Meeting 3&4 Comment Discussion

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Cross-Clause Topics

Matt

120G/163 channel insertion loss at high frequencies Comment 255 and 232

Cl 120G SC 120G.4.1 P 238 L 34 # 255

Dawe, Piers Nvidia

Comment Type T *Comment Status* D *Channel IL*

I'm sure there could be an acceptable channel that failed this mask at 45 GHz

SuggestedRemedy

Make the straight section curve down and/or truncate it at 50 GHz

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

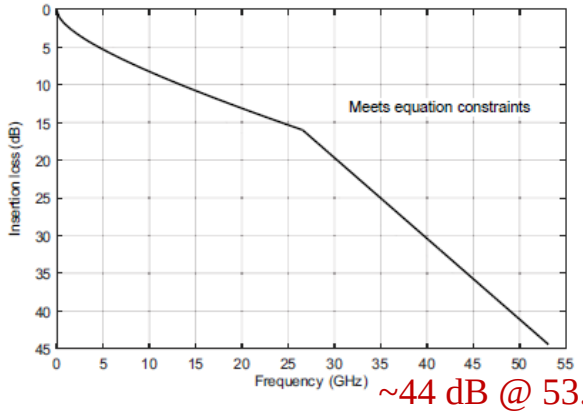
It makes sense to align the high-frequency limit with channel IL specifications in 162, 163, and/or 120F. However, even those are inconsistent.
162 specifies 40 GHz.
163 specifies 45 GHz.
120F specifies 53.125 GHz.
For task force discussion.

$$IL(f) \leq \begin{cases} 0.05 + 1.8\sqrt{f} + 0.2513f & 0.01 \leq f \leq 26.56 \\ -12.4181 + 1.07f & 26.56 < f \leq 53.125 \end{cases} \quad \text{(120G–2)}$$

where

$IL(f)$ is the channel insertion loss in dB

f is the frequency in GHz



~44 dB @ 53.125 GHz

Figure 120G–10—Recommended channel insertion loss

Cl 163 SC 163.10.2 P 186 L 28 # 232

Dawe, Piers Nvidia

Comment Type T *Comment Status* D *channel IL*

A -60 dB response at 45 GHz, 32 dB below the response at Nyquist, can't matter, but a respectable channel could fail this limit.

SuggestedRemedy

Replace the straight part of the limit with one that curves down.

Proposed Response *Response Status* W

PROPOSED REJECT.

Equation for IL mask is not provided.
The suggested remedy does not provide sufficient details to implement.
For task force discussion.

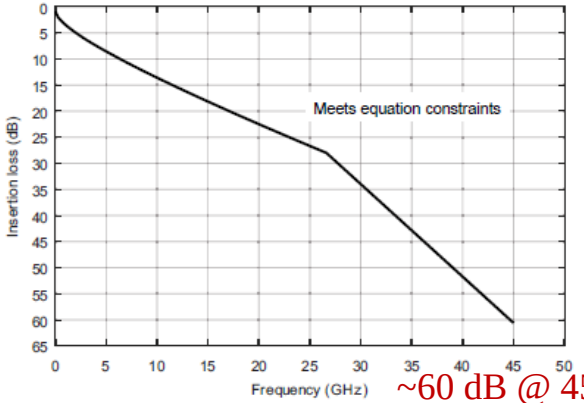
$$IL(f) \leq \begin{cases} 0.693 + 2.161\sqrt{f} + 0.607f & 0.01 \leq f \leq 26.5625 \\ -19.12 + 1.773f & 26.5625 < f \leq 45 \end{cases} \quad \text{(163–4)}$$

where

$IL(f)$ is the insertion loss in dB at frequency f

f is the frequency in GHz

The insertion loss limit is illustrated by Figure 163–6.



~60 dB @ 45 GHz

Figure 163–6—Channel insertion loss limit

162.11.2 Cable assembly insertion loss

The measured insertion loss at 26.56 GHz of a cable assembly shall be less than or equal to 19.75 dB.

The measured insertion loss of a cable assembly shall be greater than or equal to the minimum cable assembly insertion loss given in Equation (162–8) and illustrated in Figure 162–4.

$$IL_{min}(f) \geq 0.418\sqrt{f} + 0.177f + 0.0059f^2 \quad \text{(162–8)}$$

for TBD $\leq f \leq$ 40 GHz

where

$ILmin(f)$ is the minimum cable assembly insertion loss in dB

f is the frequency in GHz

- Both comments are pointing out that the stringent requirements at high frequencies (above 45 GHz) might some well-performing channels to fail. However, no evidence of this was provided.
- Neither comment provides a specific remedy nor has a proposal been provided.
- On the other hand, the highest frequency for the channel IL is inconsistent amongst the interfaces:
  - 162 specifies 40 GHz
  - 163 specifies 45 GHz
  - 120F specifies 53.125 GHz
- Note that both specifications are informative, not normative.

