

Challenges of MIPI Test

Submitted by [Keysight Technologies](#)

Mobile Industry Processor Interface (MIPI) Alliance standards used for hardware and software interfaces within mobile devices (smart phones, wireless-enabled tablets and netbooks) are a benefit to the mobile industry because they enable reuse and compatibility in mobile device development. Engineers are able to use the standards as guidelines during product design, and can rely on vendors to provide components that also conform to the interface standards, which in turn, ensures that their products interact properly with other MIPI conformant devices.

There are three high speed PHY-layer standards defined by MIPI, and they are used for different applications:

- D-PHY is a variable speed unidirectional clock synchronous streaming interface, with low speed in-band reverse channel and supports interfaces for camera (CSI), and display (DSI).
- M-PHY is performance driven, bidirectional packet/network oriented interface supporting interfaces like camera (CSI), storage (UFS), DigRF, and the UniPro, LLI, SSIC, M-PCIe which are used for inter-processor communications
- C-PHY is a variable speed unidirectional, embedded clock streaming interface, with low speed in-band reverse channel and supports interfaces for camera (CSI), and display (DSI).

Each interface provides a wide range of parameters including clocking method, channel compensation, number of pins, maximum amplitude, data rate and format, bandwidth per port, data encoding, and clock recovery. The D-PHY, M-PHY, and C-PHY MIPI interfaces are not controlled by a compliance program because they are not accessible to users. However, validation of specification conformance is important to semiconductor vendors and system integrators to ensure interoperability between components.

The MIPI specifications and Conformance Test Suite (CTS) requirements for components are quite complex and testing them is challenging. Connectivity to the Device Under Test (DUT) while making sure signal integrity is maintained, creating the worst-case stimulus for the DUT while not overstressing it, or getting test result information from the DUT are examples of such challenges.

BER test solutions offer the flexibility to test all types of MIPI receivers accurately by providing accurate high speed signal stimulus and bit error detection capabilities. More complex C-PHY and D-PHY signal stimulation can be addressed with high performance arbitrary waveform generators. Automated test software helps to reduce test development and execution time while ensuring repeatability and accuracy.

To learn more about MIPI conformance test and instrument solutions please see the “Understand MIPI Receiver Test Challenges and Solutions” application note [http://
literature.cdn.keysight.com/litweb/pdf/5991-3959EN.pdf](http://literature.cdn.keysight.com/litweb/pdf/5991-3959EN.pdf)