Comment discussion: eta0

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Clause 162: 2019-07 eta0 Baseline

Rx noise figure (η_0)

- Rx noise figure parameters go into COM Table (refer to Table 137-6 for an example)
- This matches value in draft 0.2 table 162-10

Parameter	Symbol	Value	Units
.....			
One-sided noise spectral density	η_0	8.20e-9	V^2/GHz

http://www.ieee802.org/3/ck/public/19_07/walker_3ck_01d_0719.pdf

Eta0 value selected to balance channel needs and achievable Serdes Rx performance.

For channel performance analysis examples refer to heck_3ck_01b_0719 (KR)

lim_3ck_01_0519 & palkert_3ck_01_0719 (CR)

Clause 162: 2020-01 Update

Value in D1.2 is $1e\text{-}8\,V^2/\text{GHz}$.

| CI 162 | SC 162.11.7 | P153 | L4 | # 15 |

Mellitz, Richard   Samtec

Comment Type TR   **Comment Status** A

Eta_0 needs to include the effects of host NEXT noise. Thus cannot be the same as for KR COM.

SuggestedRemedy

Replace 8.2e-9 V^2/GHz with 9e-9 V^2/GHz as in slide 8 of mellitz_3ck_03_1119 ans slide 9 of lim_3ck_01_1119 in Table 162-15.

Response   **Response Status** C

ACCEPT IN PRINCIPLE.

Based on the result of strawpolls #10 and #11 make the following change:
Replace 8.2e-9 V^2/GHz with 1E-8 V^2/GHz

Strawpoll #10
WRT comments #15 and #146, I support increasing the value of eta_0 at this time.
Yes: 15
No: 5

Strawpoll #11
WRT comments #15 and #146, I support changing eta_0 value to:
A: 9.0E-9
B: 1E-8
A: 6 B: 9

| CI 162 | SC 162.11.7 | P153 | L6 | # 146 |

Dawe, Piers   Mellanox

Comment Type T   **Comment Status** A

One-sided noise spectral density of 8.2e-9 V2^/GHz is extremely aggressive and optimistic, being half that for 50GBASE-CR, and was chosen to make particular backplane channels with issues pass COM. As high loss cable channels are smoother than backplanes, we should not be so desperate in this clause.

SuggestedRemedy

Change to 1e-8, which is 61% of 50GBASE-CR.

Response   **Response Status** C

ACCEPT IN PRINCIPLE.

Resolve using the response to comment #15.

http://www.ieee802.org/3/ck/public/20_01/minutes_3ck_0120.pdf

Clause 162: D1.2 Comments

							Comment	Proposed change
69	Champion, Bruce	162	162.11.7	161	14	T	One-sided noise spectral density set at 1.0e-8 contrary to lim_3ck_01a_1119 and mellitz_3ck_03a_1119 recommendations. This makes a large impact on cable assembly COM and the ability to achieve 2m copper reach	One-sided noise spectral density should be set to 9e-9 as recommended by lim_3ck_01a_1119 and mellitz_3ck_03a_1119, see presentation
78	Haser, Alex	162	162.11.7	161	14	TR	Current eta_0 value causes contributed cable data sets to fail 3 dB COM	Change eta_0 back to 8.37e-9 (see champion_3ck_adhoc_01_031120)
11161	Palkert, Tom	162	162.11.7	161	14	T	[Comment resubmitted from Draft 1.1. 162.11.7, P160, L27] One sided noise spectral density for passive copper cables was changed from 8.2x10-9 to 1x10-8. This went too far causing adverse impacts on COM results.	Change One-sided noise spectral density from to 1x10-8 to 1x10-9. (Supporting presentation)

C#	Proposed value	Referenced presentations
69	9e-9	lim_3ck_01a_1119 mellitz_3ck_03a_1119
78	8.37e-9	champion_3ck_adhoc_01_031120
1116	1e-9	

Annex 120F: Draft 1.2 comments

Draft 1.2

One-sided noise spectral density		η_0	8.2×10^{-9}	V^2/GHz

Comments

Open	188	Ghiasi, Ali	120F	120F.4.1	212	24	TR	Eta0 of 8.2e-9 is too low for a low power C2C innterface	Increase eta0 to 4.1E-8 inline with C2M noise spectral density, see ghiasi_3ck_01_0620
Open	236	Dawe, Piers	120F	120F.4.1	212	24	TR	One-sided noise spectral density of 8.2e-9 V2^/GHz is extremely aggressive and optimistic and was chosen to make 28 dB backplane channels pass COM. It is not appropriate for this 20 dB spec. The point of C2C is that it's not KR; something must be easier to make it different. If there were no NEXT, we might scale 8.2e-9 by 8 - 1 dB or 5 times, giving 4.1e-8, higher than 50G/lane C2C's (120C) 2.6e-8 and the same as 100G/lane C2M's 4.1e-8. 8 for loss, 1 for BER 1e-6 vs. 1e-5.	Change to 1e-8, lower than 50GBASE-CR (1.64e-8) and less than half 50G/lane C2C (120C, 2.6e-8) (half would account for the doubled signalling rate, so receiver noise is a smaller proportion of the budget in 120F than 120C).