

In Support of Test Fixtures Comments

Ali Ghiasi

Ghiasi Quantum LLC

IEEE 802.3ck Taskforce Meeting

Geneva

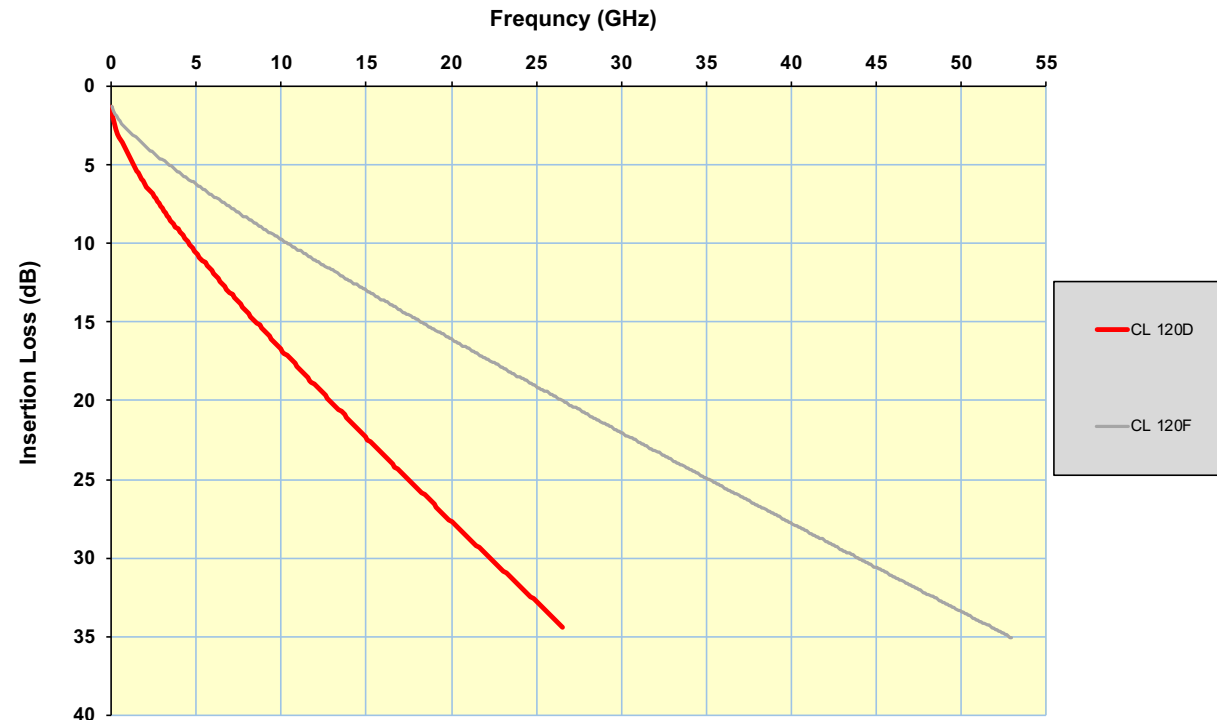
Jan 20, 2020

Overview

- ❑ **This presentation is supplemental to comments submitted against 802.3ck D1.0, addressing comments related to mated test fixture for C2M/CR and KR/CR test boards**
 - Comment 172
 - Comment 173
 - Comment 177
 - Comment 185
 - Comment 186
 - Comment 187
 - Comment 188.

