D1.2 Comments Discussion Document

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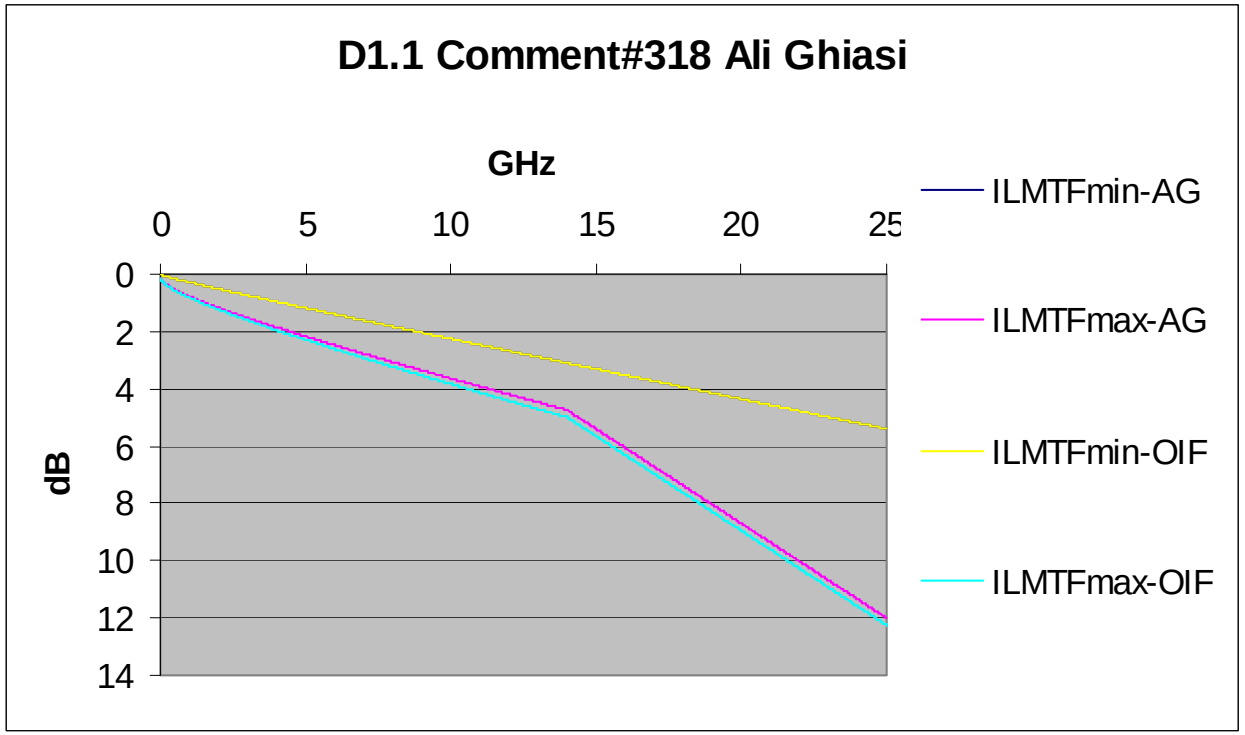
#228



OIF-Min

Mated HCB-MCB SDD21, SDD12 <-0.08$\sqrt{f}$ - 0.2*f dB for f<28 GHz (1-10)

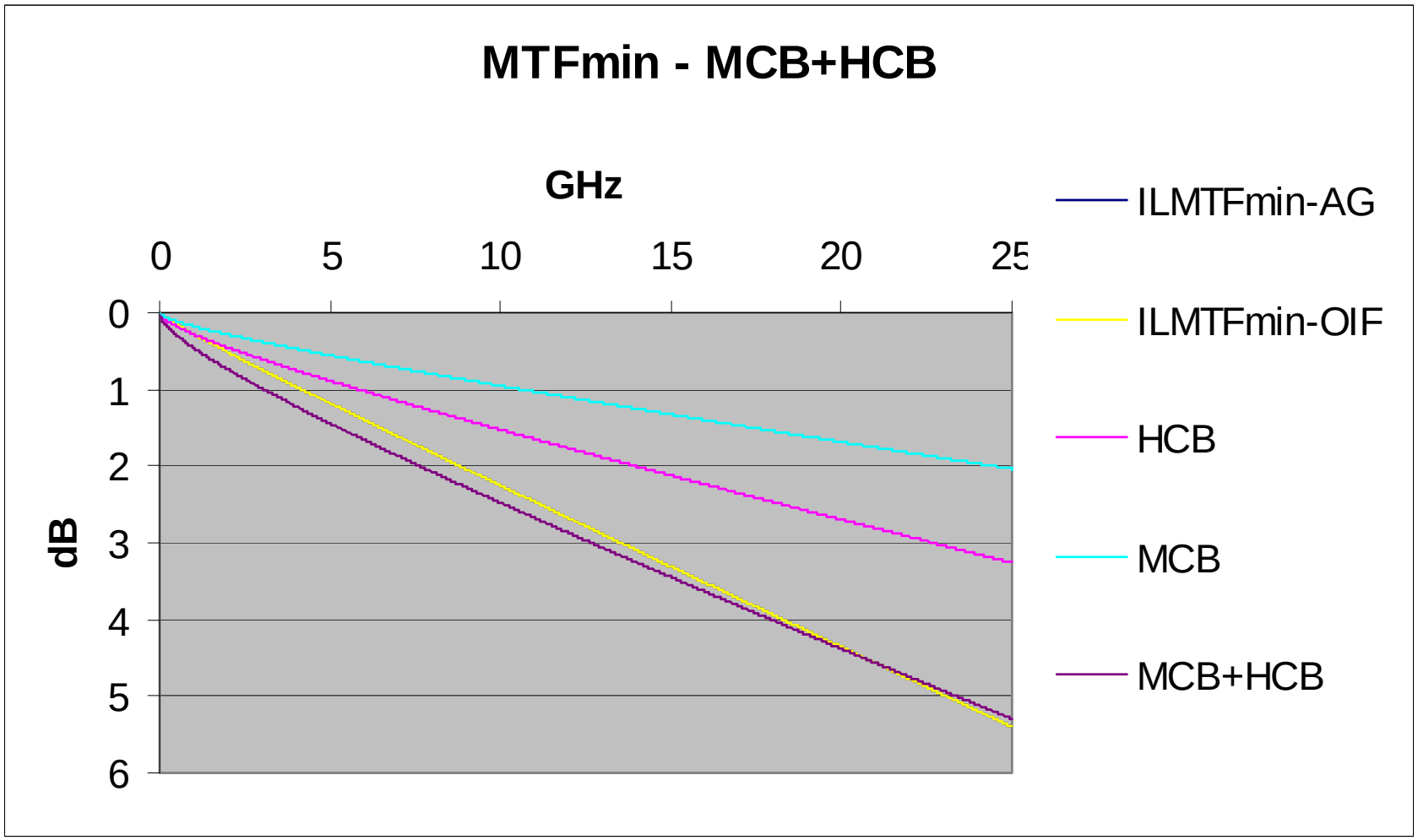
OIF-Max

Mated HCB-MCB SDD21, SDD12> -0.12-0.475$\sqrt{f}$ - 0.221*f dB for f<14 GHz (1-9)

Mated HCB-MCB SDD21, SDD12 >4.25-0.66*f dB for 14 GHz<f<28 GHz

Comment#228 D1,2
ILMTFmin=(0.08*sqrt(f)+0.2*f) for 0.01 to 25.78 GHz

ILMTFmax=(-0.114 + 0.45*sqrt(f)+0.21*f) for 0.01 to 14 GH
= 4.5 - 0.66*f for 14 to 25.78 GHz



