

RX dERL Discussion Slide

Comments 67, 8, 85

CI 163 SC 163.9.3.1 P 180 L 34 # 40

Healey, Adam Broadcom Inc.

Comment Type T Comment Status A RX test fixture

Now that the transmitter has relaxed test fixture requirements and taken a "test fixture embedding" approach, it seems appropriate for the receiver to follow suit.

SuggestedRemedy

Update 163.9.3.2 by changing references to "TP5a" to "TP5v" and add a pointer to 163.9.2.1 for test fixture requirements. Replace the specification of "ERL (min)" in Table 163-9 with a specification of "dERL" as is done for the transmitter and update 163.9.3.1 accordingly. Implement similar changes in Annex 120F. Update Annex 163A to include calculation of the reference ERL at TP5v (which should largely be a "mirror image" of the material currently describing the calculation of the reference ERL at TP0v). For interference tolerance and jitter tolerance test channel calibration, exceptions to 93A.2 and Annex 93C would need to be made to substitute TP0 to TP0v (and TP5v to TP5) replicas for their TP0 to TP0a (And TP5a to TP5) counterparts.

Response Response Status C

ACCEPT IN PRINCIPLE.

Based on Strawpoll #5 there is clear consensus to align the RX test fixture with the TX test fixture. Straw poll #5 is reproduced here for convenience.

Straw Poll #5:
I support aligning RX to TP0v test fixture characteristics and methodology:
Y: 22, N: 1, No Opinion: 6

Align the RX test fixture specifications with the TX TF specifications based on slide 12 of: https://www.ieee802.org/3/ck/public/adhoc/sept16_20/brown_3ck_adhoc_01a_091620.pdf

For 163.9.3.2:
Change references to "TP5a" to "TP5v" and add a pointer to 163.9.2.1 for test fixture requirements.
Replace the specification of "ERL (min)" in Table 163-9 with a specification of "dERL" as is done for the transmitter and update 163.9.3.1 accordingly.

For 163.9.3.3 RITT, add a bullet at the beginning of the considerations, "In this subclause TP0v (TP5v) replaces TP0a (TP5a) in Annex 93A and Annex 93C".

For 163.9.3.4 JTOL, add a sentence after "The test setup shown in Figure 93-12, or its equivalent, is used.": "In this subclause TP0v (TP5v) replaces TP0a (TP5a) in Annex 93A, Annex 93C, and Annex 120D"

Implement similar changes in Annex 120F.

For Annex 163A:
Change to include calculation of the reference ERL at TP5v (which should largely be a "mirror image" of the material currently describing the calculation of the reference ERL at

TP0v).

Implement with editorial license.

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

Closed Comments

CI 163 SC 163.9.2 P 176 L 44 # 61

Ran, Adee Intel

Comment Type T Comment Status A vf/vpeak/erl

Table 163-5 has multiple TBDs.

Reference ERL, v_f and v_peak are calculated with an idealized package model. Real products deviate from this model, so the limit values may need adjustment.

v_f and v_peak may be degraded by a device or package, but that can be mitigated using higher than minimum launch voltage and some equalization. So for dv_f and dv_peak, a minimum of 0 V may be acceptable.

There is no straightforward method to improve ERL. So to allow a wide range of implementations, the minimum dERL should be less than 0 dB. A minimum of -3 dB may be acceptable.

SuggestedRemedy

Change value for dv_f in Table 163-5 from TBD to 0.

Change value for dv_peak in Table 163-5 from TBD to 0.

Change value for dERL in Table 163-5 from TBD to -3.

Response Response Status C

ACCEPT IN PRINCIPLE.

[Editor's note: Addresses incomplete specification.]

The following presentation was reviewed by the task force:
https://www.ieee802.org/3/ck/public/20_10/wu_3ck_02_1020.pdf

The response to comment #13 replaces the specification of dv_peak to dR_peak.

Implement suggested remedy with editorial license, except change the name of dv_peak to dR_peak and use the value 0 with no units.

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

Comment #114 adopted items in red (rejected strikethrough)

