IEEE P802.3bp (1000BASE-T1) PHY Task Force
Channel Definitions Ad Hoc Report

Kanata, CA
Sept 2014

Ad hoc – co-chairs
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Mehmet Tazebay –
Broadcom

Channel Definitions Ad Hoc

- Ad Hoc charted to develop channel definitions
- Initial meeting IEEE Interim May 2012
- Communications via RTPGE reflector
- Follow-on meetings and conference calls to develop
- consensus on baseline Link Segment specifications
  - August 7, August 28
- Approved baseline text in IEEE P802.3bp™/D0.5, 4 Sept 2014

Action items

- Test fixture specifications
  - Straw proposal: 802.3bp test points-3-6-14.pdf
- Link segment balance test procedures (Annex)
  - Revisions to IEEE P802.3bp™/D0.5 – from ad hoc reviews
- Alien crosstalk topologies and test procedures (Annex)
  - Revisions to IEEE P802.3bp™/D0.5 – from ad hoc reviews

Meeting Plan

- Next webex meeting Nov 2nd - 8 AM PST
  - Meet every two weeks

Ad hoc review material

Annex: 97A 97B

Revisions to IEEE P802.3bp™/D0.5 – from ad hoc reviews

Annex 97B Alien Crosstalk Test Procedure

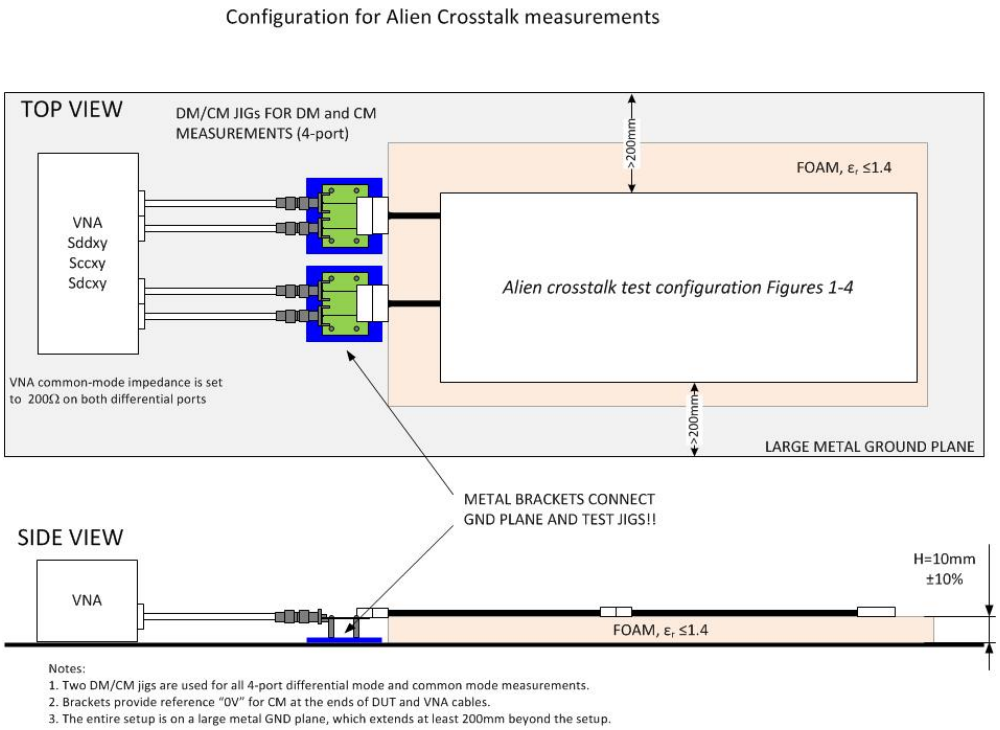
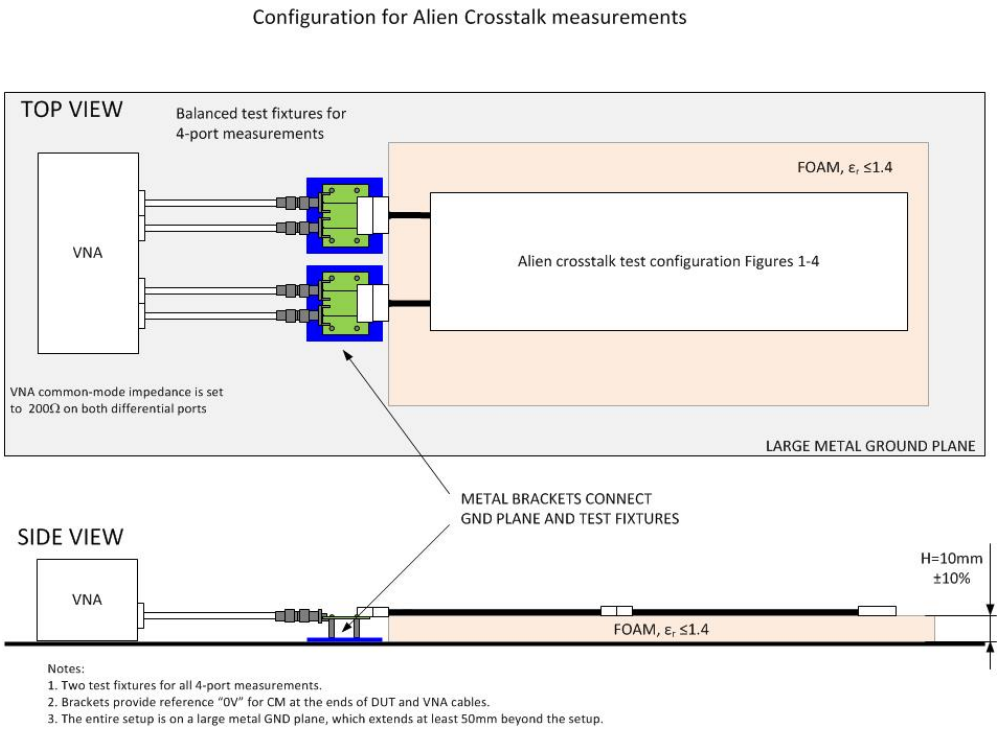


