
802.3df

considerations for test fixture specifications

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Purpose

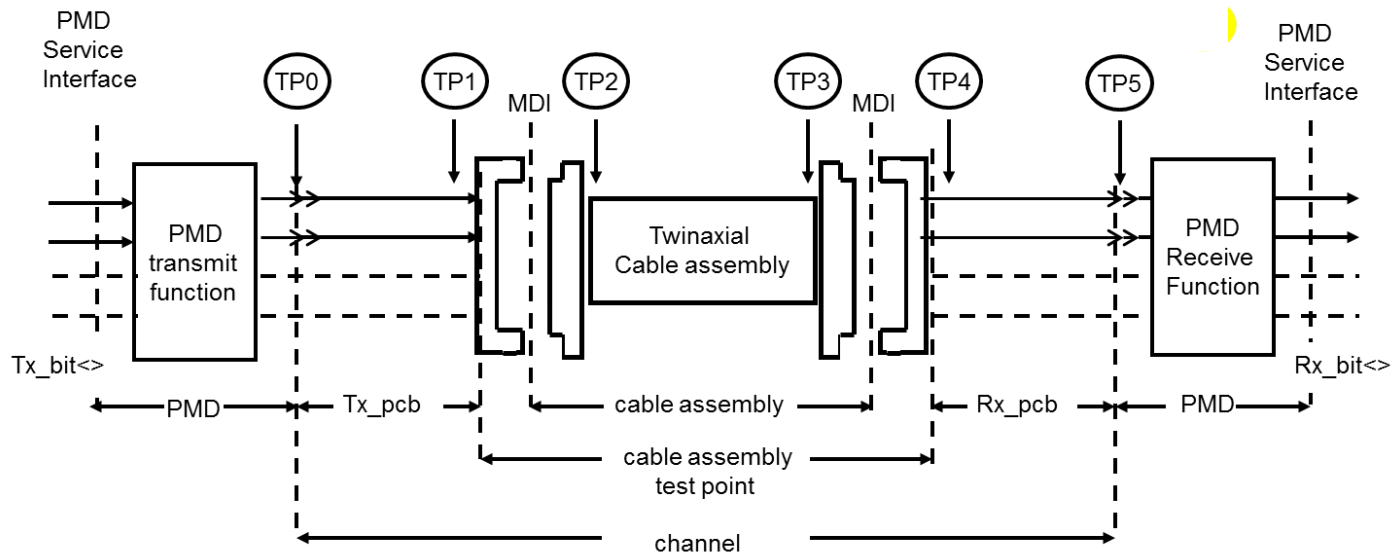
- **Considerations for 802.3df test fixture specifications**
 - **Basis - Annex 162A/B - IEEE Draft P802.3ck/D3.1**
- **Mated test fixture insertion loss**
 - **HFSS model**
 - **Suggested IL limits**

Supporters

- **Nathan Tracy, TE Connectivity**
- **Alex Haser, Molex**
- **Sam Kocsis, Amphenol**

