



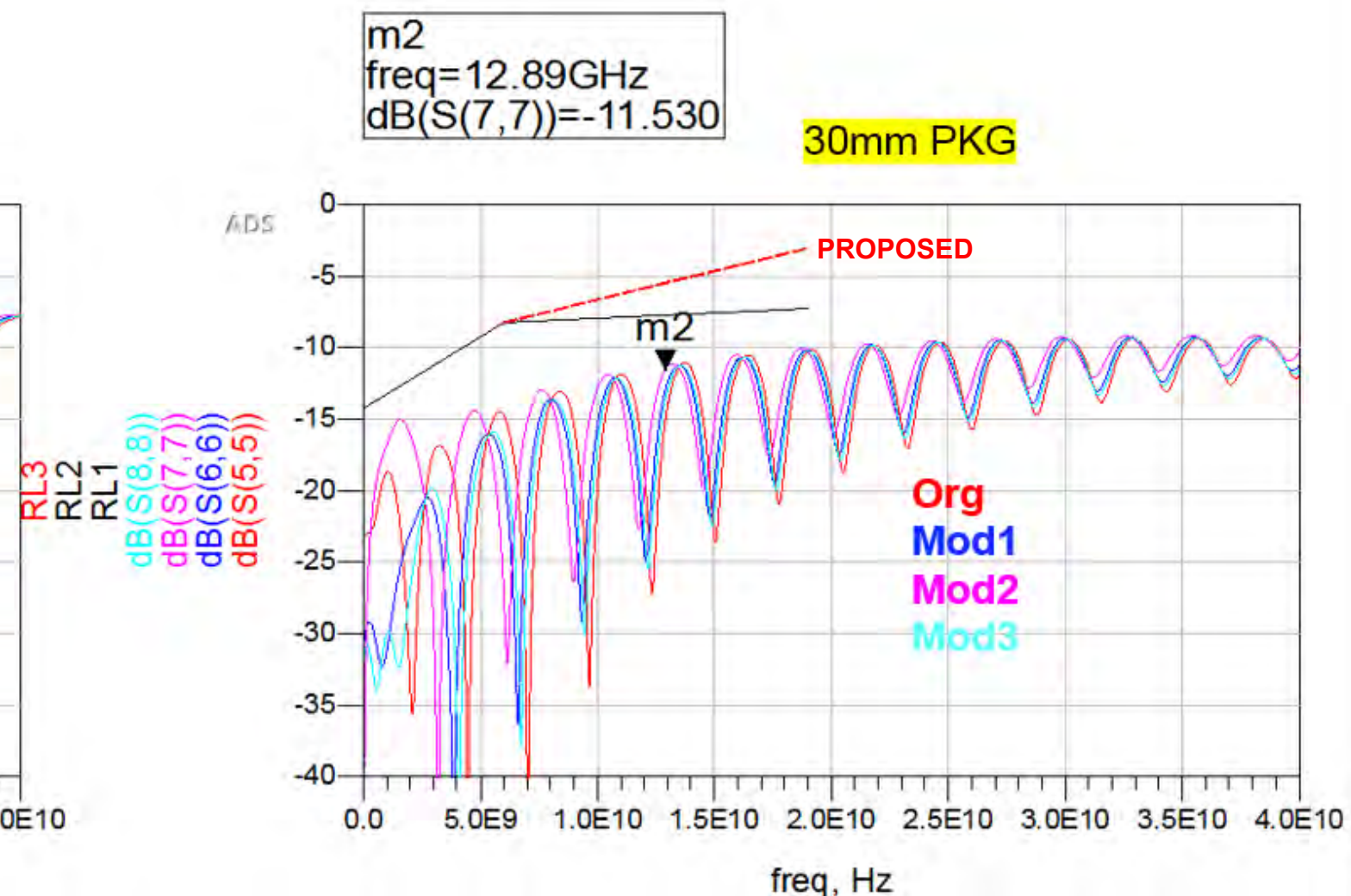
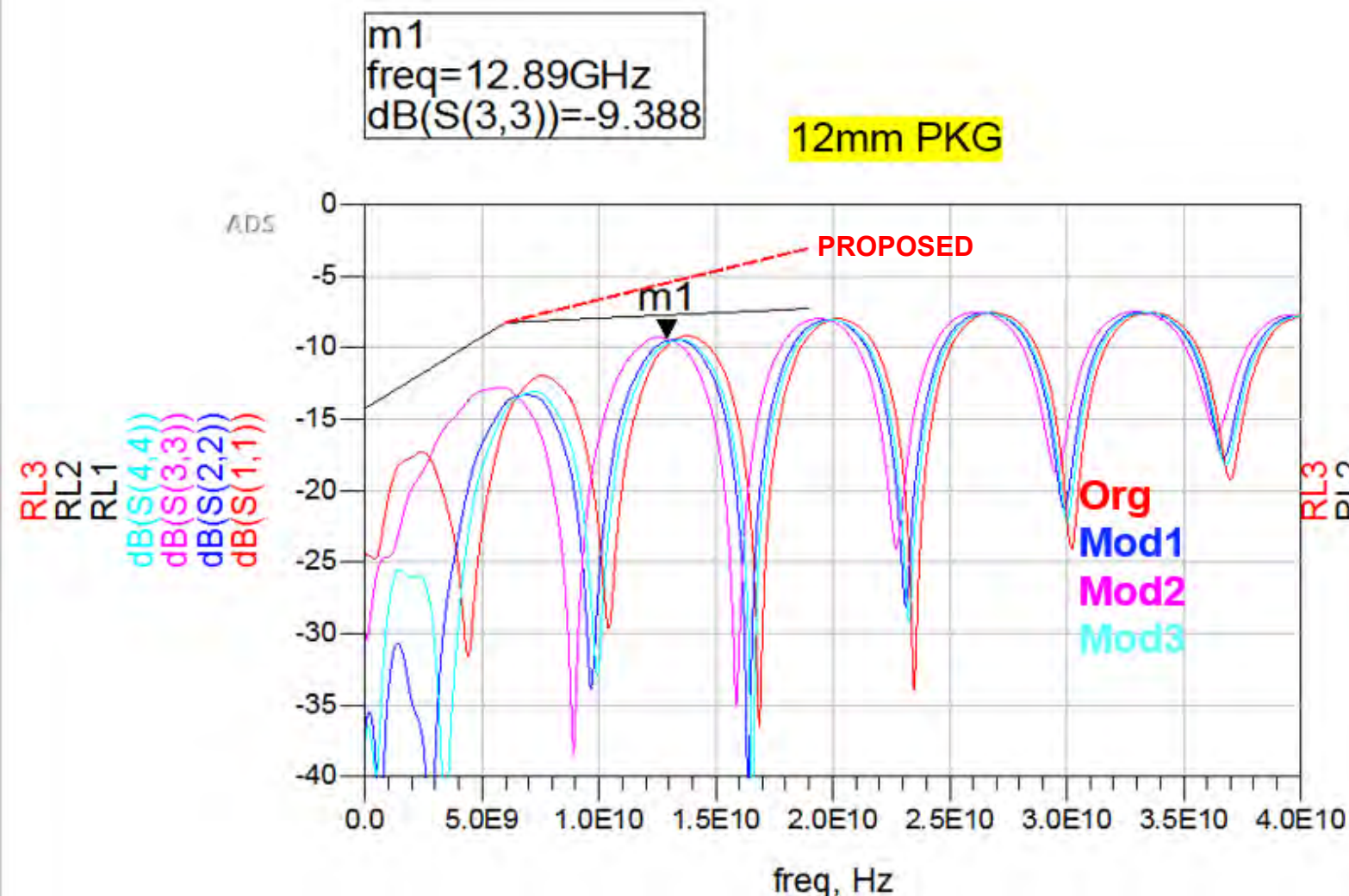
Return Loss Specifications for C2C Tx and Rx