GHz	HCB	MCB	HCB+MCB
12.8906	1.8732	1.1708	3.0440

FREQ(GHz)	ILMTFmin-AG	ILMTFmax-AG	ILMTFmin-OIF	ILMTFmax-OIF
12.8906	2.8653	4.4366	2.8653	4.6742

#165

Cl 92 SC 10 P 167 L 4648 # 165

Bugg, Mark
Molex

Comment Type TR *Comment Status* X

Modify Eqn 92-14 based on measured data

SuggestedRemedy

Change Equation 92-14 from
10.80-13log(f/5.5)
to
10.70-14LOG(f/5.5)

Proposed Response *Response Status* O

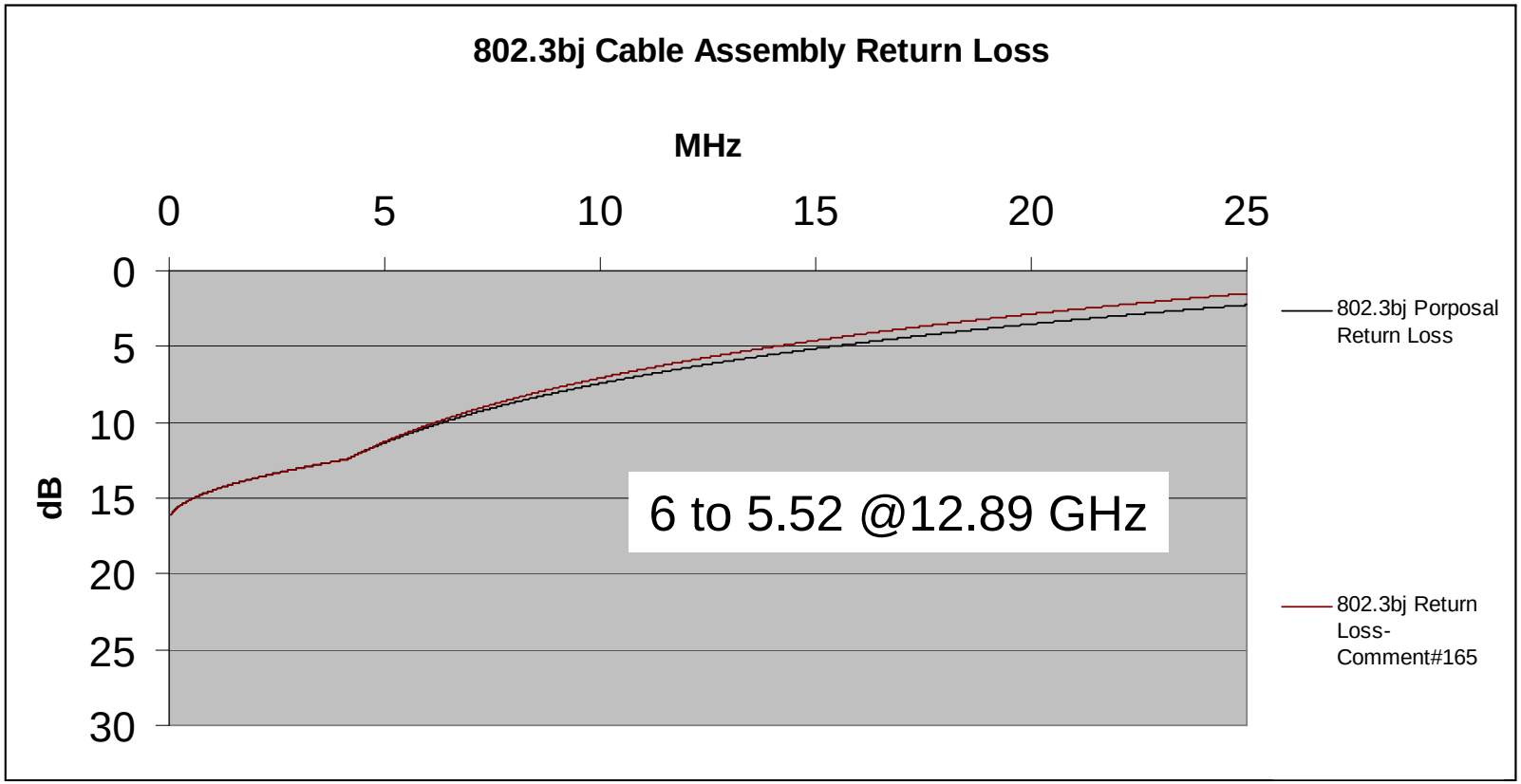
92.10.4 Cable assembly return loss

The return loss of each pair of the 100GBASE-CR4 cable assembly shall meet the values determined using Equation (92–14).

$$Return\_loss(f) \geq \begin{cases} 16.50 - 2\sqrt{f} & 0.05 \leq f < 4.1 \\ 10.80 - 13\log_{10}(f/5.5) & 4.1 \leq f \leq 25 \end{cases} \text{ (dB)} \qquad (92\text{–}14)$$

where

f is the frequency in GHz



#256,#219,#319

Frequency ranges of s-parameter specifications
-Tx/Rx specifications
-Cable assembly specifications
-Test fixture specifications

The frequency range has been debated during each ballot cycle. The Tx/Rx RL max frequency represents current consensus. Stakeholders in the Tx/Rx RL specifications have expressed interest in specifying Tx/Rx RL as well as test fixtures for Tx/Rx at the baud rate.

Cable assembly manufactures have resisted extending the frequency range beyond what's absolutely necessary so not to impose unnecessary measurement requirements both equipment and the time to perform measurements. Many VNAs used by cable assembly manufacturers are specified to 20 GHz. The 18.75 Ghz was derived as follows 18.75 GHz=(7.5/10.3125)*25.78125. From 802.3ba, the 7.5 GHz is the 3 dB reference receiver bandwidth and 10.3125 is the signaling rate, per lane. From 802.3bj, the 3 dB reference receiver bandwidth is set to 18.75 GHz.

#256,#219,#319

Frequency ranges of s-parameter specifications
-Tx/Rx specifications
-Cable assembly specifications
-Test fixture specifications

Cl 92 *SC* 8.3.2 *P* 153 *L* 33 # 256

Shanbhag, Megha TE Connectivity

Comment Type T *Comment Status* X

In equation (92-1) Maximum frequency for Tx Output RL is defined as 25GHz.
But IL in equation (92-4) is defined up to a maximum frequency of 18.75GHz.

SuggestedRemedy

Change Equation (92-1) to reflect a maximum frequency of 18.75GHz

Proposed Response *Response Status* O

Cl 92 *SC* 8.4.1 *P* 160 *L* 28 # 219

Ghiasi, Ali Broadcom

Comment Type TR *Comment Status* X

Traditionally we have used 0.05 GHz for low freq RL measuremnts and in some case 0.01 GHz is used as in the case of Eq 92-5

SuggestedRemedy

Please change 0.01 GHz limit with 0.05 GHz

Proposed Response *Response Status* O

Cl 92 SC 92.11 P 173 L 4 # 319

Dudek, Mike QLogic

Comment Type T *Comment Status* X

Allowing the test boards to have un-restricted performance above 18.75GHz could significantly degrade system performance, resulting in good devices failing. OIF has continued the specifications up to Baud Rate for the equivalent test boards. I hope to have a presentation on this for the San Antonio meeting. OIF has also adopted complete specifications for these test boards in their VSR specification. It would be good to have the same specifications for these two standards so that the same test boards could be used for both, and most of the specifications are already identical.

