IEEE 802.3CY – BEYOND 10G ELECTRICAL AUTOMOTIVE ETHERNET PHY TF

Link Segment IL Measurement

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Purpose

- Measure and show the IL of one of the available cables with connectors up to 10GHz
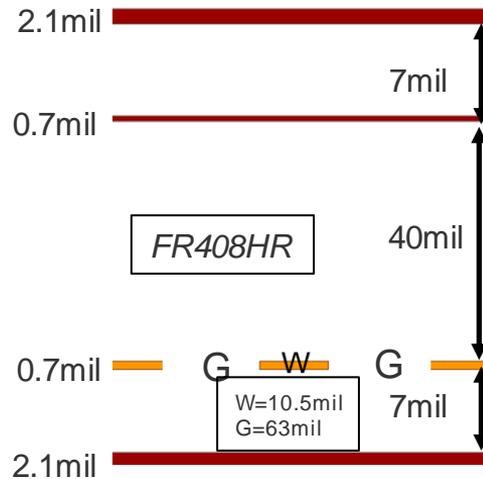 - Plug to Plug 11m without Inlines

Plug ——— 11m ——— Plug

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VNA Setup

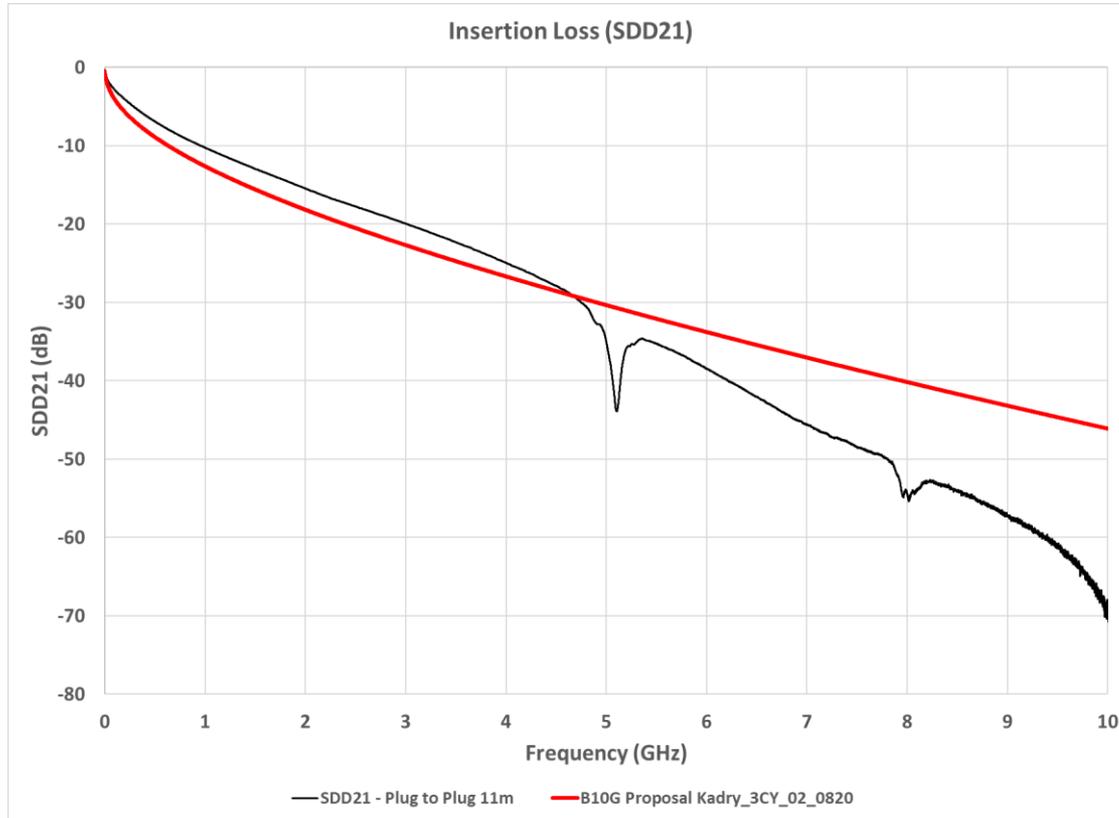| Parameter	Value
Fstart	1MHz
Fstop	10GHz
Sweep Type	Linear
Step Size	1MHz
Output Power	-10dBm
IFBW (IF Bandwidth)	10KHz
Port reference impedance (Differential Mode)	100Ω
Port reference impedance (Common Mode)	25Ω
Calibration	E-CAL
Averaging Function	Deactivated
Smoothing Function	Deactivated
Logical Differential Port 1 (Tx)	Ports 1 & 3
Logical Differential Port 2 (Rx)	Ports 2 & 4
Touchstone File	Version 1
Data Format	Real + Imaginary

