER-718 (by Agilent) is used to measure jitter generation from the transmitted port, it meets 0.05UI specification.

However, when using ANT-20 to measure the jitter generation on customer systems using 82P2288, a few violations have been reported from the customers. In one instance (see Figure 3), the measurement was greater than 0.84UI.

Figure 3. A Customer Example of Excessive Jitter Measurement



The possible reason for this excessive jitter measurement is construed to be the coincidence of ANT-20's sampling point and the “turn point” in the rising edge of the transmitted pulse shape, as described above.

There are two facts that provide the support for the statement above.

1. With the same transmitted pulse shape, other instruments, such as OmniBER-718, measures the jitter generation within range;
2. When AWG (Arbitrary Waveform Generator) is used in 82P2288 to remove the “elbow” shape in the rising edge of T1 pulse, the same ANT-20 measures the same parameter; that is, the jitter generation of the transmit port is also within range.

Suggested Workaround

The following introduces further details of the AWG-generated pulse shape, the new measurement of AWG-generated pulse shape with ANT-20. As a result, AWG is recommended as a workaround for customers when experiencing the same jitter measurement problem by ANT-20.

Other than ROM-based pulse shape, 82P2288 also provides RAM-based pulse generator. Customers can arbitrarily re-construct the transmitted pulse shape by downloading 64-byte of data into a per-port based RAM space.

In the situation described in Figure 1 and Figure 3, a fine-tune set of data (64-bytes) is downloaded into the port, the newly constructed pulse shape from the same port looks like:

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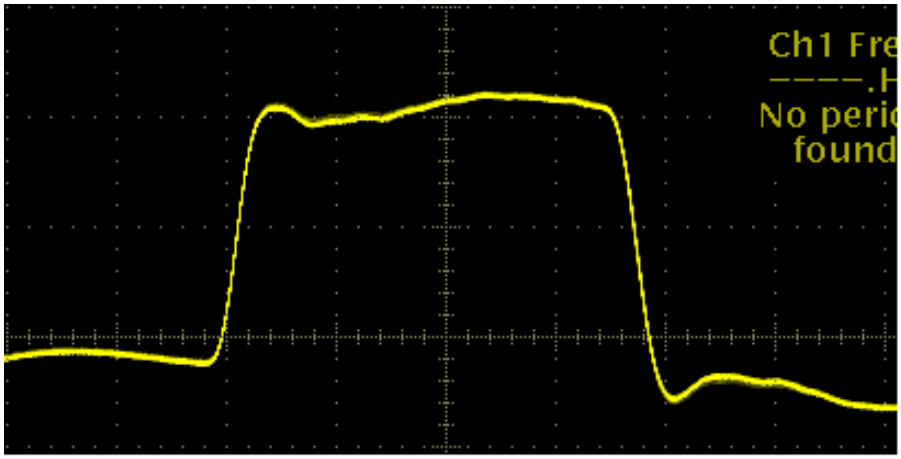
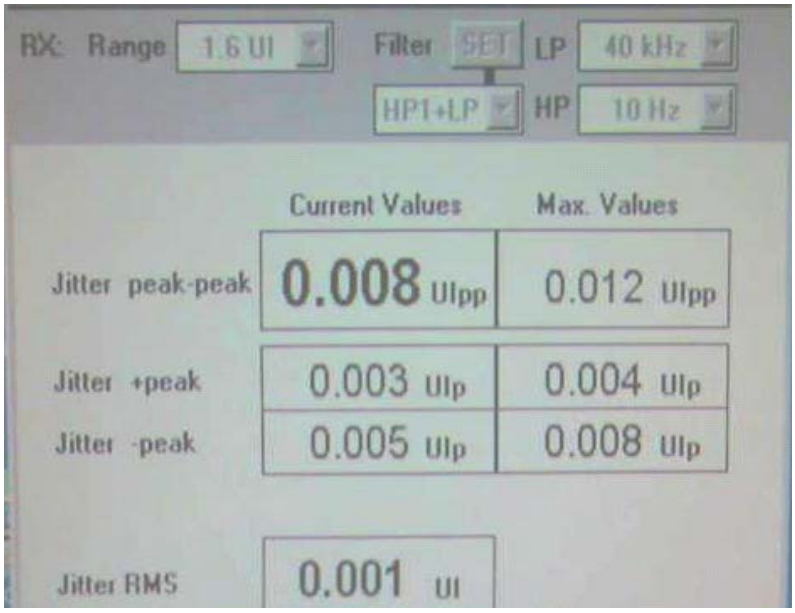
Figure 4. Pulse Shape by AWG



As shown in Figure 4, the rising edge “elbow” shape was removed. This new pulse shape still meets G.703 pulse shape mask. Using ANT-20 to measure jitter generation resulted in satisfactory readings (0.008UI), as shown in Figure 5.

Figure 5. New ANT-20 Measurement with AWG-generated Pulse Shape



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