

SFP+ Passive Cable Assembly Performance to SFF-8431 Revision 3.3 April 2009

**22-May-2009
SI-2009-04-002**

- 24AWG 7m passes all the SFF8431 Rev. 3.3 requirements
- 30AWG 3m passes all the SFF8431 Rev. 3.3 requirements

- Passive direct attach cables are tested with a pair of **module Compliance Boards** at compliance point B' and C'. SFP+ passive cable assemblies need to meet specifications in SFF8431 Rev. 3.3 Table 37 .

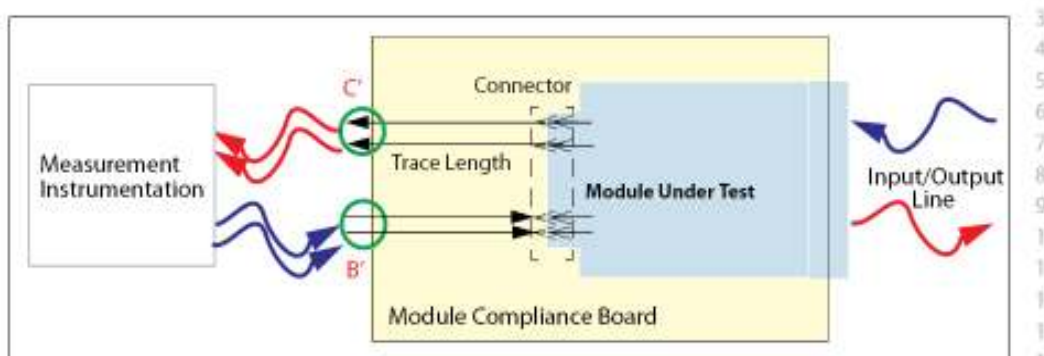
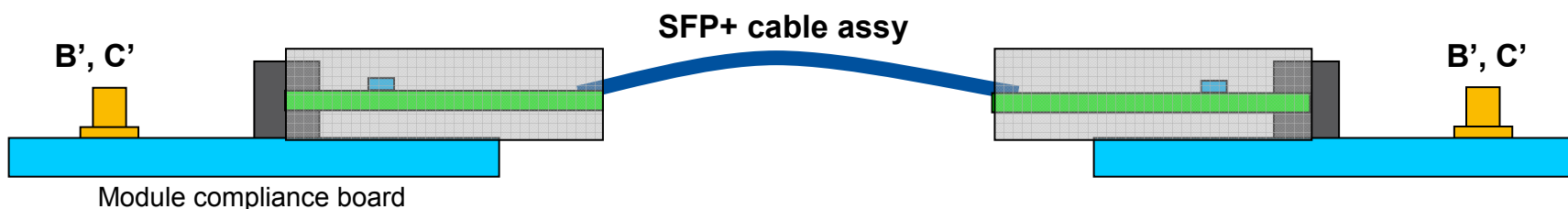


Figure 14 Module Compliance Board

- Difference Waveform Distortion Penalty (dWDPC)
 - Max: 6.75 dBe
- VMA Loss (L)
 - Max: 4.5 dBe
- VMA Loss to Crosstalk Ratio (VCR)
 - Min: 32.5 dB
- Differential Output/Input Reflection Coefficient (SDDxx)
 - See Figure 1
- Common Mode Output/Input Reflection Coefficient (SCCxx)
 - See Figure 2