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Fixture Information & De-embedding

- PCB Trace Length: 25mm
- PCB Stack up:

2.1mil

7mil

0.7mil

FR408HR

40mil

0.7mil   G   W   G

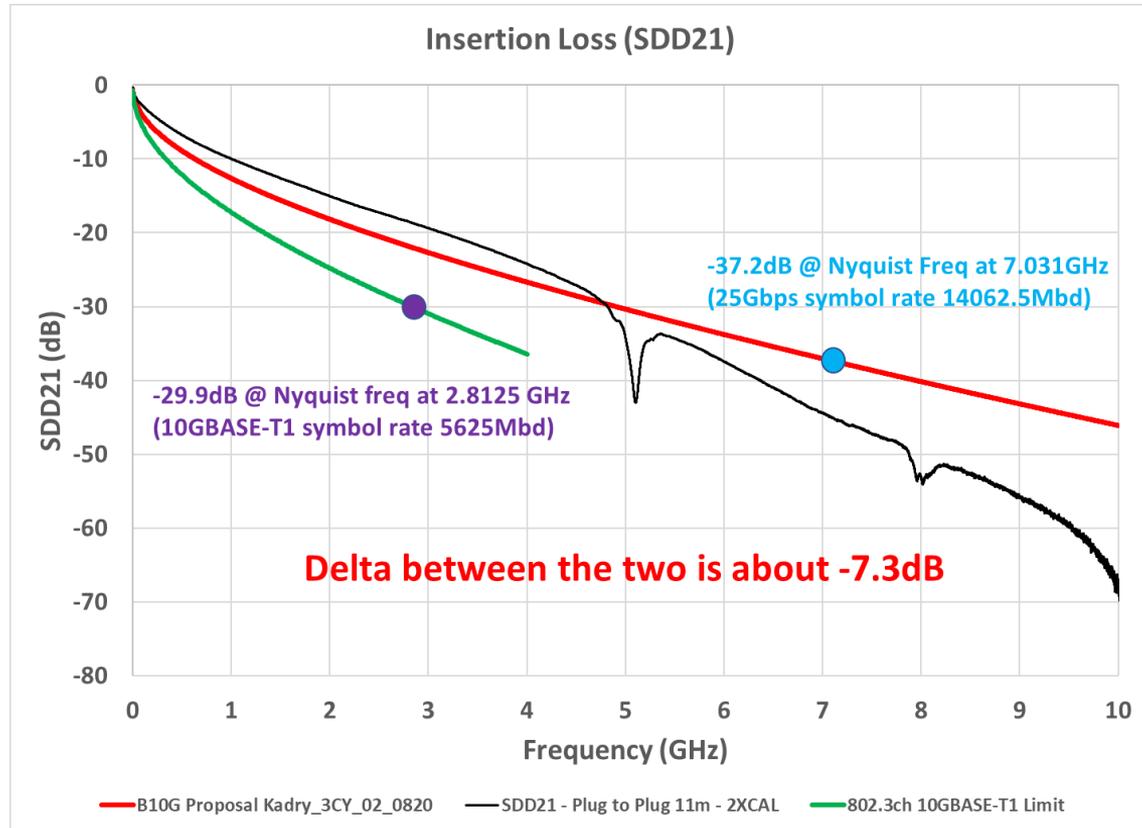W=10.5mil
G=63mil

7mil

2.1mil

De-embedding involves removing the PCB Trace length from the IL measurement by using a 2XCAL fixture (which has 2x the trace length to consider for both ends).

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Insertion Loss (SDD21) – Fixture Not Removed

Insertion Loss (SDD21) – Fixture Removed

Insertion Loss (SDD21)

-37.2dB @ Nyquist Freq at 7.031GHz
(25Gbps symbol rate 14062.5Mbd)

-29.9dB @ Nyquist freq at 2.8125 GHz
(10GBASE-T1 symbol rate 5625Mbd)

Delta between the two is about -7.3dB

B10G Proposal Kadry_3CY_02_0820 — SDD21 - Plug to Plug 11m - 2XCAL — 802.3ch 10GBASE-T1 Limit

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Conclusion

- Using existing 26AWG cables will give us about -7.3dB worse IL compared the 10GBASE-T1 budget
- Can achieve higher freq with different cable constructions to move the suck-out point to higher frequencies (beyond point of interest)
- Question for the group:
  - Is this type of loss budget from channel acceptable or do we have to reconsider the length requirements of 11m & 2 inlines like we have discussed in past meetings?

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