
802.3dj - CR

Considerations for CR Insertion Loss Budget Baseline: Cable Assemblies and Test Fixtures

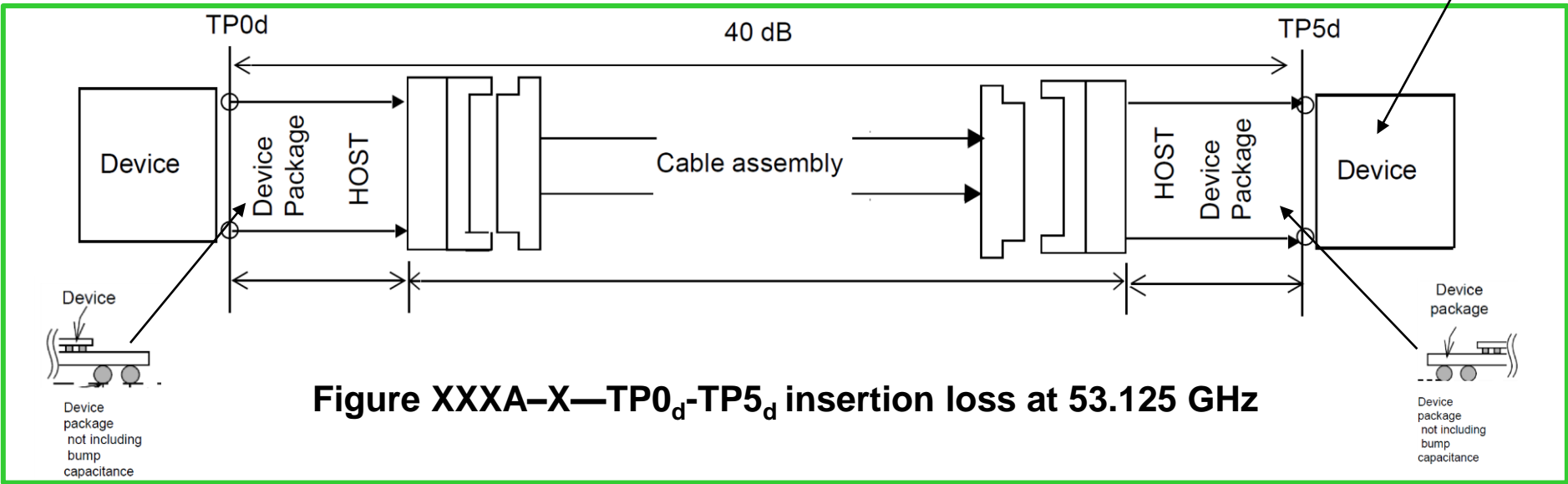
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Purpose

- Considerations for CR Insertion Loss Budget Baseline: Cable Assemblies and Test Fixtures