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- The presentation explores the impact of varying package impedance (Z_c) and R_d termination, and TP0 to TP0a test trace impedance on return loss for the 400GAUI-8 (Clause 120D) chip to chip specification.
- It compares the results to the specification that were changed in the New Orleans meeting.
- The material was originally part of a presentation to the joint 802.3bs/cd ad hoc on June 28 2017.

Return Loss at TP0a (Test trace = 100ohms)

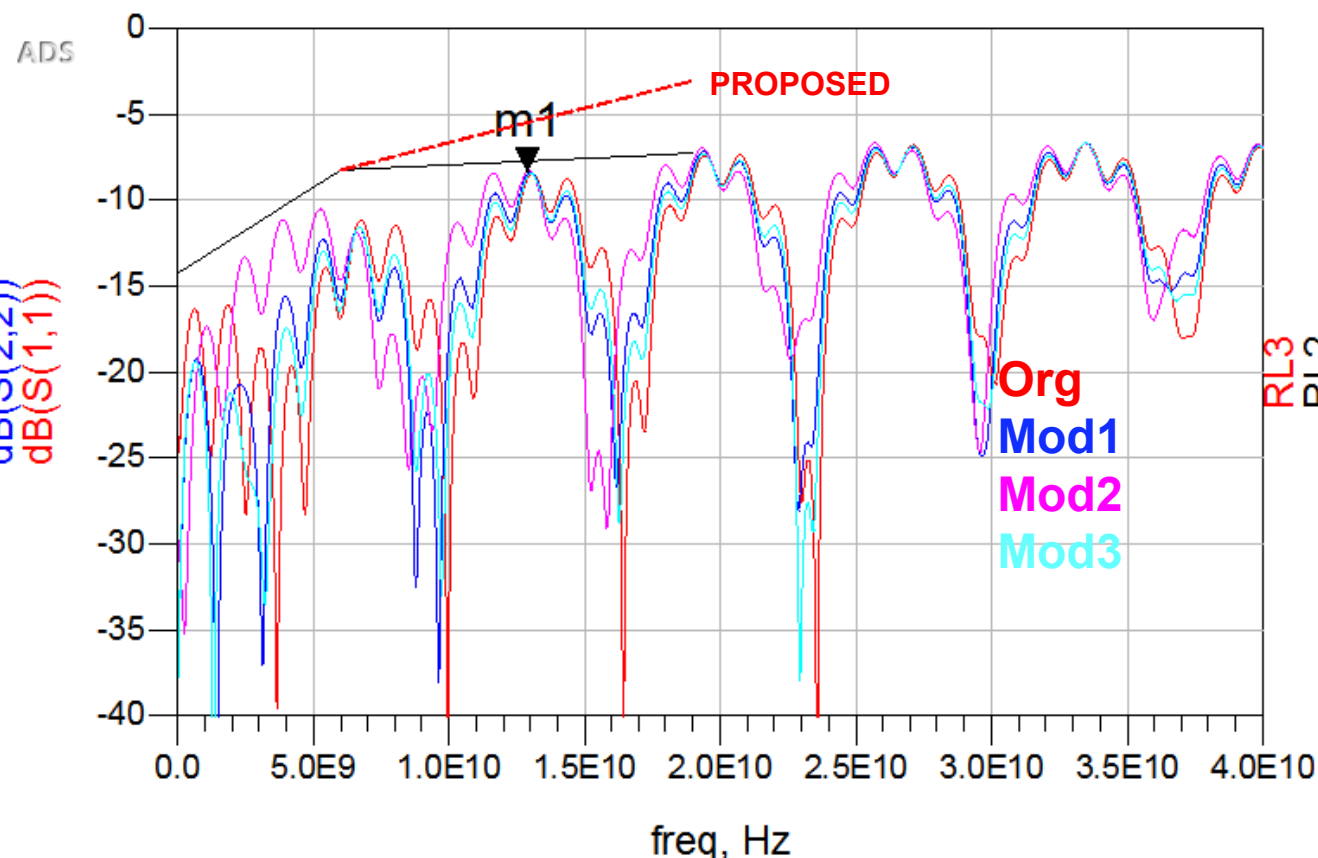


	D3.1 ORIGINAL	D3.1 CAVM mod1	D3.1 CAVM mod2	D3.1 CAVM mod3
package_Zc (ohms)	90	100	110	95
Av/Afe (V)	0.45	0.418	0.394	0.416
Cd (nF)	1.80E-04	1.80E-04	1.80E-04	1.80E-04
Rd (ohms)	[55 55]	[50 50]	[45 45]	[50 50]

Return Loss at TP0a (Test trace = 90ohms)