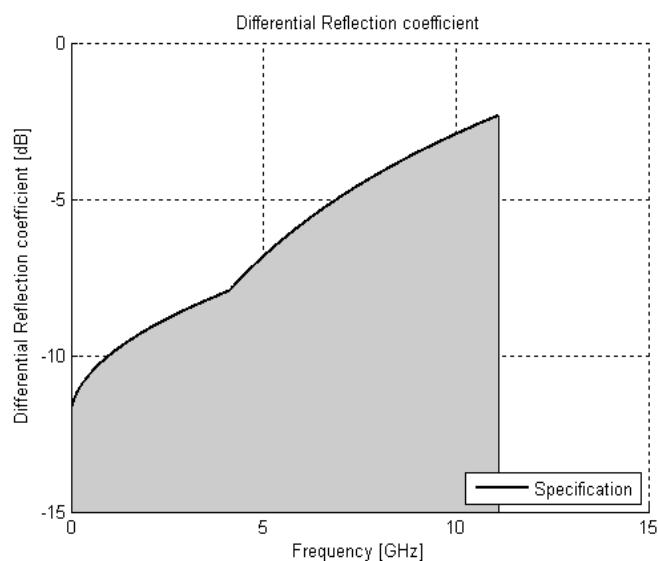


Figure 1

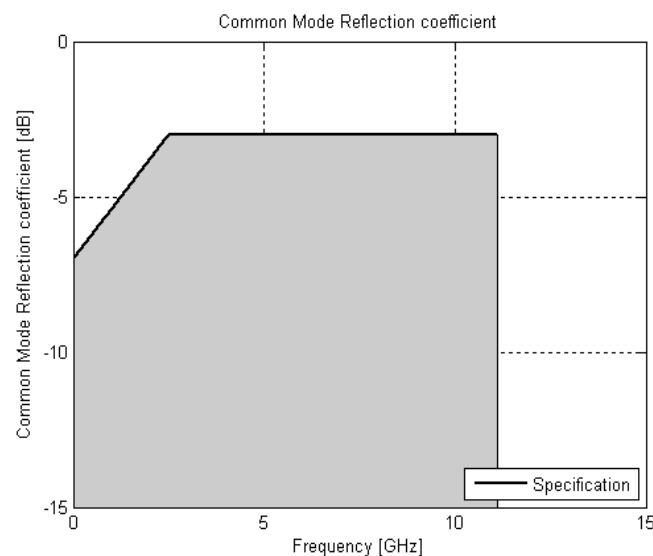
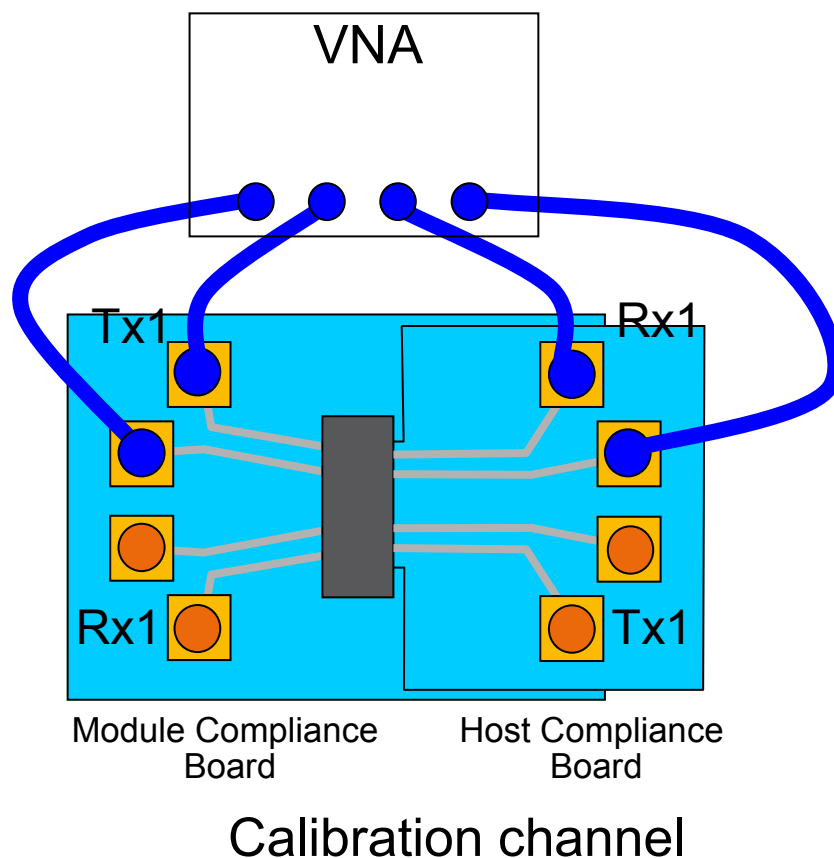


