OSFP
Test Adapters

User Manual

WILDER TECHNOLOGIES

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Introduction

This user's guide documents the OSFP Host Compliance Board (HCB), and OSFP Module Compliance Board (MCB) Test Point Adapters (TPA). These test adapters can be used in various configurations for compliance testing. Each TPA has three variations of connector types with 2.92mm, 2.4mm and 1.85mm connectors. The model numbers are as follows:

Model Numbers:

HCB (Plug):

OSFP-TPA2.92-HCB-P	HCB with 2.92mm Female Connector, 400G
OSFP-TPA2.4-HCB-P	HCB with 2.4mm Female Connector, 800G
OSFP-TPA1.85-HCB-P	HCB with 1.85mm Female Connector, 800G

MCB (Receptacle):

OSFP-TPA2.92-MCB-R	MCB with 2.92mm Female Connectors, 400G
OSFP-TPA2.4-MCB-R	MCB with 2.4mm Female Connectors, 800G
OSFP-TPA1.85-MCB-R	MCB with 1.85mm Female Connectors, 800G

The OSFP HCB (Plug) and OSFP MCB (Receptacle) TPAs, shown in Figures 1 and 2 below, test OSFP interface cables, hosts, and modules to the requirements of the OSFP MSA, IEEE 802.3ck.2.1 and OIF CEI-112G-VSR-PAM4 Standards.

NOTE: To avoid damaging the cables, use the handling techniques described in the Care and Handling section before making any connections or configuring a test setup.

Always use a static-safe workstation when performing tests, as explained in the "Electrostatic Discharge Information" section.

OSFP-TPAxxx-HCB-P

The OSFP Host Compliance Test Adapter can be used for testing the compliance of OSFP Host Devices to OSFP MSA, IEEE 802.3ck OIF CEI-112G-VSR-PAM4 standards.

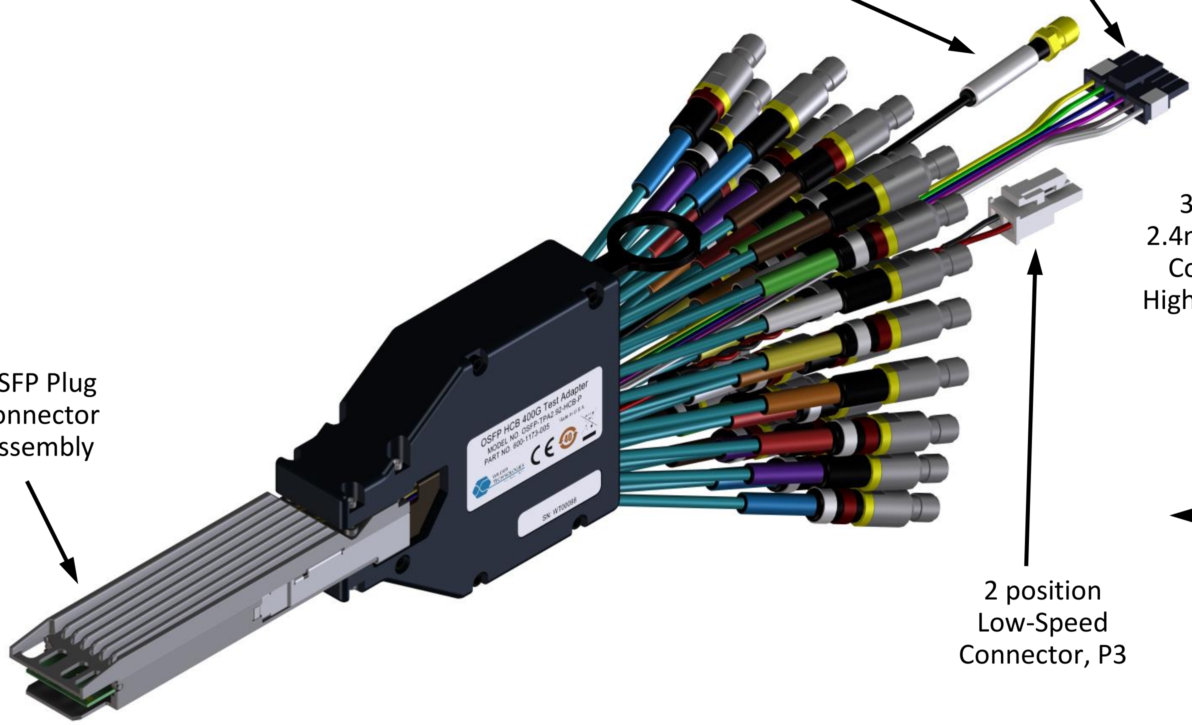

Figure 1. The OSFP HCB (Plug) Test Adapter (Note: The coaxial cables are configuration dependent and may be terminated with different connectors and have different color-coding than what is shown.)

Included with the OSFP-TPAxxx-HCB-P are a spare Molex plug connectors, provided for users to interface with the Low-Speed connection or VCC connection on the HCB. The Molex part numbers for the included separate plug and contact pins are as follows. Part numbers for the receptacle and it's contact pins, which make up the low speed connector (P2) are also listed.

6-position MicroFit Receptacle Housing (P2)	Molex PN 43645-0600
Receptacle Female Terminal Pins (P2)	Molex PN 43030-0011
6-position MicroFit Plug Header (Spare)	Molex PN 43640-0601
Plug Male Contact Pins (Spare)	Molex PN 43031-0011
2-position Mini-Fit Jr. Receptacle Housing (P3)	Molex PN 39014020
Receptacle Female Terminal Pins (P3)	Molex PN 39000074
2-position Mini-Fit Jr. Plug Header (Spare)	Molex PN 469990658
Plug Male Contact Pins (Spare)	Molex PN 39000076

OSFP-TPAxxx-MCB-R

The OSFP Module Compliance Board can be used for testing the compliance of OSFP Module Devices to OSFP MSA, IEEE 802.3ck OIF CEI-112G-VSR-PAM4 standards.

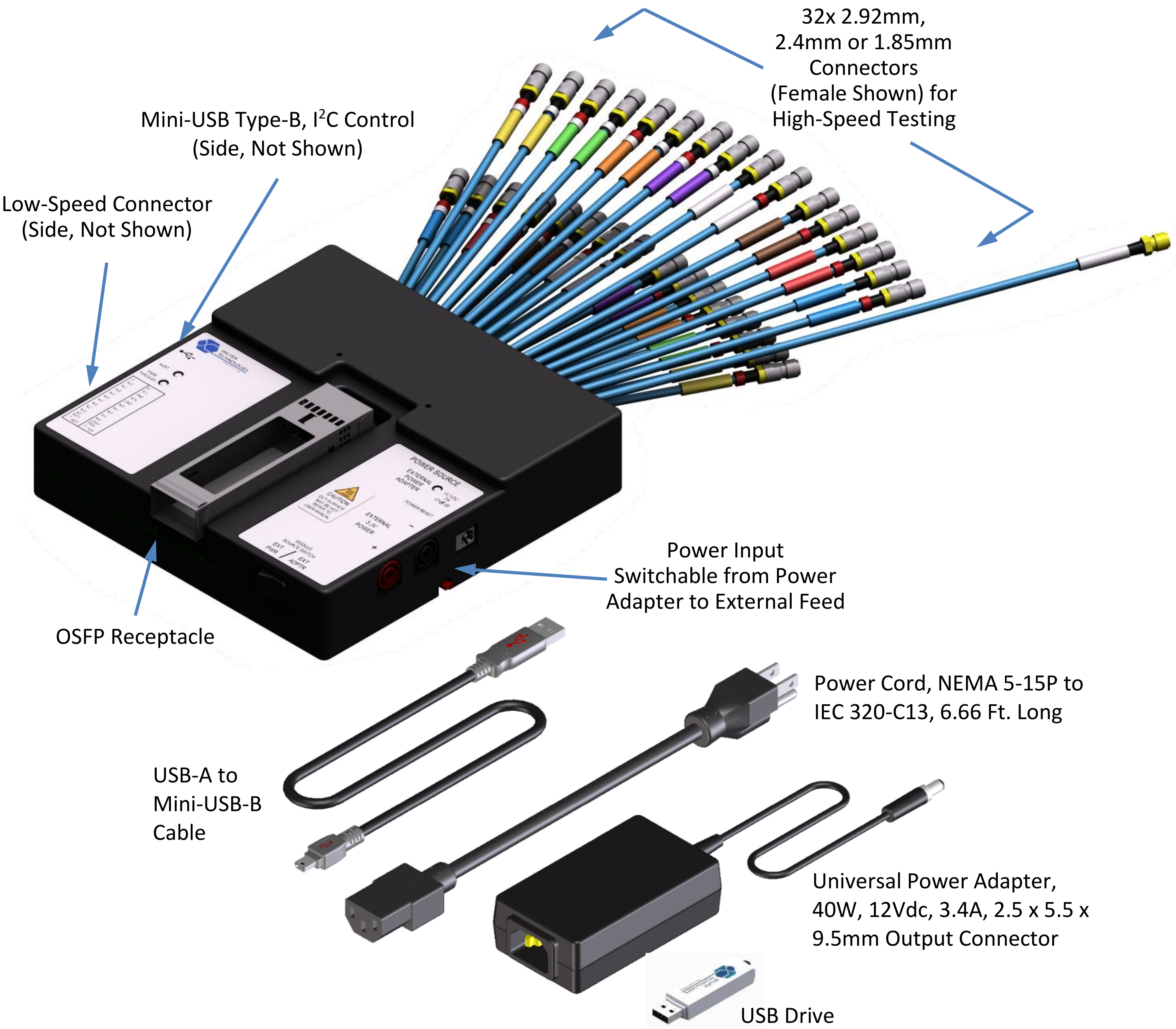

Figure 2. The OSFP MCB (Receptacle) Test Adapter and its Included cabling (Note: The coaxial cables are configuration dependent and may be terminated with different connectors than what is shown).

Included with the OSFP-TPAxxx-MCB-R is a spare Molex receptacle connector, provided for users to interface with the Low-Speed connection on the MCB. The Molex part numbers for the included receptacle, and contact pins are as follows.

20-position 2 row MicroFit Receptacle Housing (Spare)	Molex PN 43025-2000
Receptacle Female Contact Terminal Pins (Spare)	Molex PN 43030-0011

Replacement parts for the MCB and HCB low speed connections can be additionally purchased through Molex distributors.

NOTE: The receiver High-Speed connections for OSFP are normally AC coupled. The OSFP plug and receptacle TPAs do NOT have internal DC Blocks. This allows for parametric testing through the TPAs. Normal testing may require DC Blocks (Some DC blocks may be optionally ordered from Wilder Technologies or refer to the following table for purchasing options).

DC Block Specfications and Source Information				
Interface	**Frequency Range**	**VSWR**	**IL**	**Possible DC Block Sources**
1.85mm	≤10MHz - 67GHz	1.5:1	≤1.25	Centric RF Part Number C1067
2.4mm	≤10MHz - 50GHz	1.35:1	≤1.25	Centric RF Part Number C0150
2.92mm	≤10MHz - 40GHz	1.3:1	≤1.2	Centric RF Part Number C0140

NOTE: RF Terminators may be required to support specific user test configurations. (Some RF Terminators may be optionally ordered from Wilder Technologies or refer to the following table for purchasing options).

RF Terminator Specfications and Source Information				
Interface	**Frequency Range**	**VSWR**	**Power**	**Possible RF Terminator Sources**
1.85mm	0 - 67GHz	1.3:1	1W	Centric RF Part Number C673
2.4mm	0 - 50GHz	1.3:1	1W	Centric RF Part Number C505 Pasternack Part Number PE6TR1103
2.92mm	0 - 40GHz	1.2:1	1W	Centric RF Part Number C401 Pasternack Part Number PE6TR1106

NOTE: The metal shell of both the plug (QSFP-DD HCB) and receptacle (QSFP-DD MCB) connector housing or cage tie high-speed ground to chassis ground.

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Cooling Module Accessory

The Cooling Module Accessory (Included with product or optional accessory) can be installed to the OSFP MCB (Receptacle) Test Adapter. This will increase airflow through a device module (DUT) connector's heat sink and subsequently keep the device module case temperature within recommended ranges (per OSFP MSA). The Cooling Module is required when testing OSFP modules at power classes 4 or greater.

The Cooling Module is shipped disassembled from the OSFP MCB TPA. To install the cooling module onto the MCB, slide the cooling module assembly onto the mounting rail guide until the assembly clicks in place on the rail. (Figure 4)

A 12V AC-DC Power Adapter is also provided with the assembly and plugs into the Cooling Module's DC Jack, to power the fan.

NOTE: The Cooling Module is required while testing high power modules but is detachable for carrying purposes.

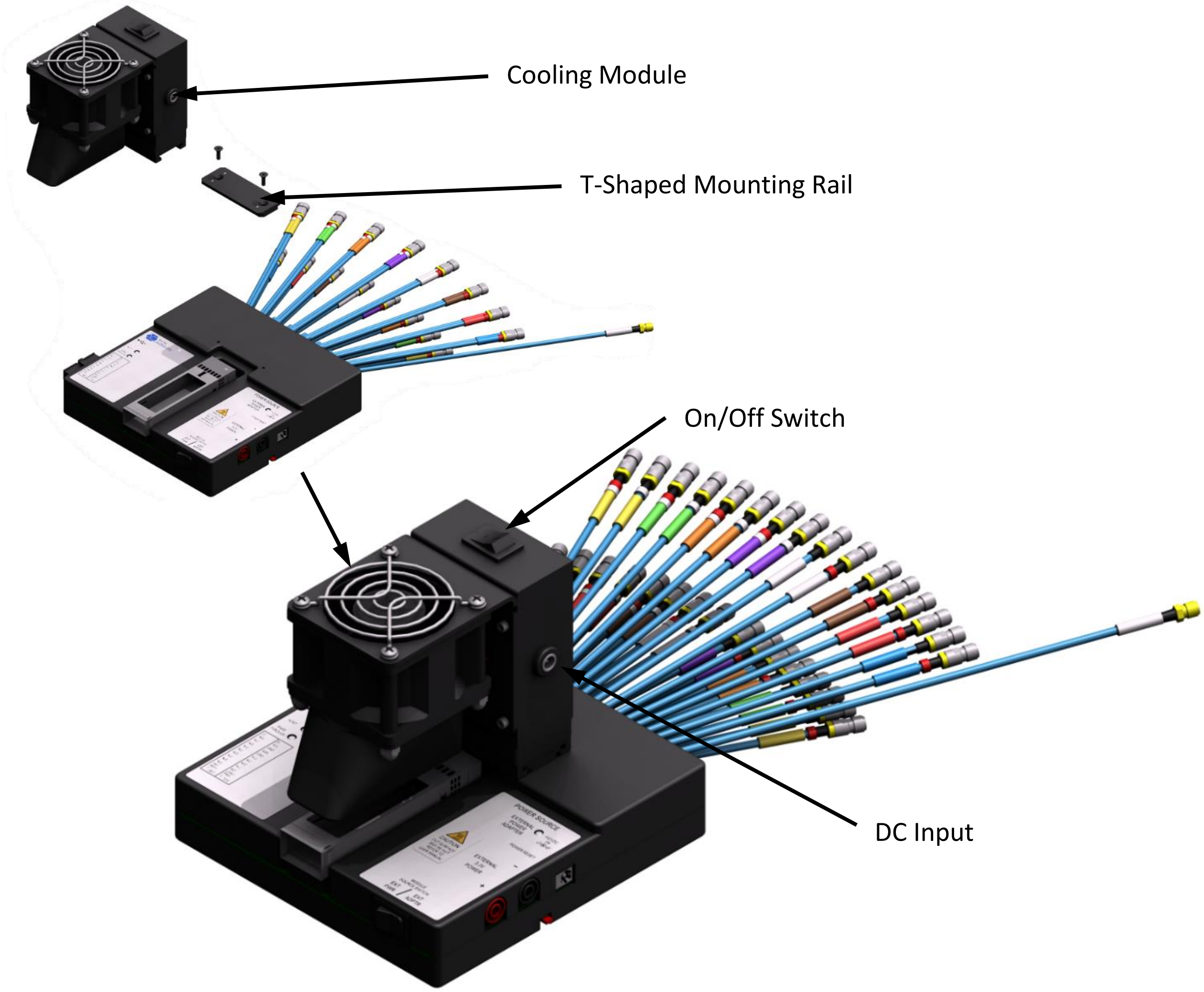


Figure 3. The OSFP MCB (Receptacle) Test Adapter with Cooling Module

Cooling Module Thermal Data

The Cooling Module is required to maintain an OSFP device module case temperature below 70°C, as defined by OSFP MSA Standards[1]. Thermal measurements at an ambient temperature of 20°C were taken of two typical OSFP Module types used with the OSFP MCB TPA while the Cooling Module was powered on.