Die-to-die IL

- Adopted: die-to-die insertion loss

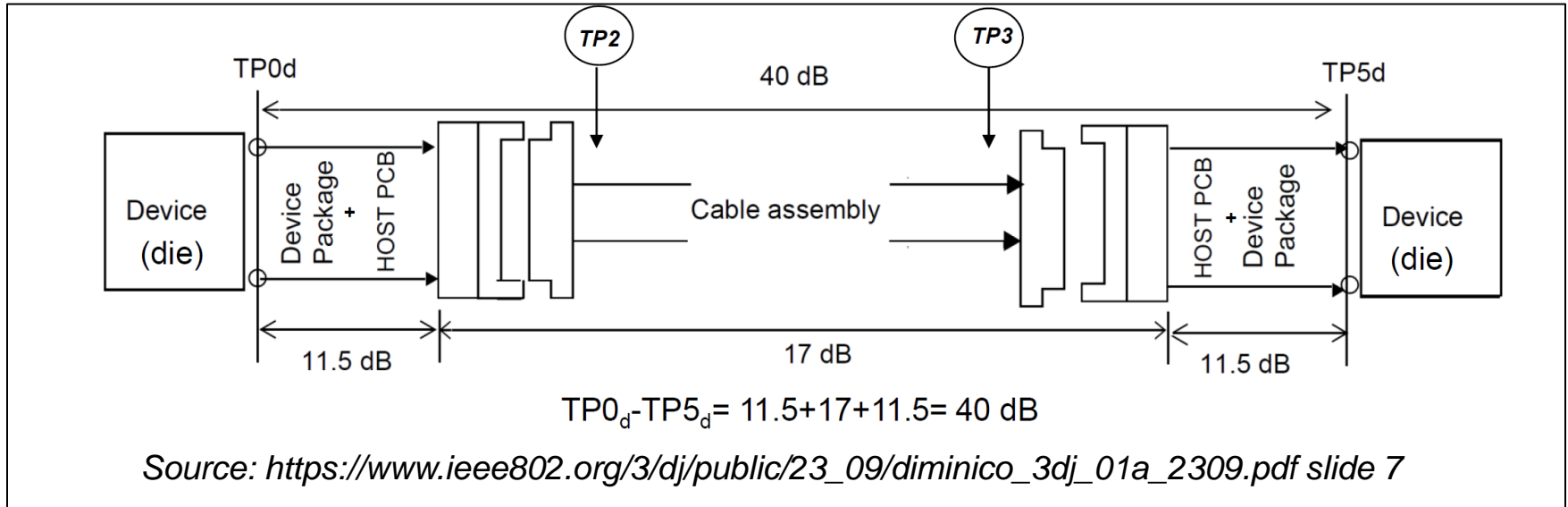


https://www.ieee802.org/3/dj/public/23_07/minutes_3dj_2307_unapproved.pdf

Motion #7	Move to adopt a die-to-die insertion loss ≤ 40 dB at 53.125 GHz for 200GBASE-CR1, 400GBASE-CR2, 800GBASE-CR4 and 1.6TBASE-CR8 PHYs
Technical ($\geq 75\%$)	
Moved by	Mike Li
Second by	Nathan Tracy
Results 802.3 (y/n/a)	passed by unanimous consent. 9:25 a.m.

CR Host IL and Cable Assembly IL - @53.125 GHz

- Adopted CR Host IL = 11.5 dB and Cable Assembly IL = 17 dB



Motion #5

Move to adopt the the CR host and cable assembly insertion loss budget proposed in diminico_3dj_01a_2309, slide 7 for the symmetrical CR use case.

M: Chris Diminico

S: Nathan Tracy

Technical (>=75%)

802.3 voters only

Result: Passed by unanimous consent. 1:57 p.m.

Task Force: 3dj

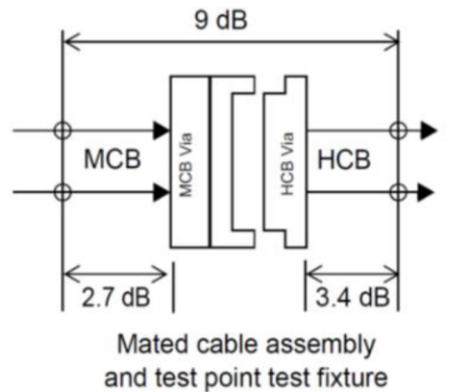
Source:

https://www.ieee802.org/3/dj/public/23_09/motions_3cwfdfj_2309.pdf

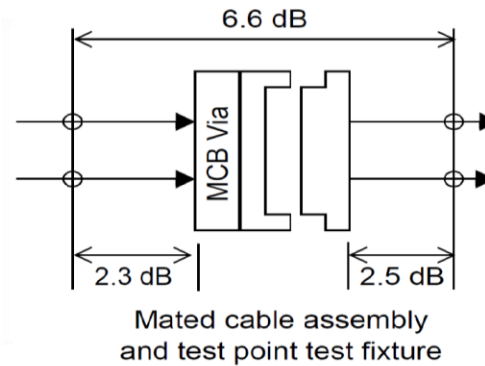
MTF IL Proposal

- HFSS model results presented.