Figure 2

Calibration channel measurement method



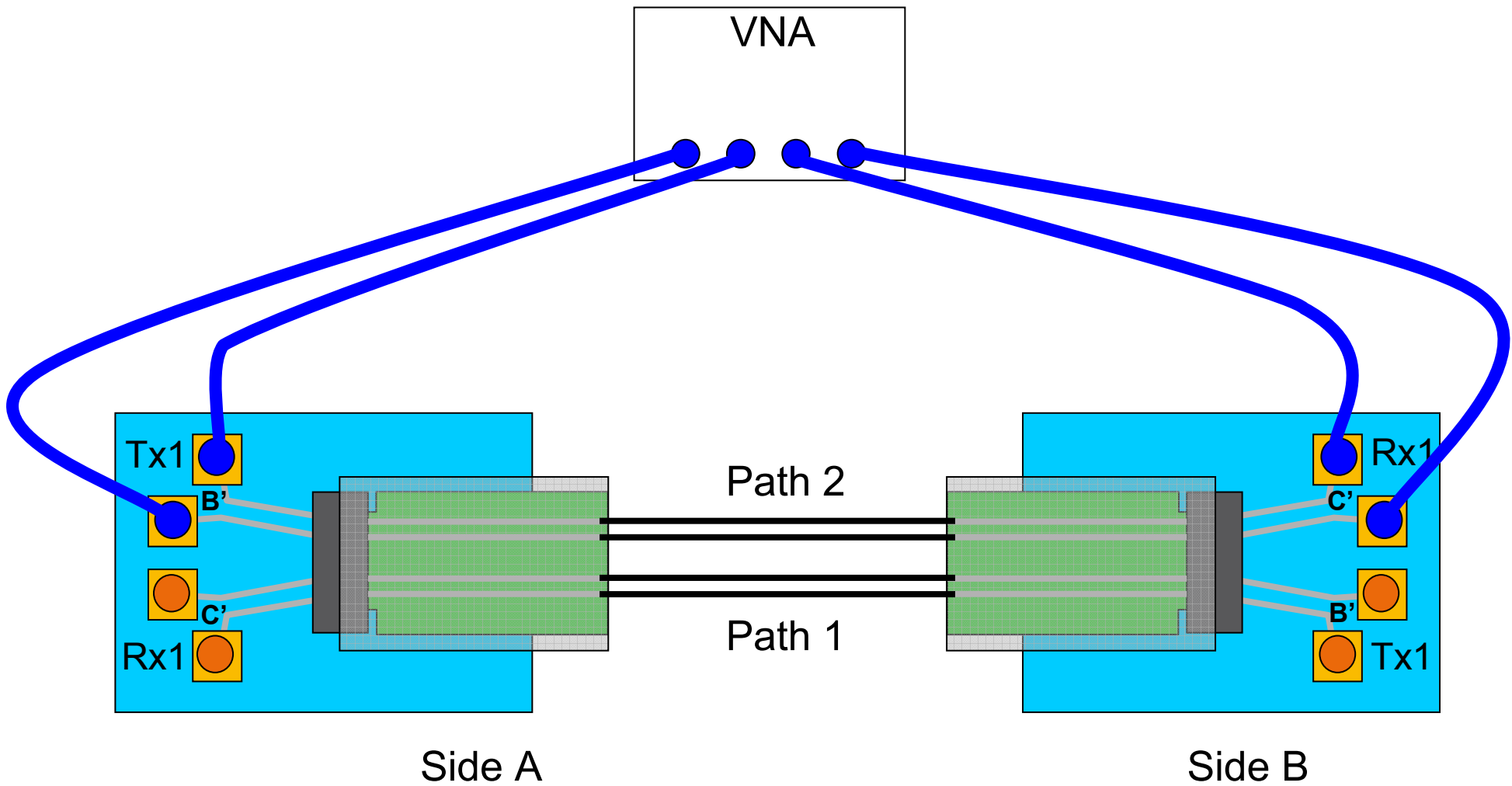
S-parameter measurement reference channel/calibration channel used to calculate WDP_{CAL} and VMA_i