SuggestedRemedy

Increase the frequency range for the test boards to 25.9GHz for all the equations in this section.
Adopt other specifications from the OIF document for these test boards to fill in any TBD values or missing specifications.(eg Mated MDNEXT=1.8mV Mated MDFEXT=4.8mV

Proposed Response *Response Status* O

#222

Cl 92A SC 3 P 281 L 36 # 222

Ghiasi, Ali Broadcom

Comment Type TR *Comment Status* X

Equation 92A-1 is not consistant with the TP0 to TP2 loss where coefficent SQRT(F) and f are about the same, but equation 92A-1 linear term is twice the SQRT term. Propose to use scale version of equation 92-4

SuggestedRemedy

If equation 92-4 is multipled by 0.7 then loss at 12.89 Ghz will be 6.8 dB
IL_Prop=0.0565+0.4263*sqrt(f)+0.4045*f where f is from 0.01 to 18.75 GHz

ghiasi_01_1112 will compare these two graphs

coef	**0.05649**	
	0.4044684	**sqrt(f)**
	0.4263112	**f**

Proposed Response *Response Status* O

92.8.3.5 Insertion loss TP0 to TP2 or TP3 to TP5

Transmitter measurements and tests defined in Table 92–5 are made at TP2 or TP3 using the test fixture of Figure 92–13, or its equivalent. The recommended maximum insertion loss from TP0 to TP2 or TP3 to TP5 including the test fixture is given by Equation (92–4). Note that the insertion loss from TP0 to TP2 or from TP3 to TP5 is 10 dB at 12.8906 GHz.

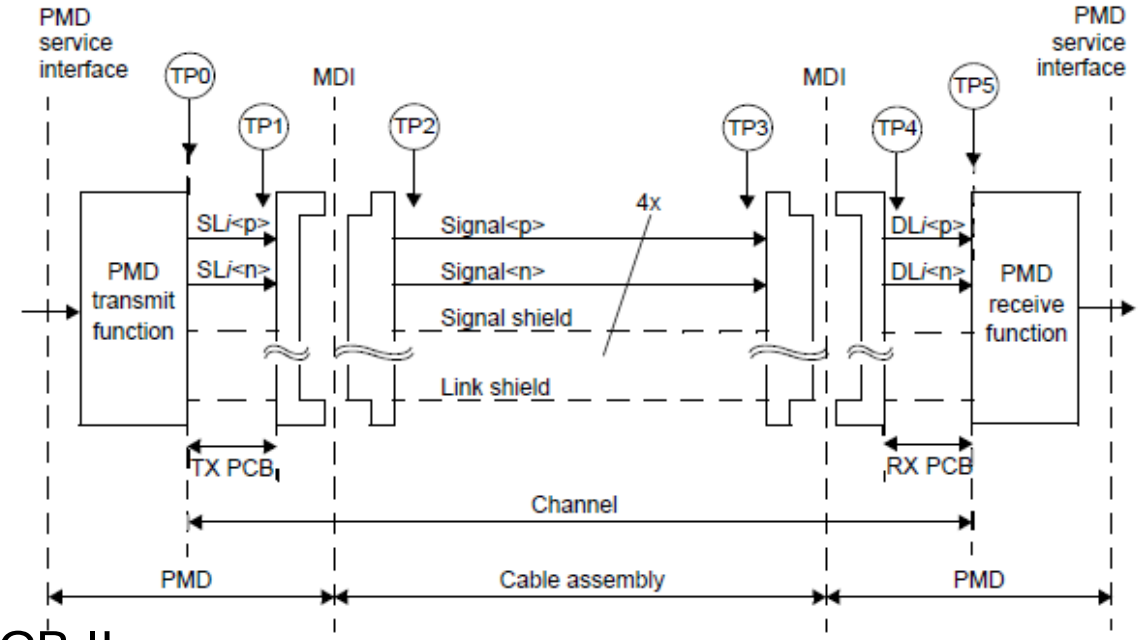
$$Insertion\_loss(f) \le \begin{cases} 1.076(0.075 + 0.537\sqrt{f} + 0.566f) & 0.01 \le f < 14 \\ 1.076(-18 + 2f) & 14 \le f \le 18.75 \end{cases} \text{ (dB)} \qquad (92\text{–}4)$$

for 0.01 GHz $\le f \le$ 18.75 GHz

where

f	is the frequency in GHz
$Insertion\_loss(f)$	is the insertion loss at frequency f

#222



92A-1 is PCB IL

TP0-TP2 includes connector which will add to sqrt(f) loss

connector IL does not scale linearly

$$IL_{PCB}(f) \le IL_{PCBmax}(f) = 0.5(0.0694 + 0.4248\sqrt{f} + 0.9322f) \text{ (dB)} \qquad (92A\text{–}1)$$

for 0.01 GHz $\le f \le$ 18.75 GHz.

where

f	is the frequency in GHz
$IL_{PCB}(f)$	is the insertion loss for the transmitter and receiver PCB
$IL_{PCBmax}(f)$	is the maximum insertion loss for the transmitter and receiver PCB

314 Cable Assembly IL – 5 m – 24 AWG

Cl 92 SC 92.10.2 P 165 L 33 # 314

Dudek, Mike QLogic

Comment Type T *Comment Status* D

Having these fitted co-efficients exactly matching the maximum loss at Nyquist heavily constrains the channel fit so that it is likely that many channels that pass the maximum loss at Nyquist will fail one or other of these fint parameters. (It also removes the need for the footnote which should be deleted if the suggested remedy is not adopted)

SuggestedRemedy

Increase the maximum insertion loss parameters by 20%.

Proposed Response *Response Status* W

PROPOSED REJECT.

See diminico_1112.pdf for development of cable assembly insertion loss.

In Table 92-10
Change a2 from 0.326 to 0.70
Change a4 from 0.0185 to 0.02

Table 92–10—Maximum and minimum cable assembly insertion loss characteristics

	Description	Value	Unit
	Maximum insertion loss at 12.8906 GHz	22.64[a]	dB
	Maximum fitted insertion loss coefficient a_1	4.28	dB/√GHz
0.70	Maximum fitted insertion loss coefficient a_2	0.326	dB/GHz
0.02	Maximum fitted insertion loss coefficient a_4	0.0185	dB/GHz^2
	Minimum insertion loss at 12.8906 GHz	8[b]	dB
	Maximum fitted insertion loss coefficient a_1	0.7	dB/√GHz
	Maximum fitted insertion loss coefficient a_2	0.3	dB/GHz
	Maximum fitted insertion loss coefficient a_4	0.01	dB/GHz^2

[a]The limit on the maximum insertion loss at 12.8906 GHz precludes the coefficients a_1, a_2, and a_4 from simultaneous maximum values.
[b]The limit on the maximum insertion loss at 12.8906 GHz precludes the coefficients a_1, a_2, and a_4 from simultaneous maximum values.

226 MTF – ICN

Cl 92 SC 11.3.5 P 177 L 38 # 226

Ghiasi, Ali Broadcom

Comment Type TR *Comment Status* D

Near end and far end crosstalk are TBD

SuggestedRemedy

Proposed limit for
NEXT = 1 mV RMS
MDNEXT= 1.7 mV RMS

FEXT= 2.6 mV RMS
MDFEXT=5.2 mV RMS

see ghiasi_01_1112

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

For committee discussion. Consider with diminico_1112.pdf.