CL120F Informative Insertion Loss (Comment 177)

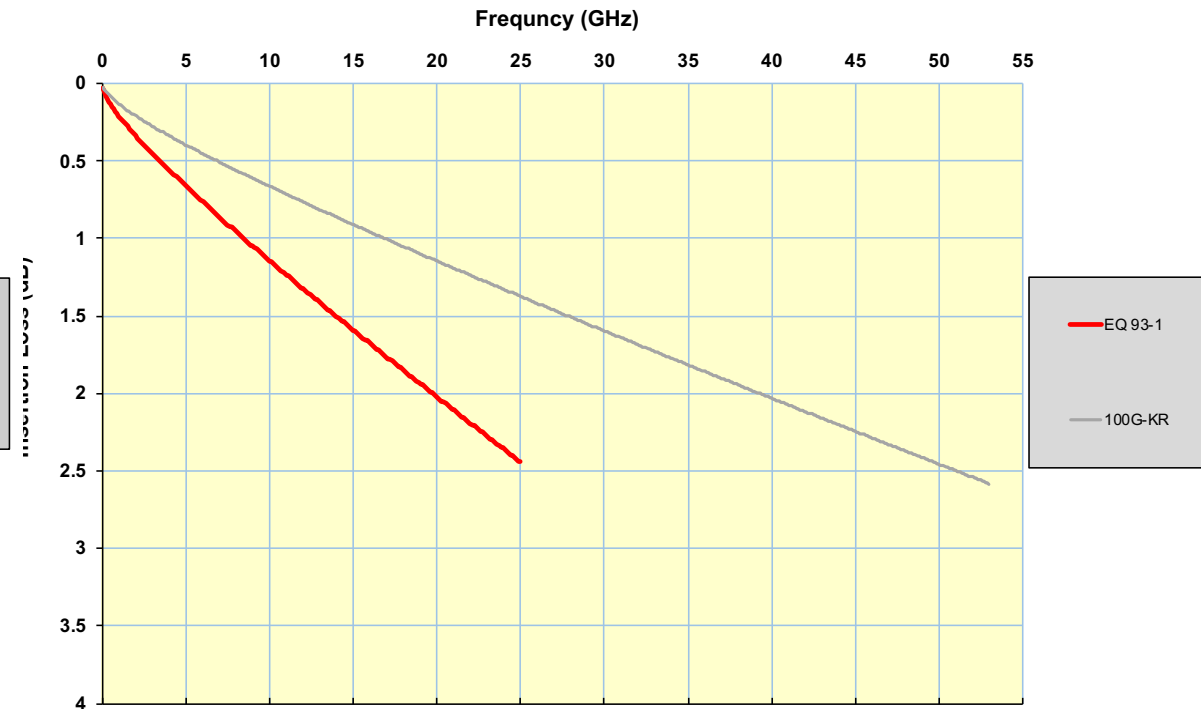
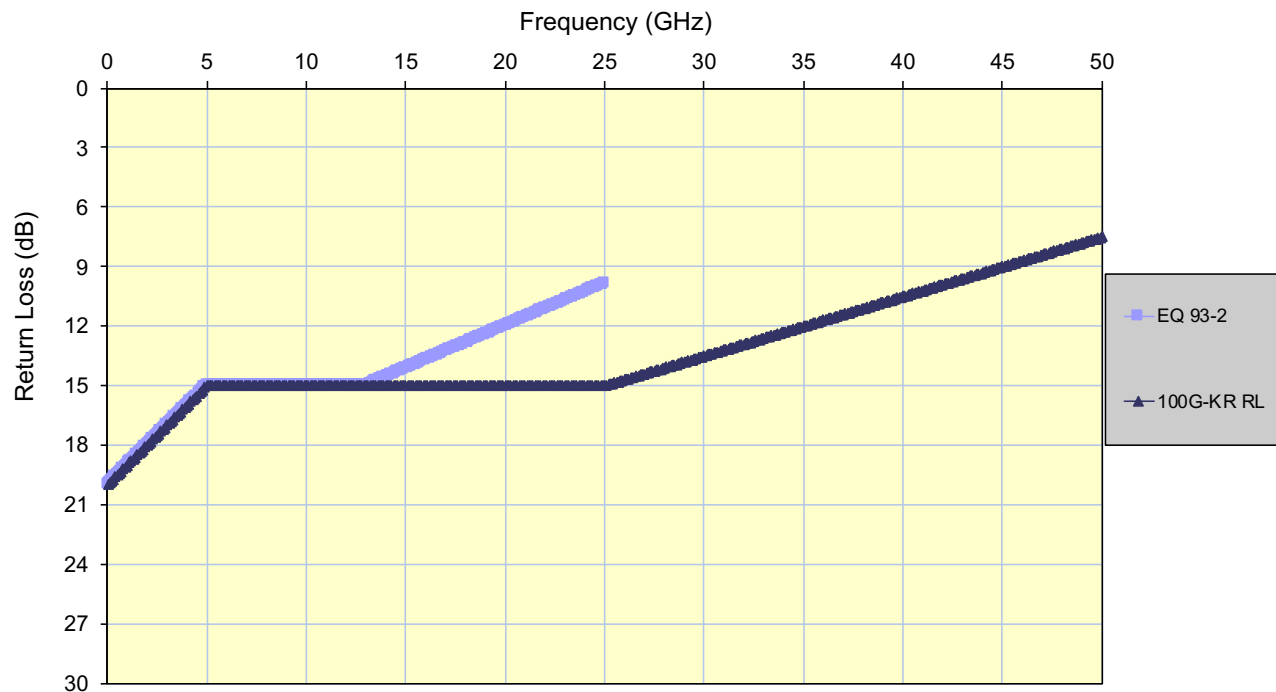
- CL120F informative insertion loss scaled scaled from CL120D both with 20 dB loss at Nyquist.