Figure 97B–1



Revision Figure 97B–1

Annex 97A Common mode conversion test methodology

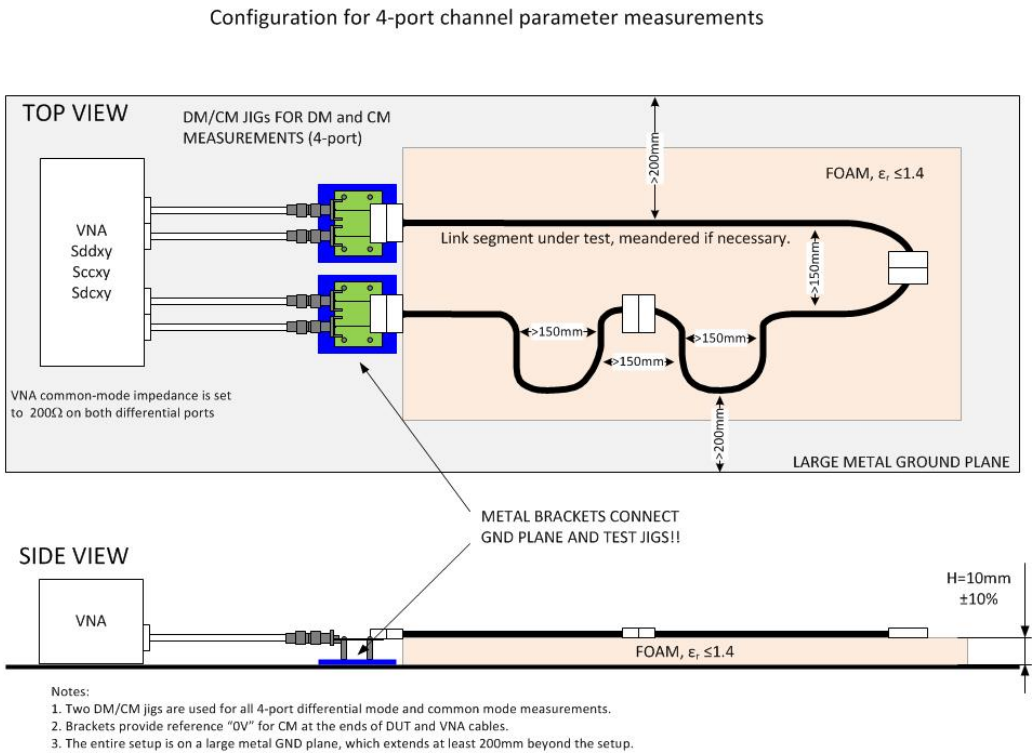
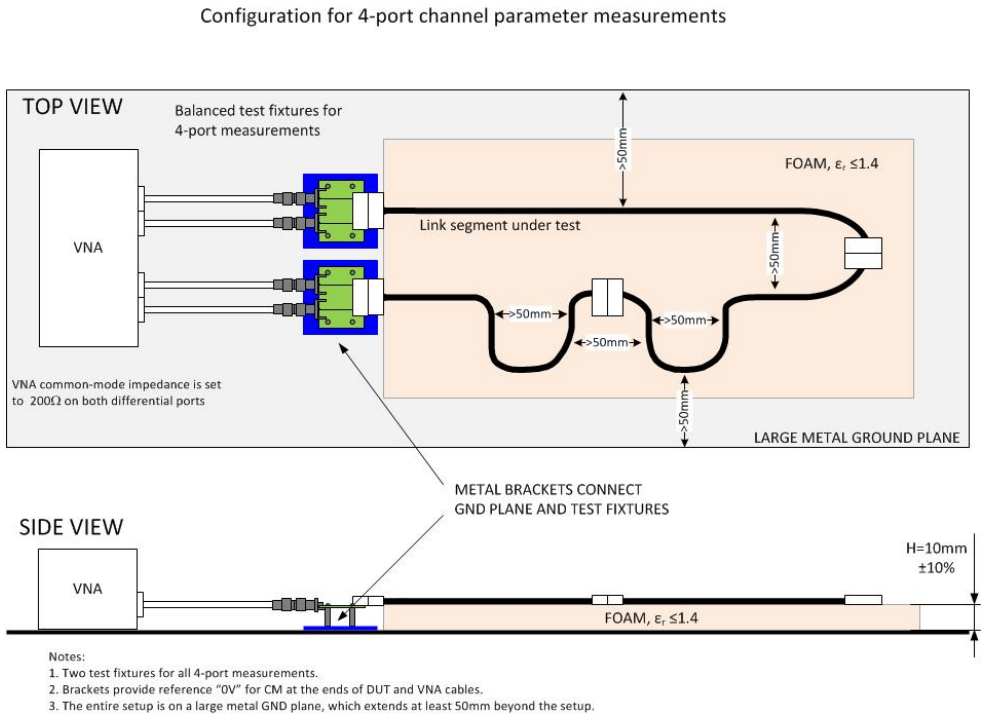