Mated test fixture insertion loss - HFSS model



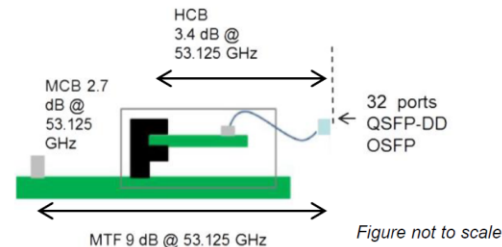
insertion loss @ 53.125 GHz



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



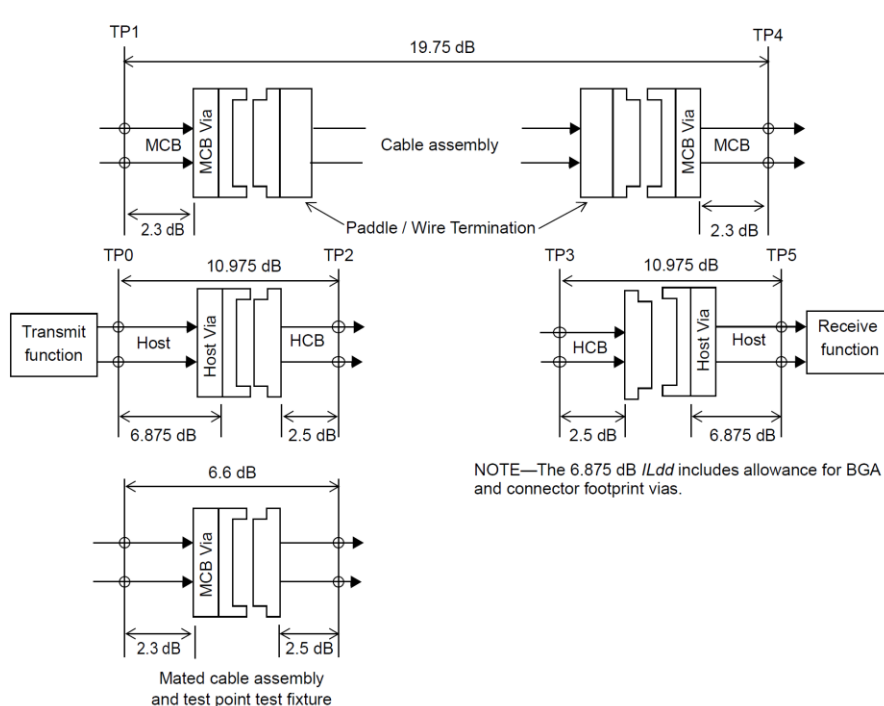
Mated test fixture and host insertion loss allocations @ 53.125 GHz

Source:

https://www.ieee802.org/3/df/public/adhoc/electrical/22_0502/diminico_3df_01_220502.pdf

Background: IEEE P802.3ck Annex 162A (informative)

- 802.3 CR channels are depicted informatively; see IEEE Draft P802.3ck Annex 162A (informative).
- The 802.3ck loss budgets for CA, Host, and mated test fixture are interrelated.



NOTE—2.3 dB MCB PCB *ILdd* includes the RF connector (up to the RF connector reference plane). The MCB via allowance is 0.2 dB.