Cable assembly measurement method

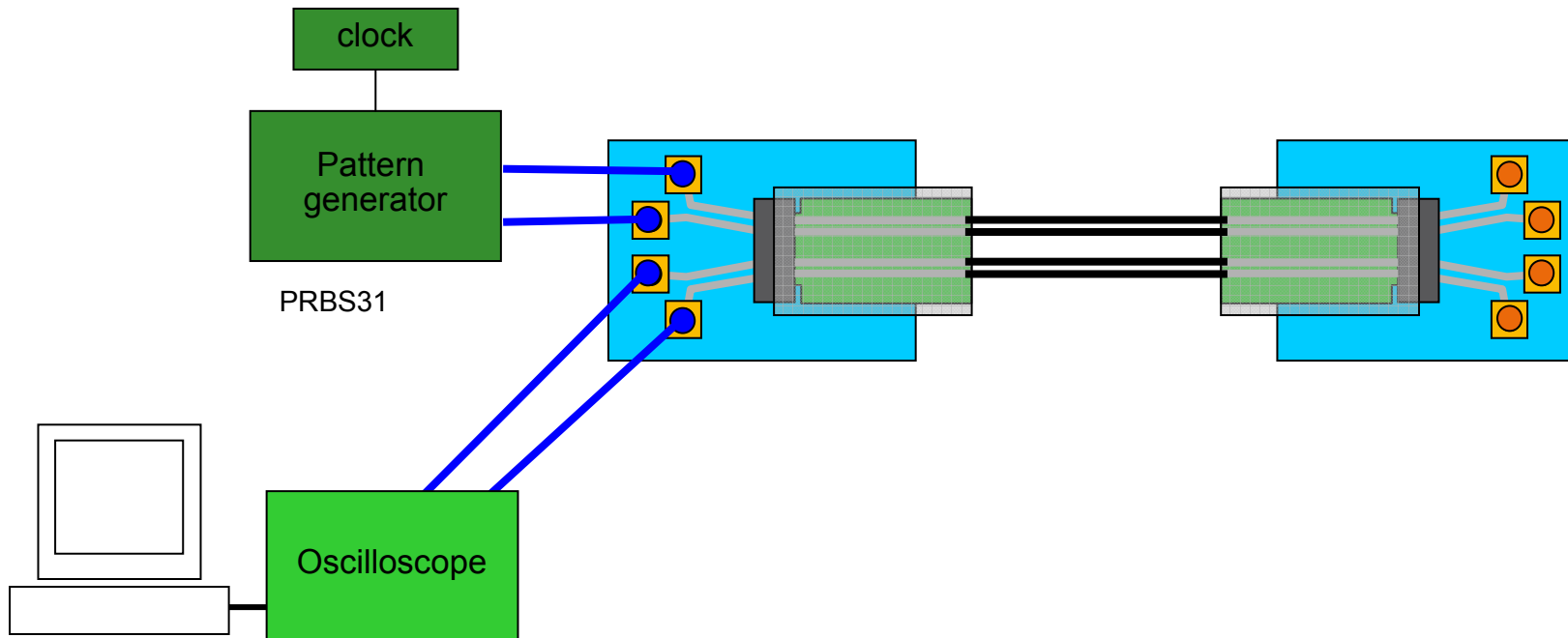


S-parameter measurement cable assembly used to calculate WDP_{CABLE} , VMA_0 , reflection coefficient SDD_{xx} , and SCC_{xx} . Additionally, insertion loss and crosstalk informative parameters also used this test method.



Cable assembly measurement method

This measurement method was used to calculate VCR. The VCR measurement is determined by computing the VMA and NEXT RMS voltage measurements.

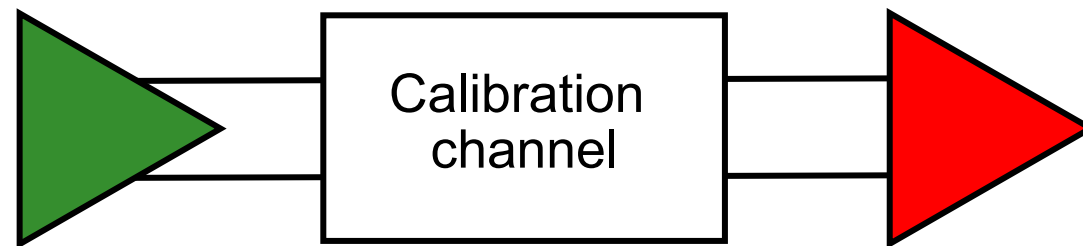


NEXT = RMS voltage measured by the scope corrected by the inherent Oscilloscope noise

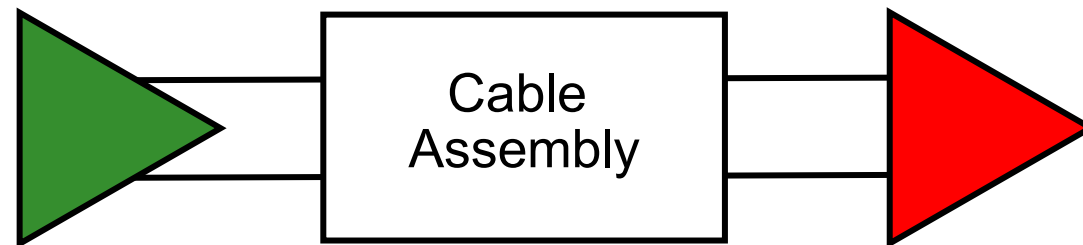
Inherent oscilloscope noise = RMS voltage measured by the scope without input signals

$$\text{NEXT} = \sqrt{(\text{RMS}_{\text{Cable}})^2 - (\text{RMS}_{\text{Scope}})^2}$$

- Calculate WDP_{CAL} in matlab, manipulate source parameters to obtain $WDP_{CAL} = 2.4$



- Calculate WDP_{CABLE} and dWDP in matlab

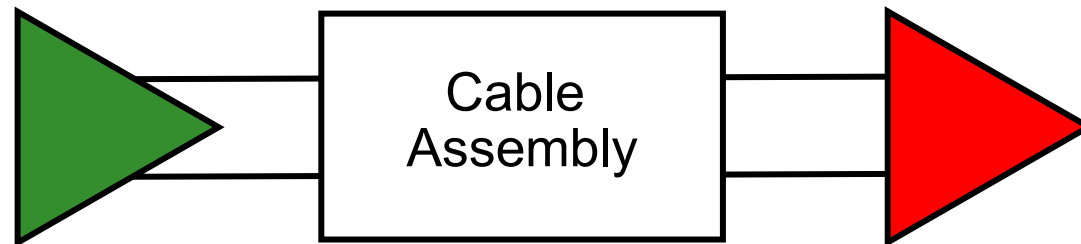


Cable Gauge	Cable Length	dWDP (dBe)	Requirement (dBe)
24	7	6.37	6.75 max
30	3	4.89	6.75 max