Figure 97A–1—4-port test setup



Revision Figure 97A–1—4-port test setup

Annex 97A Common mode conversion test methodology

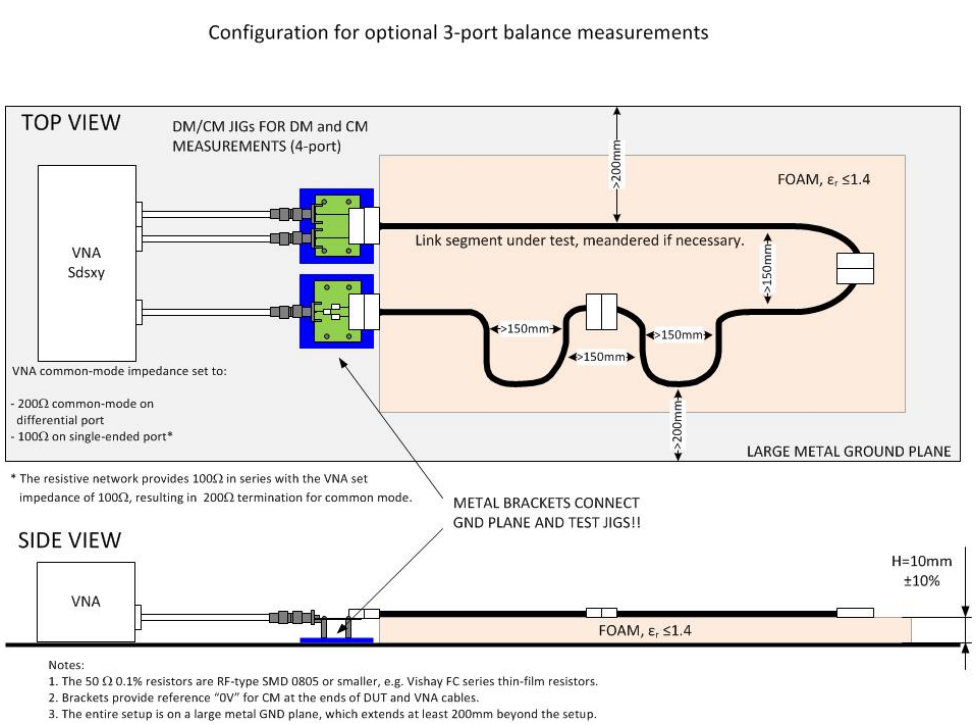
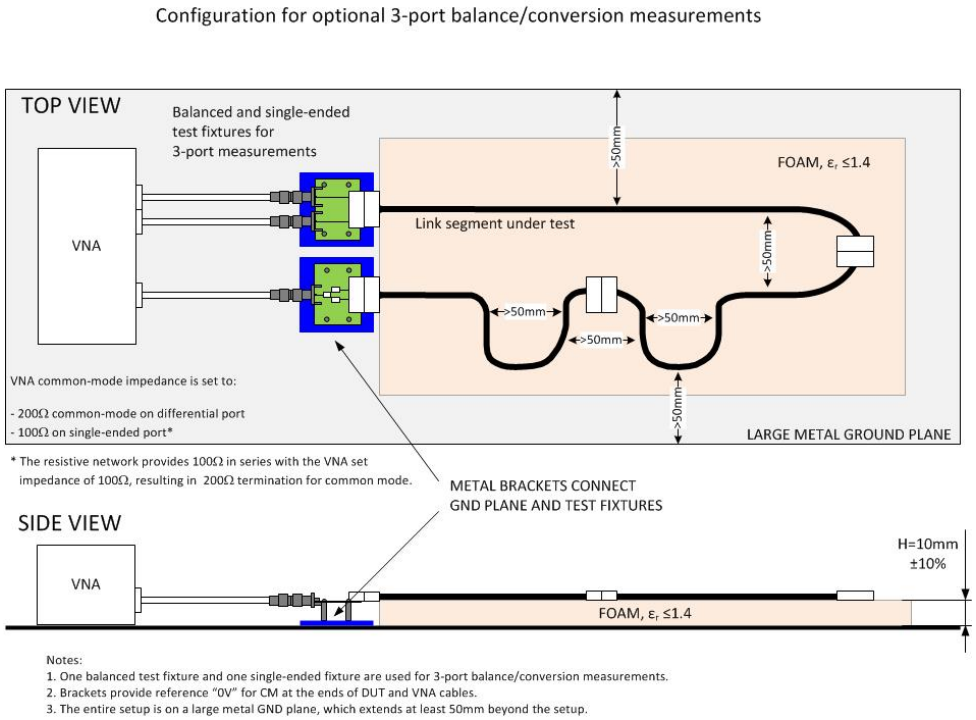