OIF: 2010.404.08 226 MTF – ICN

OIF: OIF2010.404.08

The Integrated Crosstalk Noise (ICN) as calculated using the method defined in Chapter 12 with the aggressor amplitudes a rise/fall times as listed in Table 1-3 shall be less than 5.2 mV. MDNEXT shall be less than 1.8mv rms. MDFEXT shall be less than 4.8 mv rms

Table 1-3. Crosstalk parameters for Host Output test and Module input test calibration at TP4

Parameter	Used in test	Target value	units
Crosstalk Amplitude differential voltage pk-pk	Host Output test and module stressed receiver test calibration	900	mV
Crosstalk transition time 20-80%	Host Output test and module stressed receiver test calibration	9.5	ps

D1.1 Comment#282

Mated test fixture ICN (based on SMT)

MDFEXT (RMS) 3.5 mV

MDNEXT (RMS) 1.0 mV

Cl 92 *SC* 92.10.9.4 *P* 144 *L* 35 # 282

DiMinico, Christopher MC Communications

Comment Type TR *Comment Status* D

92.10.9.4 Mated test fixtures integrated crosstalk noise parameter values in Table 92-12 are TBD's.

SuggestedRemedy

diminico_0912.pdf provides the 92.10.9.4 Mated test fixtures integrated crosstalk noise parameter values in Table 92-12.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Committee review of diminico_0912.pdf for the Mated test fixtures integrated crosstalk noise parameter values in Table 92-12.

#64 Channel ICN

Cl **92A** *SC* **92A.8** *P* **285** *L* **29** # 64

DiMinico, Christopher MC Communications

Comment Type **TR** *Comment Status* **D**

92A.8 Channel integrated crosstalk noise (ICN) includes TBDs; Equation 92A-7 and Figure 92A-3

SuggestedRemedy

diminico_1112.pdf provides Equation 92A-7 to be used for Figure 92A-3.

Proposed Response *Response Status* **W**

PROPOSED ACCEPT.

Use suggested remedy

Annex 92A provides information on parameters associated with test points TP0 and TP5 that may not be testable in an implemented system. TP0 and TP5 test points are illustrated in the 100GBASE-CR4 link block diagram of Figure 92–2.

The TBD for channel ICN has existed for multiple drafts. A proposal to bound ICN utilizing COM has been suggested but not completed. Considering COM will be used to bound ICN a recommendation on ICN may be useful but not necessary.

Proposed response: Replace this subclause with a recommendation to meet the Channel Operating Margin (COM) between TP0 and TP5.

Annex 92A

Annex 92A provides information on parameters associated with test points TP0 and TP5 that may not be testable in an implemented system. TP0 and TP5 test points are illustrated in the 100GBASE-CR4 link block diagram of Figure 92–2.

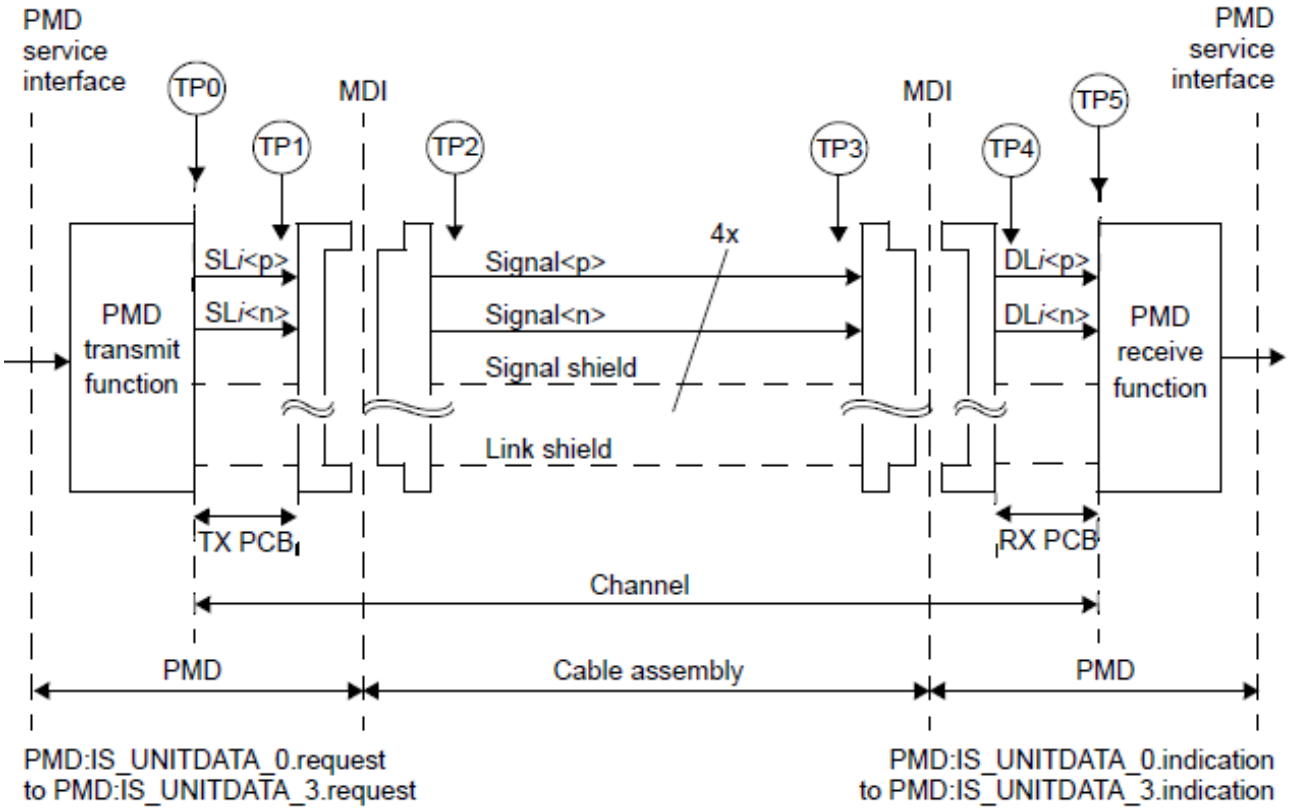


Figure 92–2—100GBASE-CR4 link (one direction is illustrated)