Matt

163 RJT, SER target #1 Comment 200

Cl 163	*SC* 163.9.3.4	*P* 183	*L* 41	# 200

Wu, Mau-Lin — MediaTek

Comment Type T *Comment Status* D *RJT*

The "Case E from Table 162-15" here is not correct. The original one in D1p2 is "Case E from Table Table 163-9", where Case E is the case with Jitter frequency 40 MHz. However, the "Case E from Table 162-15" in D1p3 is the case with Jitter frequency 12 MHz.
There is one similar errors in step c) in 120F.3.2.4 at page 214.

SuggestedRemedy

Change "Case E from Table 162-15" to "Case F from Table 162.15" both in step c) in 163.9.3.4 at page 183 & step c) in 120F.3.2.4 at page 214.

Proposed Response *Response Status* W

PROPOSED ACCEPT.

[Editor's note: CC: 120F, 163]

From D1.2 to D1.3, two changes to the RX JT parameters:

1. Inserted Case B
2. Moved table from 163 to 162.

Draft 1.3, page 183, 163.9.3.4 "Receiver jitter tolerance"

c) For the COM parameter calibration described in 120D.3.2.1 item e), the test channel transmitter J_{RMS} and J3u values are measured with the jitter frequency and amplitude set according to Case E from Table 162–15.

Should be Case F

Draft 1.2, page 183, 163.9.2.4 "Receiver jitter tolerance"

c) For the COM parameter calibration described in 120D.3.2.1 item e), the test channel transmitter J_{RMS} and J3u values are measured with the jitter frequency and amplitude set according to Case E from Table 163–9.

Draft 1.3, Table 162-15

Table 162–15—Receiver jitter tolerance parameters

Parameter	Case A	Case B	Case C	Case D	Case E	Case F	Units
FEC Symbol error ratio	10^{-3}	10^{-3}	10^{-3}	10^{-3}	10^{-3}	10^{-3}	—
Jitter frequency	0.04	0.4	1.333	4	12	40	MHz
Jitter amplitude (pk-pk)	5	0.5	0.15	0.05	0.05	0.05	UI

New column

Draft 1.2, Table 163-9

Table 163–9—Receiver jitter tolerance parameters

Parameter	Case A	Case B	Case C	Case D	Case E	Units
FEC Symbol error ratio	10^{-3}	10^{-3}	10^{-3}	10^{-3}	10^{-3}	—
Jitter frequency	0.04	1.333	4	12	40	MHz
Jitter amplitude (pk-pk)	5	0.15	0.05	0.05	0.05	UI

Matt

120F RJT, SER target #2 Comments 201

Cl 120F SC 120F.3.2.4 P 214 L 16 # 201

Wu, Mau-Lin MediaTek

Comment Type T *Comment Status* D *RITT*

It mentions that "The receiver under test shall meet the FEC symbol error ratio requirement for each case in Table 162-15". However, the FEC symbol error ratio requirement is 1e-3 in Table 162-15, which is for KR & CR. For C2C application, the FEC symbol error ratio requirement shall be 1e-4.

SuggestedRemedy

Change the sentence to "The receiver under test shall meet 1e-4 FEC symbol error ratio requirement for each case in Table 162-15."

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

The comment points out a valid issue. However, it would be better to coordinate the specification method of symbol error ratio for the 3 interfaces.
The text in 162 points to Table 162-14 for the FEC symbol error ratio so having it in the jitter tolerance table is not necessary or helpful.
Remove FEC symbol error ratio row in Table 162-15.
In 163.9.3.4, change the sentence on page 183, line 50 to:
"The receiver under test shall meet the FEC symbol error ratio in Table 163-10, for each case in Table 162–15."
In 120F.3.2.4, change the sentence on page 214, line 16 to:
"The receiver under test shall meet the FEC symbol error ratio in Table 120F-5 for each case in Table 162–15."
In several locations fix capitalization and change "FEC Symbol error ratio" to "FEC symbol error ratio".
[Editor's note: CC: 162, 163, 120F]

Table 162–15—Receiver jitter tolerance parameters

Parameter	Case A	Case B	Case C	Case D	Case E	Case F	Units
FEC Symbol error ratio	10^{-3}	10^{-3}	10^{-3}	10^{-3}	10^{-3}	10^{-3}	—
Jitter frequency	0.04	0.4	1.333	4	12	40	MHz
Jitter amplitude (pk-pk)	5	0.5	0.15	0.05	0.05	0.05	UI

Not relevant to 120F.
Not required in 162.