Figure 97A–2—3-port common mode conversion loss measurement



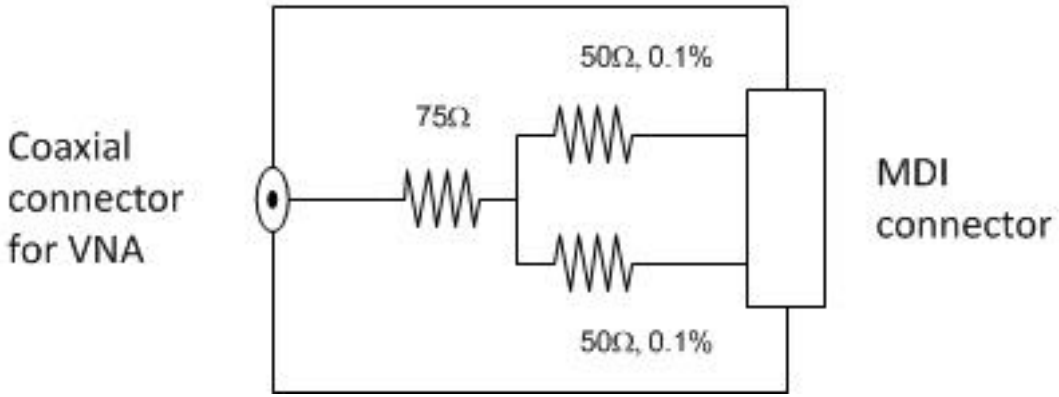
Revison: Figure 97A–2—3-port common mode conversion loss measurement

Annex 97A Common mode conversion test methodology

For measurement of the channel conversion at 10mm above the GND plane, the channel/cable under test must be terminated in common-mode impedance of 200 ohm. The common-mode termination impedance can be selected at the network analyzer or provided as a resistive termination. For example, in a four-port setup the analyzer settings can be used on both sides of the channel under test to configure both analyzer differential ports with 100 ohm differential and 200 ohm common-mode impedance. In a three-port setup, the analyzer setting can be used to provide the 200 ohm common-mode impedance on the differential port, same as in the four-port setup, and the single-ended port impedance can be adjusted to 100 ohm to result in 200 ohm when combined with the resistive power dividing network.

Annex 97A Common mode conversion test methodology

Single-ended test fixture for 3-port balance/conversion measurement



Add Figure and Equation to illustrate 66dB limit

802.3bp
Cabling parameters
to s-parameters naming

Ottawa, Canada
September 2014

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Purpose

- **Cabling parameters to s-parameters naming**

Signal impairments naming an s-parameters

•Signaling impairments naming and s-parameter designations derived from the four port network illustrated in Figure 1.