$$\text{Insertion_Loss}(f) = 1.083 + 1.25\sqrt{f} + 0.47f \quad 0.01 \leq f \leq 50 \text{ GHz}$$

Update to KR Test Fixture IL and RL (Comment 172, 173)

- RL scaled but IL max RL at 50 GHz reduced from 9.85 dB to 7.5 dB due to difficulty one would have meeting the RL at 50 GHz.



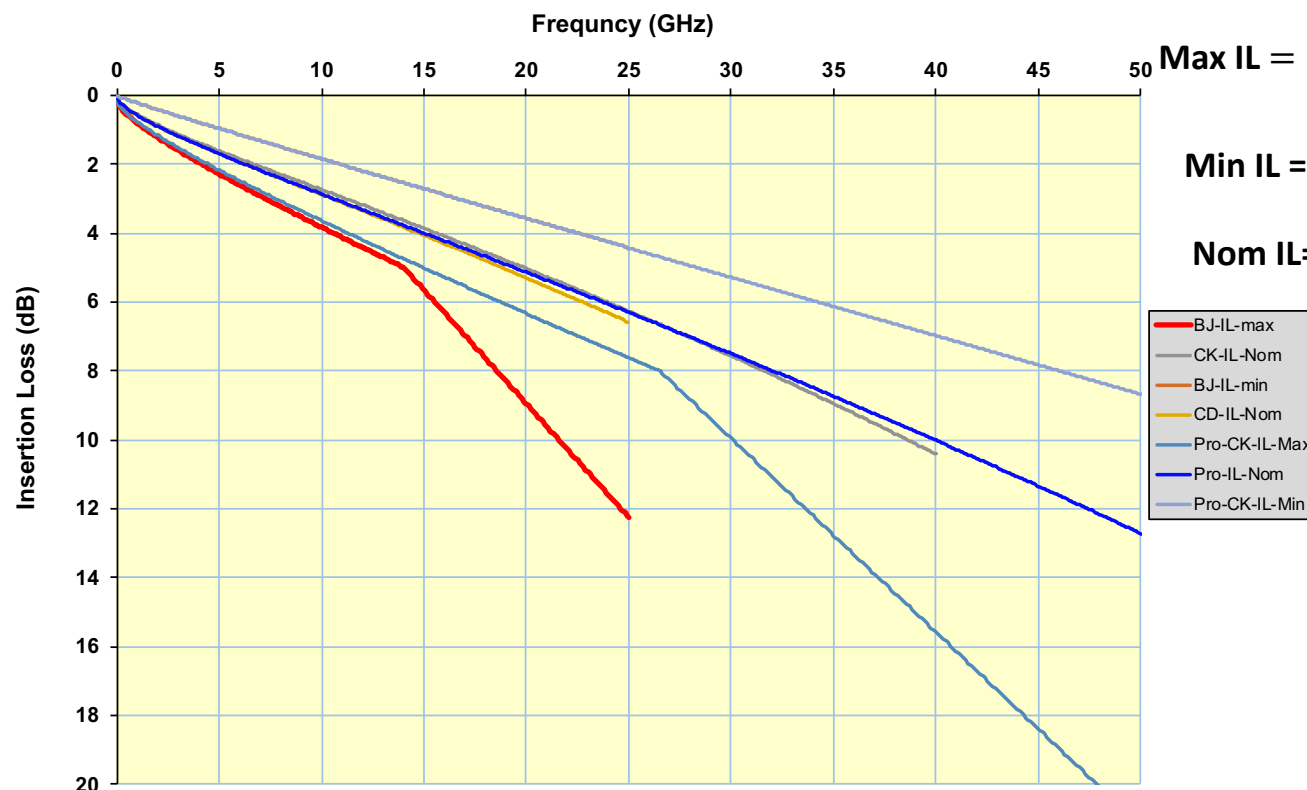
$$RL_d(f) \geq \begin{cases} 20 - f \text{ dB} & 0.05 \leq f \leq 5 \text{ GHz} \\ 15 \text{ dB} & 5 < f \leq 25 \text{ GHz} \\ 22.5 - 0.3f \text{ dB}, & 25 < f \leq 50 \text{ GHz} \end{cases}$$