Figure 162A-3—Cable assembly, host, and test fixture insertion loss at 26.56 GHz

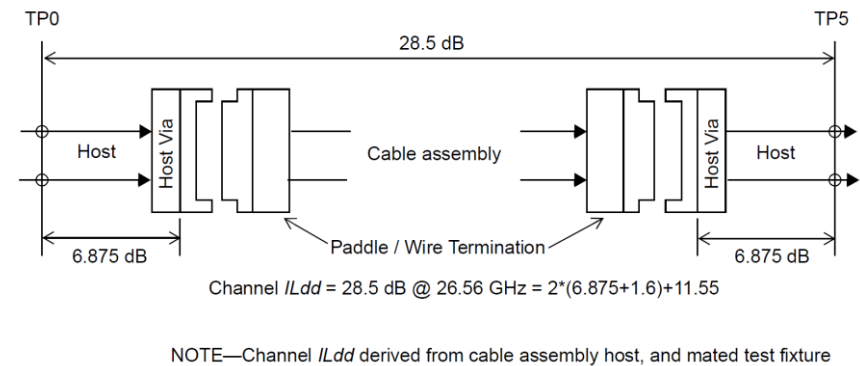
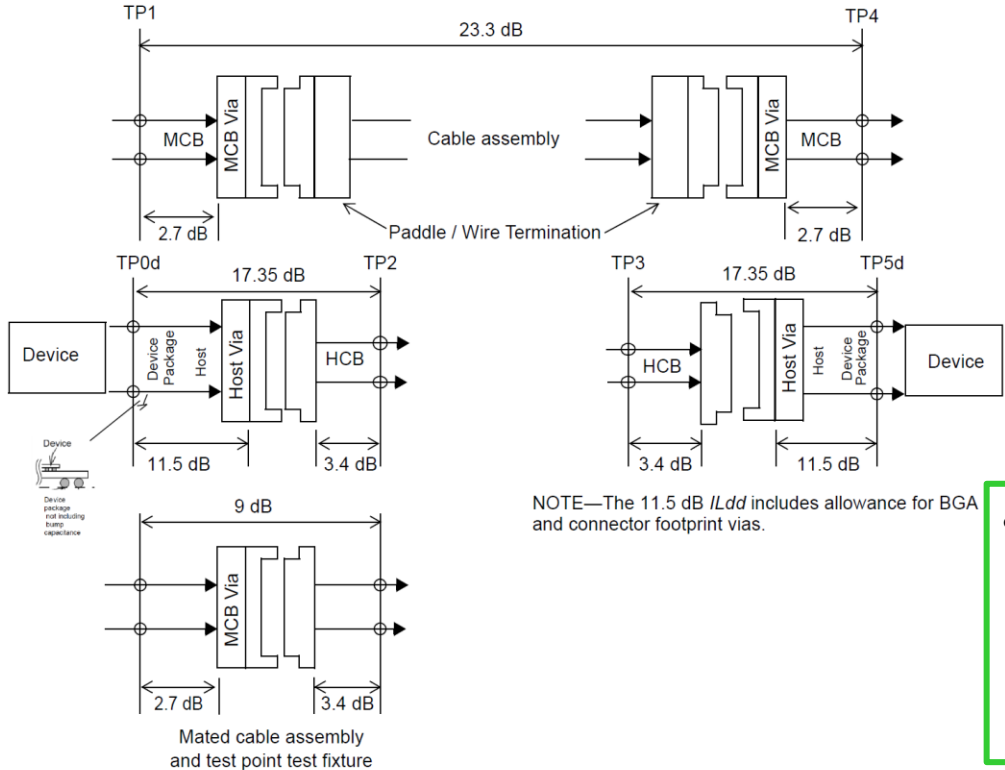


Figure 162A-4—Channel insertion loss at 26.56 GHz

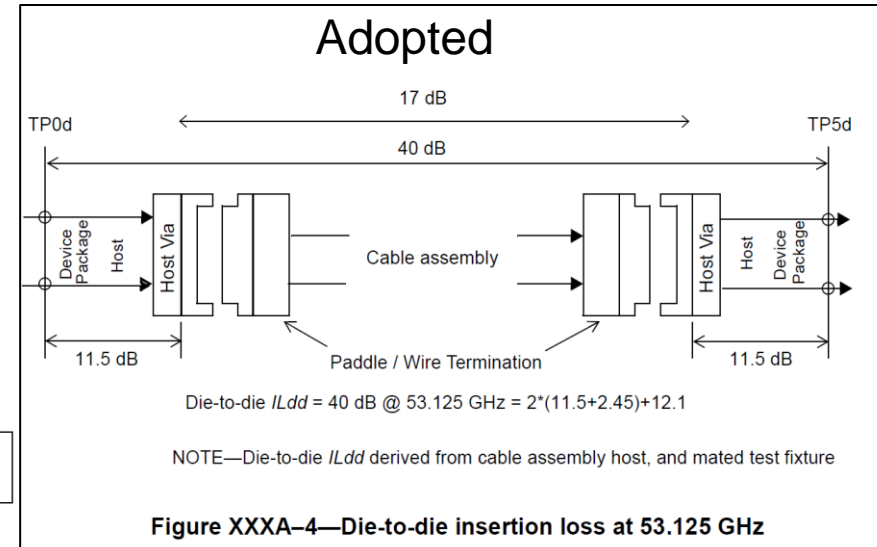
IEEE P802.3dj Annex xxxA (informative)

- Considerations for TP0d-TP2, TP3-TP5d, TP1-TP4
- 802.3dj CR informative annex



NOTE—2.7 dB MCB PCB *ILdd* inclusion of the RF connector (up to the RF connector reference plane) TBD. The MCB via allowance is 0.45 dB.