- Calculate VMA_i



- Calculate VMA_o and VMA Loss

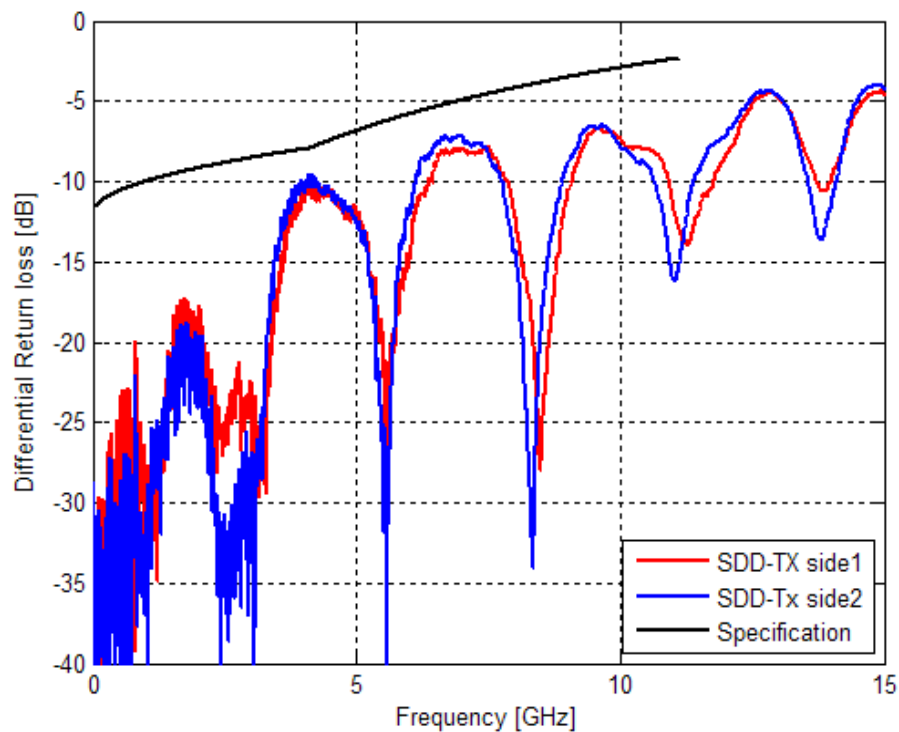


Cable Gauge	Cable Length	VMA Loss (dBe)	Requirement (dBe)
24	7	4.2	4.5 max
30	3	1.3	4.5 max

- VCR = VMA/2 to crosstalk ratio
 - VCR measurement determined by computing VMA and NEXT RMS voltage measurements.

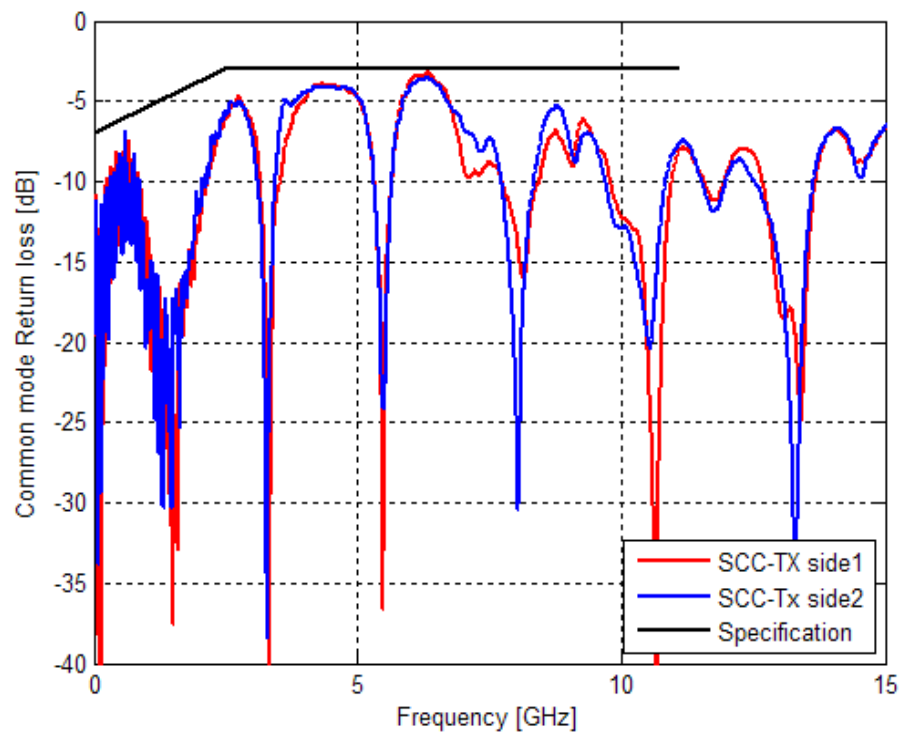
Cable Gauge	Cable Length	VCR (dB)	Requirement (dB)
24	7	38.2	32.5 min
30	3	40.2	32.5 min