$$Il_{ref}(f) = -0.0015 + 0.1\sqrt{f} + 0.035f \quad 0.05 \leq f \leq 50 \text{ GHz}$$

Mated Board IL (Comment 185)

□ Maintaining the current 6.6 dB loss at 26.55 GHz but adjusting f^2 factor slightly to remove curve past 30 GHz

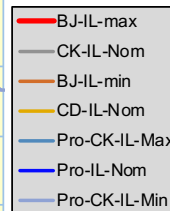
- Also providing min and max loss to replace TBDs
- FOM ILD (max) ≤ 0.1 dB over range of 0.01-40 GHz.



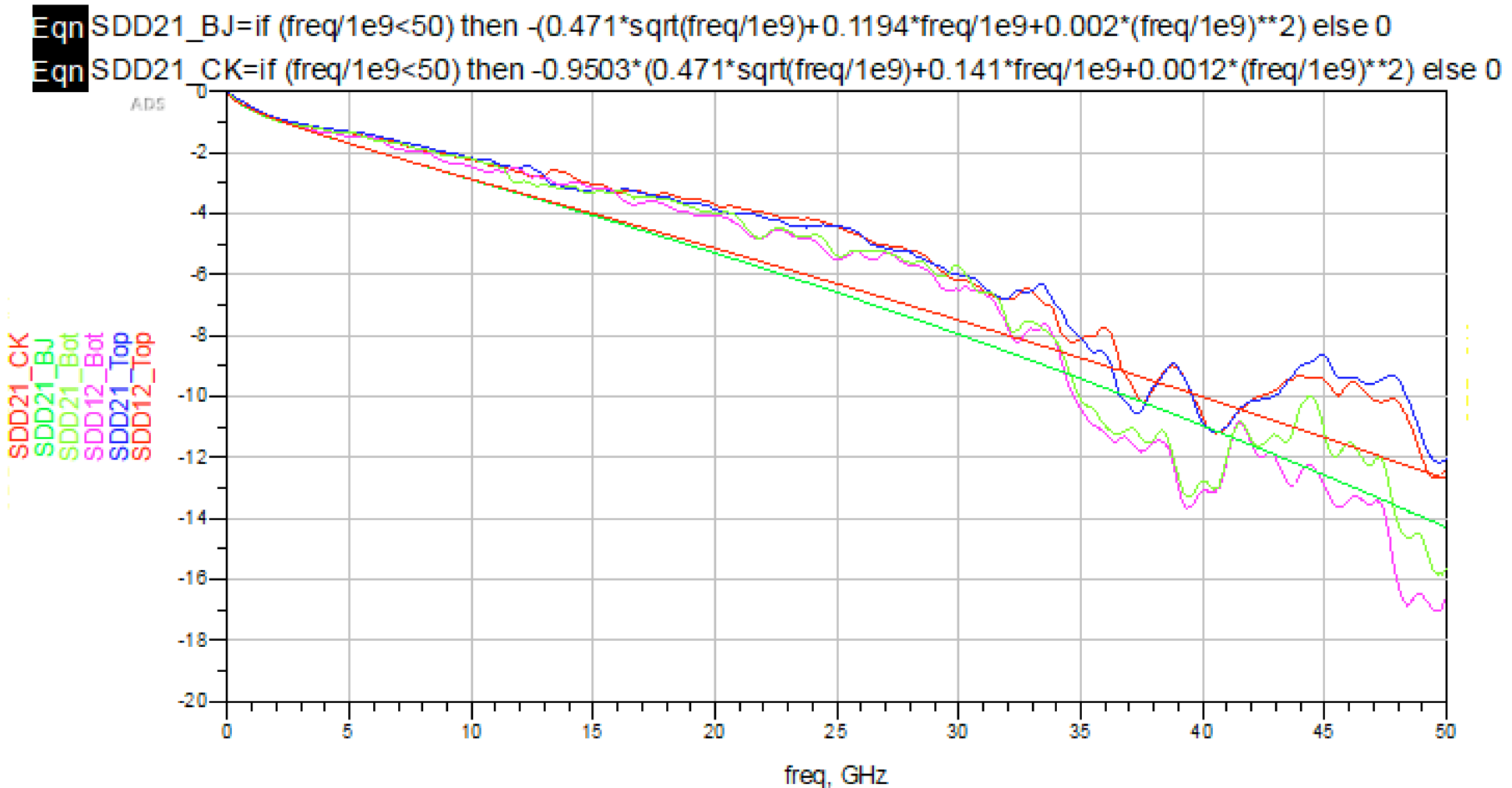
$$\text{Max IL} = \begin{cases} (0.12 + 0.475 \times \sqrt{f} + 0.221 \times f) \times 0.9503 \text{ dB} & 0.01 \leq f \leq 26.55 \text{ GHz} \\ 6.9505 + 0.562 \times f & 26.55 < f \leq 50 \text{ GHz} \end{cases}$$

$$\text{Min IL} = 0.0656 \times \sqrt{f} + 0.164 \times f$$

$$\text{Nom IL} = 0.9503 \times (0.471 \sqrt{f} + 0.141f + 0.0012 \times f^2) \quad 0.05 \leq f \leq 50 \text{ GHz}$$