Temperature results for each power class as well as usage recommendations are shown below. For each power class, the predicted outside case temperature and outside handle temperature are shown (Figure 5 displays these locations on the DUT). Additionally, the maximum allowable ambient temperature based on a 70°C case temperature is shown. This value is the maximum ambient temperature that the OSFP Device Module can be tested at before its outside case temperature exceeds 70°C.

[1] "OSFP MSA Specification for OSFP Octal Small Form Factor Pluggable Module, Rev 5.0, October 2nd, 2022"

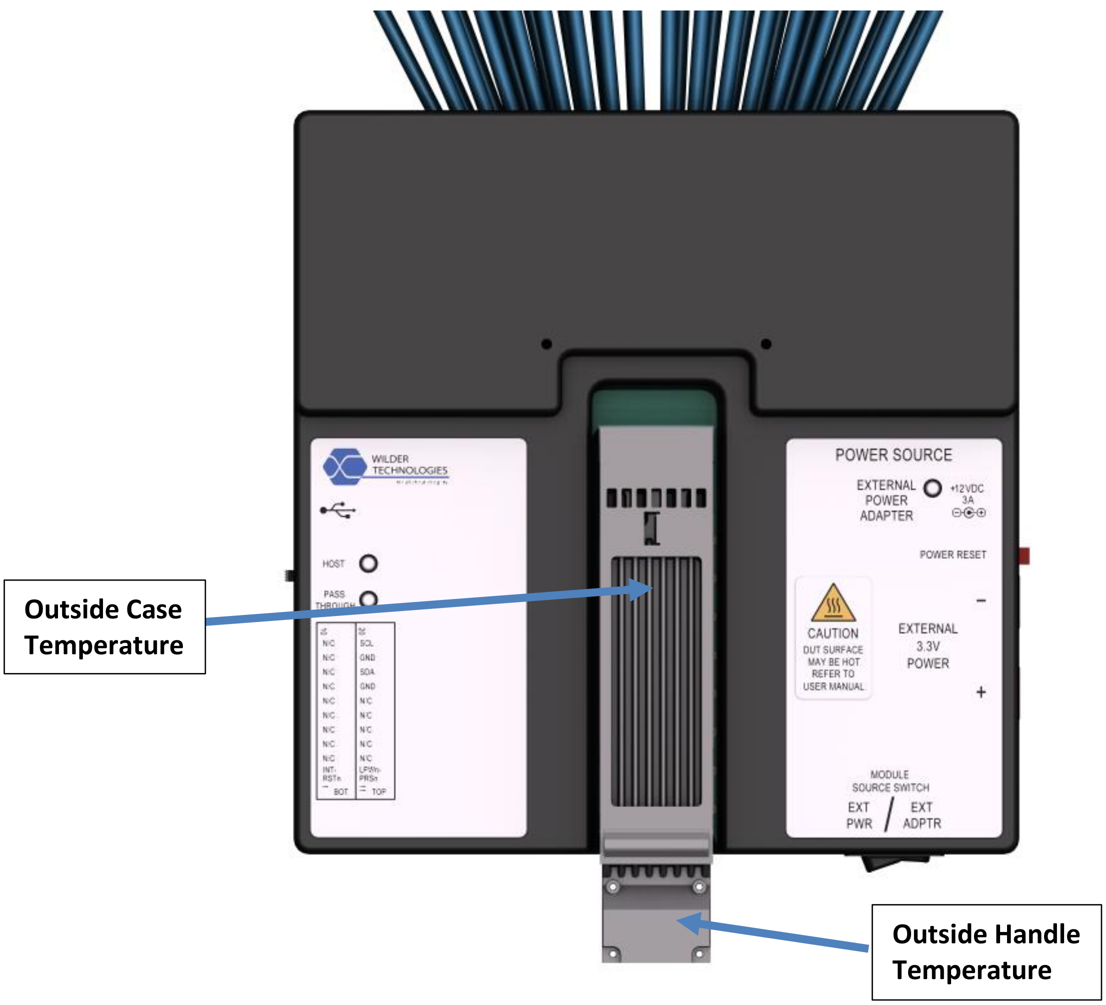


Figure 4. OSFP MCB with DUT Temperature locations, Cooling Module not shown.

Module Type 1. OSFP Open Top Heat Sink Module (Fin Type) Thermal Measurements

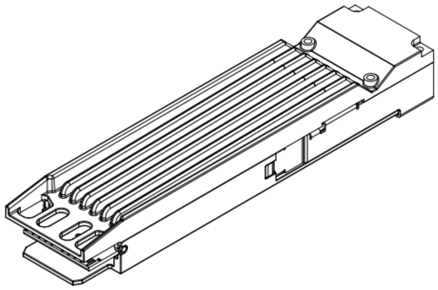


Figure 5. OSFP Open Top Heat Sink Module (Fin Type).

Table 1. OSFP Open Top Heat Sink Module Thermal Data with Cooling Module

Power Class	Max Power Consumption (W)	Outside Case Temperature[2] (C)	Outside Handle Temperature[2] (C)	Safe to Touch	Max Allowable Ambient Temp for 70°C Case Temp
1	1.5	21.85	20.49	Yes	67.4
2	3.5	23.8	21.14	Yes	65.4
3	7	27.22	22.28	Yes	62
4	8	28.2	22.6	Yes	61
5	10	30.15	23.26	Yes	59
6	12	32.1	23.91	Yes	57
7	14	34.05	24.56	Yes	55
8	20	39.91	26.51	Yes	49.4
	27	46.74	28.79	Yes	42.6
	30	49.67	29.77	Yes	39.7
	33	52.6	30.74	Yes	36.8

While being tested with the OSFP MCB TPA, the Open Top heat Sink OSFP Module is expected to be safe to touch at all power classes.

Module Type 2. OSFP Closed Top Heat Sink Module (Tunnel Type) Thermal Measurements

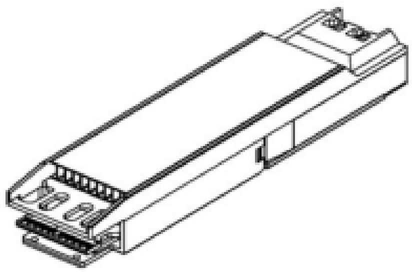


Figure 6. OSFP Closed Top Heat Sink Module (Tunnel Type).

Table 2. OSFP Closed Top Heat Sink Module Thermal Data with Cooling Module

Power Class	Max Power Consumption (W)	Outside Case Temperature[2] (C)	Outside Handle Temperature[2] (C)	Safe to Touch	Max Allowable Ambient Temp for 70°C Case Temp
1	1.5	23.75	21.27	Yes	67
2	3.5	27.37	21.97	Yes	63.4
3	7	33.7	23.19	Yes	57.1
4	8	35.51	23.54	Yes	55.3
5	10	39.13	24.24	Yes	51.7
6	12	42.74	24.94	Yes	48
7	14	46.36	25.64	Yes	44.4
8	20	57.22	27.74	Yes	33.6
	27	69.88	30.19	No	20.9
	30	75.31	31.24	No	15.4
	33	80.74	32.29	No	10.0

At a power consumption greater than 27 Watts, the Closed Top Heat Sink OSFP module exceeds the recommended case temperature of 70°C. In these cases, the test operator must use caution when handling the OSFP module. Refer to the 'Fan Module Usage Recommendations and Thermal Safety Precautions' section below.

[2] Temperatures interpolated from experimental data.

Thermal Caution

While inserted in the OSFP MCB TPA, the OSFP module is expected to exceed the recommended 70°C temperature at power consumption greater than 27 Watts. The thermal caution (Figure 5) serves as a warning of the high temperature that the DUT case can present while inserted in and being tested by the OSFP MCB TPA. Importantly, at power consumptions less than 27 Watts, the DUT is safe for skin contact since its case temperature is expected to be less than 70°C. In these cases, the test operator should still use caution, since the DUT case will be hot, just not so hot as to exceed the OSFP MSA recommended temperature of 70°C.

Figure 7. Caution Label, IEC 60417. Caution, Hot Surface

Cooling Module Usage Recommendations and Thermal Safety Precautions

While testing an OSFP device module with the OSFP MCB TPA, the test operator should adhere to the following usage recommendations and thermal safety precautions.

- The Cooling Module should always be on while the DUT is inserted in the OSFP MCB TPA.
- The user must manually turn on the Cooling Module.
- The user should acknowledge that the DUT case temperature will be hot while inserted in the OSFP MCB TPA.
- The user should minimize skin contact with the DUT case while it is being tested.
- When finished with testing, before turning off the Cooling Module, the user should leave the DUT inside the powered-off MCB for 15 seconds before removing it to allow adequate time for cooling.

Product Inspection

Upon receiving OSFP Test Adapters from Wilder Technologies, perform the following product inspection:

- Inspect the outer shipping container, foam-lined instrument case, and product for damage. Retain the outer cardboard shipping container until the contents of the shipment have been inspected for completeness and the product has been checked mechanically and electrically. Use the foam-lined instrument-case for secure storage of the Wilder Technologies OSFP Test Adapter when not in use.

- Locate the shipping list and verify that all items ordered were received.

- In the unlikely event that the product is defective or incomplete, the “Limited Warranty” (see the Wilder web site) discusses how to contact Wilder Technologies for technical assistance and/or how to package the product for return.

The OSFP Test Adapter Care and Handling Precautions

The OSFP Test Adapters require careful handling to avoid damage. Improper handling techniques, or using too small a cable bend radius, can damage the coaxial cable connections within the adapter housing or the cables themselves. This can occur at any point along the cable. To achieve optimum performance and to prolong the OSFP TPA's life, observe the following handling precautions:

- **CAUTION 1: Avoid Torque Forces** (Twisting)
  Twisting any OSFP TPA as a unit, with one end held stationary, may damage, or severely degrade performance. Adherence to Caution 5 (below) helps to avoid twisting.

- **CAUTION 2: Avoid Sharp Cable Bends**
  Never bend coaxial cables into a radius of 26 mm (1-inch) or less. Never bend cables greater than 90°. Single or multiple cable bends must be kept within this limit. Bending the OSFP TPA cables less than a 26mm (1-Inch) radius will permanently damage or severely degrade test adapter performance.

- **CAUTION 3: Avoid Cable Tension** (Pull Forces)
  Never apply tension (pull forces) to an individual coaxial cable that is greater than 2.3 kg (5 lbs.). To avoid applying tension, always place accessories and equipment on a surface that allows adjustment to eliminate tension on the OSFP TPA and cables. Use adjustable elevation stands or apparatus to accurately place and support the OSFP TPA.

- **CAUTION 4: Connect the OSFP Test Adapter First**
  To prevent twisting, bending, or applying tension to the coaxial cables when connecting a OSFP TPA, always attach the OSFP TPA to the device under test (DUT) or cable under test before attaching any High-Speed connectors. Carefully align the OSFP connectors and then gently push the connectors together until fully seated.

  If the OSFP TPA must be turned or twisted to make connection to the DUT, avoid using the OSFP TPA housing alone to make this occur. Try to distribute the torque forces along the length of the test setup and cabling. If this is not possible, it is recommended to first loosen or disconnect the High-Speed connections at the OSFP TPA, make the connection to the DUT and then re-tighten or attach the test equipment leads.

NOTE: Only grip the test adapter housing when inserting or extracting the OSFP TPA to or from the DUT. Pulling directly on the OSFP TPA cables or using them to insert the OSFP TPA may cause damage.

- **CAUTION 5: Carefully Make High-Speed (2.92mm, 2.4mm, 1.85mm) Connections**
  To connect the OSFP TPA High-Speed connectors, follow these steps:

  1. Hold the cable stationary by grasping the cable at the black heat-shrink section near the connector.

  2. Insert the mating High-Speed connector barrel and hand-tighten the free-spinning nut onto the connector while avoiding pulling, bending, or twisting the OSFP TPA coaxial cable.

  3. The OSFP TPA High-Speed connectors have flats that accept an open-end 1/4-inch or 5/16-inch wrench, depending on configuration. When attaching instrument cables to the OSFP TPA, it is recommended that the OSFP TPA connectors be mechanically held and the test leads be tightened to the equipment manufacturer's torque recommendations, normally 5 in-lbs., using an open-end torque wrench.

     If the test set-up requires repositioning, first loosen, or disconnect the coax cable connections to avoid twisting, bending, or tension.

     NOTE: A drop in signal amplitude by half or 6dB during the testing of a channel may indicate that a cable has been mechanically pulled free of coaxial cable connections internal to the assembly. This could be determined by checking if the cable has any lateral play relative to the TPA. This would only occur when the TPA has exceeded the pull force as specified within the mechanical specification. If the cable cannot be re-seated or continues to fail, the test adapter will need to be sent back to the factory for service.

- **CAUTION 6: Independently Support Instrument Cables or Accessories**
  Excessive weight from instrument cables and/or accessories connected to the OSFP TPA can cause damage or affect the test adapter performance. Be sure to provide appropriate means to support and stabilize all test set-up components.

- **CAUTION 7: ESD Sensitivity**
  The OSFP HCB is predominantly a passive component and is not in itself sensitive to electrostatic discharge (ESD). The OSFP MCB has active components and is sensitive to ESD. When an active DUT is installed, both devices become susceptible to ESD. Observe proper ESD precautions, discussed further in the Electrostatic Discharge Information section.

