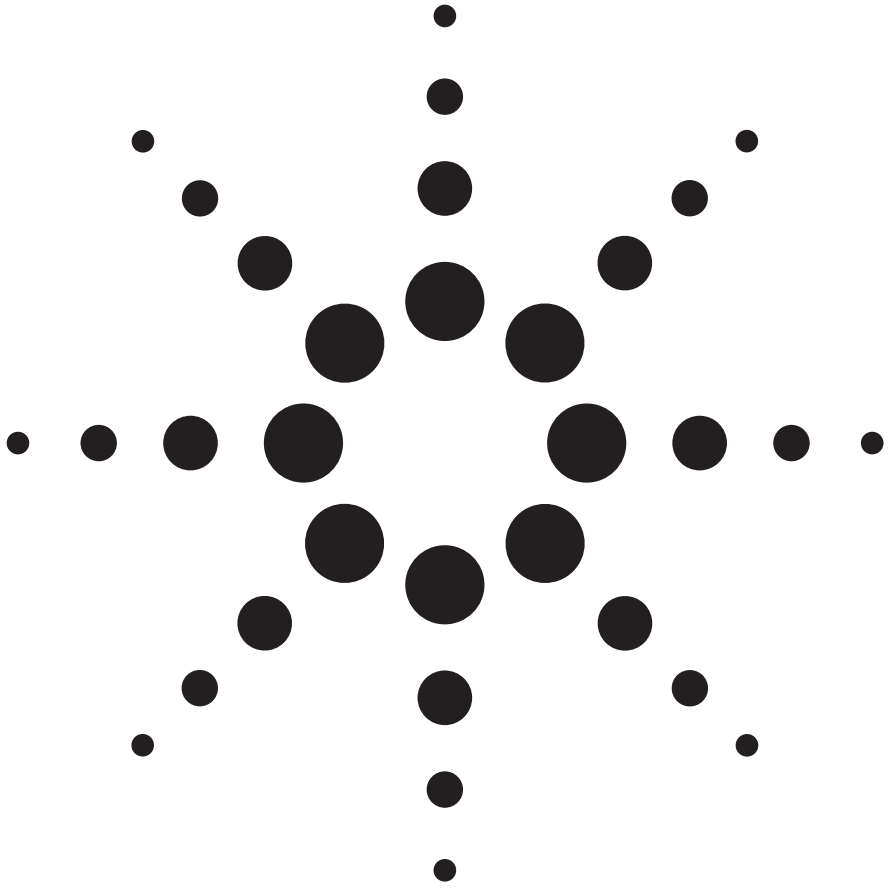
Interoperability tests between the Agilent HFCT 5942L OC-48 Fiber Optic Transceiver and the Broadcom BCM8220 Mux/DeMux with Integrated CDR/CMU and Forward Error Correction Capability

White Paper



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Introduction

This technical brief is intended to prove interoperability between the Agilent HFCT-5942L and the Broadcom BCM 8220. Data for jitter generation, transfer, and tolerance at OC-48 data rate will be provided.

The HFCT-5942x is an industry standard 2x 10 footprint single mode fiber optic transceiver for Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH) short reach applications. To learn more about the HFCT-5942L, please visit http://www.agilent.com.

The BCM 8220 is a 4 bit ultra low power SONET/SDH Mux/DeMux with forward error correction. For more information on the Broadcom BCM 8220, please visit www.broadcom.com.

Test Setup

This demonstration was completed using the evaluation boards of each respective product. The electrical inputs and outputs of the HFCT-5942 evaluation board were connected via SMA cables to the high speed electrical ports of the evaluation board for the BCM8220. Figure 1 illustrates the measurement setup and schematic.

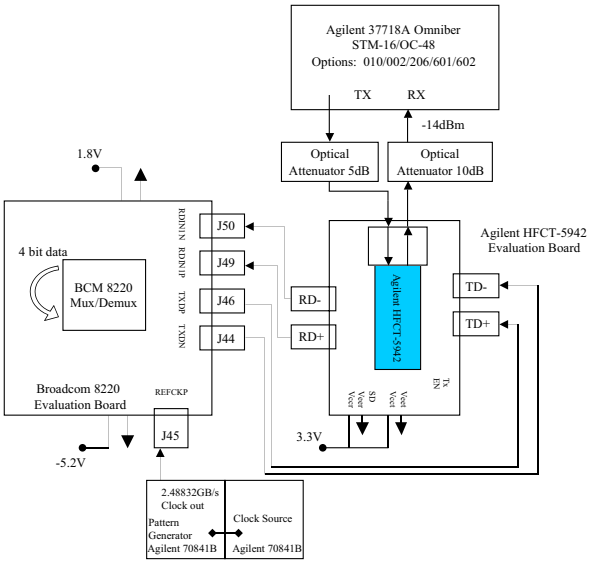

Figure 1. Block diagram of jitter measurement setup between the Agilent HFCT-5942 and the Broadcom BCM8220.

The BCM8220 is a 4-bit OC-48 SONET/SDH electrical transceiver with a voltage requirement of 1.8V. This chip is fully integrated with high speed serialization and 4-bit deserialization, a built in clock multiplication unit (CMU) and integrated clock and data recovery (CDR) circuit. The high speed output is selectable at 2.48832Gbps or 2.667 Gbps for FEC-capability. The BCM8220 evaluation board requires a 155 MHz reference clock, which is generated from a clock divider with a 2.48832 GHz clock input. A 1.8V supply for the BCM8220, and a –5.2V supply for the divide by 16 circuit are the needed supply voltages.