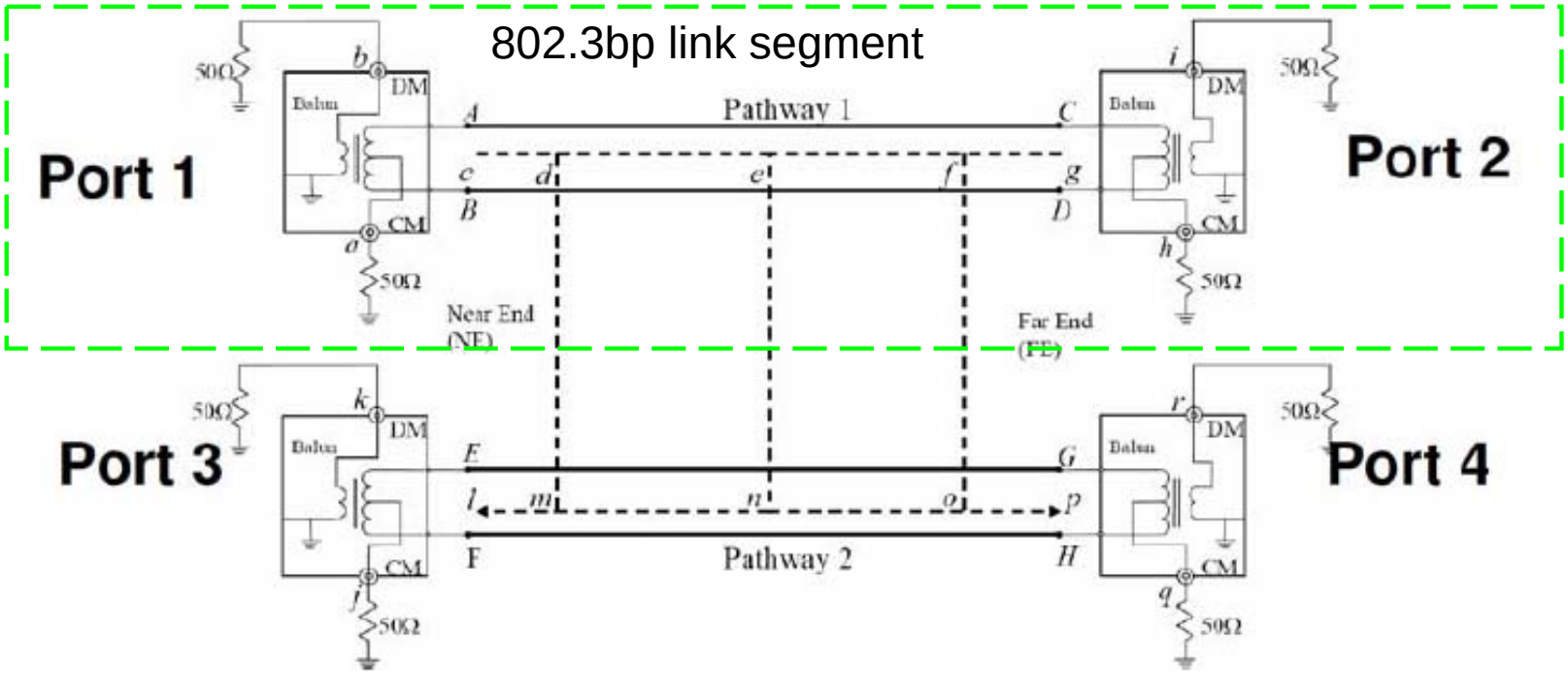


Figure 1 Four port network

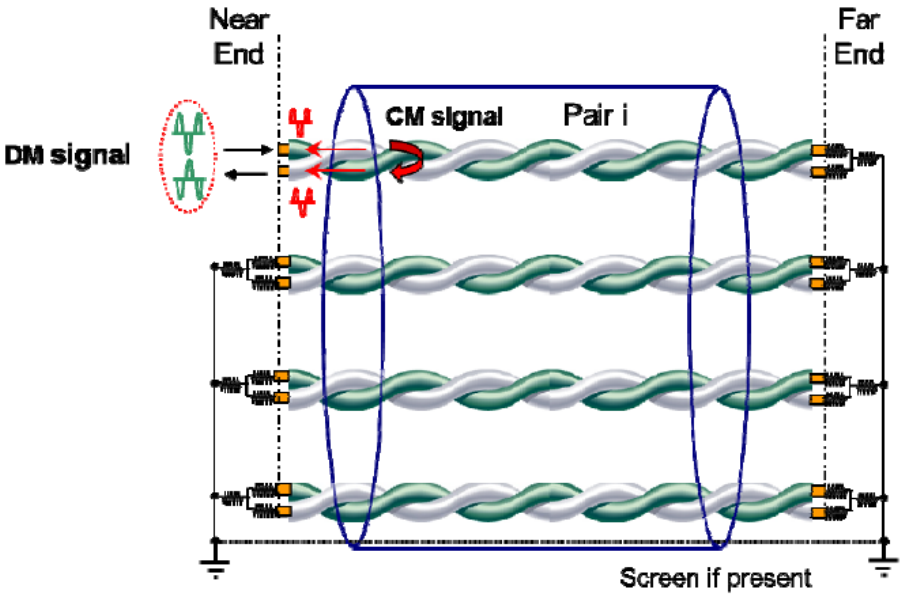
Port mapping–signal impairments to s-parameters