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



- IL proposals for adopted link above:
 - TP0d-TP2, TP3-TP5, 17.35 dB
 - TP1-TP4 = 23.3 dB
 - Mated Test Fixture = 9 dB

Flexible host architectures and cable assemblies

Proposed CR die-to-die Informative Annex - Insertion Loss @53.125 GHz, page 1

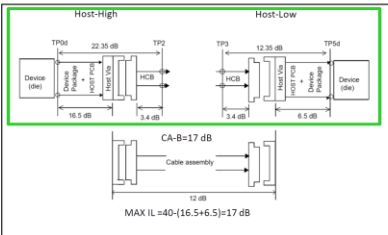
- Flexible host architectures and cable assemblies

Link Configurations IL (TX to RX)

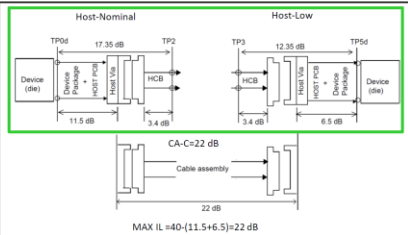
Device Package + Host PCB	Host-Low 6.5 dB	Host-Nominal 11.5 dB	Host-High 16.5 dB
Host-Low 6.5 dB	CA-A,B,C,D	CA-A,B,C	CA-A,B
Host-Nominal 11.5 dB	CA-A,B,C	CA-A,B	CA-A
Host-High 16.5 dB	CA-A,B	CA-A	not supported

Cable Assembly	Insertion Loss Cable + 2*Connectors
CA-A	12 dB
CA-B	17 dB
CA-C	22 dB
CA-D	27 dB

Proposed baseline content



NOTE—The 16.5 dB and 6.5 dB ILdd includes allowance for BGA and connector footprint vias.



NOTE—The 11.5 dB and 6.5 dB ILdd includes allowance for BGA and connector footprint vias.

*Host Losses predicated on MTF IL assumptions
https://www.ieee802.org/3/df/public/adhoc/electrical/22_0502/dimnico_3df_01_220502.pdf slide 7

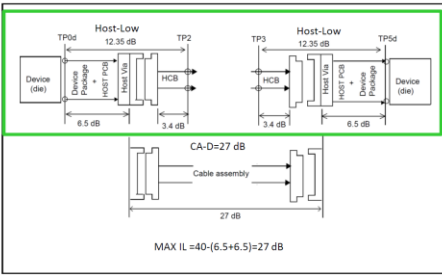
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Note: Module compliance board (MCB) is not shown and is the subject of a separate proposal

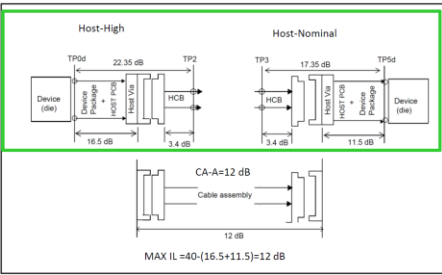
Source: A Baseline Proposal To Enable More Flexible Architectures and Longer Reach 200Gb/Lane Passive Copper Cables 11/23 - slide 12

Proposed CR die-to-die Informative Annex - Insertion Loss @53.125 GHz, page 2

- Flexible host architectures and cable assemblies



NOTE— 6.5 dB ILdd includes allowance for BGA and connector footprint vias.



NOTE—The 16.5 dB and 11.5 dB ILdd includes allowance for BGA and connector footprint vias.