General Test Adapter, Cable, and Connector

Observing simple precautions can ensure accurate and reliable measurements.

Handling and Storage

Before each use of the OSFP TPA, ensure that all connectors are clean. Handle all cables carefully and store the OSFP TPA in the foam-lined instrument case when not in use, if possible. Do not set connectors contact end down. Install the coax connector protective end caps when the OSFP TPA is not in use.

Visual Inspection

Be sure to inspect all cables carefully before making a connection. Inspect all cables for metal particles, scratches, deformed threads, dents, or bent, broken, or misaligned center conductors. Do not use damaged cables.

Cleaning

If necessary, clean the connectors using low-pressure (less than 60 PSI) compressed air or nitrogen with an effective oil-vapor filter and condensation trap. Clean the cable threads, if necessary, using a lint-free swab or cleaning cloth moistened with isopropyl alcohol. Always completely dry a connector before use. Do not use abrasives to clean the connectors. Re-inspect connectors, making sure no particles or residue remains.

Making Connections

Before making any connections, review the “Care and Handling Precautions**”** section. Follow these guidelines when making connections:

- Align cables carefully
- Make preliminary connection lightly
- To tighten, turn connector nut only
- Do not apply bending force to cable
- Do not over-tighten preliminary connections
- Do not twist or screw-in cables
- Use an appropriately sized torque wrench, and do not tighten past the “break” point of the torque wrench (normally 5-inch pounds)

Electrostatic Discharge Information

Protection against electrostatic discharge (ESD) is essential while connecting, inspecting, or cleaning the OSFP TPA test adapter and connectors attached to a static-sensitive circuit (such as those found in test sets).

Electrostatic discharge can damage or destroy electronic components. Be sure to perform all work on electronic assemblies at a static-safe workstation, using two types of ESD protection:

- Conductive tablemat and wrist-strap combination
- Conductive floor-mat and heel-strap combination

When used together, both types provide a significant level of ESD protection. Used alone, the tablemat and wrist-strap combination provide adequate ESD protection. To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground. Acceptable ESD accessories may be purchased from a local supplier.

WARNING: These techniques for a static-safe workstation should not be used when working on circuitry with a voltage potential greater than 500 volts.

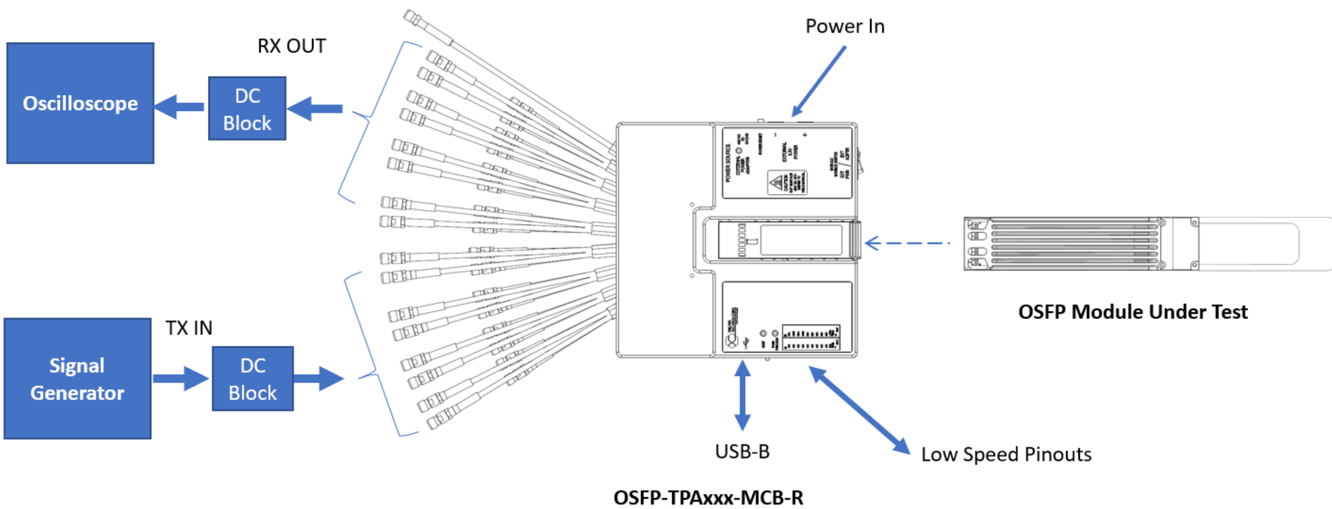
User Model

The OSFP TPAs are capable of performing to the requirements of both MSA, OIF, and IEEE 802.3ck specifications, limited only by the specifications, environmental, care and handling specified in this document.

The two most common testing configurations are shown below.

OSFP-MCB

OSFP-TPAH-MCB-R is used to test an OSFP Module:



*DC blocks are accessories and not provided with this product

Figure 8. OSFP MCB User Model

In this configuration, the OSFP-MCB is used to test an OSFP Module. The MCB must be powered by an external source, either with the provided 12V power supply, or with the 3.3V banana plug jacks.

The MCB receives input signals from a signal generator connected to its TX lines (indicated by TX IN). These signals are then transferred to the OSFP module under test (indicated by TX OUT). The module responds with the RX IN signal, which is transferred through the MCB, and outputted to a connected oscilloscope through its RX lines.

*Note that between the Signal Generator and MCB and the MCB and Oscilloscope are DC Blocks which need to be separately obtained.

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Closeup of MCB Interface and Functional Ports

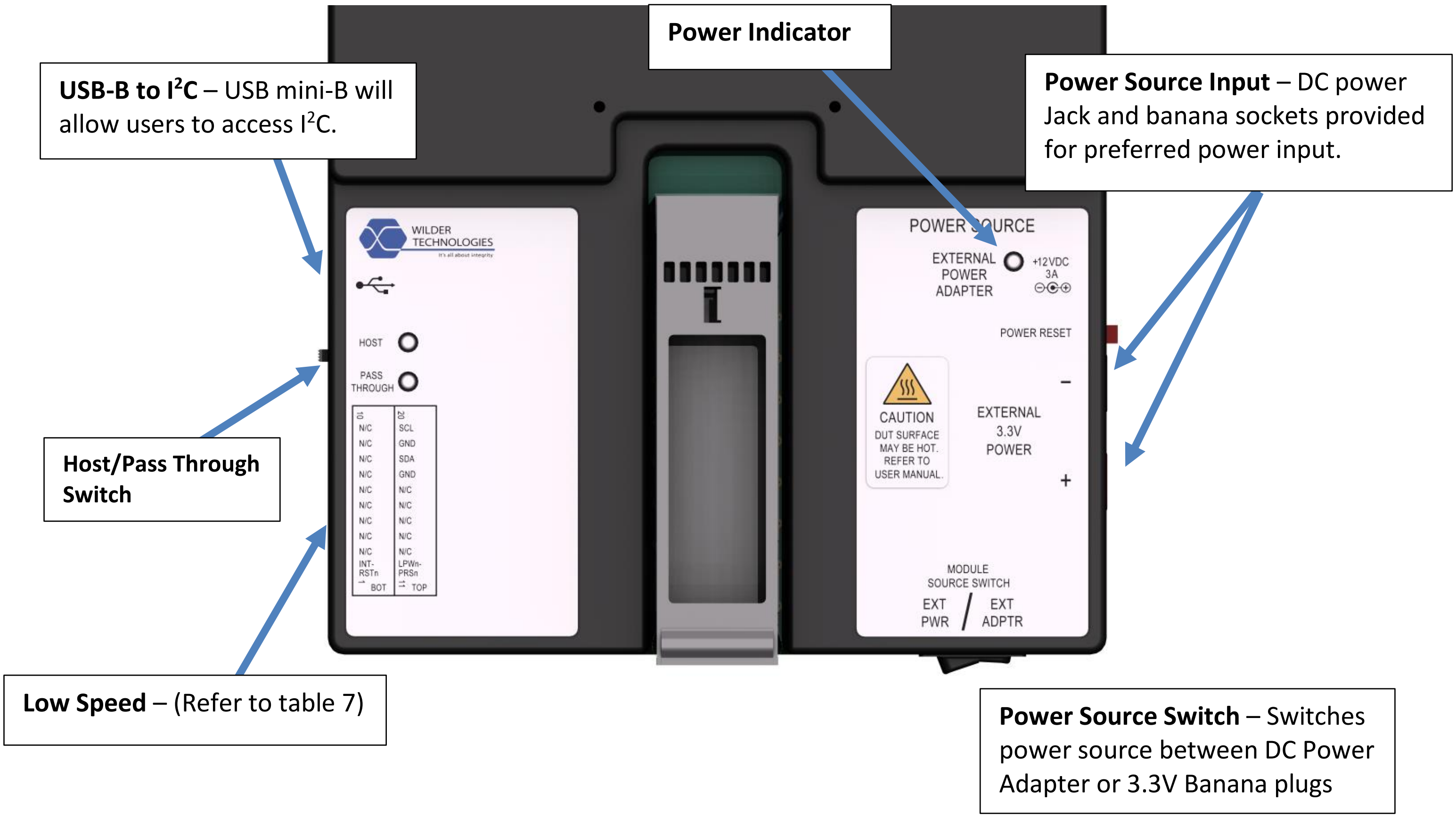


Figure 9. Closeup of OSFP I/O's and External Functions

The **Module Source Switch** allows a user to select which power input supplies the 3.3V OSFP connector pins. With the switch in the **EXT PWR** position the module will take power from the **External 3.3V Power** connectors (banana jacks). With the switch in the **EXT ADPTR** position the module will take power from the **External Power Adapter** (+12VDC, 60-Watt Power Adapter). The 12V to 3.3V regulator can supply up 8 amps to the module. Note: The external power adapter is always required even when switched to External Power, to run software applications.

The **Power Reset** circuit breaker will trip if power consumption exceeds 38W while in **EXT ADPTR** Mode. When tripped, a **Power Reset** button will pop out of the MCB casing. The **Power Reset** button must be pushed back into the MCB casing to allow power into the MCB once again.

Note: The user should provide an external current limiter, fuse, or breaker to prevent any possible short circuit damage while in **EXT PWR** mode. In EXT PWR mode, the MCB **Power Reset** circuit breaker will still trip if there is a short circuit within the MCB host emulation circuitry.

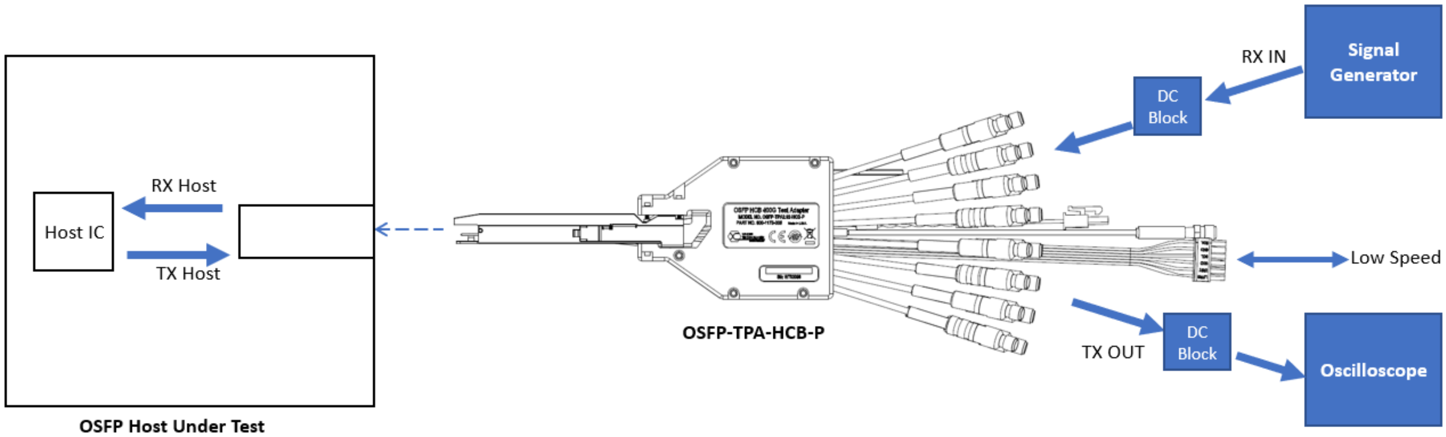
The **Host/Pass Through Switch** switches between a host emulation mode and a signal passthrough mode. In host emulation mode, the MCB can communicate with the Wilder Technologies CMIS GUI software that is running on an external PC. This allows the user to monitor and control the data registers of the system. In signal passthrough mode, the MCB will connect all low-speed signals to the low-speed header on the side of the MCB. This gives users access to all low-speed signals for their own monitoring and control. Note: CMIS GUI monitoring and control will be disabled in passthrough mode.

The **USB to I2C –** CMIS (Common Management Interface Specification) is a standardized way for manufacturers to define what data goes in registers based on Two Wire Interface. To access this information, use the Wilder Technologies CMIS GUI software. Installation and instructions are in the CMIS GUI user manual (910-0070-000). This manual is provided on USB Flash Drive supplied with the OSFP MCB product.

The **VCC Sense** SMA connector (Cable interface at the rear of the unit) can be used to precisely monitor supply voltages just before the OSFP primary connector contact-lead pads.

OSFP-HCB

OSFP-TPA-HCB-P is used to test an OSFP Host:



*DC blocks are accessories and not provided with this product

Figure 10. OSFP HCB User Model

In this configuration, the OSFP HCB is used to test an OSFP Host.

An RX signal, inputted from a connected Signal Generator, is transferred through the HCB's RX lines into the OSFP host under test. The Host responds by outputting TX signals which are transferred through the HCB, out through its TX lines into a connected Oscilloscope for measurement.

*Note that between the Signal Generator and MCB and the MCB and Oscilloscope are DC Blocks which need to be separately obtained.

Note: In the case where the laboratory source or load is not used in the test, each unused signal line must be replaced with RF terminals. Some RF terminals can be optionally purchased from Wilder Technologies.

Channel De-Embedding

The OSFP TX and RX channels are fully passive. Therefore, calibration compensating for the losses must occur within the test instrumentation that drives the OSFP Receivers or looks at the response of the OSFP Transmitters.

The OSFP TPA's have Touchstone S4P files for de-embedding the electrical length and losses within the TPA up to the OSFP connector interface pads. (Contact Wilder Technologies, support@wilder-tech.com, to obtain a copy of the S4P files.) The Touchstone S4P files enable the test engineer to compensate for the last four of the following six repeatable, systematic errors that occur when moving the reference plane:

- Signal leakage effects: *Directivity errors*
- Signal leakage effects: *Crosstalk errors*
- Reflection effects: *Source Impedance Mismatching errors*
- Reflection effects: *Load Impedance Mismatching errors*
- Bandwidth effects: *Receiver Transmission in Test Equipment errors*
- Bandwidth effects: *Receiver Reflection-tracking in Test Equipment errors*

These errors are corrected on each port. Refer to the Instrument Manual for instructions on the instrument's specific de-embedding process.