802.3bp link segment

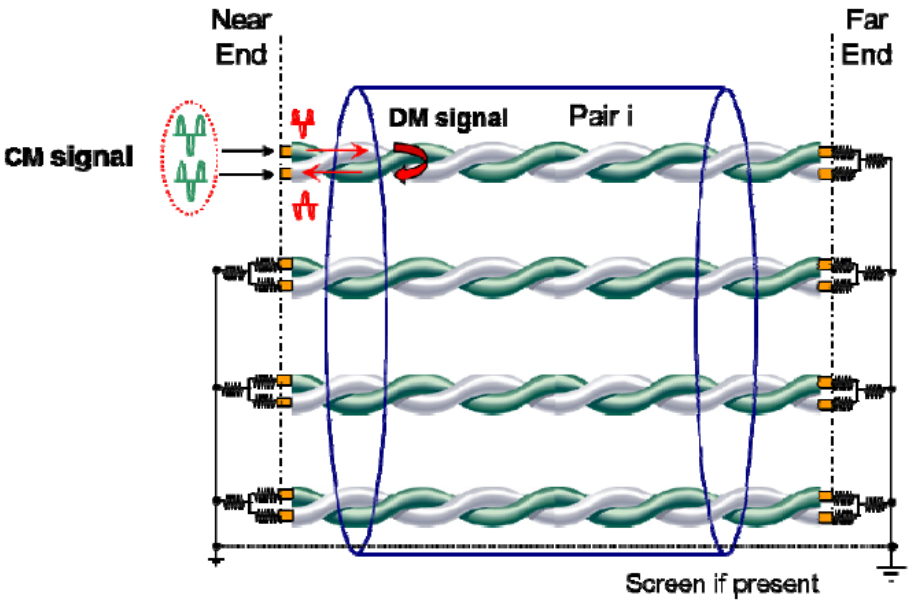
		Port 1		Port 2		Port 3		Port 4	
Port 1	cc	Scc11	RLcc11	Scc12	ILcc12	Scc13	NEXTcc13	Scc14	FEXTcc14
	cd	Scd11	TCLcd11	Scd12	TCTLcd12	Scd13	NEXTcd13	Scd14	FEXTcd14
	dc	Sdc11	LCLdc11	Sdc12	LCTLdc12	Sdc13	NEXTdc13	Sdc14	FEXTdc14
	dd	Sdd11	RLdd11	Sdd12	ILdd12	Sdd13	NEXTdd13	Sdd14	FEXTdd14
Port 2	cc	Scc21	ILcc21	Scc22	RLcc22	Scc23	FEXTcc23	Scc24	NEXTcc24
	cd	Scd21	TCTLcd21	Scd22	TCLcd22	Scd23	FEXTcd23	Scd24	NEXTcd24
	dc	Sdc21	LCTLdc21	Sdc22	LCLdc22	Sdc23	FEXTdc23	Sdc24	NEXTdc24
	dd	Sdd21	ILdd21	Sdd22	RLdd22	Sdd23	FEXTdd23	Sdd24	NEXTdd24
Port 3	cc	Scc31	NEXTcc31	Scc32	NEXTcc32	Scc33	RLcc33	Scc34	ILcc34
	cd	Scd31	NEXTcd31	Scd32	NEXTcd32	Scd33	TCLcd33	Scd34	TCTLcd34
	dc	Sdc31	NEXTdc31	Sdc32	NEXTdc32	Sdc33	LCLdc33	Sdc34	LCTLdc34
	dd	Sdd31	NEXTdd31	Sdd32	NEXTdd32	Sdd33	RLdd33	Sdd34	ILdd34
Port 4	cc	Scc41	FEXTcc41	Scc42	FEXTcc42	Scc43	ILcc43	Scc44	RLcc44
	cd	Scd41	FEXTcd41	Scd42	FEXTcd42	Scd43	TCTLcd43	Scd44	TCLcd44
	dc	Sdc41	FEXTdc41	Sdc42	FEXTdc42	Sdc43	LCTLdc43	Sdc44	LCLdc44
	dd	Sdd41	FEXTdd41	Sdd42	FEXTdd42	Sdd43	ILdd43	Sdd44	RLdd44