BACKUP

Test Fixture Crosstalk

MCB-ICN-RX1
RX1-MDFEXT-RX2,RX3,RX4
RX1-MDNEXT-TX1,TX2,TX3,TX4

MCB-ICN-RX2
RX2-MDFEXT-RX1,RX3,RX4
RX2-MDNEXT-TX1,TX2,TX3,TX4

MCB-ICN-RX3
RX3-MDFEXT-RX1,RX2,RX4
RX3-MDNEXT-TX1,TX2,TX3,TX4

MCB-ICN-RX4
RX4-MDFEXT-RX1,RX2,RX3
RX4-MDNEXT-TX1,TX2,TX3,TX4

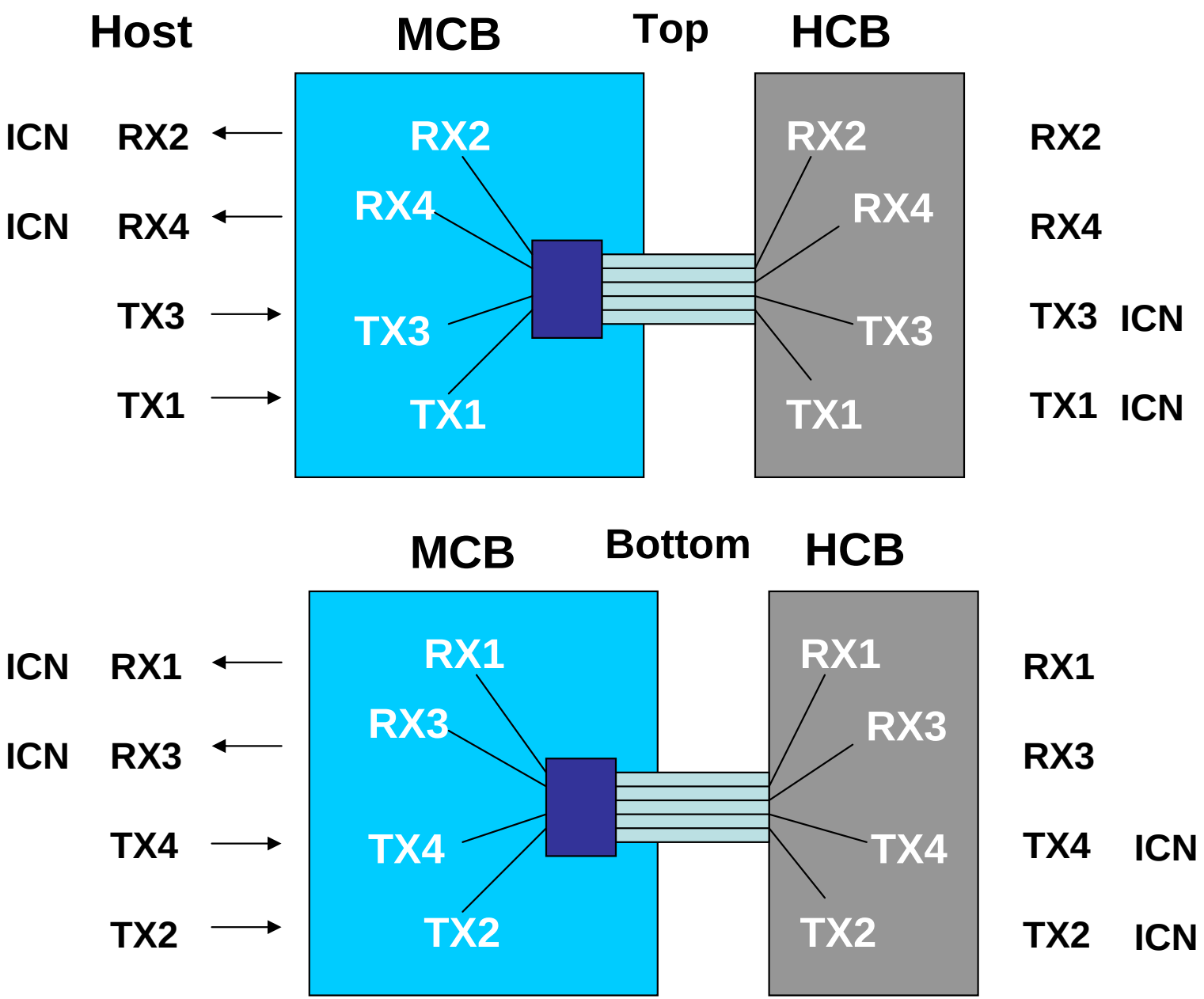
HCB-ICN-TX1
TX1-MDFEXT-TX2,TX3,TX4
TX1-MDNEXT-RX1,RX2,RX3,RX4

HCB-ICN-TX2
TX2-MDFEXT-TX1,TX3,TX4
TX2-MDNEXT-RX1,RX2,RX3,RX4

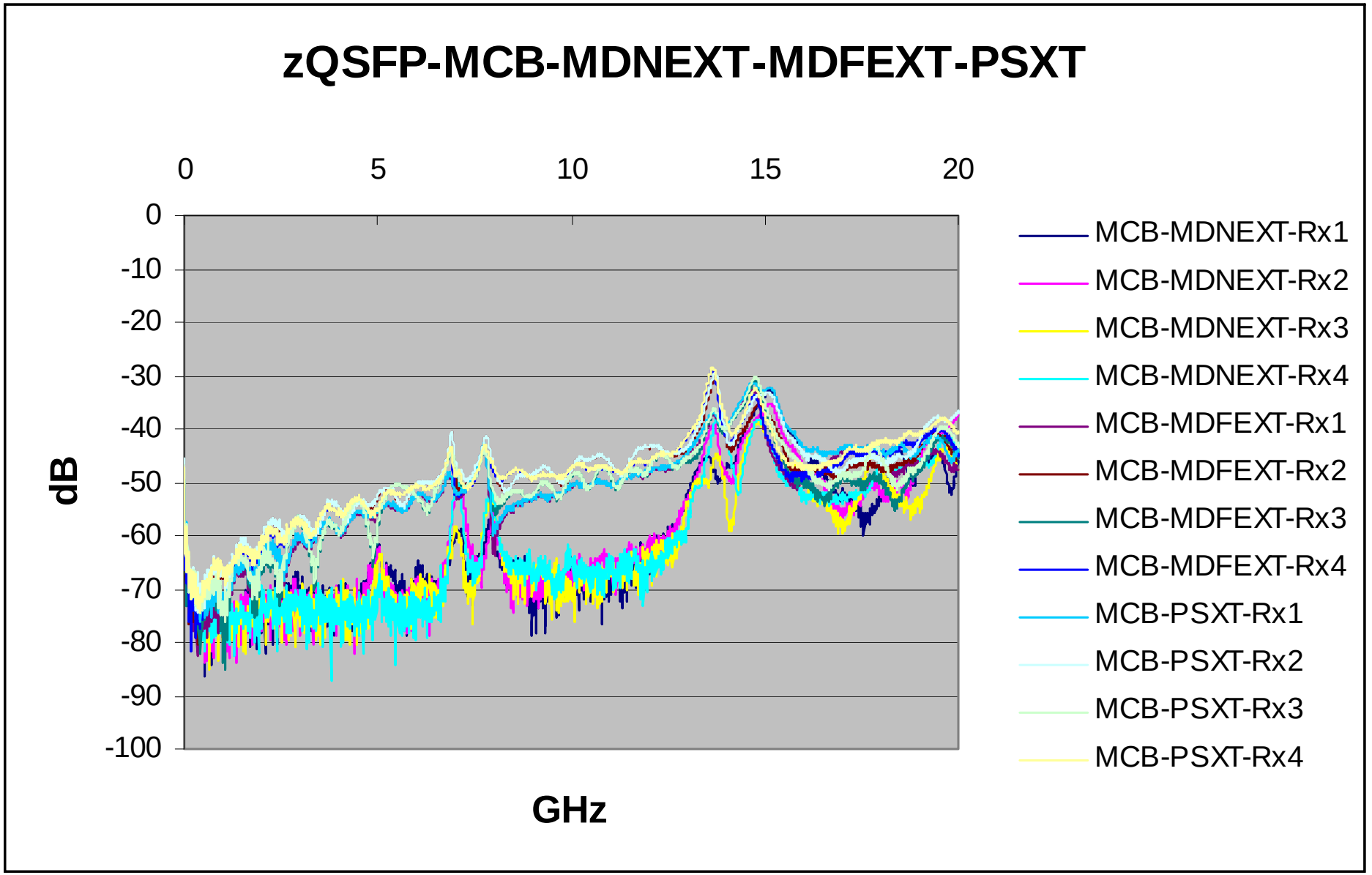