NOTE: The reference plane is the boundary, both physically and electrically, between the calibrated and uncalibrated portions of the circuit. Everything outside the reference plane is considered part of the DUT. Any instrument that does not use calibration or de-embedding of the test fixture defines the DUT as the total of externally connected components. If the de-embedding file is not used, all of the OSFP TPA and associated coaxial cables, as well as cables connecting the TPA assembly to the test instrument, would be a part of the DUT.

Non-repeatable errors, such as drift or random errors, can be reduced but not corrected. Drift errors aggregate over time or with environmental changes such as temperature shift. To eliminate drift errors, perform an instrumentation-level calibration.

A random error cannot be corrected through calibration since the error occurred randomly. Random errors are typically associated with either test instrument noise or test repeatability problems. Reduce test instrument noise by increasing source power, lowering the IF bandwidth, or averaging results over multiple sweeps. Reduce test repeatability problems through the use of a torque wrench or, again, by averaging over multiple sweeps.

Mechanical and Environmental Specifications

NOTE: All specifications in this manual are subject to change.

Table 3. General Specifications

ITEM	DESCRIPTION
Usage Environment	Controlled indoor environment
HCB (Plug) Test Adapter Length (w/2.92mm coax)	264.66 mm +/- 2 mm (10.42 inches +/- .08 inches) (Characteristic)
MCB (Receptacle) Test Adapter Length (w/2.92mm coax)	253.51 mm +/- 2 mm (9.98 inches +/- .08 inches) 306.31 mm +/- 2 mm (12.06 inches +/- .08 inches)
Receptacle Test Adapter Housing Dimensions	154.94 x 151.13 x 40.90 mm (6.10 x 5.95 x 1.61 inches) (L, W, H)
Operating Temperature	0°C to +55°C (32°F to +131°F) (Characteristic)
Storage Temperature	-40°C to +70°C (-40°F to +158°F) (Characteristic)

OSFP-TPA-HCB-P (Plug)

The Plug-Type OSFP-TPA-HCB-P test adapter provides thirty-two 2.92mm, 2.4mm, or 1.85mm (High-Speed) connectors (eight lanes of primary differential signals). Color coded heat shrink labels mark each cable or connector. The following figure refers to the pin-description tables for the OSFP-TPA-HCB-P (Plug) test adapters.

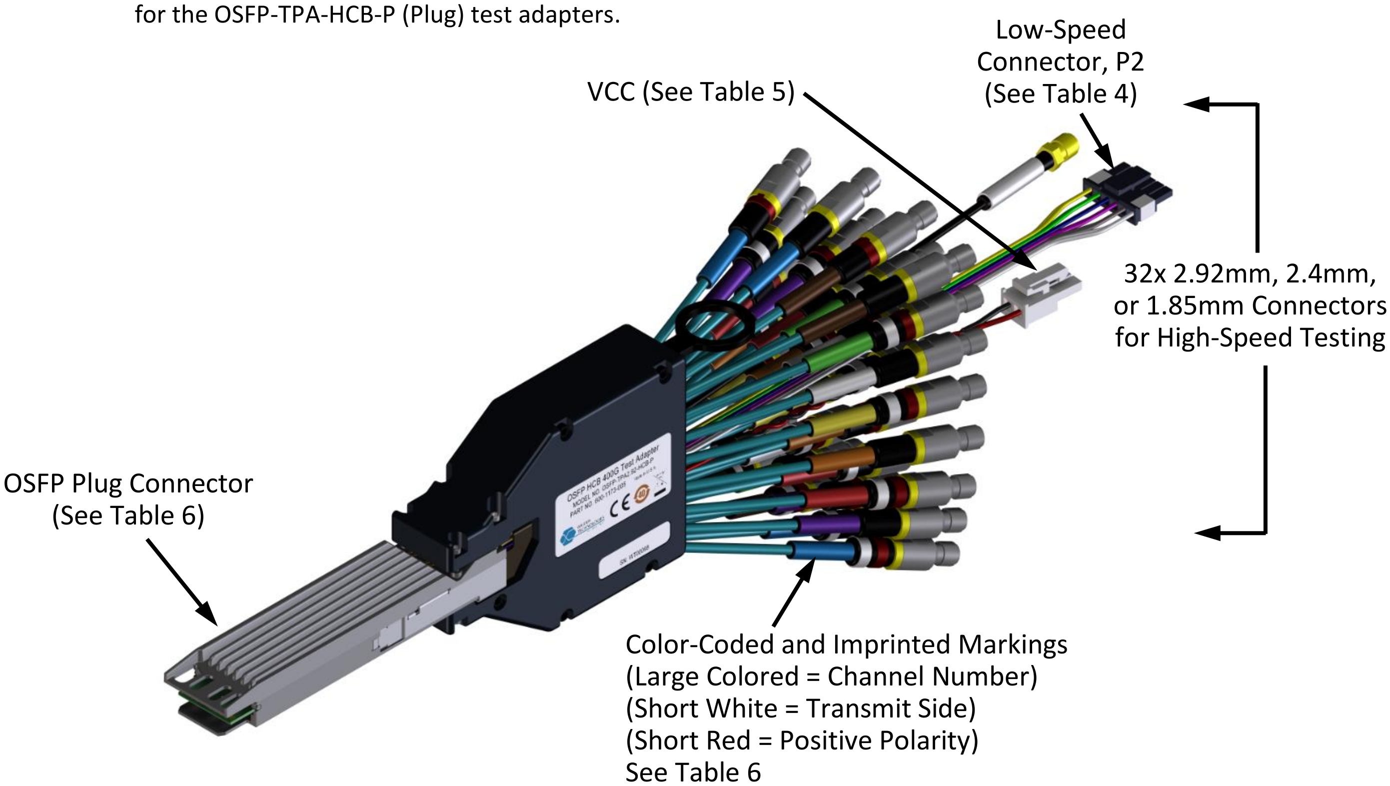


Figure 11. Cable Connectors (OSFP-TPA-HCB-P shown).

Table 4. OSFP-TPA-HCB-P (P2) 6-Position Cable Connector (Low-Speed).

LABEL	PIN NO.	COLOR ID FOR HCB	DESCRIPTION
SDA	Pin 1	Black	SDA, I^2C Data, Serial Data Line
GND	Pin 2	Black	Signal (RF Ground) and Supply (Power) Common
SCL	Pin 3	Black	SCL, I^2C Clock, Serial Clock Line
GND	Pin 4	Black	Signal (RF Ground) and Supply (Power) Common
I/RST	Pin 5	Black	Interrupt
L/PRS	Pin 6	Black	Low Power Mode/ Module Present

Table 5. OSFP-TPA-HCB-P (P3) 2-Position Cable Connector (Low-Speed).

LABEL	PIN NO.	COLOR ID FOR HCB	DESCRIPTION
GND	Pin 1	Black	Signal (RF Ground) and Supply (Power) Common
VCC	Pin 2	Red	Voltage Common Collector

Table 6. OSFP-TPA-HCB-P (Plug) Pin Assignments

Pin Description	Connector Pin Number	Destination (HCB)	Color ID for Data Line Polarity	Color Identification (HCB)
Ground	1	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx2p	2	Tx2+	Red	White/Blue
Tx2n	3	Tx2-	Black	White/Blue
Ground	4	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx4p	5	Tx4+	Red	White/Red
Tx4n	6	Tx4-	Black	White/Red
Ground	7	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx6p	8	Tx6+	Red	White/Brown
Tx6n	9	Tx6-	Black	White/Brown
Ground	10	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx8p	11	Tx8+	Red	White/White
Tx8n	12	Tx8-	Black	White/White
Ground	13	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
SCL	14	P2 Pin 5	N/A	Black Insulation
Vcc	15	VCC Sense (SMA) P3 Pin 2	N/A	White Red Insulation
Vcc	16	VCC Sense (SMA) P3 Pin 2	N/A	White Red Insulation
LPWn/PRSn	17	P2 Pin 6	N/A	Black Insulation
Ground	18	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx7n	19	Rx7-	Black	Violet
Rx7p	20	Rx7+	Red	Violet
Ground	21	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx5n	22	Rx5-	Black	Orange
Rx5p	23	Rx5+	Red	Orange
Ground	24	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx3n	25	Rx3-	Black	Green
Rx3p	26	Rx3+	Red	Green

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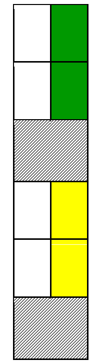
Ground	27	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx1n	28	Rx1-	Black	Yellow
Rx1p	29	Rx1+	Red	Yellow
Ground	30	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Ground	31	Coax Shield and P2 Pin 1	N/A	Black Insulation
Rx2p	32	Rx2+	Red	Blue
Rx2n	33	Rx2-	Black	Blue
Ground	34	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx4p	35	Rx4+	Red	Red
Rx4n	36	Rx4-	Black	Red
Ground	37	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx6p	38	Rx6+	Red	Brown
Rx6n	39	Rx6-	Black	Brown
Ground	40	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Rx8p	41	Rx8+	Red	White
Rx8n	42	Rx8-	Black	White
Ground	43	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
INT/RSTn	44	P2 Pin 4	N/A	Black Insulation
Vcc	45	VCC Sense (SMA) P3 Pin 2	N/A	White Red Insulaton
Vcc	46	VCC Sense (SMA) P3 Pin 2	N/A	White Red Insulation
SDA	47	P2 Pin 3	N/A	Black Insulation
Ground	48	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx7n	49	Tx7-	Black	White/Violet
Tx7p	50	Tx7+	Red	White/Violet
Ground	51	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx5n	52	Tx5-	Black	White/Orange
Tx5p	53	Tx5+	Red	White/Orange
Ground	54	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation

Tx3n	55	Tx3-	Black	White/Green
Tx3p	56	Tx3+	Red	White/Green
Ground	57	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation
Tx1n	58	Tx1-	Black	White/Yellow
Tx1p	59	Tx1+	Red	White/Yellow
Ground	60	Coax Shield and P2 Pin 2,4 P3 Pin1	N/A	Black Insulation



OSFP-TPA-MCB-R (Receptacle) Cable Pin-out

The OSFP-TPA-MCB-R test adapter provides thirty-two 2.92mm, 2.4mm or 1.85mm connectors (eight lanes of primary differential signals) to access all OSFP high-speed signals. Labels clearly mark each cable or connector. The following figure refers to the pin-description tables for the OSFP-TPA-MCB-R (Receptacle) test adapter.

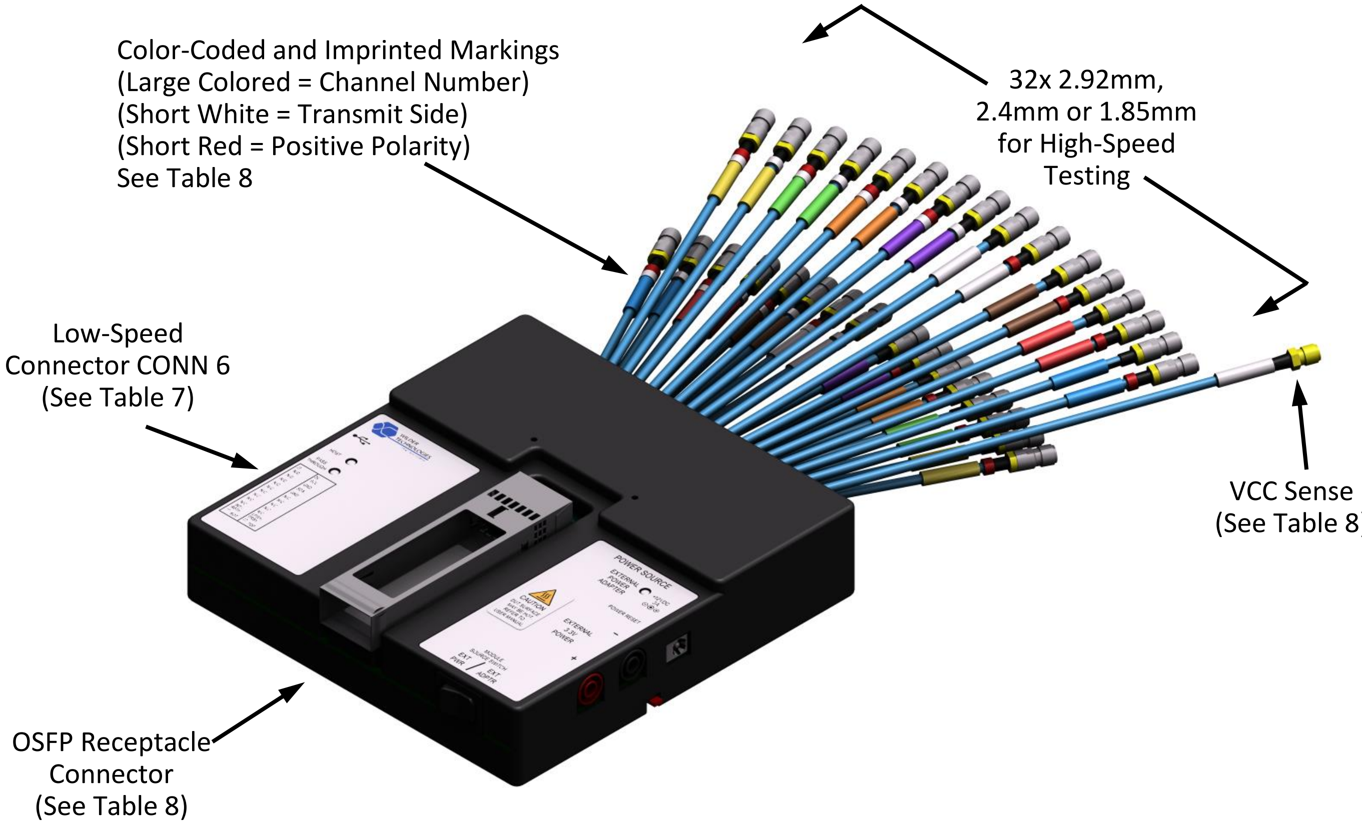


Figure 12. Cable Connectors (OSFP-TPA-MCB-R shown)

Table 7. OSFP-TPA-MCB-R (CONN6) 20-Position Fixture-Mounted Connector (Low-Speed)

LABEL	PIN NO.	DESCRIPTION
INT-RSTn	Pin 1	Interrupt
N/C	Pin 2	No Connection
N/C	Pin 3	No Connection
N/C	Pin 4	No Connection
N/C	Pin 5	No Connection
N/C	Pin 6	No Connection
N/C	Pin 7	No Connection
N/C	Pin 8	No Connection
N/C	Pin 9	No Connection
N/C	Pin 10	No Connection
LPWn-PRSn	Pin 11	Low Power Mode/ Module Present
N/C	Pin 12	No Connection
N/C	Pin 13	No Connection
N/C	Pin 14	No Connection
N/C	Pin 15	No Connection
N/C	Pin 16	No Connection
GND	Pin 17	Signal (RF Ground) and Supply (Power) Common
SDA	Pin 18	SDA, I^2C Data, Serial Data Line
GND	Pin 19	Signal (RF Ground) and Supply (Power) Common
SCL	Pin 20	SCL, I^2C Clock, Serial Clock Line