Table 1 Port mapping – s-parameter naming to signal impairment naming

Port mapping–signal impairments to s-parameters

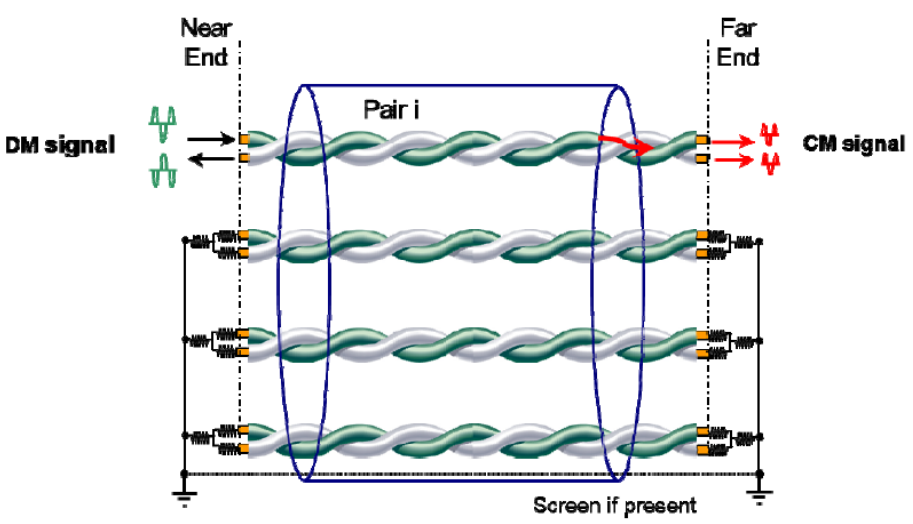


SCD11/SCD22 - Transverse conversion loss (TCL)

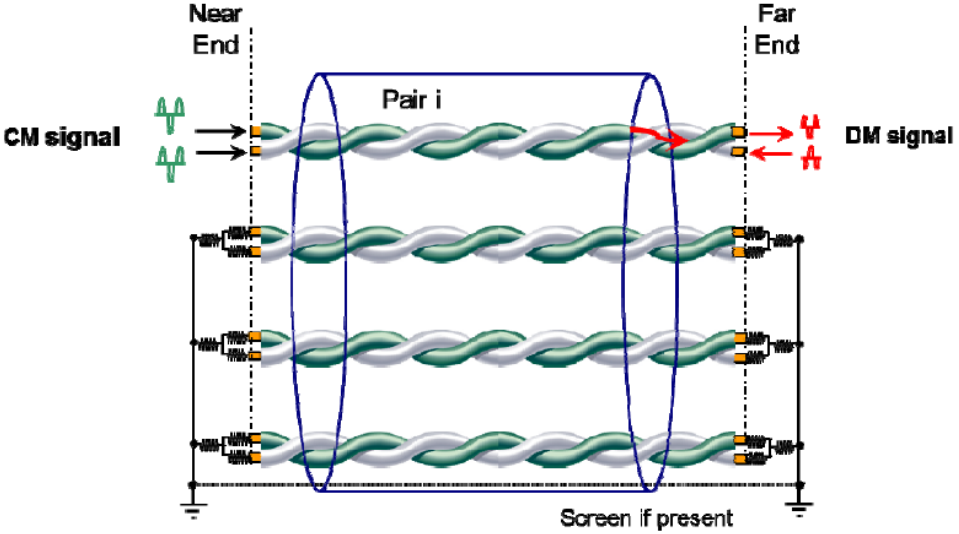


SDC11/SDC22 – Longitudinal conversion loss (LCL)

Port mapping–signal impairments to s-parameters



SCD12/SCD21 –
Transverse conversion transmission loss (TCTL)



SDC12/SDC21 –
Longitudinal conversion transmission loss (LCTL)

Link segment transmission parameters (UTP)

97.4.4.1.4 Differential to common mode conversion

The balance of the type A link segment is characterized by the differential to common mode conversion Each type A link segment shall meet the values determined using Equation (97–3) at all frequencies from 1 MHz to 600 MHz.

$$\text{ConversionLoss}(f) \geq \begin{cases} -50 & 10 \leq f \leq 80 \\ 5 \times \ln f - 72 & 80 < f \leq 600 \end{cases} \text{dB} \qquad (97\text{–}3)$$

where

f is the frequency in MHz; $1 \leq f \leq 600$

The function ConversionLoss(f) represents the conversion insertion loss at frequency f.

Editorial Note (to be removed prior to publication): Equation (97–3) needs to be converted into conversion loss.

- SCD12/SCD21 – Transverse conversion transmission loss (TCTL)
- SDC12/SDC21 – Longitudinal conversion transmission loss (LCTL)