SDDxx reflection coefficient



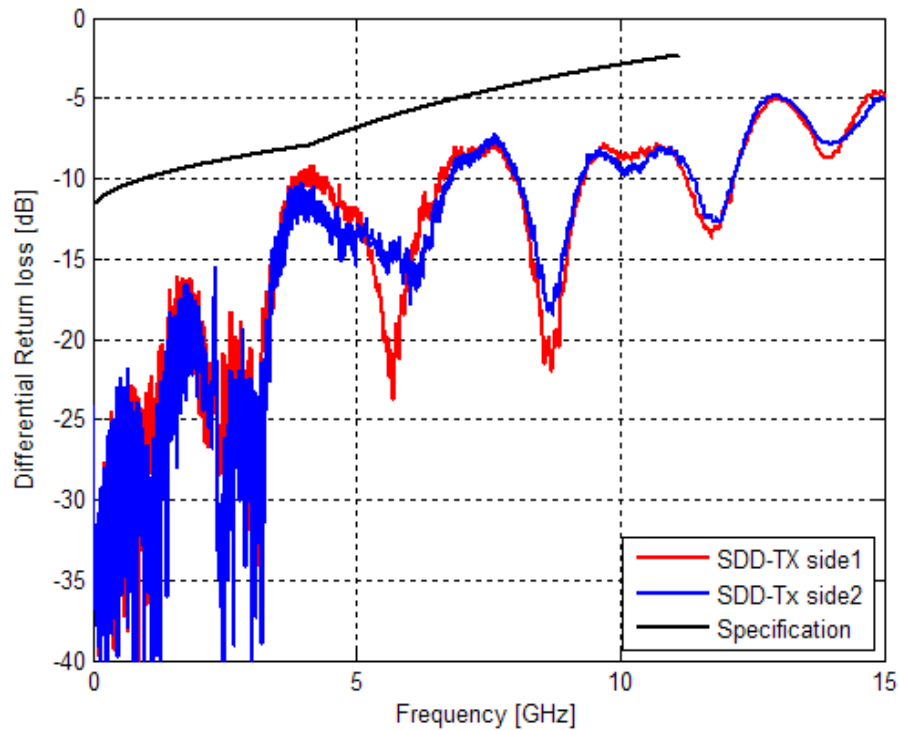
(Differential Return Loss)

SCCxx reflection coefficient



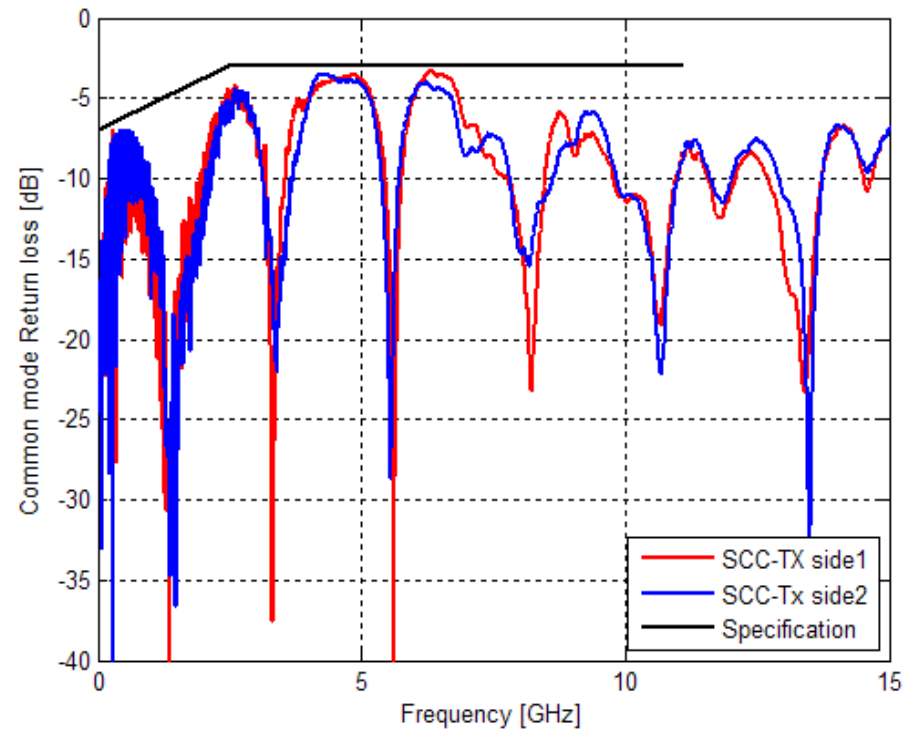
(Common Mode Return Loss)