From 162.9.4.4.2…

A PHY shall meet the FEC symbol error ratio requirement defined in Table 162–14 for each pair of jitter frequency and peak-to-peak amplitude values listed in Table 162–15 with jitter added to all lanes (see 162.9.4.3.4).

All okay in 162.9.4.4.2.

Table 162–14—Interference tolerance test parameters

Parameter	Test 1 (low loss)		Test 2 (high loss)		Units
	Min	Max	Min	Max	
Test pattern	Scrambled idle encoded by FEC				
FEC symbol error ratio required[a]	$< 10^{-3}$				

From 163.9.3.4…

The receiver under test shall meet the FEC symbol error ratio requirements for each case in Table 162–15.

Table 163–10—Receiver interference tolerance parameters

Parameter	Test 1 (low loss)			Test 2 (high loss)			Units
	Min	Max	Target	Min	Max	Target	
FEC Symbol error ratio[a]	—	10^{-3}	—	—	10^{-3}	—	—

Should be small "s".

From 120F.3.2.4…

The receiver under test shall meet the FEC symbol error ratio requirements for each case in Table 162–15.

Table 120F–5—Receiver interference tolerance parameters

Parameter	Test 1 (low loss)			Test 2 (high loss)			Units
	Min	Max	Target	Min	Max	Target	
FEC Symbol error ratio[a]	—	10^{-4}	—	—	10^{-4}	—	—

Should be small "s".

Matt

120G DC Common-Mode voltage (part I) Comments 146, 147, 148, 149

CI 120G SC 120G.3.3 P 231 L 47 # 146

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *CM DC voltage*

KR/CR chips are defiend with common mode of 0.2 V to 1.0 V, there is no reason to define the same host with such high common mode

SuggestedRemedy

Reduce common mode min to 0.2 V and common mode max to 1.0 V

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #148.

CI 120G SC 120G.3.2 P 229 L 34 # 147

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *CM DC voltage*

KR/CR chips are defiend with common mode of 0.2 V to 1.0 V, there is no reason to define the same host with such high common mode.
If the CDR in the module is BiCMOS and uses 3.3 V then one will use the right voltage rating but if the CDR in the module is CMOS then one doesn't need to use 3.3V+ DC blocks.

SuggestedRemedy

Reduce common mode min to 0.2 V and common mode max to 1.0 V

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #148.

CI 120G SC 120G.3.1 P 224 L 9 # 148

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *CM DC voltage*

KR/CR chips are defiend with common mode of 0.2 V to 1.0 V, there is no reason to define the same host to have such large output common mode voltage. If the CDR in the module is BiCMOS and uses 3.3 V then one will use the right voltage rating but if the CDR in the module is CMOS then one doesn't need to use 3.3V+ DC blocks.

SuggestedRemedy

Reduce common mode min to 0.2 V and common mode max to 1.0 V

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

In 802.3ck...
CR TX DC CM voltage (max) = 1.9 V
KR TX DC CM voltage (max/min) = 1.0/0.2 V
C2C TX DC CM voltage (max/min) = 1.9/0 V
C2M host in/out CM voltage (max/min) = 2.8/-0.3 V
C2M module in/out CM voltage (max/min) = 2.85/-0.35 V
There is not good alignment of CM voltage amongst each of the interfaces listed above. It would make more sense align the module interfaces with the CR specifications.
Alternately, align all of the interfaces.
For task force discussion.
[Editor's note: CC: 120F, 120G, 162]

CI 120G SC 120G.3.4 P 235 L 18 # 149

Ghiasi, Ali — Ghiasi Quantum/Inphi

Comment Type TR *Comment Status* D *CM DC voltage*

KR/CR chips are defiend with common mode of 0.2 V to 1.0 V, there is no reason to define the same host to have such large output common mode voltage. If the CDR in the module is BiCMOS and uses 3.3 V then one will use the right voltage rating but if the CDR in the module is CMOS then one doesn't need to use 3.3V+ DC blocks.

SuggestedRemedy

Reduce common mode min to 0.2 V and common mode max to 1.0 V

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Resolve using the response to comment #148.