Source: A Baseline Proposal To Enable More Flexible Architectures and Longer Reach 200Gb/Lane Passive Copper Cables 11/23 - slide 13

IEEE P802.3dj Annex xxxA (informative)

- Flexible host architectures and cable assemblies HN-HN depicted

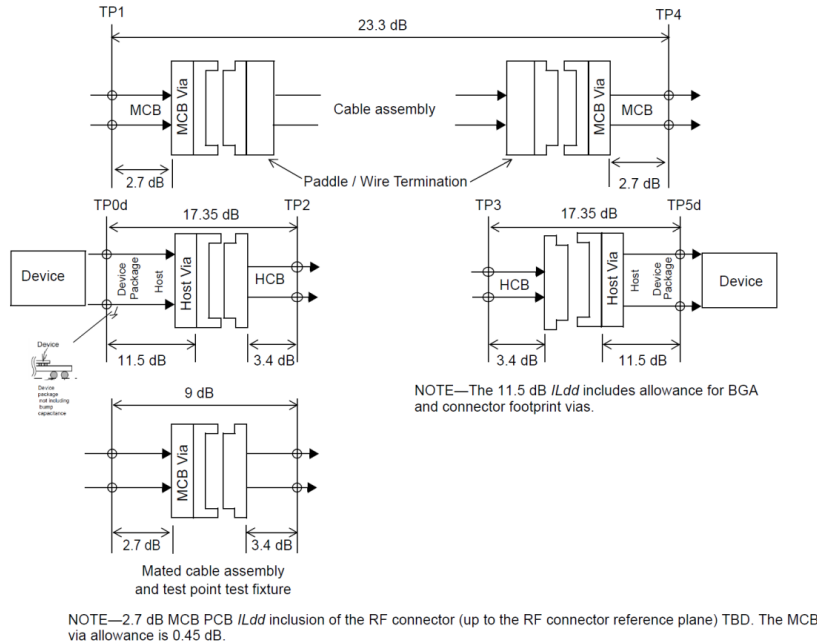
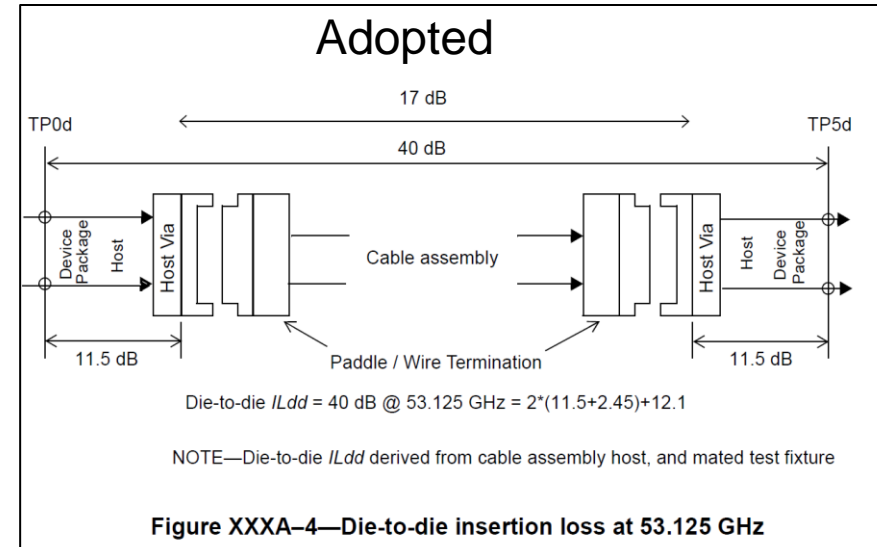


Figure XXXA-3—Cable assembly, host, and test fixture insertion loss at 53.125 GHz



- Informative annex with inclusion of flexible host architectures and cable assemblies IL dB @53.125 GHz

Cable Assembly	Link Configurations	IL	TP0d-TP2 IL (dB)	TP3-TP5d IL (dB)	Cable +2*connectors IL (dB)	TP1-TP4 IL (dB)	MTF IL (dB)	Die-to-die IL (dB)
CA-A	HH-HN		22.35	17.35	12	18.3	9	40
CA-B	HH-HL		22.35	12.35	17	23.3	9	40
CA-B - depicted	HN-HN		17.35	17.35	17	23.3	9	40
CA-C	HN-HL		17.35	12.35	22	28.3	9	40
CA-D	HL-HL		12.35	12.35	27	33.3	9	40

Summary

- Considerations for CR Insertion Loss Budget Baseline: Cable Assemblies and Test Fixtures