SDDxx reflection coefficient



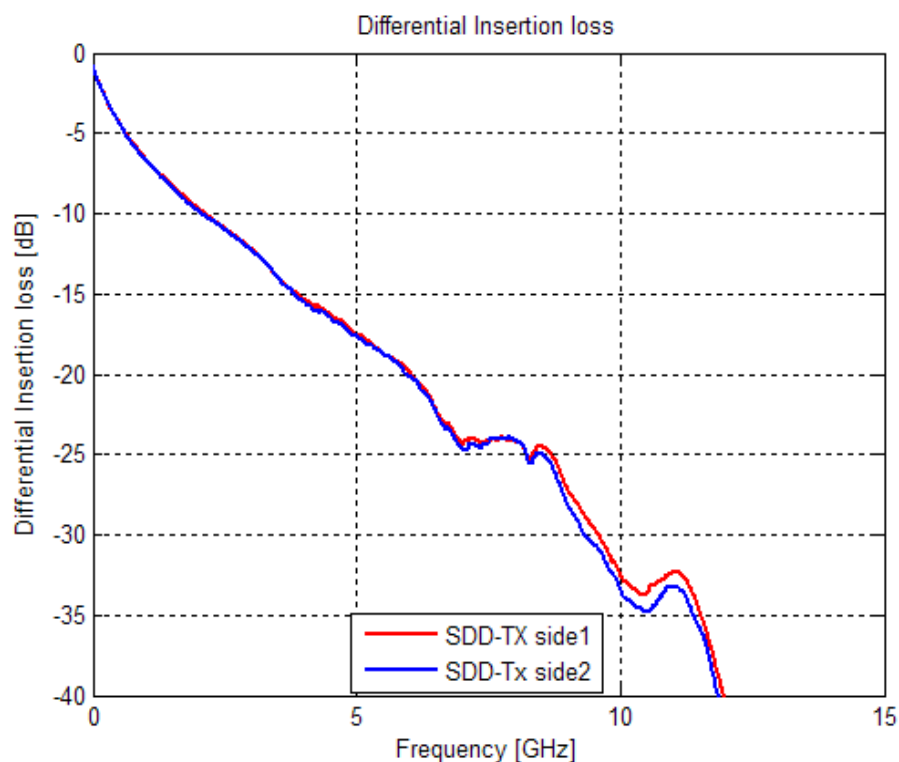
(Differential Return Loss)

SCCxx reflection coefficient

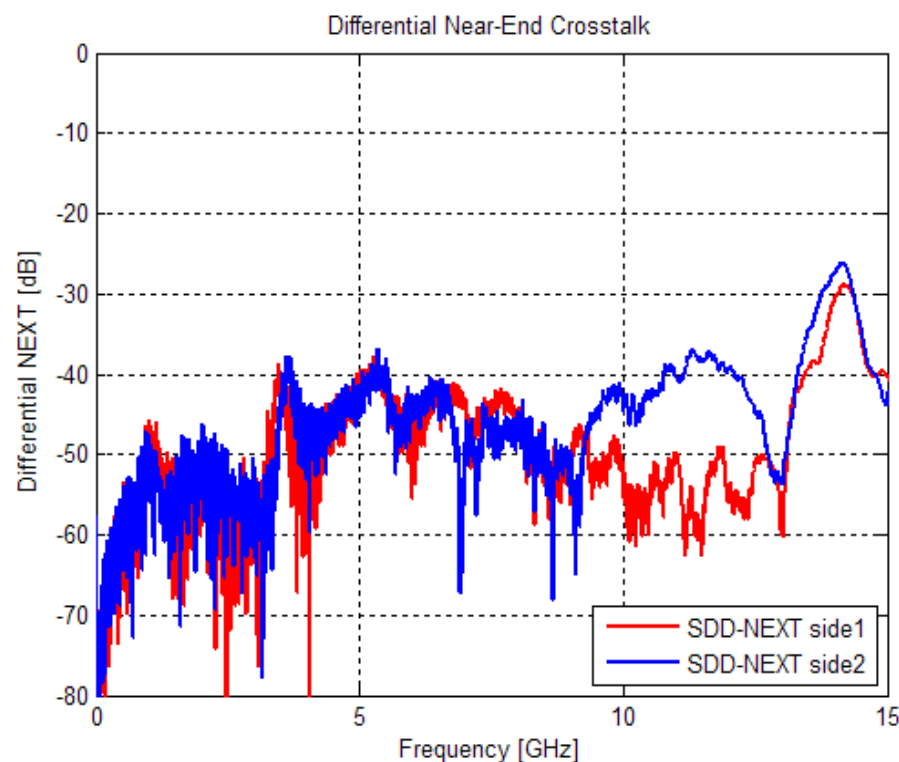


(Common Mode Return Loss)