Matt

120G DC Common-Mode voltage (part 2) Comments 146, 147, 148, 149

Table 162–10—Summary of transmitter specifications at TP2

Parameter	Subclause reference	Value	Units
Signaling rate		53.125 ± 100 ppm	GBd
Differential pk-pk voltage with Tx disabled (max)[a]	93.8.1.3	30	mV
DC common-mode voltage (max)[a]	93.8.1.3	1.9	V

No min

Table 163–5—Summary of transmitter specifications at TP0v

Parameter	Reference	Value	Units
Signaling rate		53.125 ± 100 ppm	GBd
Differential pk-pk voltage (max)[a] Transmitter disabled Transmitter enabled	93.8.1.3	 30 1200	 mV mV
DC common-mode voltage (max)[a]	93.8.1.3	1.0	V
DC common-mode voltage (min)[a]	93.8.1.3	0.2	V

Table 120F–1—Transmitter electrical characteristics at TP0v

Parameter	Reference	Value	Units
Signaling rate per lane (range)		53.125 ± 100 ppm	GBd
Differential peak-to-peak output voltage[a] (max) Transmitter disabled Transmitter enabled	93.8.1.3	 35 1200	 mV mV
Common-mode voltage[a] (max)	93.8.1.3	1.9	V
Common-mode voltage[a] (min)	93.8.1.3	0	V

Table 120G–1—Host output characteristics at TP1a

Parameter	Reference	Value	Units
Signaling rate per lane (range)	120G.3.1.1	53.125 ± 100 ppm	GBd
DC common-mode output voltage (max)	120G.5.1	2.8	V
DC common-mode output voltage (min)	120G.5.1	–0.3	V

Table 120G–5—Host input characteristics

Parameter	Reference	Test point	Value	Units
Common-mode voltage[b] Min Max	120G.5.1	TP4a	 –0.3 2.8	V

[a]Meets BER specified in 120G.1.1.
[b]Generated by host, referred to host ground

Table 120G–3—Module output characteristics (at TP4)

Parameter	Reference	Value	Units
Transition time (min, 20% to 80%)	120G.5.1.3	TBD	ps
DC common-mode voltage (min)[a]	120G.5.1	–350	mV
DC common-mode voltage (max)[a]	120G.5.1	2850	mV

tolerance

[a] DC common-mode voltage is generated by the host. Specification includes effects of ground offset voltage.

Table 120G–8—Module input characteristics

Parameter	Reference	Test point	Value	Units
Signaling rate per lane (range)	120G.3.1.1	TP1	53.125 ± 100 ppm	GBd
DC common-mode voltage (min)[b]	120G.3.1.1	TP1	–350	mV
DC common-mode voltage (max)[b]	120G.3.1.1	TP1	2850	mV

tolerance

[a] Meets BER specified in 120G.1.1.
[b] DC common-mode voltage generated by the host. Specification includes effects of ground offset voltage.

TP0v test fixture topic

120F/163/163A parameter names

Cl 120F SC 120F.3.1.1 P 209 L 14 # 77

Brown, Matt Huawei

Comment Type E *Comment Status* D *parameter name*

The parameter name "Difference between measured and reference effective return loss" is a real mouthful. A more concise name would beneficial.

SuggestedRemedy

Change "Difference between measured and reference effective return loss" to "difference effective return loss". Apply throughout 163, 120F, and 163A.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

Note that the proposed response to comment #56 proposes to use "ERL" rather than "effective return loss".
Implement the suggested remedy considering the closed response to comment #56 with editorial license.
[Editor's note: CC: 120F, 163, 163A]

Cl 120F SC 120F.3.1.1 P 209 L 18 # 78

Brown, Matt Huawei

Comment Type E *Comment Status* D *parameter name*

The parameter name "Difference between measured and reference steady-state voltage" is a real mouthful. A more concise name would beneficial.

SuggestedRemedy

Change "Difference between measured and reference steady-state voltage" to "difference steady-state voltage". Apply throughout 163, 120F, and 163A.

Proposed Response *Response Status* W

PROPOSED ACCEPT.

[Editor's note: CC: 120F, 163, 163A]

Cl 120F SC 120F.3.1.1 P 209 L 21 # 79

Brown, Matt Huawei

Comment Type E *Comment Status* D *parameter name*

The parameter name "Difference between measured and reference linear fit pulse peak" is a real mouthful. A more concise name would beneficial.

SuggestedRemedy

Change "Difference between measured and reference linear fit pulse peak" to "linear fit pulse
peak". Apply throughout 163, 120F, and 163A.

Proposed Response *Response Status* W

PROPOSED ACCEPT IN PRINCIPLE.

The proposed response to comment #13 proposes to use the ratio V_peak/V_f rather than V_f and to define this ratio as R_peak and the difference as dR_peak.
Implement the suggested remedy considering the closed response to comment #13 with editorial license.
[Editor's note: CC: 120F, 163, 163A]

Throughout 120F, 163, and 163A as appropriate…
Change "Difference between measured and reference effective return loss" to "difference ERL".
Change "Difference between measured and reference steady-state voltage" to "difference steady-state voltage".
Change "Difference between measured and reference linear fit pulse peak" to “difference linear fit pulse peak“ or depending on comment #13…
Change "Difference between measured and reference linear fit pulse peak" to “difference peak ratio”.

Thanks