Table 8. OSFP-TPA-MCB-R (Receptacle) Pin Assignments

Pin Description	Connector Pin Number	Destination (MCB)	Color ID for Data Line Polarity	Color Identification (MCB)
Ground	1	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx2p	2	Tx2+	Red	White/Blue
Tx2n	3	Tx2-	Black	White/Blue
Ground	4	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx4p	5	Tx4+	Red	White/Red
Tx4n	6	Tx4-	Black	White/Red
Ground	7	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx6p	8	Tx6+	Red	White/Brown
Tx6n	9	Tx6-	Black	White/Brown
Ground	10	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx8p	11	Tx8+	Red	White/White
Tx8n	12	Tx8-	Black	White/White
Ground	13	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
SCL	14	J2 Pin 5	N/A	N/A
Vcc	15	(3.3V Filtered) VCC Sense (SMA)	N/A	White
Vcc	16	(3.3V Filtered) VCC Sense (SMA)	N/A	White
LPWn/PRSn	17	J2 Pin 6	N/A	N/A
Ground	18	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Rx7n	19	Rx7-	Black	Violet
Rx7p	20	Rx7+	Red	Violet
Ground	21	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Rx5n	22	Rx5-	Black	Orange
Rx5p	23	Rx5+	Red	Orange
Ground	24	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Rx3n	25	Rx3-	Black	Green
Rx3p	26	Rx3+	Red	Green

Ground	27	Coax Shield and CONN 6 Pin 17,19	N/A	Black Insulation
Rx1n	28	Rx1-	Black	Yellow
Rx1p	29	Rx1+	Red	Yellow
Ground	30	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Ground	31	Coax Shield and J2 Pin 1	N/A	N/A
Rx2p	32	Rx2+	Red	Blue
Rx2n	33	Rx2-	Black	Blue
Ground	34	Coax Shield and CONN 6 Pin 17,19	N/A	Black Insulation
Rx4p	35	Rx4+	Red	Red
Rx4n	36	Rx4-	Black	Red
Ground	37	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Rx6p	38	Rx6+	Red	Brown
Rx6n	39	Rx6-	Black	Brown
Ground	40	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Rx8p	41	Rx8+	Red	White
Rx8n	42	Rx8-	Black	White
Ground	43	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
INT/RSTn	44	J2 Pin 4	N/A	N/A
Vcc	45	(3.3V Filtered) VCC Sense (SMA)	N/A	White
Vcc	46	(3.3V Filtered) VCC Sense (SMA)	N/A	White
SDA	47	J2 Pin 3	N/A	N/A
Ground	48	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx7n	49	Tx7-	Black	White/Violet
Tx7p	50	Tx7+	Red	White/Violet
Ground	51	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx5n	52	Tx5-	Black	White/Orange
Tx5p	53	Tx5+	Red	White/Orange
Ground	54	Coax Shield and CONN 6 Pin 17,19	N/A	N/A

Tx3n	55	Tx3-	Black	White/Green
Tx3p	56	Tx3+	Red	White/Green
Ground	57	Coax Shield and CONN 6 Pin 17,19	N/A	N/A
Tx1n	58	Tx1-	Black	White/Yellow
Tx1p	59	Tx1+	Red	White/Yellow
Ground	60	Coax Shield and CONN 6 Pin 17,19	N/A	N/A

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Electrical Responses

Documented in the following pages are the electrical responses of the Wilder 800G OSFP TPAs. HCB loss, MCB loss, MTF response and ICN data is shown.

Wilder 800G OSFP HCB Response

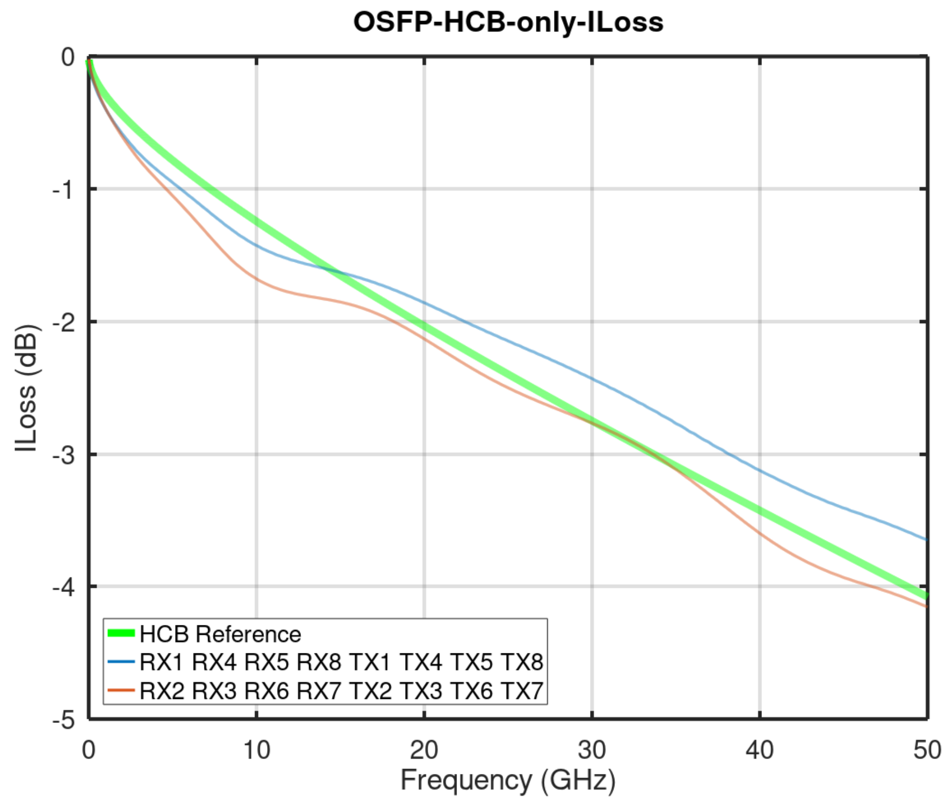

Figure 13. Plot of OSFP HCB Insertion Loss

The loss of the HCB up to but excluding the connector and its associated PCB pads is plotted in Figure 13. The loss at 28GHz is in table below. Note that the IEEE 802.3ck specification states that the difference between reference and true HCB response should be accounted for in the measurement.

Table 9. HCB Insertion Loss @ 28GHz

Channel Group	ILoss at 28GHz (dB)
RX1-RX4-RX5-RX8-TX1-TX4-TX5-TX8	-2.31407
RX2-RX3-RX6-RX7-TX2-TX3-TX6-TX7	-2.66485

Wilder 800G OSFP MCB Response

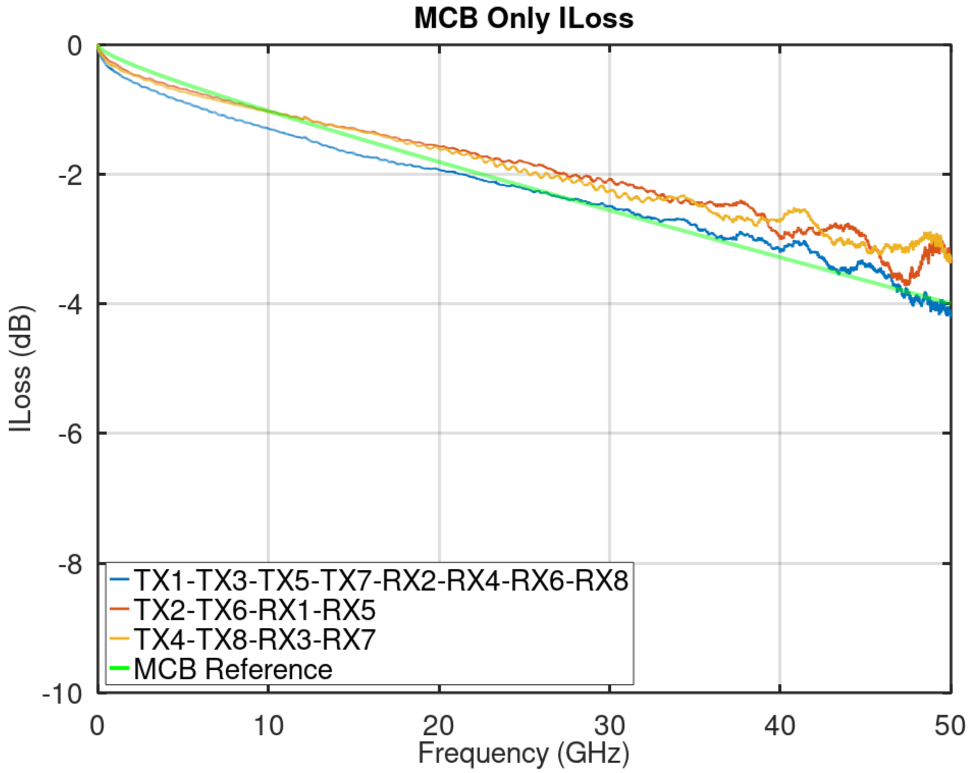

Figure 14. Plot of OSFP MCB Insertion Loss

The loss of the MCB up to but excluding the connector and its associated PCB pads is plotted in Figure 14. The loss at 28GHz is in table below. Note that the IEEE 802.3ck specification states that the difference between reference and MCB response should be accounted for in the measurement.

Table 10. MCB Insertion Loss @ 28GHz

Channel Group	ILoss at 28GHz (dB)
TX1-TX3-TX5-TX7-RX2-RX4-RX6-RX8	-2.373381
TX2-TX6-RX1-RX5	-2.006165
TX4-TX8-RX3-RX7	-2.126761

Wilder 800G OSFP Typical MTF Response

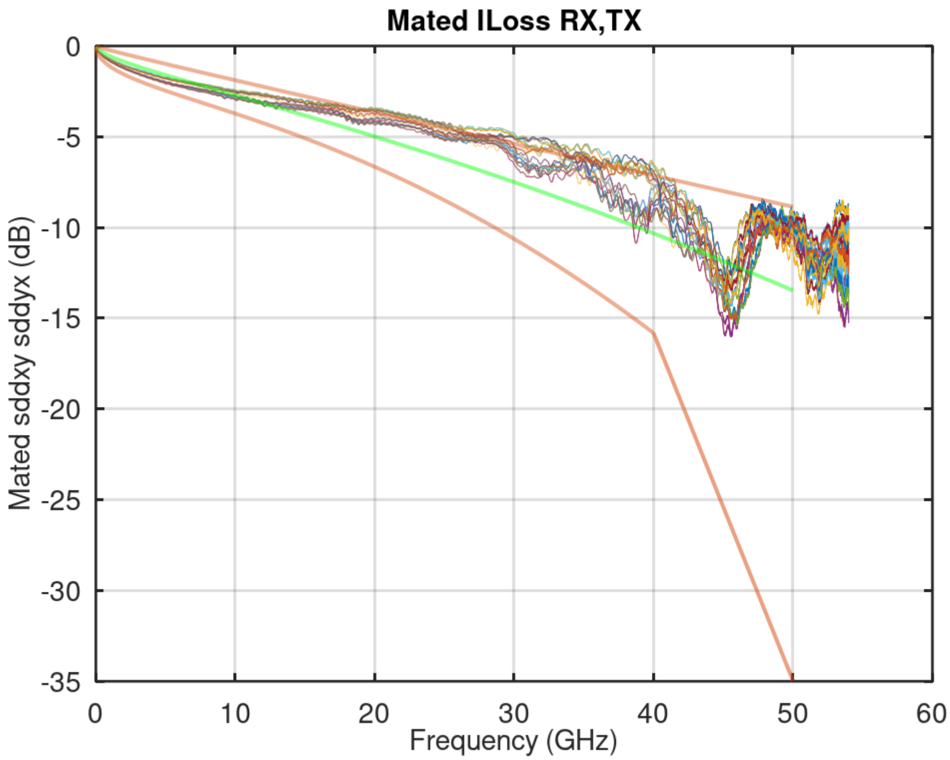

Figure 15. Plot of OSFP Mated Test Fixture Response with 802.3ck limits

MTF ILoss is plotted with 802.3ck limits and ILoss at 28GHz is in table below.

Table 11. MTF Insertion Loss @ 28GHz

MTF Channel	SDD21 at 28GHz (dB)
RX1	-5.200246
RX2	-5.346592
RX3	-4.614978
RX4	-4.988445
RX5	-5.111021
RX6	-5.157356
RX7	-4.890851
RX8	-4.999494
TX1	-5.278281
TX2	-5.666542
TX3	-5.294758
TX4	-4.582884
TX5	-4.977205
TX6	-5.056471
TX7	-5.202835
TX8	-4.664503

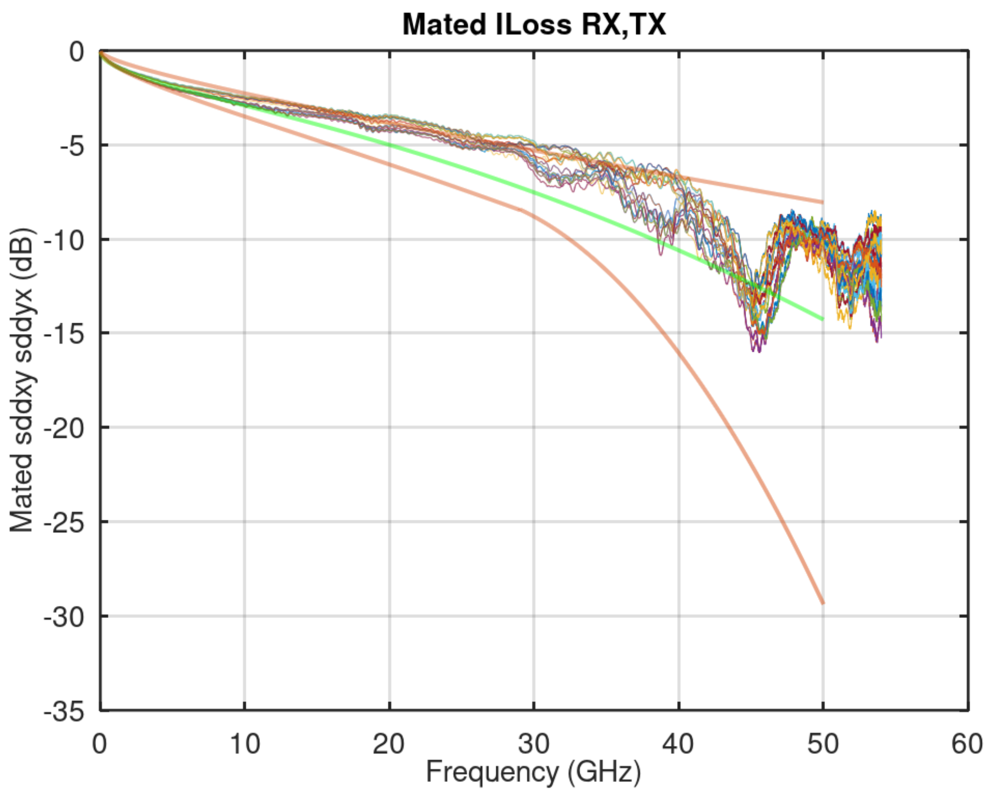

Figure 16. Plot of OSFP Mated Test Fixture Response with CEI VSR Limits

MTF ILoss is plotted with OIF CEI VSR limits.

