

Comment 124: Realigning the Cable Spec



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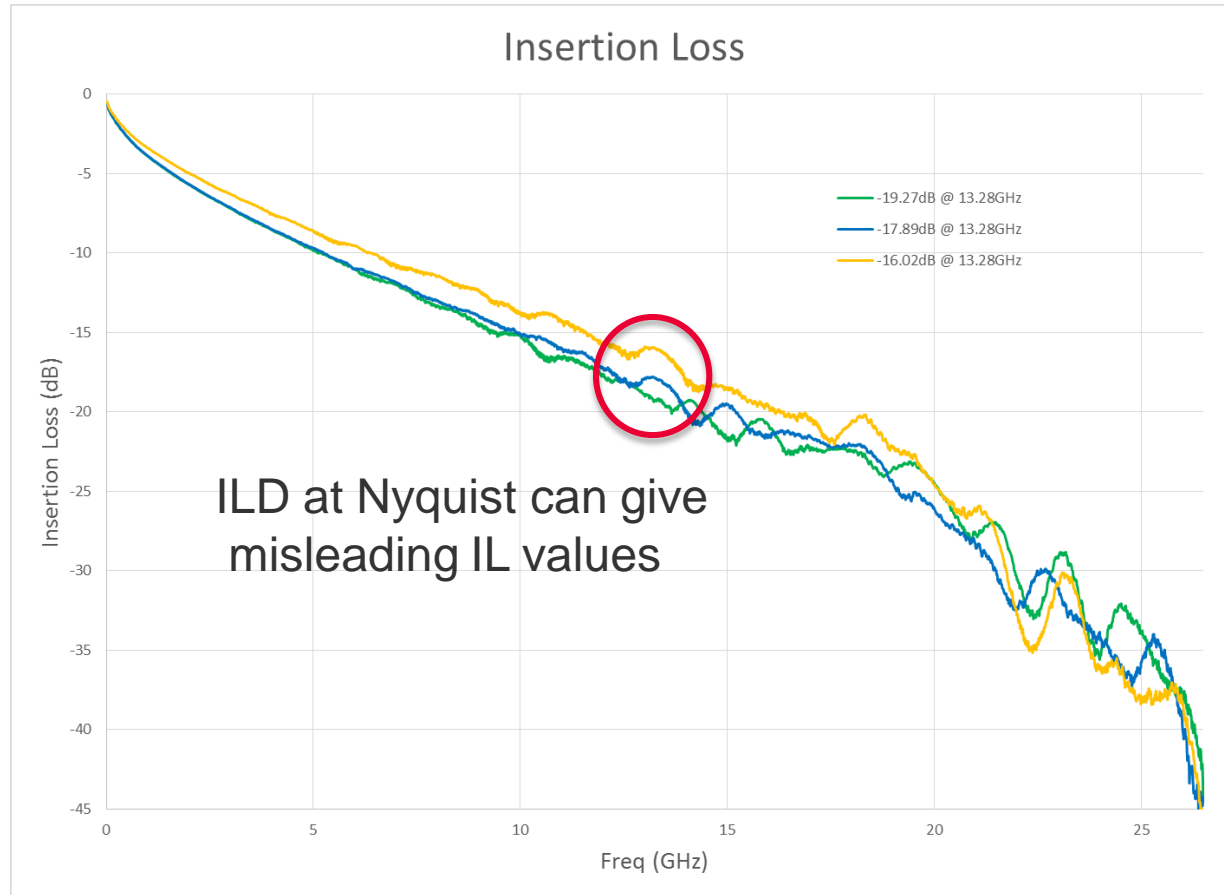