HCB-ICN-TX3
TX3-MDFEXT-TX2,TX3,TX4
TX3-MDNEXT-RX1,RX2,RX3,RX4

HCB-ICN-TX4
TX4-MDFEXT-TX1,TX2,TX3
TX4-MDNEXT-RX1,RX2,RX3,RX4

Test Fixture Crosstalk

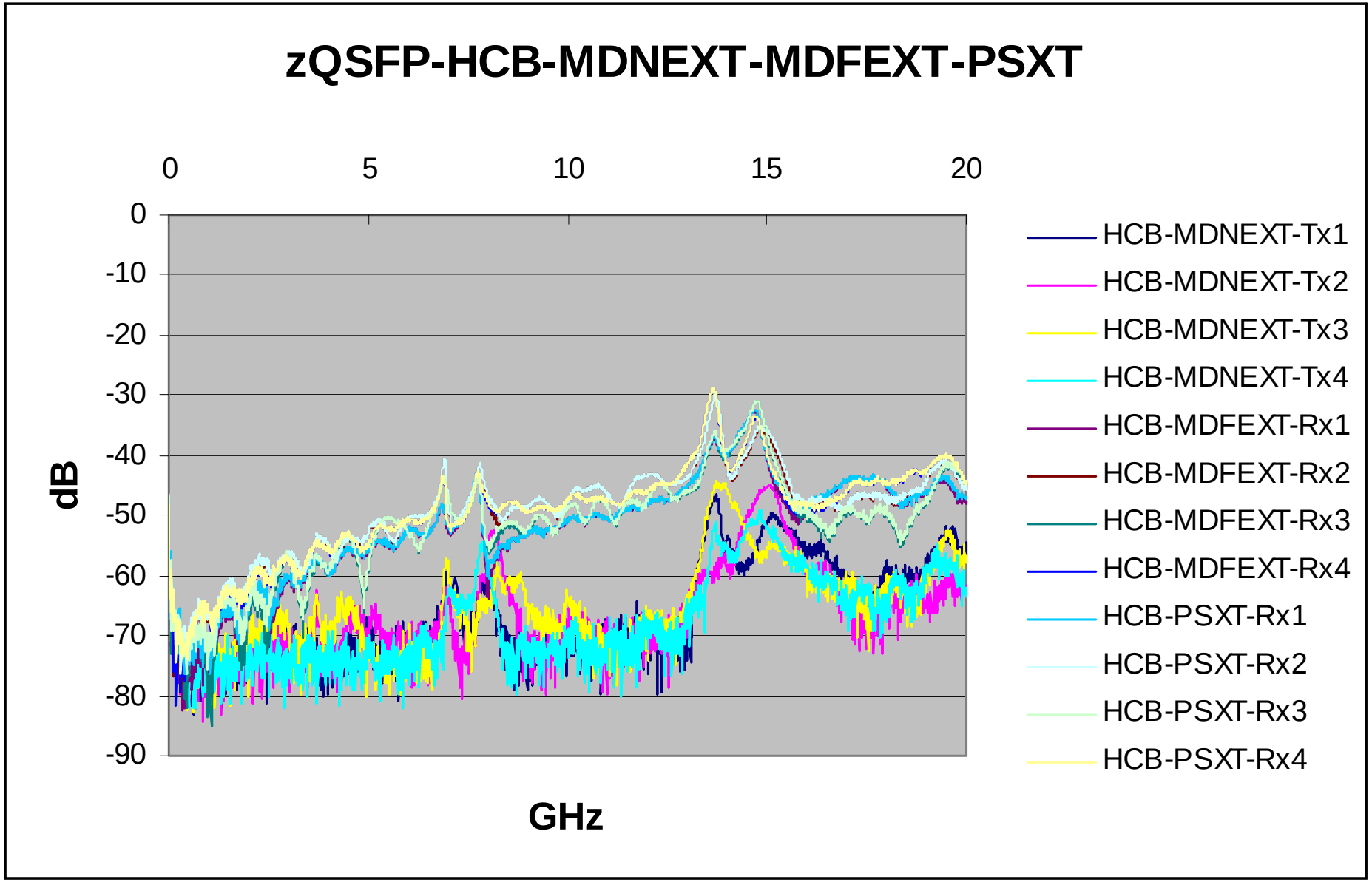


MCB side – Integrated Crosstalk Noise



Molex zQSFP – S4P measurement data provided by Michael Rost – Molex

HCB side – Integrated Crosstalk Noise



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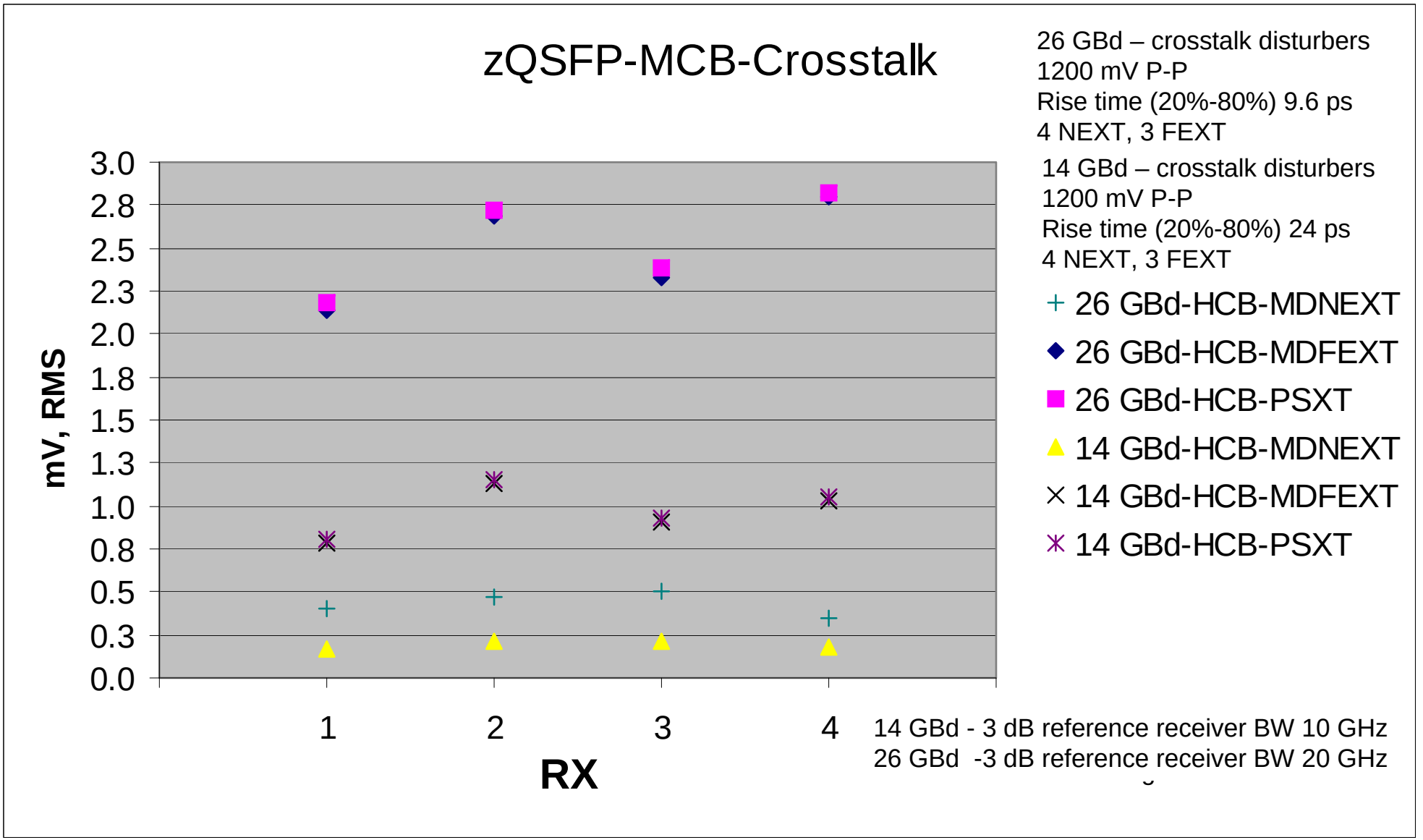
MCB side – Integrated Crosstalk Noise