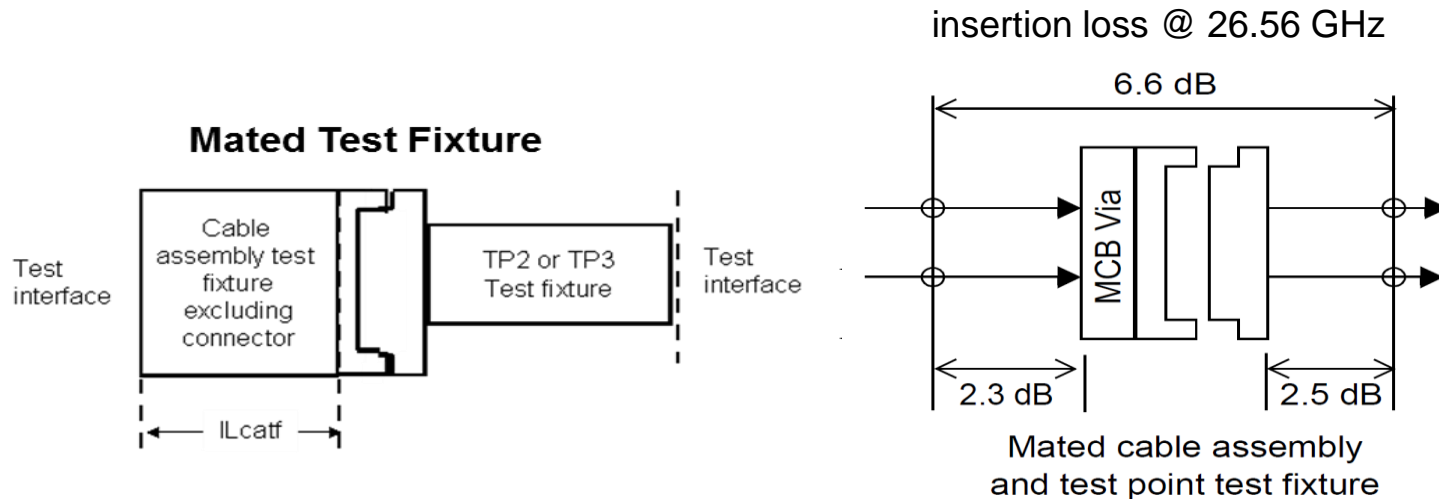
Test point and definitions

Test Points	Description
TP0 to TP5	The channel including the transmitter and receiver differential controlled impedance printed circuit board insertion loss and the cable assembly insertion loss.
TP1 to TP4	Test points for all cable assembly measurements. The cable assembly test fixture, or its equivalent, is required for measuring the cable assembly specifications at TP1 and TP4.
TP0 to TP2 TP3 to TP5	A mated connector pair is included in both the transmitter and receiver specifications. The recommended maximum insertion loss from TP0 to TP2 or from TP3 to TP5 including the test fixture is specified.
TP2	Unless specified otherwise, all transmitter measurements are made at TP2 utilizing the specified test fixture.
TP3	Unless specified otherwise, all receiver measurements and tests are made at TP3 utilizing the specified test fixture.



802.3ck-Test fixture specifications

- The test fixtures used for the transmitter, the receiver, and cable assembly measurements are specified in a mated state to enable connections to measurement equipment
- The TP2/TP3 test fixture (also known in the industry as Host Compliance Board) is required for measuring the transmitter specifications at TP2 and the receiver return loss at TP3.
- The cable assembly test fixture (also known in the industry as Module Compliance Board) is required for measuring the cable assembly specifications at TP1 and TP4.



NOTE—2.3 dB MCB PCB IL_{dd} includes the RF connector (up to the RF connector reference plane). The MCB via allowance is 0.2 dB.

Figure source: IEEE Draft P802.3ck/D3.1

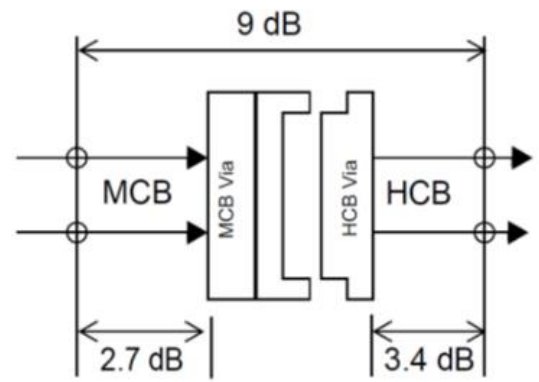
802.3df - Mated test fixture specifications

- Parameters specified for mated test fixtures in P802.3ck to be considered in P802.3df are listed below; frequency range is TBD.

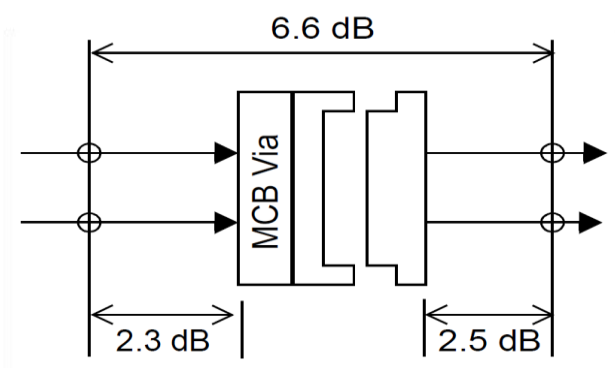
Parameter description	f(GHz)	Unit
Reference insertion loss	$0.01 \leq f \leq (\text{TBD})$	dB
Maximum insertion loss	$0.01 \leq f \leq (\text{TBD})$	dB
Minimum insertion loss	$0.01 \leq f \leq (\text{TBD})$	dB
Effective return loss (ERL)	$0.01 \leq f \leq (\text{TBD})$	dB
Common-mode to differential-mode insertion loss	$0.01 \leq f \leq (\text{TBD})$	dB
Common-mode to common-mode return loss	$0.01 \leq f \leq (\text{TBD})$	dB
Common-mode to differential-mode return loss	$0.01 \leq f \leq (\text{TBD})$	dB
Integrated crosstalk noise	(TBD)	mV

Parameters specified for mated test fixtures in P802.3ck to be considered in P802.3df (TBD).

Mated test fixture insertion loss - HFSS model



Mated cable assembly and test point test fixture
insertion loss @ 53.125 GHz



Mated cable assembly and test point test fixture
insertion loss @ 26.56 GHz

Figure source:
IEEE Draft
P802.3ck/D3.1

Component	Insertion Loss (dB)
Module Compliance Board (MCB) PCB - 2" of ~1.35 dB/in	2.7
Host Compliance Board (HCB) - 1inch*1.35dB/in + 6inch coax * .28dB/inch + 0.5dB via and co-ax transitions.	3.4
Mated Test Fixture (MTF)	9
MTF connector + 2 via's	2.9

