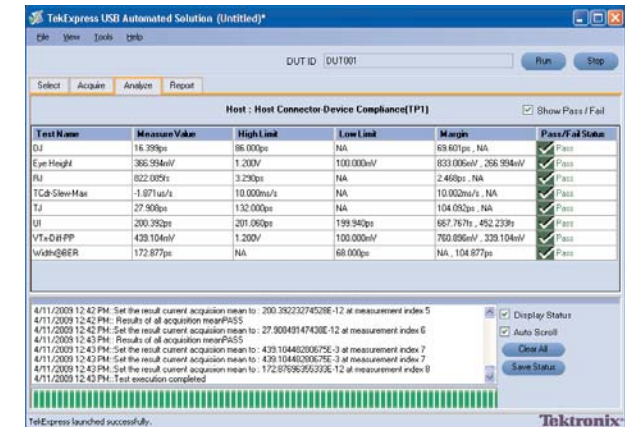
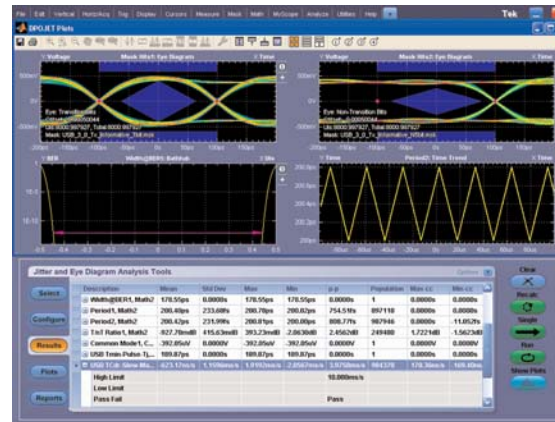
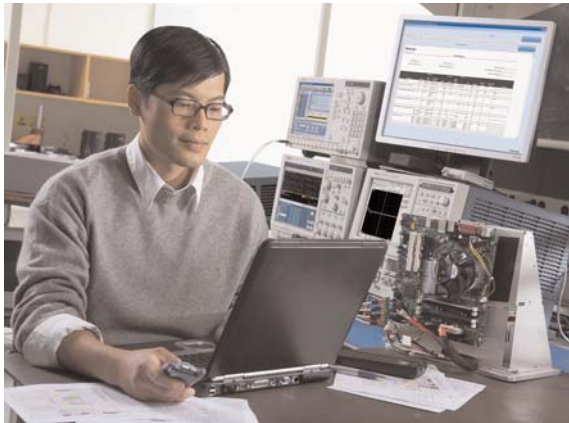


# USB3.0 Compliance Solution

## Complete Automated Solutions for USB Compliance Measurement Challenges



USB (Universal Serial Bus) enables peripheral devices such as portable disk drives, printers, and digital cameras to be connected to a PC using a universal interface socket. USB 3.0 increases the data rate from 480Mb/s to 5 Gb/s and adds full duplex transfer capabilities. The USB Standard is maintained by the USB Implementers Forum, [www.usb.org](http://www.usb.org)

### USB 3.0 Verification, Characterization, Debug, and Compliance Test

Transmitter path measurements (amplitude, timing and jitter), waveform mask testing and limit testing described in the USB 3.0 specification

### Comprehensive Set of Tests Fixtures and Probing Options

Flexible fixture options enable test access at both the transmitter and receiver test points and provide access to both USB 3.0 transmitter and receiver signals.

### Real-Time Oscilloscope for Fast, Accurate Signal Acquisition

DPO/DSA70000B Series real-time oscilloscope with >12 GHz bandwidth for higher signal fidelity and best effective number of bits.

### Sampling Oscilloscope for SuperSpeed USB Cable Characterization

DSA8200 Series sampling oscilloscope for fast, accurate TDR results for USB impedance measurements.

### Signal Generators for USB Receiver Sensitivity Tests

AWG7122B delivers signals that include the worse-case jitter and noise to stress USB receivers.