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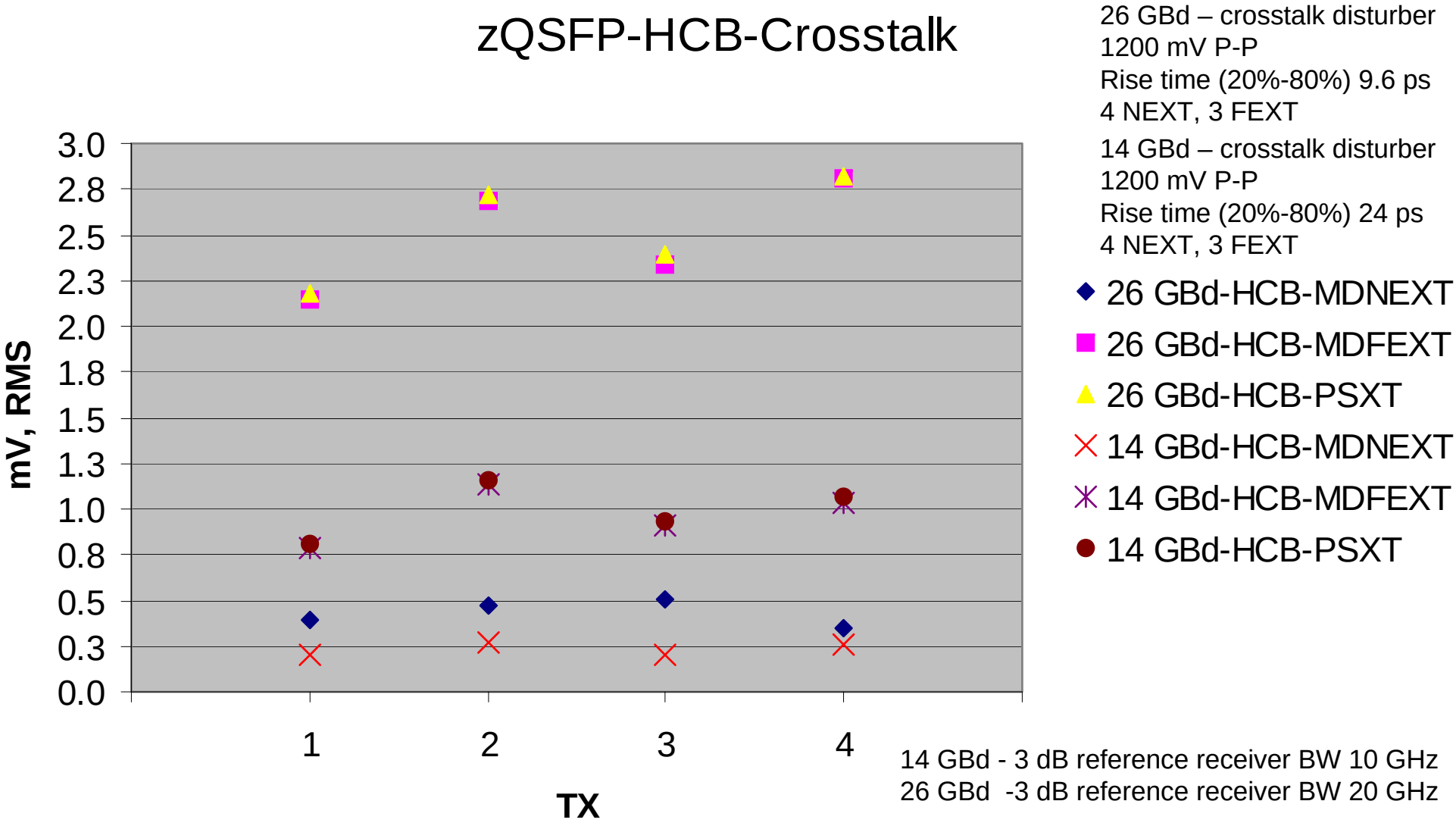
HCB side – Integrated Crosstalk Noise



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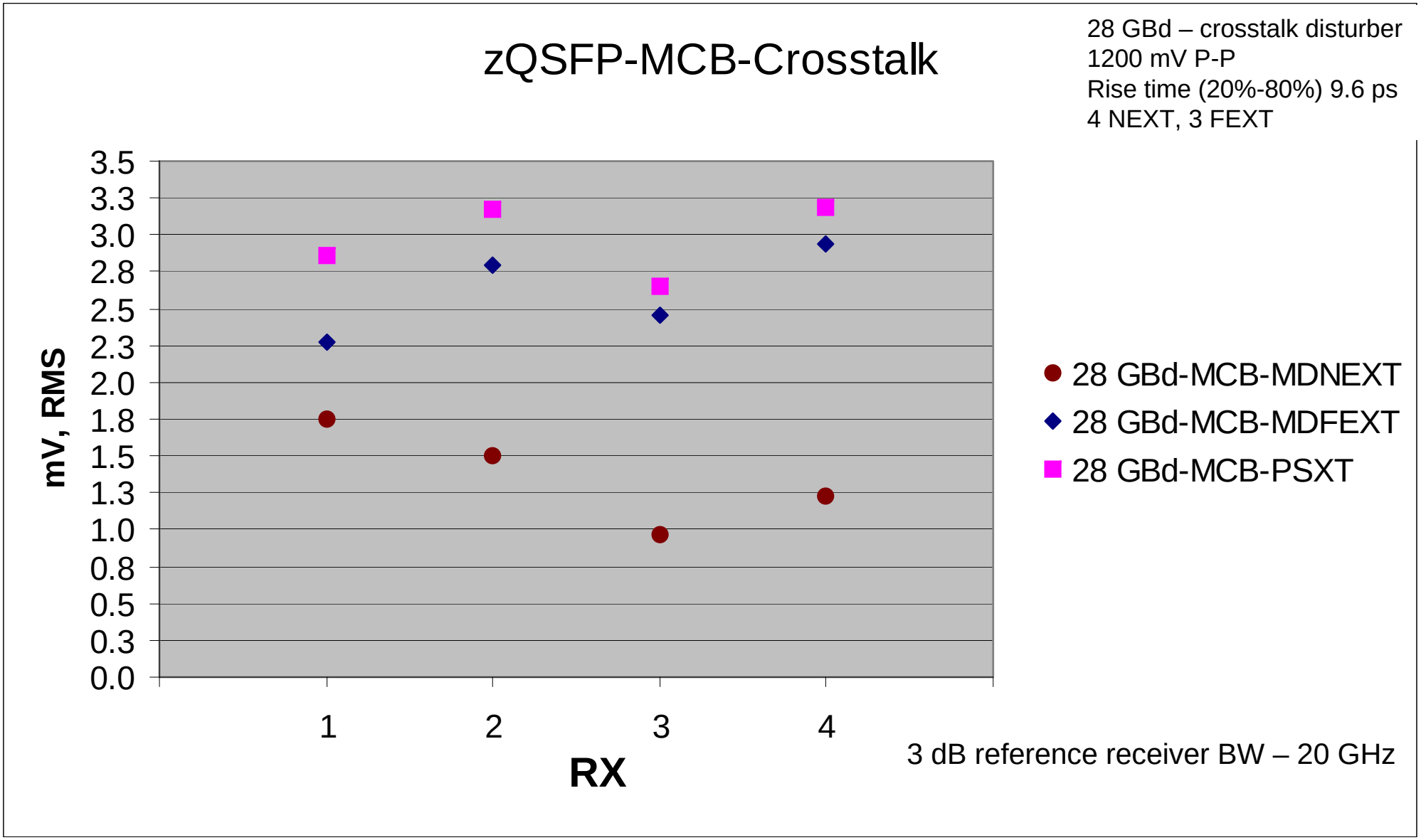