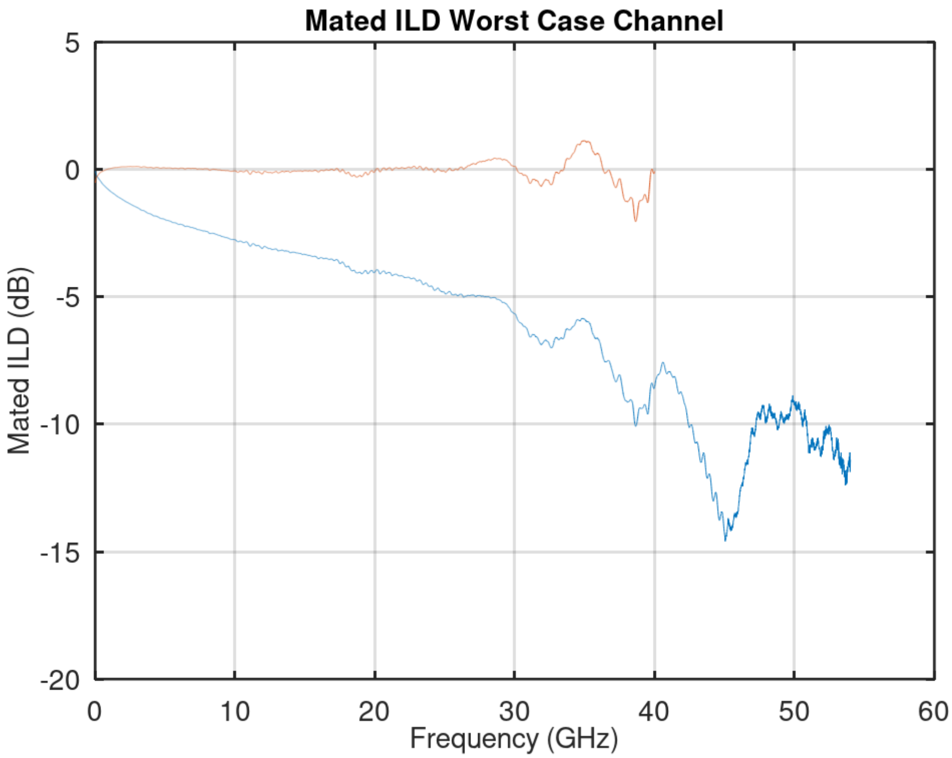

Figure 17. Plot of OSFP Mated Test Fixture Worst Case Response

Worst case FOM_ild is plotted in Figure 17 and typical results for all 16 channels are shown in the table below. FOM_ild below is calculated using IEEE 802.3ck and CEI VSR parameters.

Table 12. MTF FOM_ild for CK and VSR

MTF Channel	FOM_ild CK Parameters (dB)	FOM_ild VSR Parameters (dB)
RX1	0.059766	0.065688
RX2	0.091874	0.100148
RX3	0.051715	0.05561
RX4	0.096245	0.104984
RX5	0.060691	0.065552
RX6	0.084281	0.091936
RX7	0.055266	0.059744
RX8	0.097209	0.107081
TX1	0.093116	0.099601
TX2	0.068399	0.075694
TX3	0.092354	0.099044
TX4	0.056301	0.061349
TX5	0.090774	0.098884
TX6	0.064645	0.071268
TX7	0.08756	0.094962
TX8	0.05645	0.062031

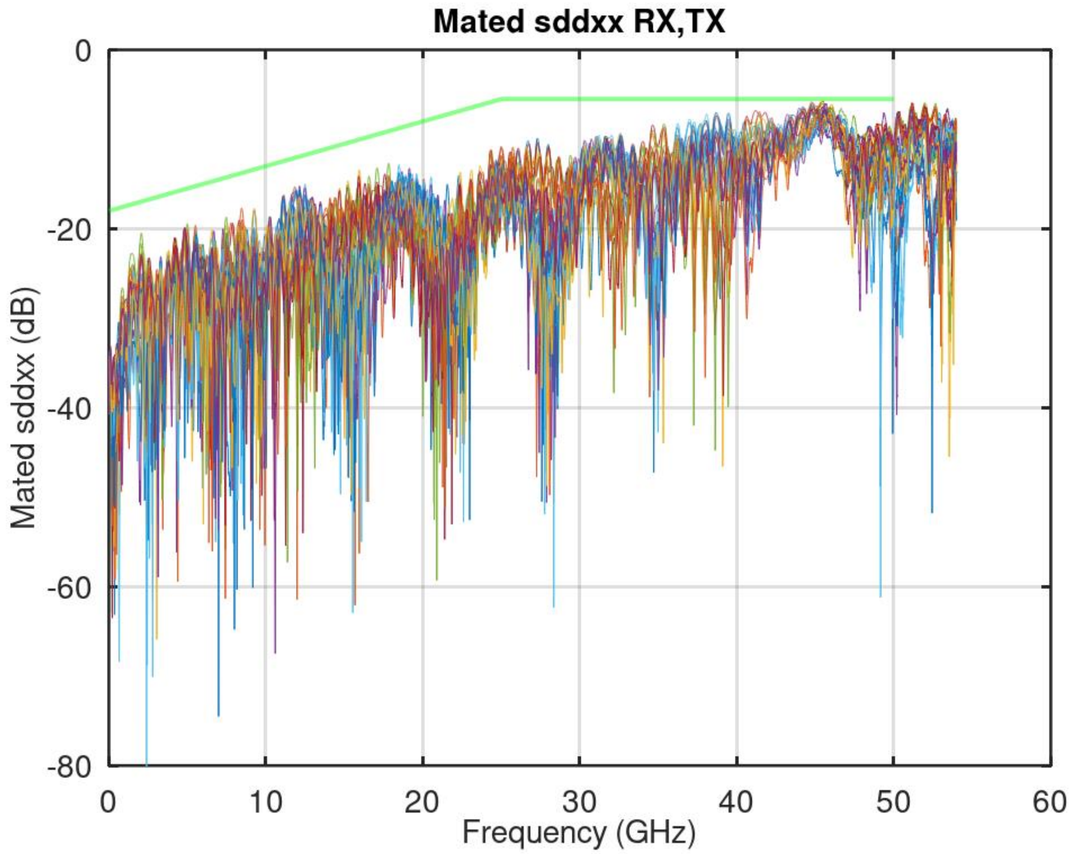

Figure 18. Plot of OSFP Mated Test Fixture Return Loss with Original 802.3ck Limit (Informative)

MTF RLoss is shown for information only.

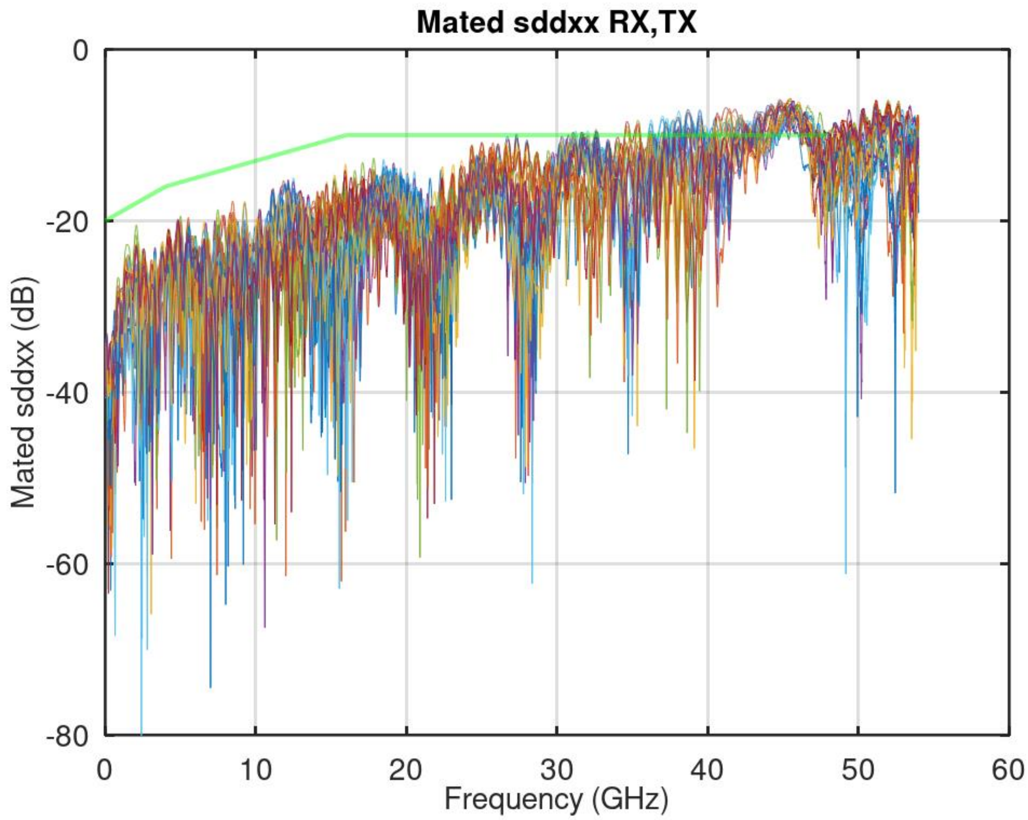

Figure 19. Plot of OSFP Mated Test Fixture Return Loss with Original CEI VSR Limit (Informative)

MTF RLoss is shown for information only.

The ERL numbers below are for all 16 measured channels for a typical mated fixture set and are calculated with no gating. ERL11 is from the HCB side. ERL22 is from the MCB side.

Table 13. ERL Numbers

	ERL11 (dB)	ERL22 (dB)	ERL (dB)	ERL Limit (dB)
RX1	13.2828	13.0183	13.0183	10.3
RX2	14.8753	15.1095	14.8753	
RX3	14.2127	13.7058	13.7058	
RX4	13.689	14.2934	13.689	
RX5	13.689	13.0612	13.0612	
RX6	14.856	15.0848	14.856	
RX7	14.0755	13.8117	13.8117	
RX8	15.0063	15.1046	15.0063	
TX1	14.2889	14.6848	14.2889	
TX2	14.0755	14.2082	14.0755	
TX3	14.2889	14.1904	14.1904	
TX4	14.2171	14.146	14.146	
TX5	14.2038	14.3748	14.2038	
TX6	13.3674	12.9718	12.9718	
TX7	14.7557	14.5446	14.5446	
TX8	14.343	13.7227	13.7227	