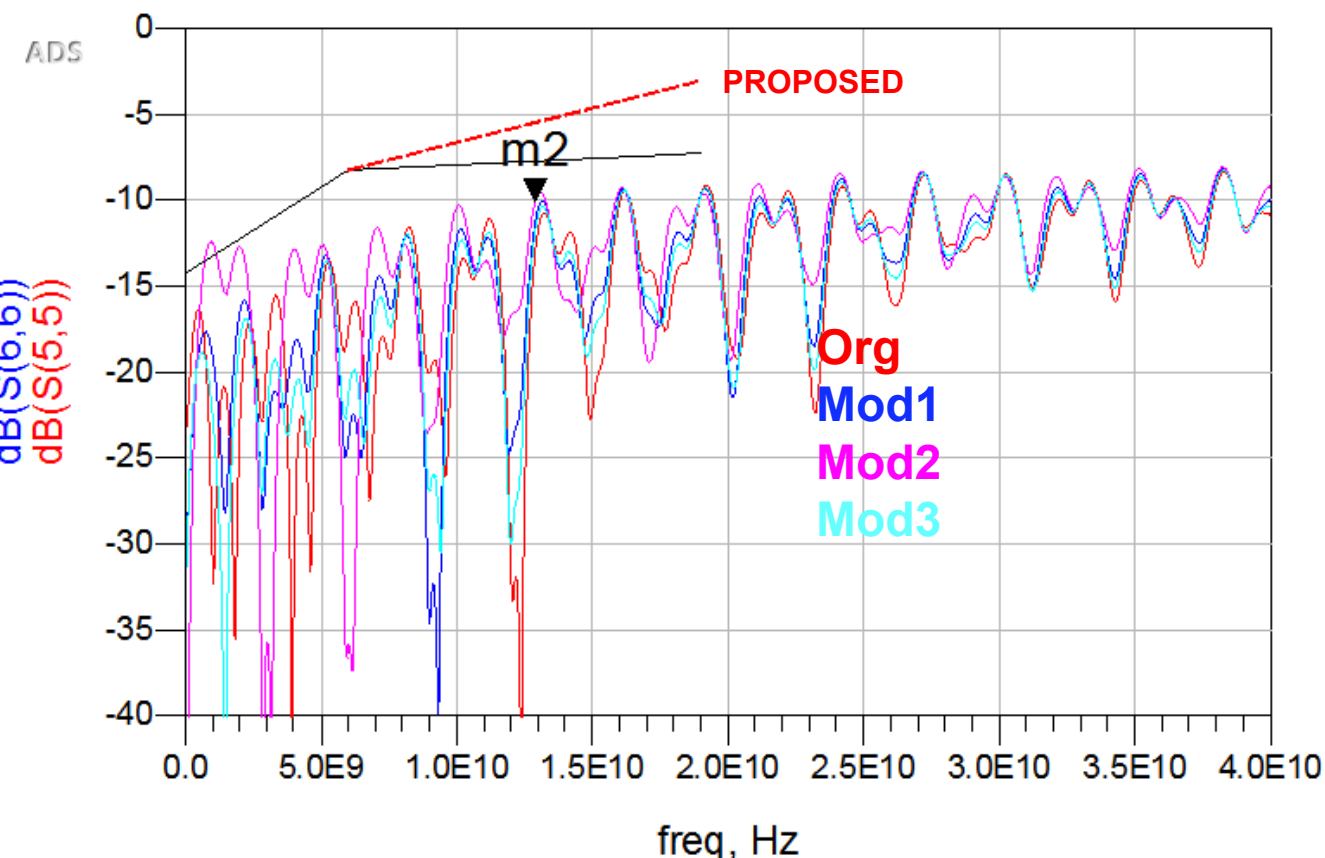
m1
freq=12.89GHz
dB(S(3,3))=-8.313

12mm PKG



m2
freq=12.89GHz
dB(S(7,7))=-10.049

30mm PKG

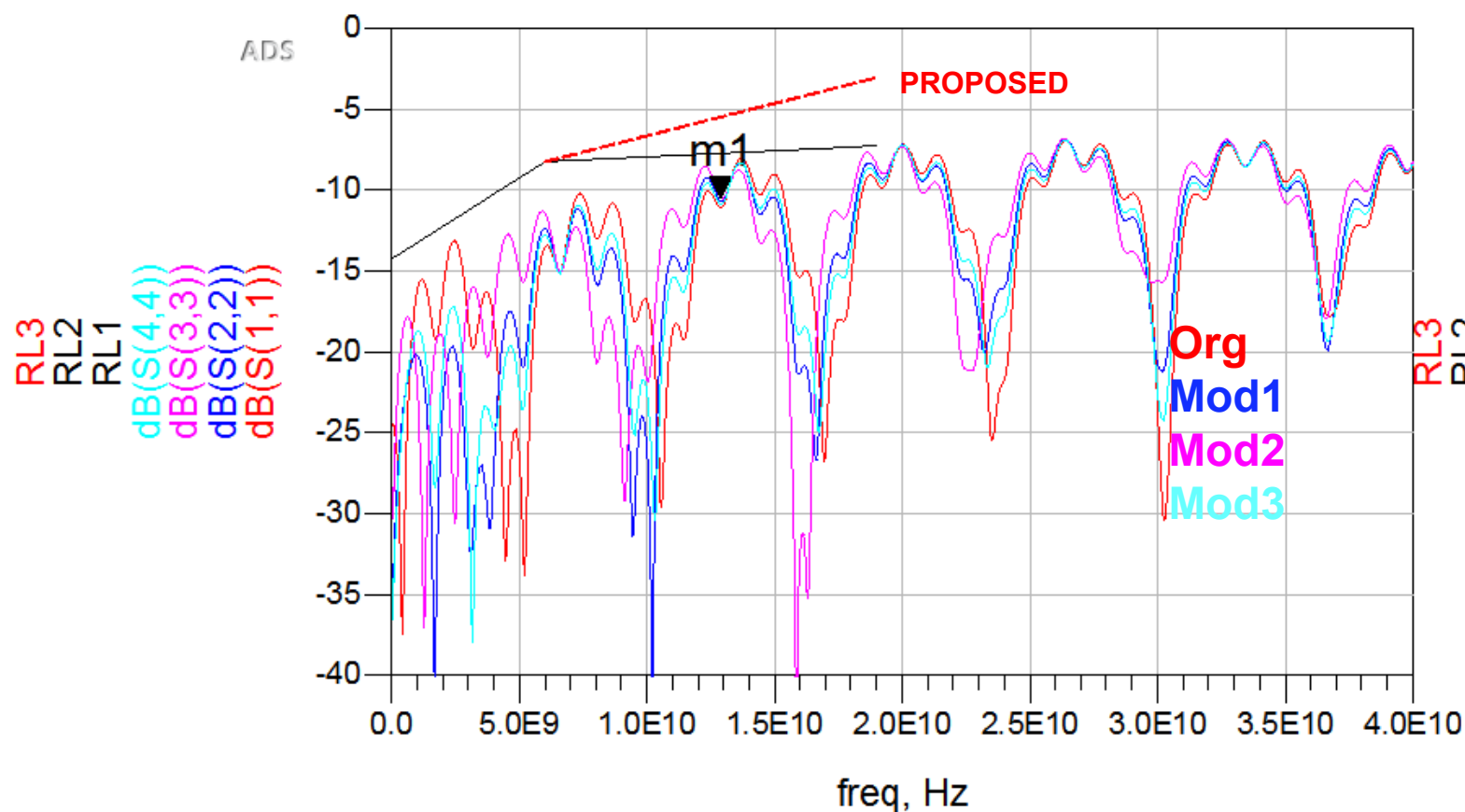


	D3.1 ORIGINAL	D3.1 CAVM mod1	D3.1 CAVM mod2	D3.1 CAVM mod3
package_Zc (ohms)	90	100	110	95
Av/Afe (V)	0.45	0.418	0.394	0.416
Cd (nF)	1.80E-04	1.80E-04	1.80E-04	1.80E-04
Rd (ohms)	[55 55]	[50 50]	[45 45]	[50 50]

Return Loss at TP0a (Test trace = 110ohms)