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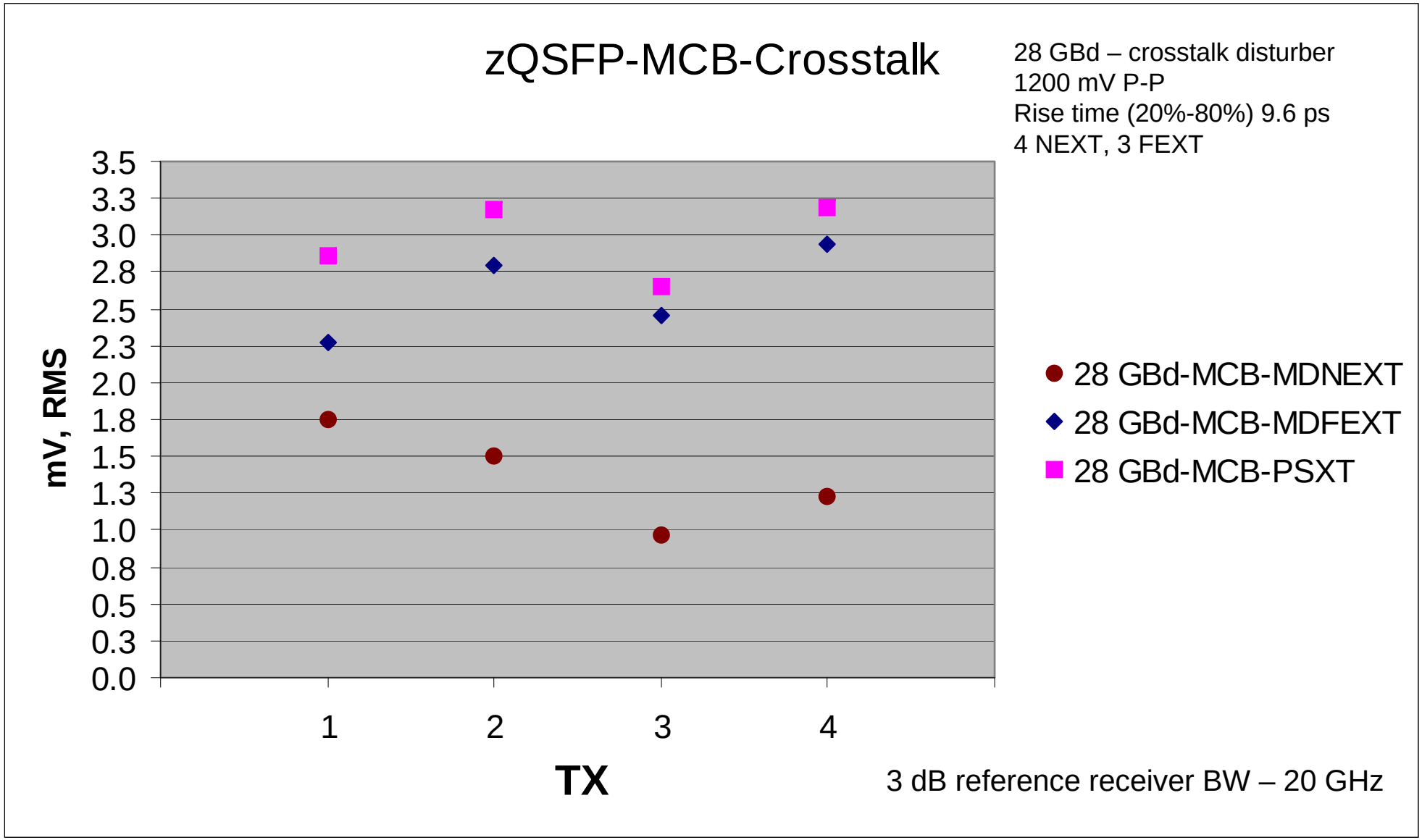
HCB side – Integrated Crosstalk Noise



Molex zQSFP – S4P measurement data provided by Michael Rost – Molex

314 Cable Assembly IL – 5 m – 24 AWG

Cl 92 SC 92.10.2 P 165 L 33 # 314

Dudek, Mike QLogic

Comment Type 0.70 *Comment Status* D

Having these ...icients exactly matching the maximum loss at Nyquist heavily constrains th ...so that it is likely that many channels that pass the maximum loss at Nyquist wi 0.02 ...ther of these fint parameters. (It also removes the need for the footnote whi ...deleted if the suggested remedy is not adopted)

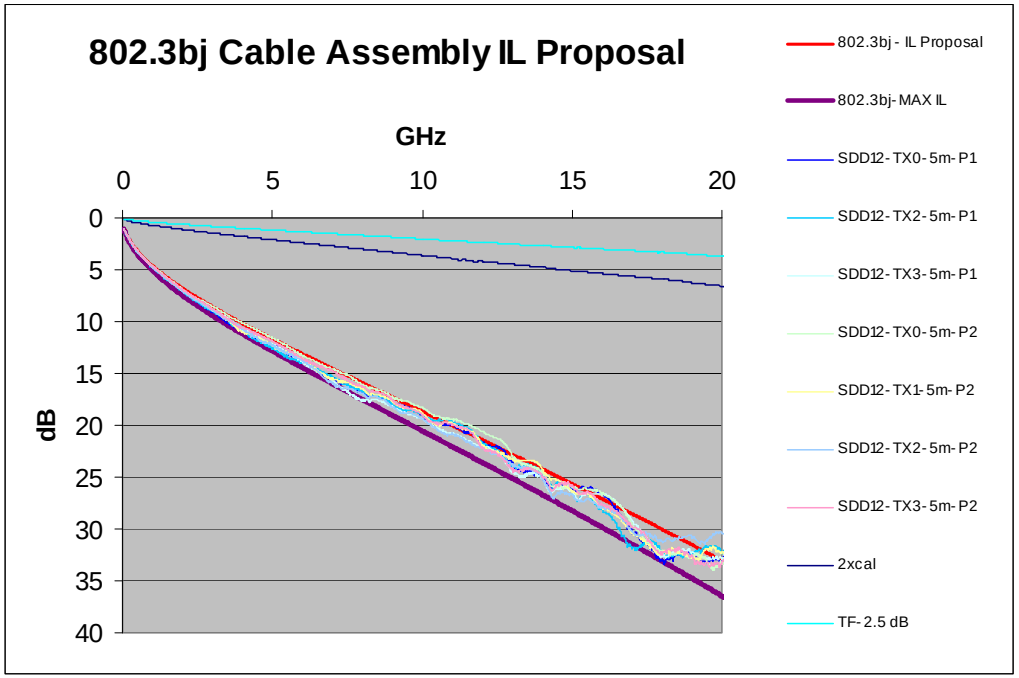
SuggestedRemedy

Increase the maximum insertion loss parameters by 20%.

Proposed Response *Response Status* W

PROPOSED REJECT.

See diminico_1112.pdf for development of cable assembly insertion loss.



802.3bj IL Proposal = 4.28*SQRT(f)+0.325*f+0.0185*f^2 = 22.64 @ 12.89 GHz

http://www.ieee802.org/3/100GCU/public/channel.html

Mark Bugg- Molex Full ZQSFP Cable Assembly, including Test Fixture(10-Feb 11)
5m: All (40M),
P1_RX0, P1_RX1, P1_RX2, P1_RX3,
P2_RX0, P2_RX1, P2_RX2, P2_RX3
Calibration file (23-Feb 2-11 633k)
Reference (6-Jan-11 1.2M)

The max loss is a fit to the envelope of the worse case of all the measurements at each frequency...including ILD peaks. The fitting coefficients to any of the individual losses (falling under the max loss) will be less than the values of the fitted coefficients of the max loss.