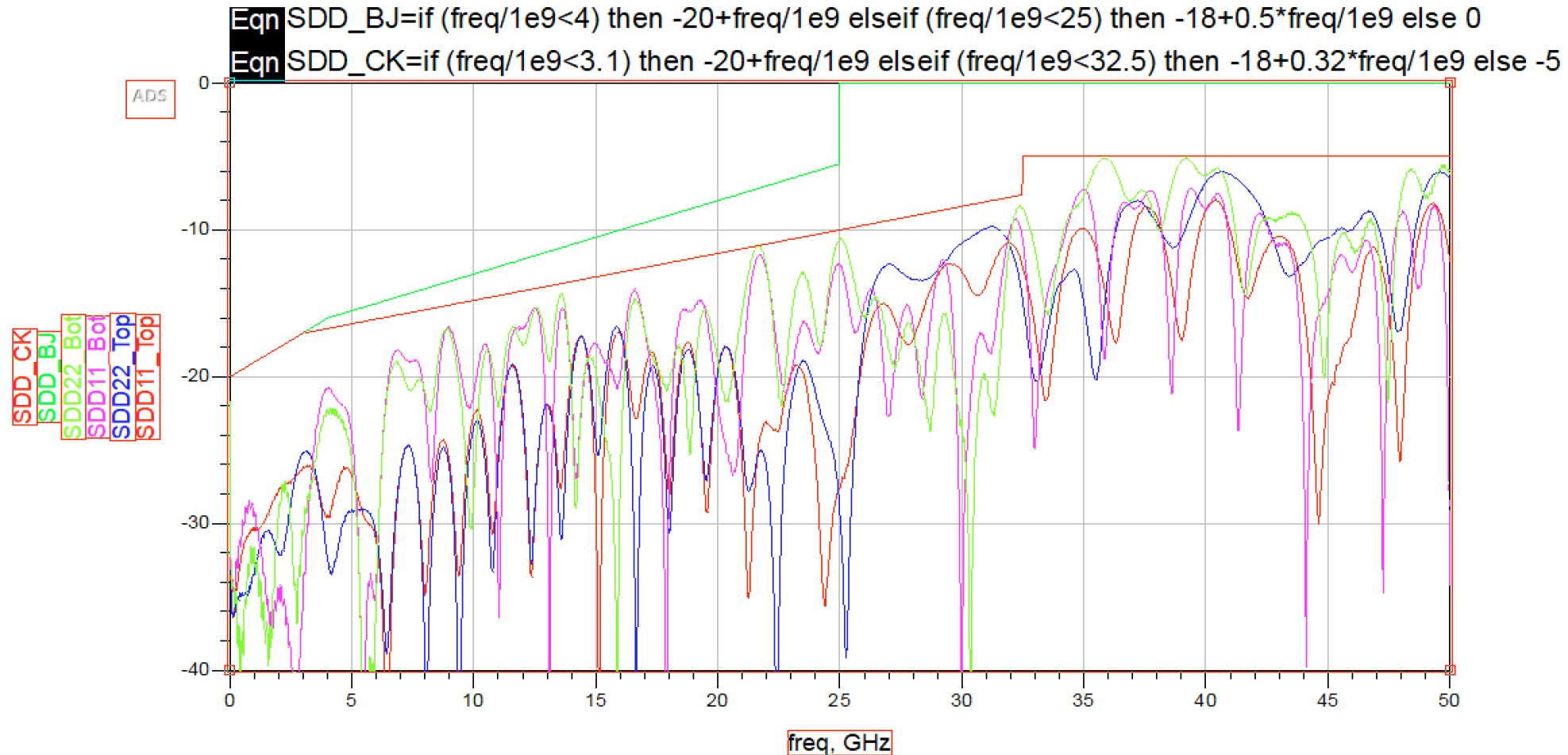
Mated Board IL Compare to Measured QSFP56 MCB/HCB



Mated Board SDD11/22 (Comment 188)

□ Proposed SDD extend the BJ SDD11/SDD22 masks

- Graph below shows S-parameters for RL invert the sign.