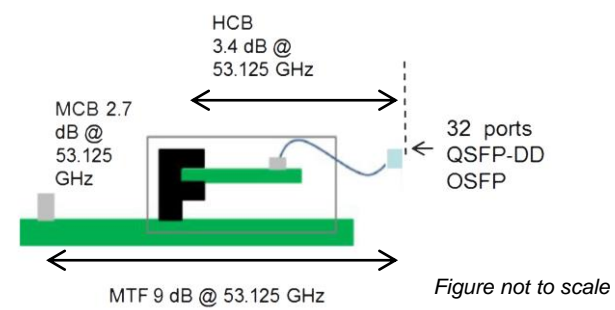


Figure not to scale

Mated test fixture and host insertion loss allocations @ 53.125 GHz

Mated test fixture HFSS model

- The mated test fixture model results with 802.3df suggested limits.

$$MTF_{refIL}(f) = 0.5266\sqrt{f} + 0.0974f \quad 0.01 \leq f \leq 67 \text{ (TBD)}$$

Where:

$MTF_{refIL}(f)$ is the mated test fixture reference insertion loss in dB at frequency f

f is the frequency in GHz

$$MTF_{minIL}(f) \geq 0.9 \left(0.1858\sqrt{f} + 0.0897f \right) \quad 0.01 \leq f \leq 67 \text{ (TBD)}$$

Where:

$MTF_{minIL}(f)$ is the mated test fixture minimum insertion loss in dB at frequency f

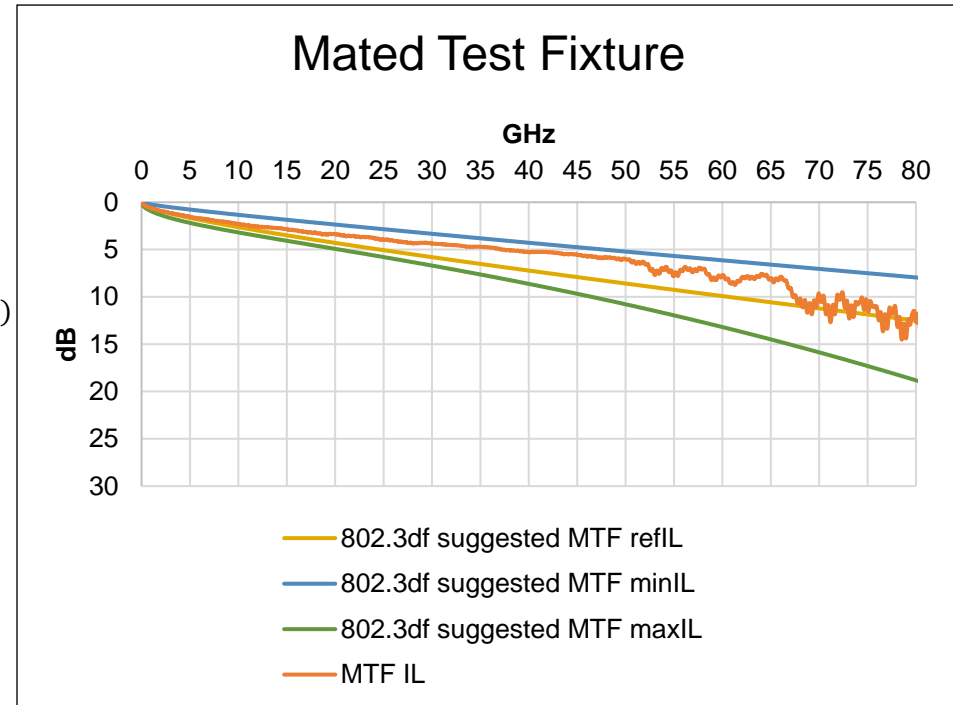
f is the frequency in GHz

$$MTF_{maxIL}(f) \leq 0.96\sqrt{f} + 0.0016f^2 \quad 0.01 \leq f \leq 67 \text{ (TBD)}$$

Where:

$MTF_{maxIL}(f)$ is the maximum insertion loss in dB at frequency f

f is the frequency in GHz

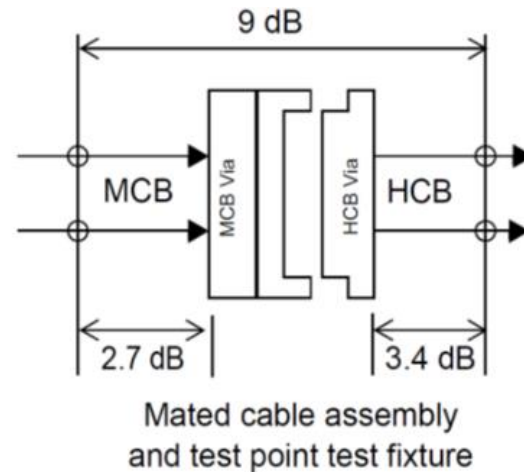


802.3df - XXXA.5 Channel insertion loss

Annex XXXA
(informative)

Transmitter, receiver and channel parameters associated with test points TP0 and TP5 for 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4, and 1.6TBASE-CR8.

XXXA.5 Channel insertion loss



NOTE—2.7 dB MCB PCB IL_{dd} includes the RF connector (up to the RF connector reference plane).

Figure XXXA-3—Cable assembly, host, and test fixture insertion loss at 53.125 GHz

Summary

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