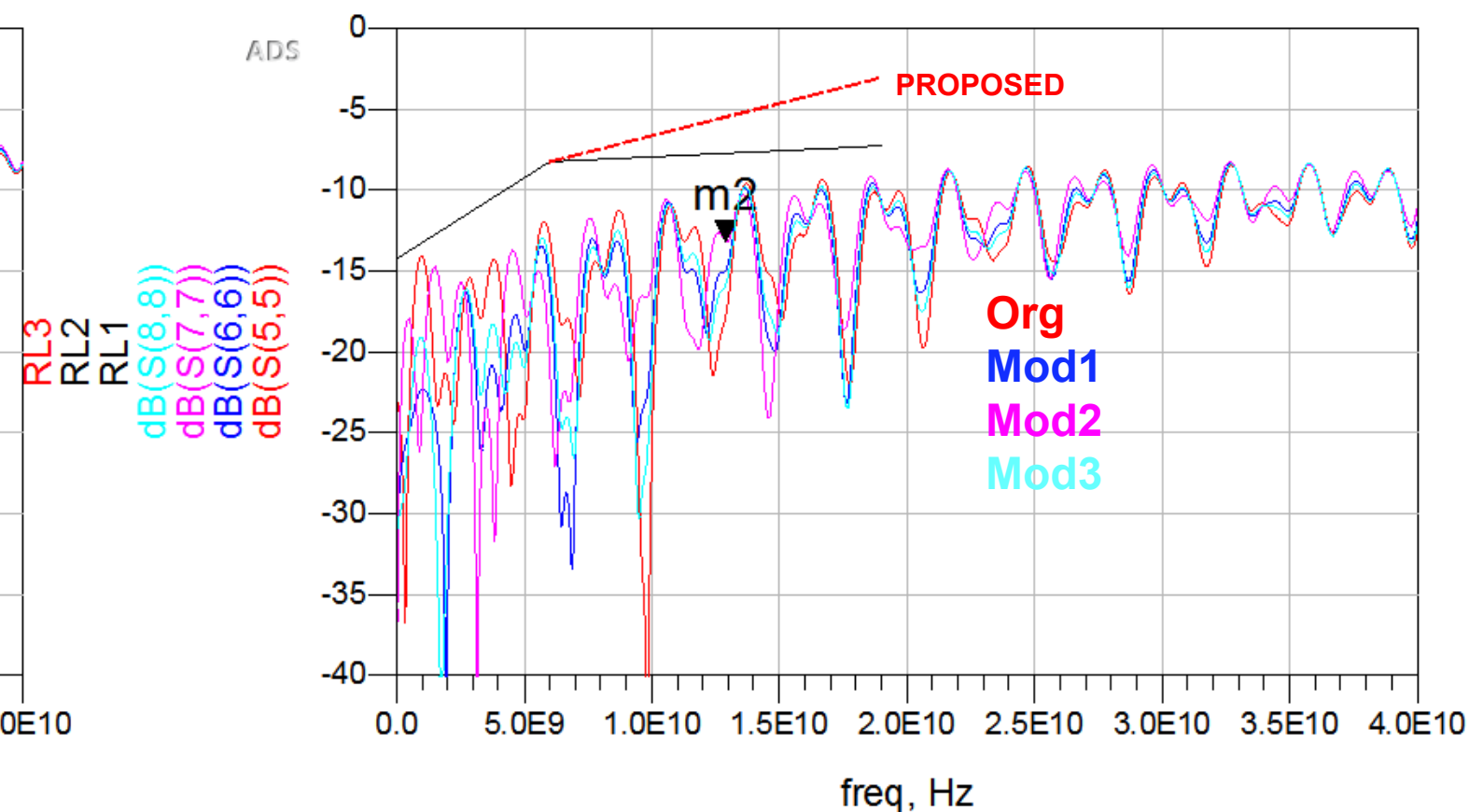
m1
freq=12.89GHz
dB(S(3,3))=-10.502

12mm PKG



m2
freq=12.89GHz
dB(S(7,7))=-13.183

30mm PKG



	D3.1 ORIGINAL	D3.1 CAVM mod1	D3.1 CAVM mod2	D3.1 CAVM mod3
package_Zc (ohms)	90	100	110	95
Av/Afe (V)	0.45	0.418	0.394	0.416
Cd (nF)	1.80E-04	1.80E-04	1.80E-04	1.80E-04
Rd (ohms)	[55 55]	[50 50]	[45 45]	[50 50]

Conclusions

- **The effect of changing R_d and Z_c on the return loss measured at TP0a is not great. It is therefore not possible to control the R_d and Z_c impedances using the return loss at TP0a.**
- **At higher frequencies the D3.2 return loss specification is too tight particularly for the short package. Note that these simulations do not include the additional degradations due to a non-ideal connector (or vias) at TP0a.**

Proposal

- Change the second half of the Tx and Rx return loss specifications as highlighted below

$$RL_d(f) \geq \left\{ \begin{array}{ll} 14.25 - f & 0.05 \leq f \leq 6 \\ \text{10.65} - 0.4f & 6 < f \leq 19 \end{array} \right\} \text{ dB} \quad (120D-2)$$