	162.9.3.4 CR TX	162.9.4.5 CR RX	162.11.3 Cable Ass.	163.9.2.1.2 KR Test Fixture	Sample Test point (TP0a)	163.9.2.3 KR TX	163.9.3.1 KR RX	163.10.3 KR Chan.	120F.3.1.1 C2C TX	120F.3.2.1 C2C RX	120F.4.3 C2C Chan.	120G.3.1.3 Host output	120G.3.3.1 Host input	120G.3.2.3 Module output	120G.3.4.2 Module input
	Table 162-12		Table 162-17	Table 163-6		Table 163-8		Table 163-12	Table 120F-2		Table 120F-8	Table 120G-2		Table 120G-4	
T_r	0.01 ns		0.01 ns	0.01 ns		0.01 ns		0.01 ns	0.01 ns		0.01 ns	0.01 ns		0.01 ns	0.01 ns
B_x	0 GHz		0 GHz	0 GHz		0 GHz		0 GHz	0 GHz		0 GHz	0 GHz		0 GHz	0 GHz
P_x	0.618		0.618	0.618		0.618		0.618	0.618		0.618	0.618	0.19	0.618	0.19
N	800 UI	#113	3500 5100 UI	20 UI		200 UI		3500 UI	200 UI		2000 UI	800 UI	#143, 145		400 UI
N_{bx}	0 UI		0 UI	0 UI		21 UI		21 UI	6 UI		6 UI	0 UI		0 UI	0 UI
T_{fx}	0.2 ns		0.2 0.2 ± 10% ns	0 ns		Twice the delay from TP0 to TP0v	Twice the delay from TP5av to TP5	0 ns	Twice the delay from TP0 to TP0v	Twice the delay from TP5av to TP5	0 ns	0.2 ns		0.2 ns	
T_w	1	#175	1	1		1		1	1		1	1		1	1
	Table 163-10	Table 163-13	Table 162-16		Table 163-7 (TP0a)	Table 163-5	Table 163-9		Table 120F-1	Table 120F-4		Table 120G-1	Table 120G-5	Table 120G-3	Table 120G-8
ERL	TBD 7.3 dB #3	TBD 7.3 dB #4	TBD 7.4 dB for cable	#110, 114	TBD 15.5 dB wu_04	dERL -3 dB #61 & 40	dERL -3 dB	TBD 9.7 dB	dERL -3 dB #61 & 40	dERL -3 dB	TBD dB #87, no value	TBD 7.3 dB #90, 99, wu_03	TBD 7.3 dB	TBD dB #95, 104, no values	TBD dB

CI 163 SC 163.9.3 P 180 L 26 # 8

Mellitz, Richard Samtec

Comment Type TR Comment Status D ERL value (bucket5)

There is no reason why the receive ERL specification should be different from the transmitter ones.

SuggestedRemedy

Point to the transmitter specification for DERL

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

Closed comment #40 aligned the RX test fixture with the TX test fixture and the replaced ERL with dERL.

[Editor's note (to be removed when closing this comment): Added to bucket #5.]

CI 120F SC 120F.3.2.1 P 211 L 40 # 85

Brown, Matt Huawei

Comment Type T Comment Status D ERL value (bucket5)

The receiver ERL should be defined and measured in the same way as for the transmitter.

SuggestedRemedy

Assuming that the receiver test fixture is aligned with the transmitter test fixture, specify the receiver ERL using the same specification as the transmitter ERL using dERL in 120F.3.1.1. In Table 120F-3, replace the the parameter name and set the specification to 0 dB.

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

The referenced ad hoc presentations is here:
https://www.ieee802.org/3/ck/public/adhoc/sept23_20/wu_3ck_adhoc_01a_092320.pdf

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

Closed comment #40 aligned the RX test fixture with the TX test fixture and the replaced ERL with dERL.

Use the value provided in the response to comment #61.

[Editor's note (to be removed when closing this comment): Added to bucket #5.]

CI 163 SC 163.9.3.1 P 180 L 33 # 67

Ran, Adee Intel

Comment Type T Comment Status D ERL value

The method of Annex 163A can be used for receiver ERL just like it is for transmitter ERL, that is, specify difference from a reference value.

In the case of the receiver, there may be a tradeoff between optimizing for ERL and optimizing for BER. The receiver should be allowed more design freedom. Therefore the minimum dERL should be lower than for the receiver.

A minimum dERL of -5 dB may be acceptable. Alternatively, dERL can be made informative (recommendation).

Also applies to 120F.3.2.1.

SuggestedRemedy

Change receiver ERL subclause (163.9.3.1) to match 163.9.2.3.

In Table 163-9, change ERL (min) to dERL(Min) with value -5 dB.

Change subclause 120F.3.2.1 to match 163.9.3.1 (apply the change above).

In Table 120F-4, change ERL (min) to dERL(Min) with value -5 dB.

Consider changing Rx dERL from a normative specification (shall) to a recommendation (should).

Proposed Response Response Status W

PROPOSED ACCEPT IN PRINCIPLE.

In Table 163-9, change ERL (min) to dERL (min) with value -5 dB.
 Implement suggested remedy for 120F.
 For task force discussion whether to change Rx dERL from normative to a recommendation.
 Resolve with comment #40.
 [Editor's note: CC: 163, 120F]

On the verge of being overtaken by comments 61 and 40

Proposed response:

Closed comment #40 aligned the RX test fixture with the TX test fixture and the replaced ERL with dERL.

Use the value provided in the response to comment #61.

There was no consensus to make a change to the normative nature of RX dERL.