## Recommended Equipment

|  | Transmitter | Receiver | Channel |
|--|-------------|----------|---------|
| <b>Instruments</b>   |             |          |         |
| DPO/DSA71254B or higher Real-Time Oscilloscope   | 1           | 1        |         |
| DSA8200 Sampling Oscilloscope  |             |          | 1       |
| <b>Sampling Modules</b>  |             |          |         |
| 80E08 TDR Module   |             |          | 2       |
| AWG7122B Series Arbitrary Waveform Generators with Opt. 6, 8 <sup>*1</sup>   |             | 1        |         |
| <b>Test Fixture<sup>*4</sup></b>   |             |          |         |
| For Host Testing:<br>TF-USB3-A-P used for best signal quality.<br>For more mechanical flexibility use TF-USB3-B-R (includes a 13cm USB 3.0 cable - P/N 174-5772-00).<br>For precision De-Embed of TF-USB3-A plug fixture, order TF-USB3-AB-KIT (includes Cal Kit). | 1           | 1        |         |
| For Device Testing:<br>RF-USBV3-A-R (includes short USB 3.0 cable).  | 1           | 1        |         |
| For Cable Testing:<br>TF-USB3-A-KIT (A Plug Fixture, A Receptacle Fixture, B Receptacle Fixture, Cal Kit and 13cm USB 3.0 Cable P/N 174-5772-00).  |             |          | 1       |
| <b>Application Software</b>  |             |          |         |
| Protocol Trigger and Decode Software for DP/DSA70000B Series (Opt. PTD)  |             | 1        |         |
| DPOJET Jitter and Eye Diagram Analysis Tool for DPO/DSA70000B Series (option DJA) <sup>*5</sup>  |             |          |         |
| USB3.0 Test Solution for Transmitter Test (Opt. USB3) <sup>*2</sup>  | 1           |          |         |
| USB3.0 TekExpress Automated Test Solution (Opt. USB-TX) <sup>*3</sup>  | 1           |          |         |
| IConnect TDR and S-Parameter measurement software (80SSPAR)  |             |          | 1       |
| SerialXpress Advanced Jitter Generation Tool for AWG7122B (SDX100 with Opt. ISI, SSC)  | 1           | 1        |         |
| <b>Probes</b>  |             |          |         |
| P7313SMA (Optional)  | 1           | 1        |         |
| <b>Protocol Analysis and Compliance Testing</b>  |             |          |         |
| Ellisys USB Explorer 280   |             |          |         |

<sup>\*1</sup> Tektronix offers a large selection of Software packages and options for different serial technologies applications. The exact solution including all options and probing requirements is depending on the configuration of the device to be tested. Please have an Account Manager contact you to configure the exact solution.

<sup>\*2</sup> Includes USB 3.0 measurement library for DPOJET.

<sup>\*3</sup> Provides full transmitter automation including normative and informative measurements with custom test reports, requires option TEKEXP.

<sup>\*4</sup> Please contact your Account Manager for availability.

<sup>\*5</sup> DPOJET software is standard on the DSA70000B Series and optional on the DPO70000B Series

[www.tektronix.com/usb](http://www.tektronix.com/usb)

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## Supported USB3.0 Transmitter Measurements

| Spec Reference          | Parameter  | Symbol(s)          |
|-------------------------|--|--------------------|
| Table 6-10              | Unit Interval including SSC <sup>*1</sup>              | UI                 |
| Table 6-8<br>Table 6-12 | Tj - Dual Dirac at 10 <sup>-12</sup> BER <sup>*1</sup> | tTX-DJ-DD          |
| Table 6-8<br>Table 6-12 | Tx deterministic Jitter - Dual Dirac <sup>*1</sup>     | tTX-DJ-DD          |
| Table 6-8<br>Table 6-12 | Tx random jitter - Dual Dirac <sup>*1</sup>            | tTX-DJ-DD          |
| Table 6-9               | SSC Modulation Rate                                    | tSSC-MOD-RATE      |
| Table 6-9               | SSC deviation  | tSSC-MOD-RATE      |
| Table 6-10              | Differential p-p Tx voltage swing                      | VTX-DIFF-PP        |
| Table 6-10              | Low-Power Differential p-p Tx voltage swing            | VTX-DIFF-PP-LOW    |
| Table 6-10              | De-emphasized output voltage ratio                     | Tx de-emphasis     |
| Table 6-10              | Maximum slew rate                                      | tCDR_SLEW_MAX      |
| Table 6-11              | Tx min pulse   | tMIN-PULSE-Tj      |
| Table 6-11              | Transmitter Eye - Dual Dirac at 10 <sup>-12</sup> BER  | tTX-EYE            |
| Table 6-11              | Transmitter DC common-mode voltage                     | VTX-DC-CM          |
| Table 6-11              | Tx AC common mode voltage active                       | VTX-CM-ACPP_ACTIVE |

<sup>\*1</sup> Denotes normative tests, all other tests are informative.