The measurements for jitter generation, transfer, and tolerance were completed using the above diagram.

Measurement Results

The jitter generation of the Agilent HFCT-5942 and BCM8220, shown in Figure 2, is well within the SONET specifications.

The BCM8220 and HFCT-5942 fulfill jitter tolerance and transfer requirements for SONET GR-253. The jitter tolerance and transfer were measured with the optical attenuator set so that the optical signal received by the transceiver is +1dB above the SONET sensitivity specification at OC-48. Figure 3 shows the jitter tolerance results for this setup. Figures 4 and 5 show the low and high frequency jitter transfer characteristics.

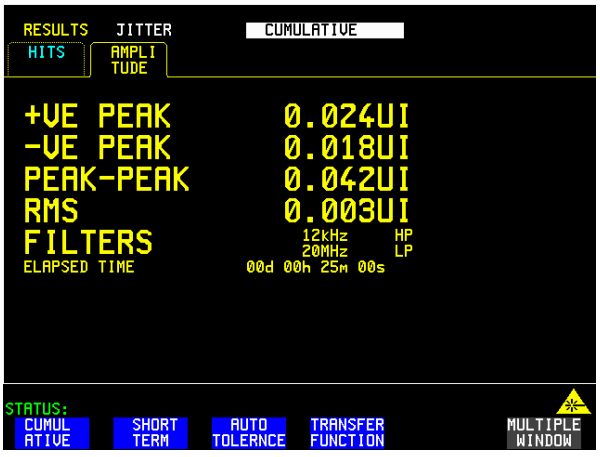

Figure 2. Jitter generation result as measured with the setup described in Figure 1.

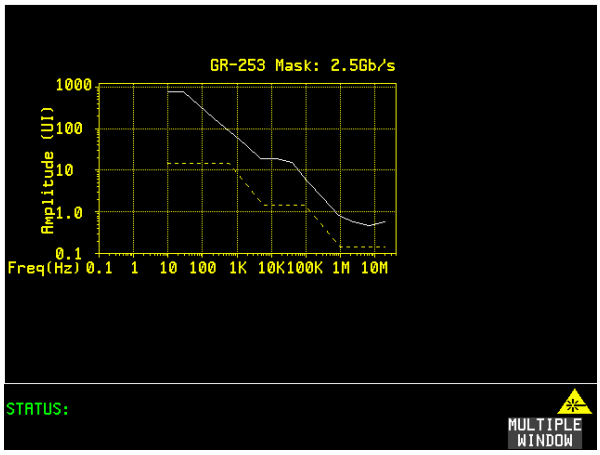

Figure 3. The HFCT-5942 and BCM8220 fulfills the GR-253 jitter tolerance mask.

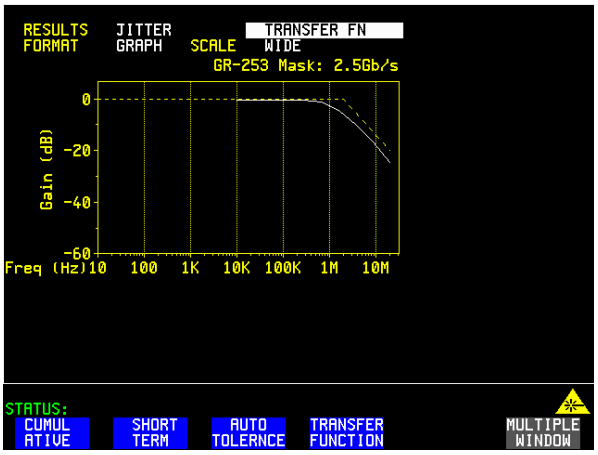

Figure 5. The HFCT-5942 and BCM8220 fulfills the high frequency GR-253 jitter transfer mask.

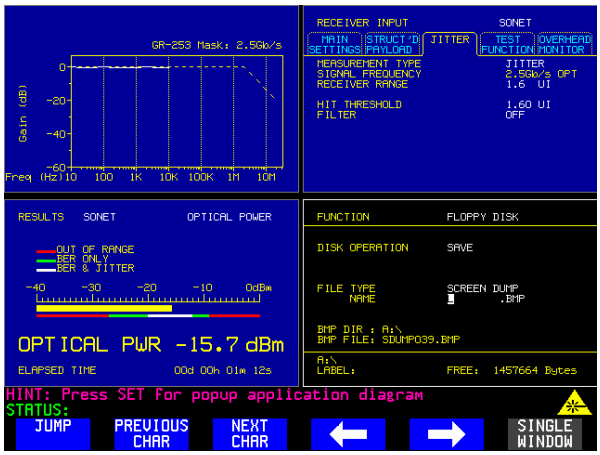

Figure 4. The HFCT-5942 and BCM8220 fulfills the low frequency GR-253 jitter transfer mask.

Summary

Interoperability between the Agilent HFCT-5942 and the BCM8220 has been proven. The results presented can aid a designer in selecting the needed parts for a SONET compliant system.

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Data subject to change.

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