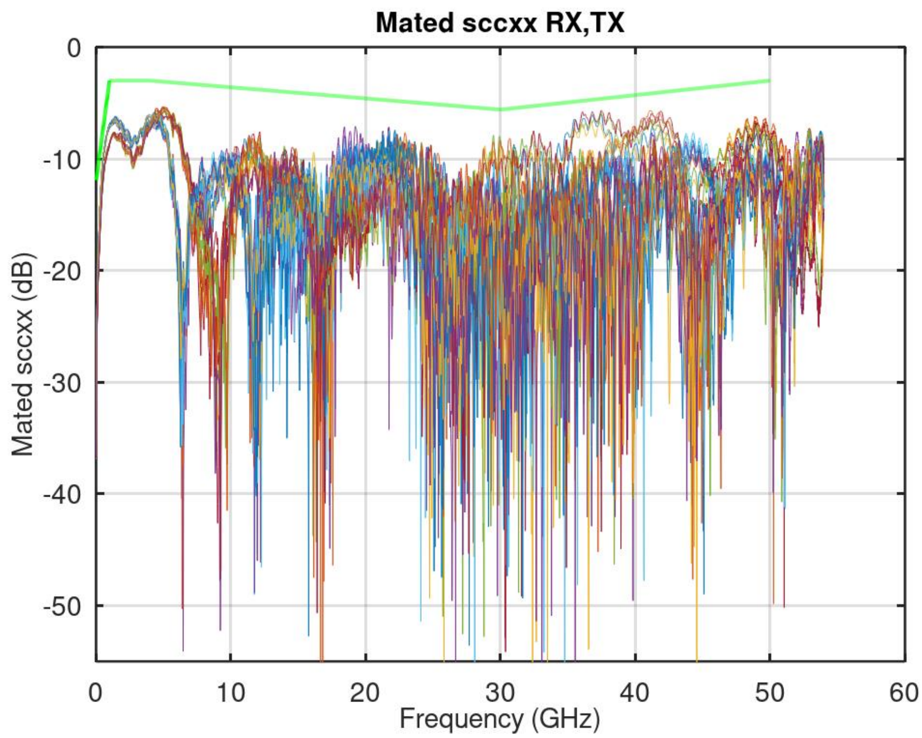

Figure 20. Plot of OSFP MTF Common Mode Return Loss with 802.3ck Limit

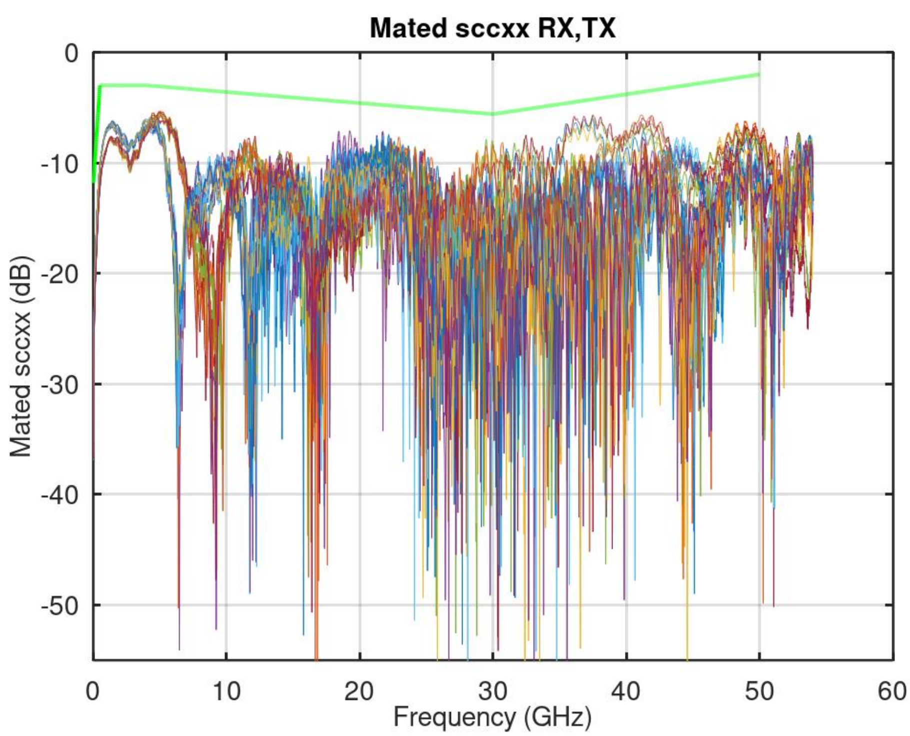

Figure 21. Plot of OSFP MTF Common Mode Return Loss with CEI VSR Limit

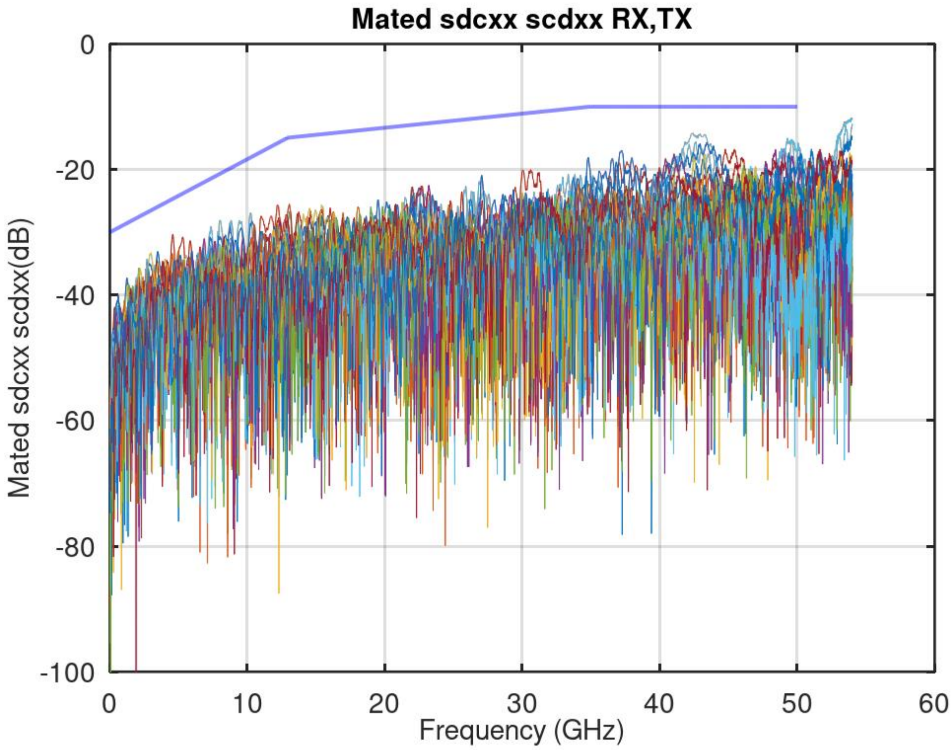

Figure 22. Plot of OSFP MTF Conversion Return Loss with 802.3ck Limit

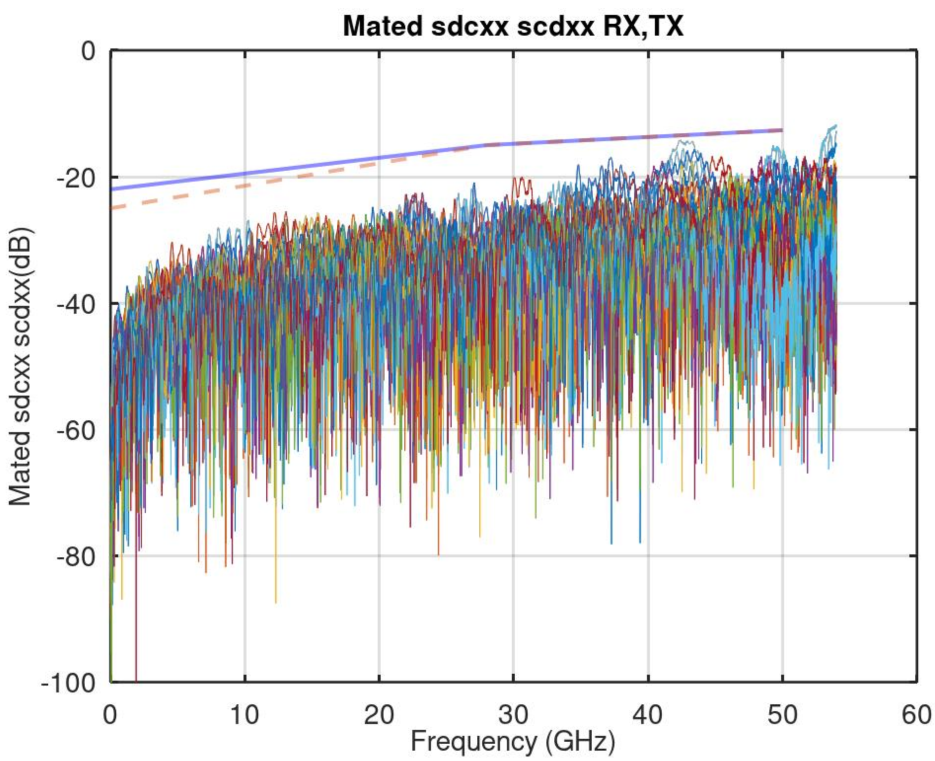

Figure 23. Plot of OSFP MTF Conversion Return Loss with CEI VSR Limit

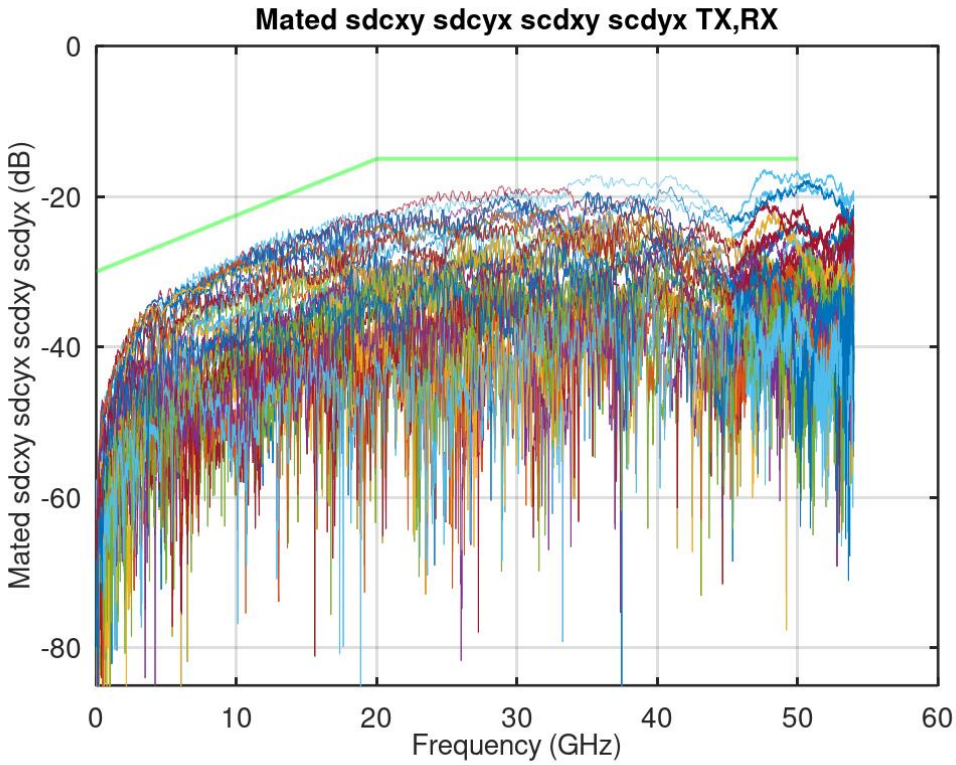

Figure 24. Plot of OSFP MTF Conversion Insertion Loss with 802.3ck and CEI VSR Limit

Wilder 800G OSFP ICN

TX victim is on HCB side and aggressors for TX victim are TX1in-TX[n]in on MCB (excluding thru channel) and TX1in-TX[n]in on MCB which make up the FEXT and NEXT responses, respectively.

RX victim is on MCB side and aggressors for RX victim are RX1in-RX[n]in on HCB (excluding thru channel) and TX1in-TX[n]in on MCB which make up the FEXT and NEXT responses, respectively.

For each victim, all FEXT aggressors are power summed, and all NEXT aggressors are power summed then each are integrated as outlined in the CK and OIF specification. Both single valued integrated noise levels are then added RSS to give the total ICN value.

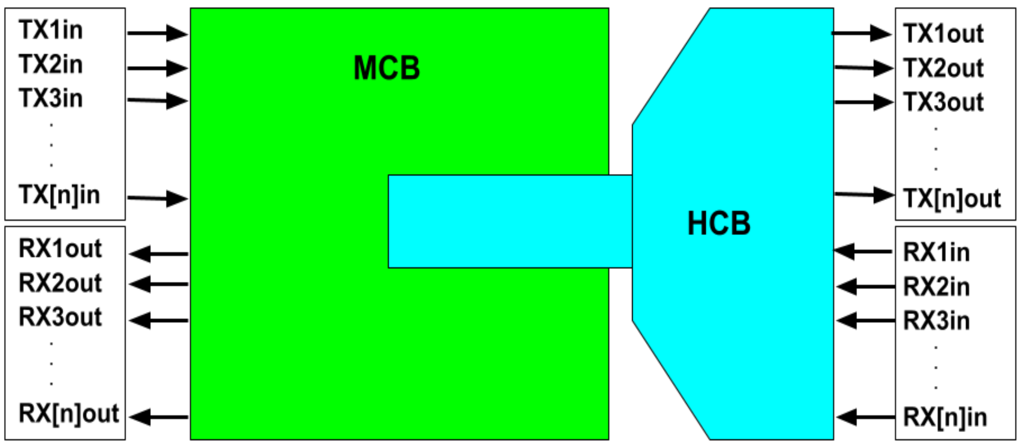

Table 14. TX ICN Data (802.3ck)

ICN (mV) from TX FEXT	Victim (HCB) p=port1, n=port2							
Aggressor (MCB) p=port3, n=port4	TX1 (mV)	TX2 (mV)	TX3 (mV)	TX4 (mV)	TX5 (mV)	TX6 (mV)	TX7 (mV)	TX8 (mV)
TX1	NA	0.82972	3.01501	0.32844	0.67448	0.195842	0.39838	0.18106
TX2	0.88103	NA	0.31057	2.68713	0.22839	0.503482	0.23935	0.28859
TX3	1.60421	0.36254	NA	0.56573	3.62028	0.278108	1.01312	0.25149
TX4	0.30509	2.53043	0.63317	NA	0.25947	2.26442	0.21999	0.52677
TX5	0.6998	0.25924	2.28145	0.26115	NA	0.548691	2.667	0.21328
TX6	0.19662	0.55156	0.22189	1.89138	0.60005	NA	0.21983	2.33503
TX7	0.46412	0.2389	0.59948	0.17631	2.39819	0.21292	NA	0.55394
TX8	0.19264	0.31856	0.17722	0.43344	0.21141	1.957155	0.5927	NA
TX MDFEXT	1.85673	2.78441	3.90291	3.39309	4.45386	3.110248	2.96704	2.5023

ICN (mV) from TX NEXT	Victim (HCB) p=port1, n=port2							
Aggressor (HCB) p=port1, n=port2	TX1 (mV)	TX2 (mV)	TX3 (mV)	TX4 (mV)	TX5 (mV)	TX6 (mV)	TX7 (mV)	TX8 (mV)
RX1	0.24125	0.21794	0.18214	0.18609	0.19477	0.146317	0.19564	0.21243
RX2	0.31982	0.23185	0.19467	0.16333	0.2365	0.131197	0.26933	0.16172
RX3	0.17344	0.15348	0.11213	0.17492	0.10005	0.133619	0.12322	0.17021
RX4	0.24861	0.1752	0.28351	0.12219	0.27306	0.084282	0.22431	0.13367
RX5	0.17641	0.15278	0.11128	0.12552	0.10763	0.16047	0.13008	0.16503
RX6	0.2413	0.1704	0.24495	0.11392	0.26771	0.100393	0.26424	0.13729
RX7	0.19797	0.18375	0.12388	0.18678	0.10706	0.129905	0.1677	0.22754
RX8	0.25646	0.13216	0.20497	0.11811	0.22422	0.097542	0.30547	0.15191
TX MDNEXT	0.66835	0.50903	0.542	0.42942	0.56871	0.35468	0.62007	0.48893

TX ICN total (mV)	1.97336	2.83055	3.94036	3.42016	4.49002	3.130406	3.03114	2.54962

The table above is ICN data calculated as outlined in 802.3CK for the TX victim responses.

Note that each row represents an ICN value as each aggressor is added to the power sum.

The maximum required MDFEXT ICN is 4.2mV, maximum required MDNEXT ICN is 1.5mV, and the maximum required Total ICN is 4.4mV.

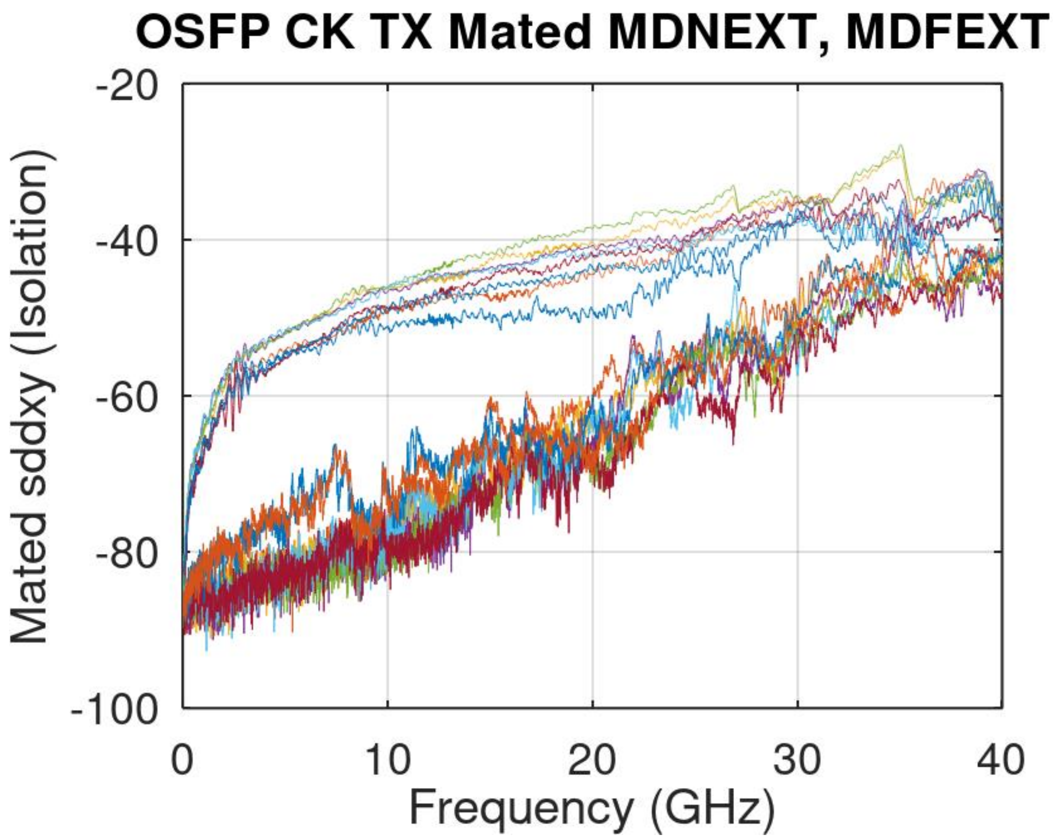

Figure 23. Plot of TX Victim Response to NEXT and FEXT

Table 15. RX ICN Data (802.3ck)