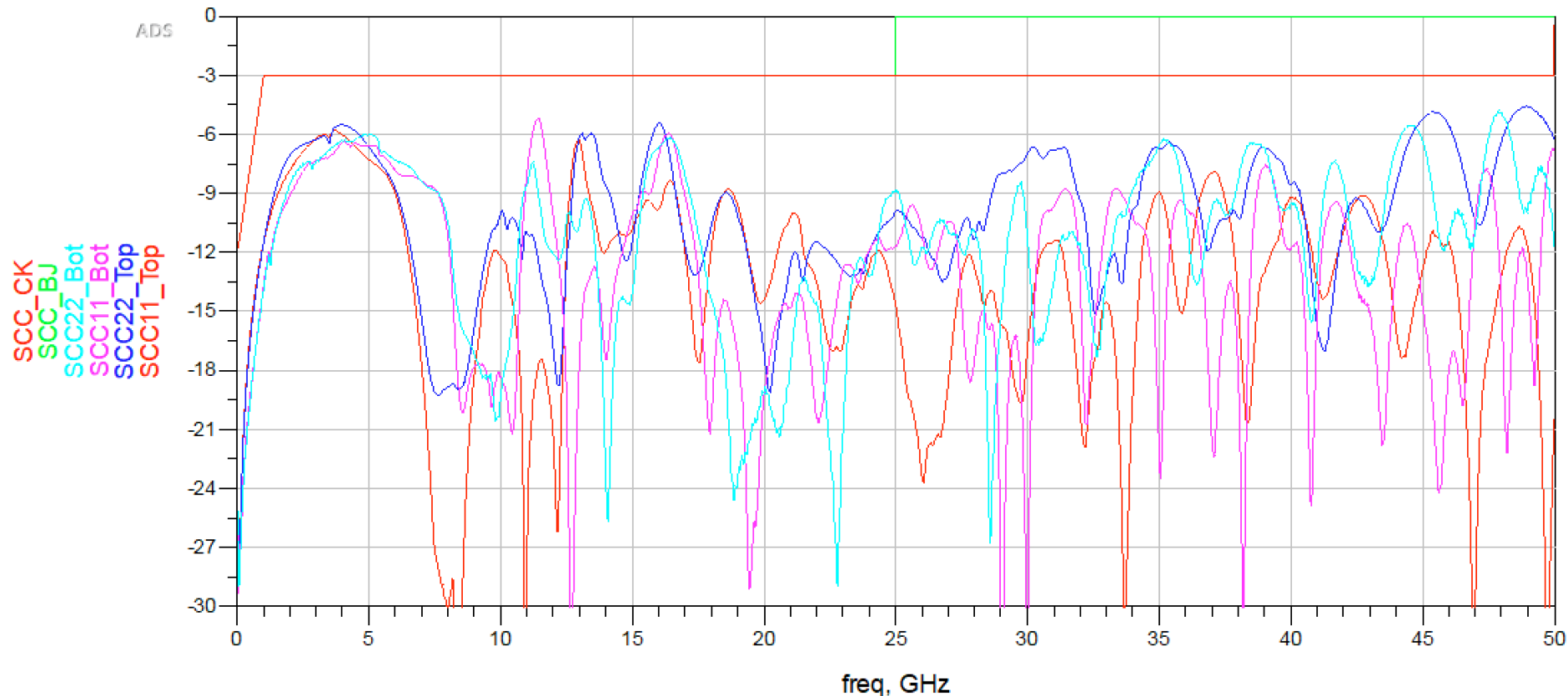


Mated Board SCC11/22

□ Proposed common mode RL extend the BJ SCC11/SCC22 masks

- Graph below shows S-parameters for RL invert the sign.

Eqn SCC_BJ=if (freq/1e9<1) then -12+9*freq/1e9 elseif (freq/1e9<25) then -3 else 0
Eqn SCC_CK=if (freq/1e9<1) then -12+9*freq/1e9 elseif (freq/1e9<50) then -3 else 0