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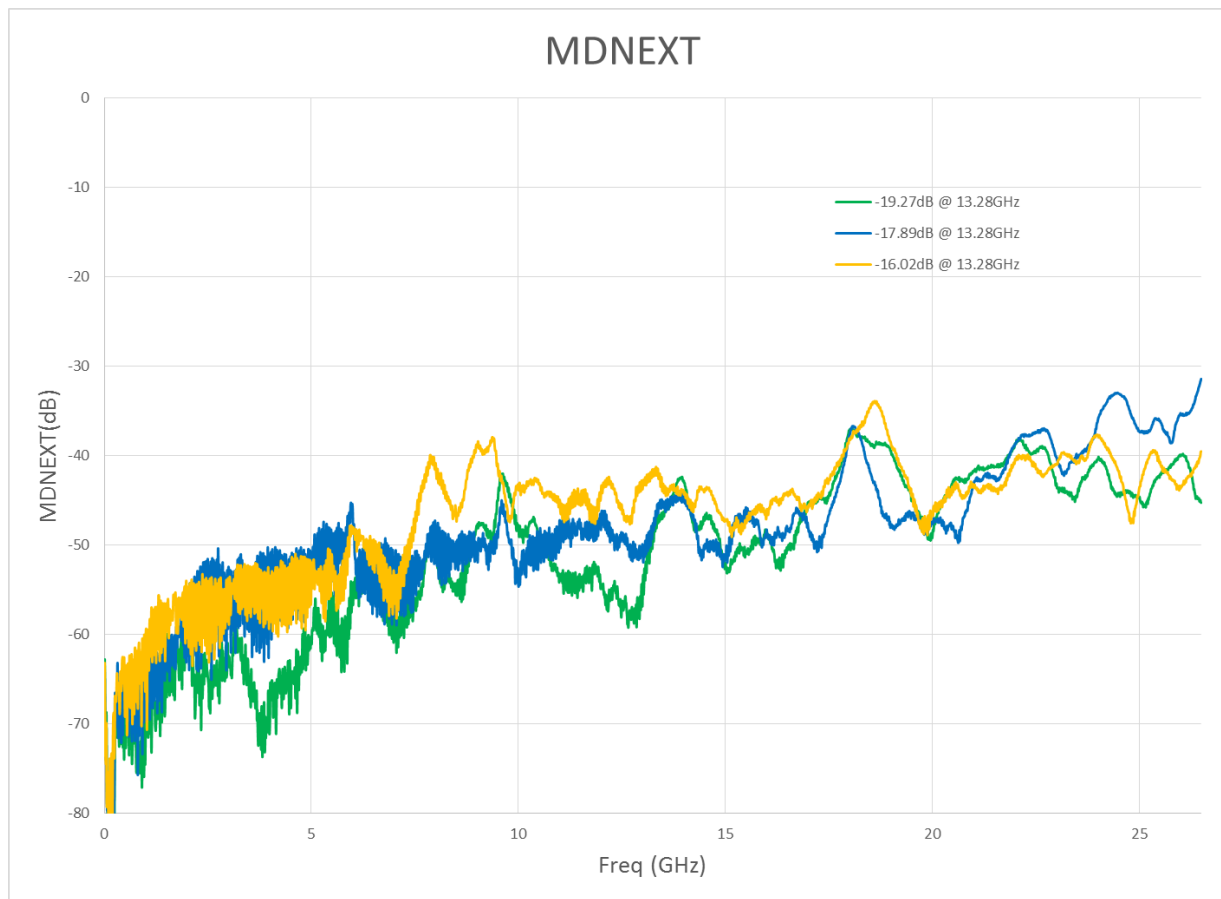
Problem Statement:

