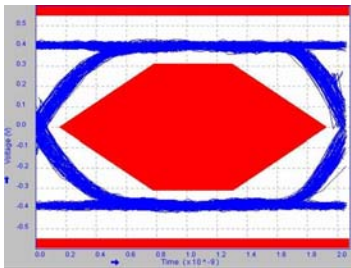


USB Testing Solution

Electrical Validation & Compliance Test, Signal Path Characterization, Digital Validation & Debug, Wireless EVM Compliance Test

Technology Fact Sheet

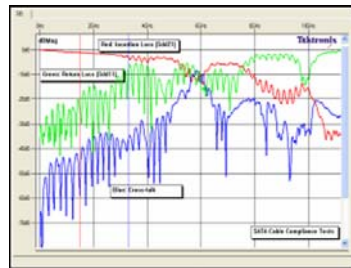
USB (Universal Serial Bus) enables peripheral devices such as thumb drives, printers, and digital cameras to be connected to a PC or other electronic device using a universal interface socket, and allows these devices to be hot-swapped. Wireless USB adds the capability to seamlessly connect these devices without cabling. The theoretical maximum data rate of USB 2.0 and wireless USB is 480 Mb/s and USB 3.0 will operate at 5 Gb/s.



Electrical Validation & Compliance Test

USB 3.0 testing includes the effects of a reference channel and equalization. For all USB electrical tests, signal quality is among the most critical and also includes:

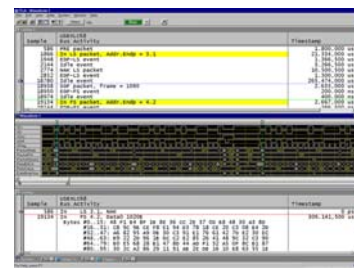
- Eye-diagram testing
- Signal rate
- Jitter
- Rising and Falling Edge Rates



Signal Path Characterization

With increasing speeds, signal path characterization is becoming more important. As an example, USB also specifies:

- Time Domain Reflectometry to determine sources of impedance/reflection on cables and connectors
- Signal rate differential impedance tolerance tests
- Differential insertion loss
- Crosstalk measurements



Digital Validation & Debug

A USB system is a form of network with many interdependencies. Determining the cause of a data error or performance problem can be very difficult. USB devices must therefore also be tested for compliance with the USB-Implementers' Forum (USB-IF) interoperability specification. This includes:

- Bus behavior such as low level signaling
- Chirp speed negotiation
- Suspend or resume



Wireless EVM Compliance Test

Certified wireless USB analysis involves:

- All data rates, time frequency codes and band groups

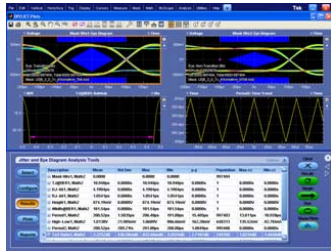
Time, frequency and modulation analysis includes:

- Constellation patterns, EVM, spectrograms, power spectral density and adjacent channel power ratio measured directly from single shot ultra wideband RF

USB Testing Solution

Electrical Validation & Compliance Test, Signal Path Characterization, Digital Validation & Debug, Wireless EVM Compliance Test

Technology Fact Sheet



Electrical Validation & Compliance Test

DPO7000; DPO/DSA7000B Oscilloscopes, Signal Generator and Analysis Software

- “One touch” compliance testing by automatically setting up the oscilloscope
- Single fixture for High, Full, and Low speed testing
- Serial Data Link Analysis and USB 3.0 Analysis software required for Tx CTLE equalizer function and reference channel emulation



Signal Path Characterization

DSA8200 Sampling Oscilloscope and TDR Modules

- The DSA8200 Sampling Oscilloscope and 80E04 dual-channel time domain reflectometry (TDR) sampling modules with up to 23ps incident and 28ps reflected rise time
- True differential or common-mode TDR and S-parameters testing of two coupled lines.
- Independent testing of isolated lines which ensures measurement accuracy of non-linear differential devices



Digital Validation & Debug

MSO/DPO4000 Series Oscilloscope with DPO4USB Module

- Automated trigger, decode and search for USB 2.0 Low-speed, Full-speed and High-speed modes

TLA5000 or TLA7000 Series Logic Analyzer

- TLA Series enables quick analysis of real-time system operation to verify USB designs.
- Crescent Heart USB-2XP probe adapter facilitates “industrial-strength” probing systems.



Wireless EVM Compliance Test

DPO/DSA7000B Oscilloscopes, Signal Generator and Analysis Software:

- Fully documented, approved Wireless USB - EVM Compliance Test Procedure
- Automatic detection of datarate, time frequency codes (TFC) and bandgroups
- AWG7000B Series with RFXpress single box solution for compliance and custom generation of all wireless USB bandgroups datarates and TFC