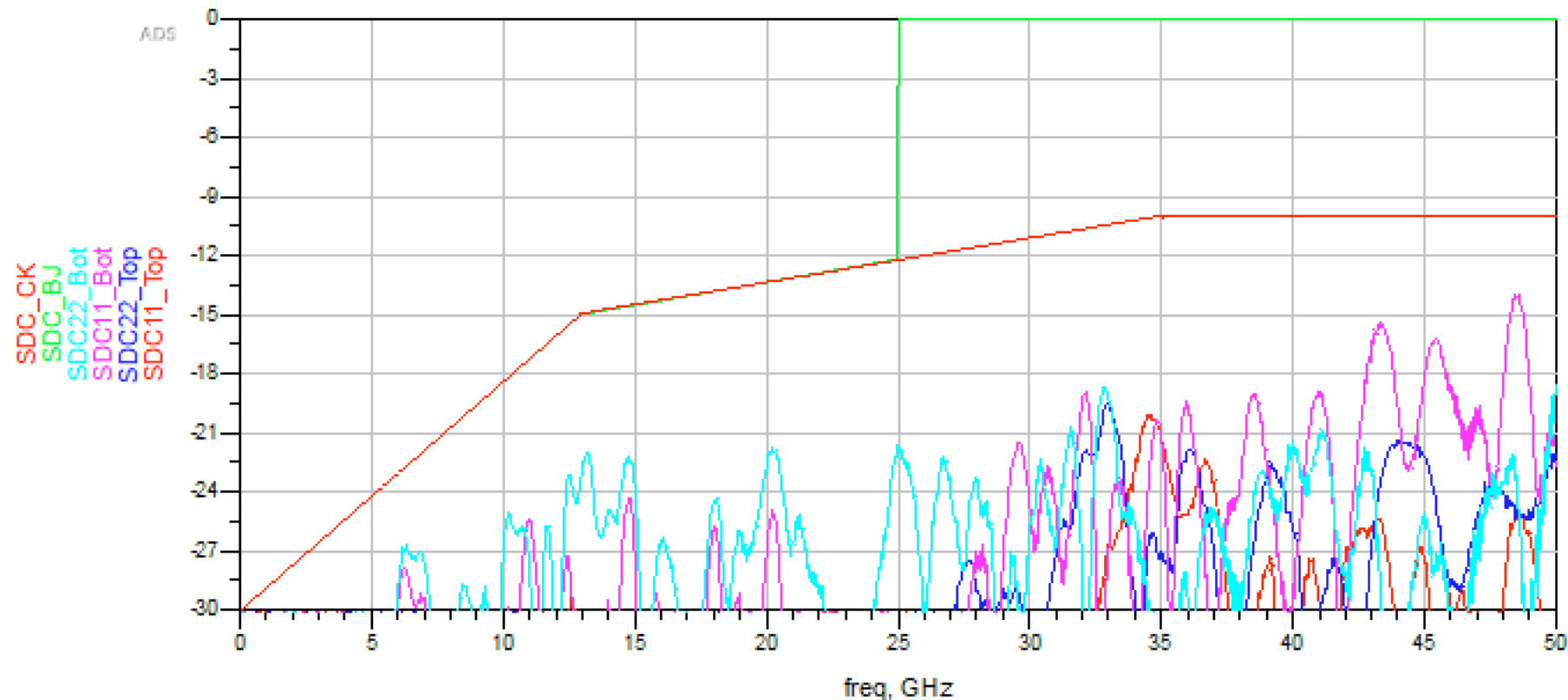
Mated Board SDC11/22 (Comment 186)

□ Proposed common mode to differential extend the BJ SDC11/22 masks

- Graph below shows S-parameters for RL invert the sign.

Eqn SDC_BJ=if (freq/1e9<12.89) then -30+30*freq/1e9/25.78 elseif (freq/1e9<25) then -18+6*freq/25.78/1e9 else 0

Eqn SDC_CK=if (freq/1e9<12.89) then -30+30*freq/1e9/25.78 elseif (freq/1e9<35) then -17.85+0.225*freq/1e9 else -10



Mated Board SDC12/21 (Comment 187)

□ Proposed common mode to differential transfer extend the BJ SDC12/21 masks

- Graph below shows S-parameters for RL invert the sign
- The common mode to differential transfer is lower than SDC11/22 not sure why BJ has tighter limit on the SDC11/22 and not on the SDC12/21!

Eqn SDC21_BJ=if (freq/1e9<16.5) then -30+29*freq/1e9/22 elseif (freq/1e9<25) then -8.25 else 0

Eqn SDC21_CK=if (freq/1e9<15) then -30+0.935*freq/1e9 elseif (freq/1e9<50) then -16 else -16