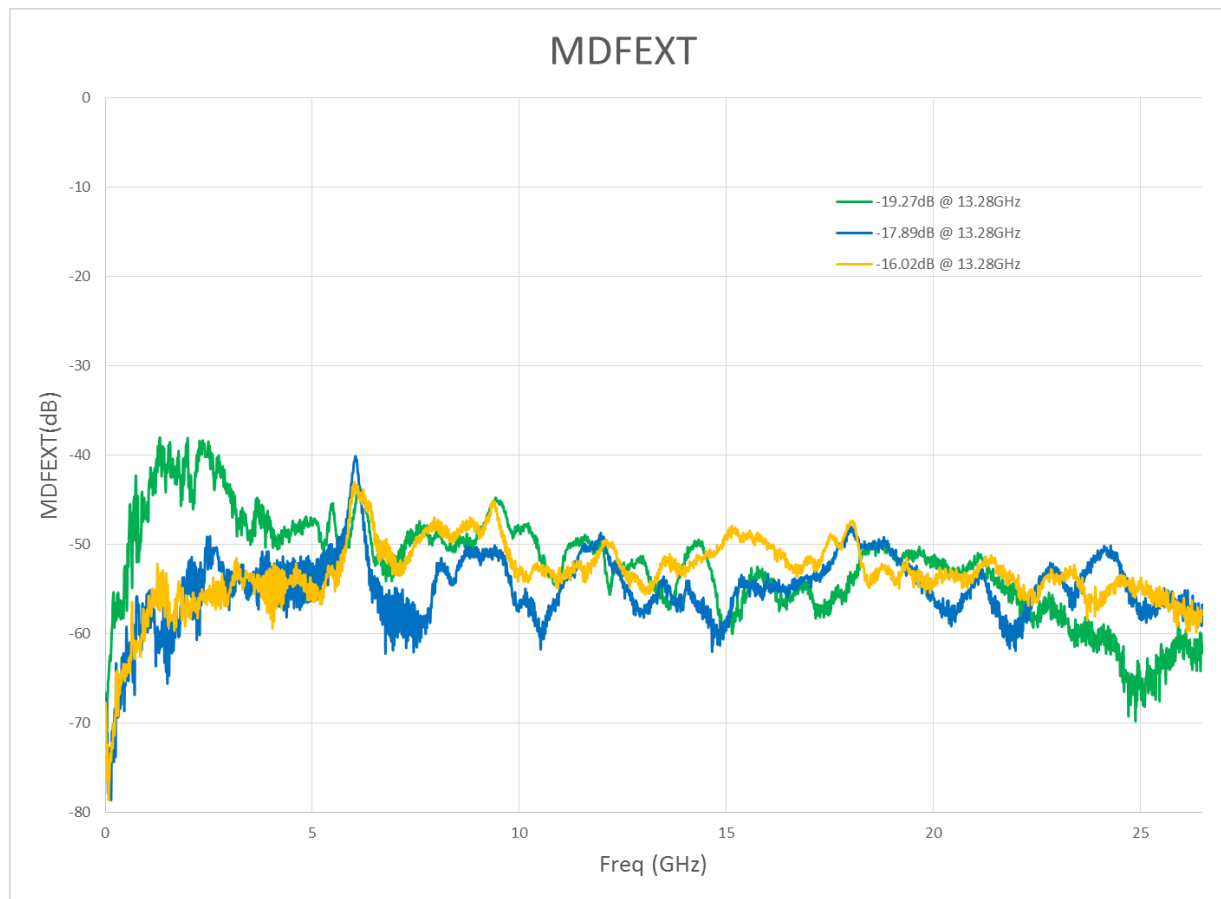
- Loss budgeting at a single frequency point of insertion loss is an outdated method for specifying a channel
- COM was explicitly created to address this and allow for trade off between loss and noise
- The current Insertion Loss Limit listed in clause 136.10 is overly restrictive and undermines COM results of higher loss, higher performance cables