ICN (mV) from RX FEXT	Victim (MCB) p=port3, n=port4							
Aggressor (HCB) p=port1, n=port2	RX1 (mV)	RX2 (mV)	RX3 (mV)	RX4 (mV)	RX5 (mV)	RX6 (mV)	RX7 (mV)	RX8 (mV)
RX1	NA	0.91578	2.23959	0.30516	0.47756	0.311417	0.26043	0.24372
RX2	0.87587	NA	0.34016	1.95629	0.20346	0.735266	0.22311	0.39777
RX3	2.41206	0.2786	NA	0.62172	1.86896	0.282173	0.44686	0.17548
RX4	0.2815	2.66715	0.62366	NA	0.18903	3.028386	0.16657	0.73242
RX5	0.44134	0.18777	2.41778	0.24109	NA	0.576729	1.5469	0.21969
RX6	0.22389	0.64512	0.28225	3.14349	0.57601	NA	0.20026	1.92283
RX7	0.26607	0.16669	0.4143	0.16159	2.07204	0.229284	NA	0.60719
RX8	0.22031	0.4038	0.18509	0.83883	0.23318	2.006419	0.57972	NA
RX MDFEXT	2.65116	2.94487	3.41345	3.8699	2.91165	3.781434	1.76468	2.21339

ICN (mV) from RX NEXT	Victim (HCB) p=port1, n=port2							
Aggressor (HCB) p=port1, n=port2	RX1 (mV)	RX2 (mV)	RX3 (mV)	RX4 (mV)	RX5 (mV)	RX6 (mV)	RX7 (mV)	RX8 (mV)
TX1	0.25285	0.42573	0.15198	0.21358	0.13356	0.228088	0.14348	0.26666
TX2	0.16603	0.25471	0.14483	0.10769	0.12772	0.134158	0.1443	0.14593
TX3	0.13449	0.22048	0.1231	0.2151	0.09001	0.147819	0.12726	0.18581
TX4	0.13677	0.13353	0.17189	0.085	0.09427	0.093051	0.12513	0.10594
TX5	0.13795	0.22833	0.09929	0.14985	0.07523	0.203923	0.09927	0.16883
TX6	0.1258	0.12883	0.08878	0.0895	0.10298	0.078618	0.11216	0.1061
TX7	0.15349	0.2575	0.12083	0.18629	0.08555	0.168531	0.12069	0.29187
TX8	0.14427	0.14037	0.12818	0.11548	0.12742	0.086137	0.23137	0.12701
RX MDNEXT	0.45555	0.6836	0.37087	0.43499	0.30159	0.429092	0.40471	0.52842

RX ICN total (mV)	2.69001	3.02317	3.43354	3.89427	2.92723	3.805701	1.8105	2.27559

The table above is ICN data calculated as outlined in 802.3CK for the RX victim responses.

Note that each row represents an ICN value as each aggressor is added to the power sum.

The maximum required MDFEXT ICN is 4.2mV, maximum required MDNEXT ICN is 1.5mV, and the maximum required Total ICN is 4.4mV.

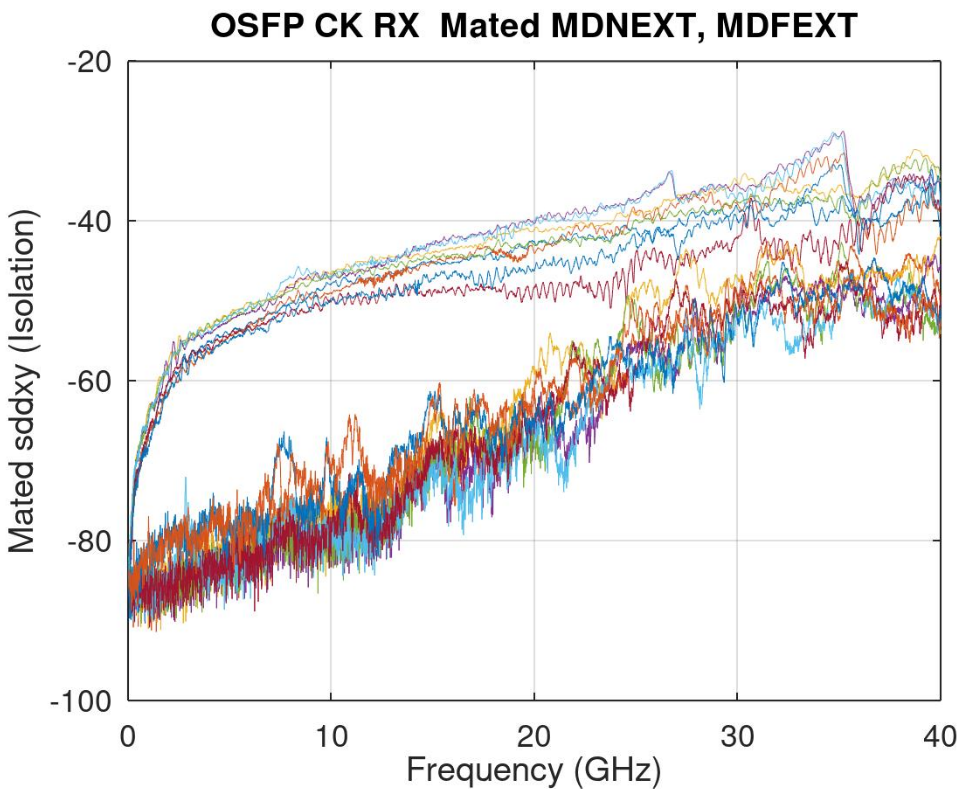

Figure 24. Plot of RX Victim Response to NEXT and FEXT

Table 16. TX ICN Data (CEI VSR)

ICN (mV) from TX FEXT	Victim (HCB) p=port1, n=port2							
Aggressor (MCB) p=port3, n=port4	TX1 (mV)	TX2 (mV)	TX3 (mV)	TX4 (mV)	TX5 (mV)	TX6 (mV)	TX7 (mV)	TX8 (mV)
TX1	NA	0.59646	2.1625	0.24311	0.4941	0.148974	0.29448	0.13516
TX2	0.63106	NA	0.22776	1.92282	0.171	0.36691	0.17733	0.21315
TX3	1.168	0.26469	NA	0.41108	2.59265	0.202733	0.73104	0.18816
TX4	0.22803	1.82912	0.45802	NA	0.19452	1.621455	0.16797	0.3791
TX5	0.50852	0.19164	1.64383	0.19372	NA	0.396395	1.91109	0.16074
TX6	0.15103	0.40161	0.17045	1.3681	0.43313	NA	0.16431	1.68958
TX7	0.34135	0.18036	0.4347	0.13962	1.72126	0.157629	NA	0.39898
TX8	0.14605	0.23511	0.14172	0.31526	0.15471	1.417906	0.42773	NA
TX MDFEXT	1.49456	2.01429	2.80683	2.43996	3.19489	2.240417	2.13144	1.81178

ICN (mV) from TX NEXT	Victim (HCB) p=port1, n=port2							
Aggressor (HCB) p=port1, n=port2	TX1 (mV)	TX2 (mV)	TX3 (mV)	TX4 (mV)	TX5 (mV)	TX6 (mV)	TX7 (mV)	TX8 (mV)
RX1	0.18004	0.16631	0.13607	0.1442	0.14852	0.111908	0.15209	0.16072
RX2	0.23655	0.18006	0.14641	0.12514	0.1749	0.100655	0.20197	0.12283
RX3	0.12894	0.11965	0.08483	0.14061	0.07876	0.110887	0.09462	0.13304
RX4	0.19198	0.13486	0.21367	0.09257	0.21245	0.065775	0.17565	0.10694
RX5	0.13665	0.12041	0.08909	0.09762	0.08709	0.13068	0.10083	0.12726
RX6	0.18136	0.13059	0.18802	0.09232	0.20805	0.082215	0.22617	0.11363
RX7	0.14815	0.14542	0.10155	0.14561	0.09425	0.101303	0.13264	0.18614
RX8	0.19841	0.11134	0.15816	0.09923	0.1818	0.079237	0.24107	0.11996
TX MDNEXT	0.5047	0.39709	0.41403	0.33748	0.44361	0.282231	0.49067	0.38496

TX ICN total (mV)	1.57748	2.05305	2.8372	2.46319	3.22554	2.258123	2.18718	1.85222

The table above is ICN data calculated as outlined in CEI VSR for the TX victim responses.

Note that each row represents an ICN value as each aggressor is added to the power sum.

The maximum required MDFEXT ICN is 3.6mV, maximum required MDNEXT ICN is 1.35mV, and the maximum required Total ICN is 3.85mV.

Table 17. RX ICN Data (CEI VSR)

ICN (mV) from RX FEXT	Victim (MCB) p=port3, n=port4							
Aggressor (HCB) p=port1, n=port2	RX1 (mV)	RX2 (mV)	RX3 (mV)	RX4 (mV)	RX5 (mV)	RX6 (mV)	RX7 (mV)	RX8 (mV)
RX1	NA	0.65496	1.6208	0.22438	0.34865	0.225128	0.19097	0.18399
RX2	0.62649	NA	0.24762	1.41513	0.14872	0.525315	0.16289	0.29386
RX3	1.72923	0.20534	NA	0.45078	1.36258	0.206891	0.32454	0.14241
RX4	0.20402	1.91253	0.45278	NA	0.14175	2.171832	0.12425	0.53536
RX5	0.32387	0.14117	1.72888	0.17654	NA	0.415587	1.12937	0.17476
RX6	0.16682	0.47619	0.20891	2.25337	0.41532	NA	0.14725	1.38601
RX7	0.19653	0.12515	0.30128	0.12172	1.49166	0.167347	NA	0.43745
RX8	0.16834	0.29738	0.14538	0.6102	0.17154	1.453568	0.41626	NA
RX MDFEXT	1.79765	2.11653	2.45722	2.78427	2.10887	2.72027	1.28616	1.60313

ICN (mV) from RX NEXT	Victim (HCB) p=port1, n=port2							
Aggressor (HCB) p=port1, n=port2	RX1 (mV)	RX2 (mV)	RX3 (mV)	RX4 (mV)	RX5 (mV)	RX6 (mV)	RX7 (mV)	RX8 (mV)
TX1	0.18645	0.31394	0.11938	0.15588	0.10152	0.165669	0.10718	0.19477
TX2	0.12364	0.18449	0.11147	0.07875	0.09431	0.097568	0.10708	0.10696
TX3	0.09909	0.16055	0.0918	0.16017	0.06754	0.108164	0.09244	0.13887
TX4	0.10801	0.10114	0.1592	0.06531	0.0738	0.069545	0.09552	0.07955
TX5	0.10154	0.16447	0.0747	0.10947	0.05857	0.151908	0.07259	0.12728
TX6	0.09691	0.0973	0.07696	0.06846	0.08384	0.059017	0.08499	0.07888
TX7	0.11434	0.18657	0.09074	0.13817	0.06488	0.13245	0.08959	0.2161
TX8	0.11067	0.1053	0.09781	0.08501	0.0954	0.063708	0.17118	0.09406
RX MDNEXT	0.3414	0.50101	0.29959	0.32157	0.23017	0.318845	0.30074	0.3911

RX ICN total (mV)	1.82978	2.17502	2.47541	2.80278	2.12139	2.738893	1.32085	1.65015

The table above is ICN data calculated as outlined in CEI VSR for the RX victim responses.

Note that each row represents an ICN value as each aggressor is added to the power sum.

The maximum required MDFEXT ICN is 3.6mV, maximum required MDNEXT ICN is 1.35mV, and the maximum required Total ICN is 3.85mV.

Compliance with Environmental Legislation

Wilder Technologies, LLC, is dedicated to complying with the requirements of all applicable environmental legislation and regulations, including appropriate recycling and/or disposal of our products.

WEEE Compliance Statement

The European Union adopted Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), with requirements that went into effect August 13, 2005. WEEE is intended to reduce the disposal of waste from electrical and electronic equipment by establishing guidelines for prevention, reuse, recycling and recovery.

Wilder Technologies has practices and processes in place to conform to the requirements in this important Directive.

In support of our environmental goals, effective January 1st, 2009 Wilder Technologies, LLC has partnered with EG Metals Inc. – Metal and Electronics Recycling of Hillsboro, Oregon, www.egmetalrecycling.com, to recycle our obsolete and electronic waste in accordance with the European Union Directive 2002/96/EC on waste electrical and electronic equipment ("WEEE Directive").

As a service to our customers, Wilder Technologies is also available for managing the proper recycling and/or disposal of all Wilder Technologies products that have reached the end of their useful life. For further information and return instructions, contact support@wilder-tech.com.

Compliance To RoHS 2 Substance Restrictions

Wilder Technologies, LLC certifies that the parts described in this document are compliant to the substance restrictions of Directive 2011/65/EU of the European Parliament, and of the Council of 8 June, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2 Directive), prohibiting the use in homogeneous materials in excess of the listed maximum concentration value, except in cases where use is allowed by applicable exemptions listed in Annex III and Annex IV of the Directive.

Compliance with RoHS 2 has been verified through internal controls at design and production sites, including establishment of processes for specifying and controlling materials and segregation of non-compliant parts, receipt of supplier declarations of compliance and/or analytical test.

Glossary of Terms

TERMINOLOGY	DEFINITION
Aggressor	A signal imposed on a system (i.e., cable assembly) to measure response on other signal carriers.
Decibel (dB)	Ten times the common logarithm (i.e. log10) of the ratio of relative powers.
Far-end crosstalk or FEXT	Crosstalk that is propagated in a disturbed channel in the same direction as the propagation of a signal in the aggressor channel. The terminals of the aggressor channel and the victim channel are usually close to each other.
Informative	The designation of a test that is not required for compliance.
Insertion loss	The ratio, expressed in dB, of incident power to delivered power.
Near-end crosstalk or NEXT	Crosstalk that is propagated in a disturbed channel in the opposite direction as the propagation of a signal in the aggressor channel. The terminals of the aggressor channel and the victim channel are usually close to each other.
Normative	The designation of a test that is required for compliance.
Return Loss	The ratio, expressed in dB, of incident power to reflected power.
OSFP	50 Gbps 8X Pluggable Transceiver (High-Density Quad Small Form Factor Pluggable)
OSFP Host	The OSFP Host is the fixed end of the connection supporting IEEE 802.3.
OSFP Module	The OSFP Module is the moveable end of the connection supporting IEEE 802.3.
OSFP TPA	OSFP Test Point Access. A specialized assembly that interfaces to a OSFP host or module and enables access of signals for measurement or stimulation.
Victim	A signal carrier on a system that has a response imposed on it by other signals in the system.

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