Informative

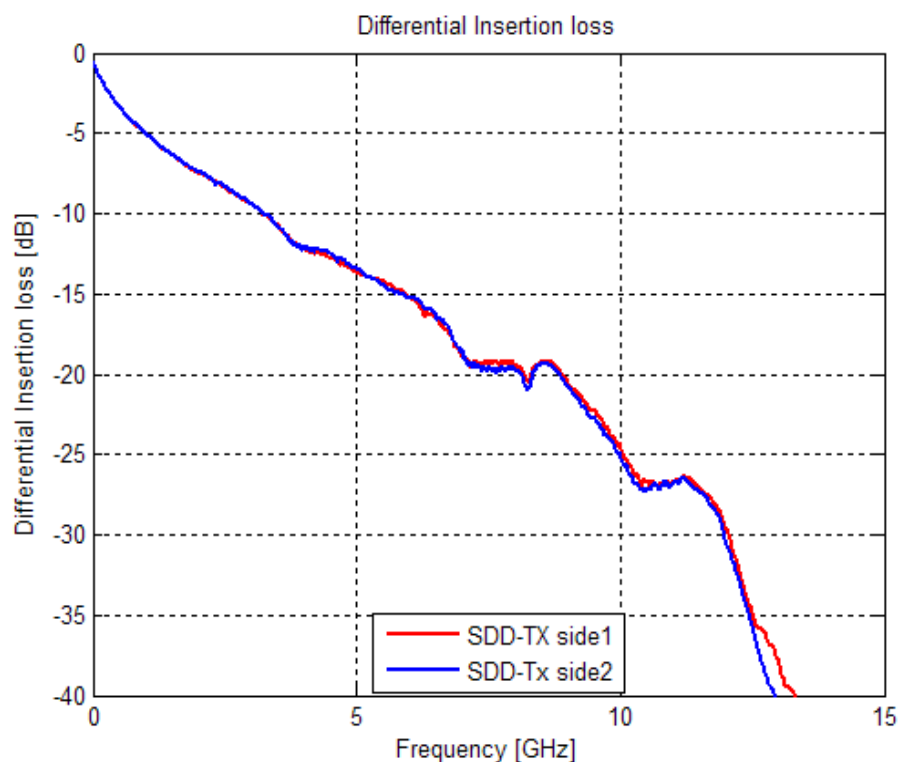


Typical Insertion loss curve showing suck out free performance through 12GHz

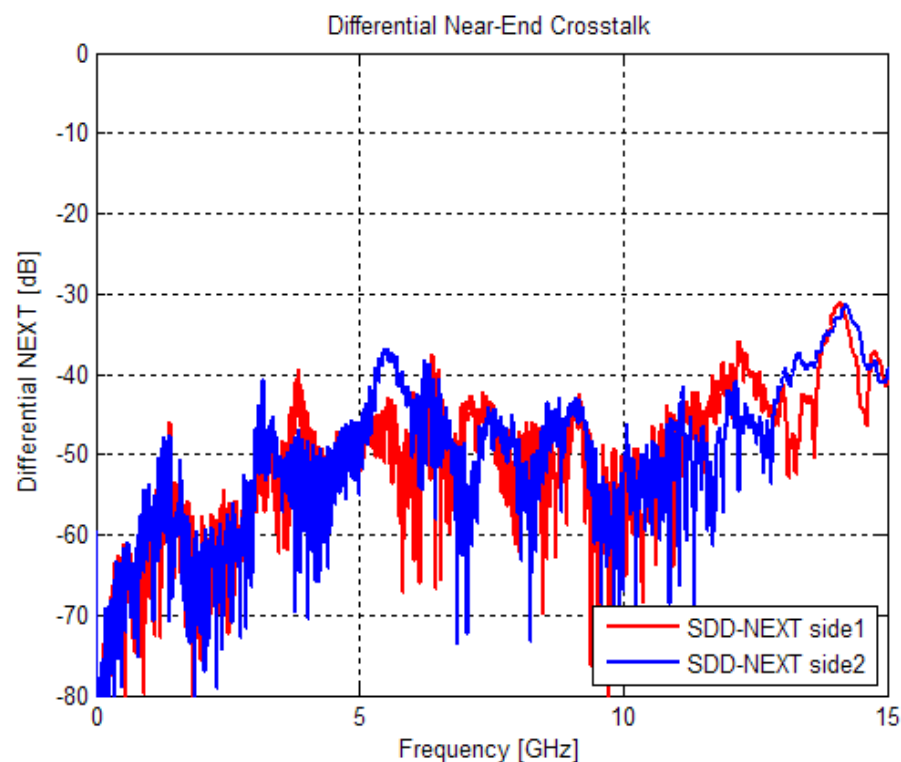


Minimal coupling between pairs

Informative



Typical Insertion loss curve showing suck out free performance through 12GHz



Minimal coupling between pairs