Outline:

- S parameters values are presented for low, mid, and high loss channels
- COM analysis is done with two COM parameter sets
- Data summary of Insertion Loss and COM values is shown
- Conclusions and supporting slides







Analysis:

- Compare channels with different losses:
 - Low loss: pass the current 16.06dB limit
 - Mid loss: passes the proposed 18.00dB limit
 - High loss: loss greater than 18.00dB
- Calculate COM with different settings:
 - A Settings: D2.0 settings
 - B Settings: Yasuo's proposed settings

Varied Parameters	Settings	
	A	B
A_v	0.45	0.415
A_fe	0.45	0.415
A_ne	0.63	0.604
package_Z_c	90	95

COM Results

Channels	Low Loss		Mid Loss		High Loss	
	A	B	A	B	A	B
IL (dB)	16.02		17.89		19.27	
COM (dB)	TBD	TBD	TBD	TBD	TBD	TBD
Interference (mV)	TBD	TBD	TBD	TBD	TBD	TBD
Channel Interference (mV)	TBD	TBD	TBD	TBD	TBD	TBD
ISI (mV)	TBD	TBD	TBD	TBD	TBD	TBD
MDXTK (mV)	TBD	TBD	TBD	TBD	TBD	TBD
MDNEXT (mV)	TBD	TBD	TBD	TBD	TBD	TBD
MDFEXT (mV)	TBD	TBD	TBD	TBD	TBD	TBD
Signal after Eq. (mV)	TBD	TBD	TBD	TBD	TBD	TBD

Conclusion:

- Enough COM margin exists in high performance channels that the limit on insertion loss can be loosened to 18dB without having a detrimental effect on channel performance
 - COM values can support higher loss cables
 - ILD at Nyquist can 'skew' the IL data at Nyquist
- If Yasuo proposed COM values are accepted a cable COM specification of 3.0 is recommended
- This will allow cable types with inherently higher loss to achieve 3m reaches.

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COM Settings:

Table 93A-1 parameters

Parameter	Setting	Units	Information
f_b	26.5625	GBd	
f_min	0.05	GHz	
Delta_f	0.01	GHz	
C_d	[1.8e-4 1.8e-4]	nF	[TX RX]
z_p select	[1]		[test cases to run]
z_p (TX)	[30]	mm	[test cases]
z_p (NEXT)	[12]	mm	[test cases]
z_p (FEXT)	[30]	mm	[test cases]
z_p (RX)	[30]	mm	[test cases]
C_p	[1.1e-4 1.1e-4]	nF	[TX RX]
R_0	50	Ohm	
R_d	[55 55]	Ohm	[TX RX]
f_r	0.75	*fb	
c(0)	0.6		min
c(-1)	[-0.25:0.05:0]		[min:step:max]
c(-2)	[0:0.025:1]		[min:step:max]
c(1)	[-0.25:0.05:0]		
g_DC	[-20:1:-15]	dB	[min:step:max]
f_z	10.625	GHz	
f_p1	10.625	GHz	
f_p2	2.66E+01	GHz	

A_v	Varies	V	
A_fe	Varies	V	
A_ne	Varies	V	
L	4		
M	32		
N_b	12	UI	
b_max(1)	0.7		
b_max(2..N_b)	0.2		
sigma_RJ	0.01	UI	
A_DD	0.02	UI	
eta_0	1.64E-08	V^2/GHz	
SNR_TX	32.5	dB	
R_LM	0.95		
DER_0	1.00E-04		
Operational control			
COM Pass threshold	3	dB	
Include PCB	1	Value	0, 1, 2
g_DC_HP	[-6:1:-2]		[min:step:max]
f_HP_PZ	0.6640625	GHz	

COM Settings Continued:

I/O control		
DIAGNOSTICS	1	logical
DISPLAY_WINDOW	0	logical
Display frequency domain	0	logical
CSV_REPORT	1	logical
RESULT_DIR	.\DDQ\	
SAVE_FIGURES	0	logical
Port Order	[1 3 2 4]	
RUNTAG	_CR-4	
Receiver testing		
RX_CALIBRATION	0	logical
Sigma BBN step	5.00E-03	V
IDEAL_TX_TERM	0	logical
T_r	1.20E-02	ns
T_r_filter_type	1	logical
T_r_meas_point	0	logical
Non standard control options		
INC_PACKAGE	1	logical
IDEAL_RX_TERM	0	logical
INCLUDE_CTLE	1	logical
INCLUDE_TX_RX_FILTER	1	logical
COM_CONTRIBUTION	0	logical

Table 93A-3 parameters		
Parameter	Setting	Units
package_tl_gamma0_a1_a2	[0 1.734e-3 1.455e-4]	
package_tl_tau	6.141E-03	ns/mm
package_Z_c	Varies	Ohm
Table 92-12 parameters		
Parameter	Setting	
board_tl_gamma0_a1_a2	[0 4.114e-4 2.547e-4]	
board_tl_tau	6.191E-03	ns/mm
board_Z_c	110	Ohm
z_bp (TX)	151	mm
z_bp (NEXT)	72	mm
z_bp (FEXT)	72	mm
z_bp (RX)	151	mm