

802.3ck D3.0 Comment Resolution Clause 163 and 163B

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Clause 163 TX Residual ISI #236

Cl 163 SC 163.9.2.6 P206 L42 # I-236

Dudek, Michael Marvell

Comment Type **TR** Comment Status **D** Residual ISI

The value of $N_p=11$ is unnecessarily low for this variant where the receiver equalizer has many more taps. Note however that this section is referenced by the C2C in 120F.3.1 where the number of DFE taps is only 6.

Suggested Remedy

Change the value of N_p from 11 to 24 here. Reference Residual ISI in table 120F-1 to a new section in 120F.3.1. This section to say "Residual Intersymbol Interference is measured with the procedure in 163.9.2.6 with the exception that $N_p=11$

Proposed Response Response Status **W**

PROPOSED REJECT.
 This comment suggests to relax N_p because the reference receiver has long taps. However, a receiver might see longer reflections because of the interaction of the package and channel.
 For task force discussion.
 [Editor's note. CC: 120F, 163]

163.9.2.6 Residual intersymbol interference

Residual intersymbol interference ISI_RES is determined using Equation (163–1). The linear fit pulse response $p(k)$ and error $e(k)$ are determined using the linear fit procedure in 162.9.3.1.1 with the exception that $N_p = 11$.

$$ISI_RES = 20\log_{10}\left(\frac{\sigma_e}{p_{max}}\right) \tag{163-1}$$

where

- ISI_RES is the residual intersymbol interference in dB
- σ_e is the standard deviation of linear fit error $e(k)$
- p_{max} is the maximum value of linear fit pulse response $p(k)$

The residual intersymbol interference shall meet the specification ISI_RES (max) in Table 163–5.

What Value for N_p in Clause 163 and 120F?

Clause 163 Channel ILdc #65

Cl 163 **SC 163.10.6** **P217** **L41** # I-65 $ILcd(f) - ILdd(f) \geq \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14 - 0.3108f & 12.89 \leq f \leq 40 \end{cases}$ (163-8)

Ran, Adee Cisco Systems, Inc.

Comment Type **TR** **Comment Status** **D** **Channel** **ILdc**

The specification of ILdc-ILdd in equation 163-9 and Figure 163-9 is identical to the specification of ILcd - ILdd in equation 163-8 and Figure 163-8, and also identical to the one in equation 162-19 and Figure 162-9.

It makes sense physically and from link budget purposes to have identical specifications for these parameters. It makes less sense to have duplicated equations and figures. It just confuses the reader.

$$ILdc(f) - ILdd(f) \geq \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14 - 0.3108f & 12.89 \leq f \leq 40 \end{cases} \quad (163-9)$$

SuggestedRemedy

Replace equations 163-8 and 163-9 with references to equation 162-19.
 Replace figure 163-8 and figure 163-9 with references to figure 162-9.

Proposed Response **Response Status** **W**

PROPOSED REJECT.
 Although the masks happen to be the same, ILdc and ILcd are from two different tests.

$$ILcd(f) - ILdd(f) \geq \begin{cases} 10 & 0.05 \leq f < 12.89 \\ 14 - 0.3108f & 12.89 \leq f \leq 40 \end{cases} \quad (162-19)$$

Editorial preference?

Clause 163B TP0v Example #222

Cl **163B** SC **163B.2** P **322** L **21** # **I-222**
 Dawe, Piers J G NVIDIA
 Comment Type **T** Comment Status **D** Example ERL

Complete the example

Suggested Remedy

As this is a Clause 163 example, there's another package length $z_p = 12$. Change "z_p = 31 mm" to "z_p = 12 mm or 31 mm". Delete the sentence "Although clauses using the TP0v methodology may require the ERL reference value to be calculated at more than one package length, only one is shown here."

In table 163B-1, add a row for package z_p. Add a column for the 12 mm case. Add a row called "Candidate effective return loss" with the two entries. Straddle the entry for "Effective return loss, ERL"

Proposed Response Response Status **W**

PROPOSED REJECT.

This subclause was intended only to help the reader to confirm his understanding of the calculation of the reference ERL value, not as a complete specification. Therefore adding results for a second package length is not necessary.

The suggested remedy does not provide sufficient detail, e.g., ERL value, to implement.

163B.2 Characteristics

This example test fixture is defined using the PCB trace model in 162.11.7.1, with $z_p = 71$ mm, and parameter values in Table 162–20, with the exception that C_0 and C_1 are both 0. This results in a TP0 to TP0v differential-mode to differential-mode insertion loss of 2.8 dB at 26.5625 GHz. The reference values are calculated for the transmitter characteristics of Clause 163. The reference transmitter device and package model uses the parameter values $T_r = 7.5$ ps, $f_r = 0.75 \times f_b = 39.8438$ GHz, $z_p = 31$ mm, and $A_v = 0.413$ V. The values of v_{peak} and v_f are calculated with $f_b = 53.125$ GBd and $N_v = 200$.

Although clauses using the TP0v methodology may require the ERL reference value to be calculated at more than one package length, only one is shown here.

Table 163B–1—Summary of transmitter reference values at TP0v

Parameter	Reference	Value	Units
Effective return loss, $ERL^{(ref)}$	163A.3.1.2	12.95	dB
Transmitter steady-state voltage, $v_f^{(ref)}$	163A.3.1.1	0.409	V
Transmitter linear fit pulse peak, $v_{peak}^{(ref)}$	163A.3.1.1	0.237	V
Transmitter pulse peak ratio, $R_{peak}^{(ref)}$	163A.3.2.1	0.580	-

Clause 163B Example TF ILdd #223

CI **163B** SC **163B.2** P**322** L**31** # **I-223**
Dawe, Piers J G NVIDIA
Comment Type **T** Comment Status **D** Example TF ILdd

Figure 163B-1 doesn't match Equation 163B-1.

Suggested Remedy

I believe the graph is right, and the right coefficients are 0, 0.235616, 0.059147.

Proposed Response Response Status **W**

PROPOSED ACCEPT IN PRINCIPLE.

Equation 163B-1 comes from an earlier presentation:

https://www.ieee802.org/3/ck/public/20_10/ghiasi_3ck_01a_1020.pdf

Figure 163B-1 is plotted according to the PCB trace model in Clause 163B.2. The following presentation suggested this PCB trace model and pointed out Equation 163B-1 loss is slightly different:

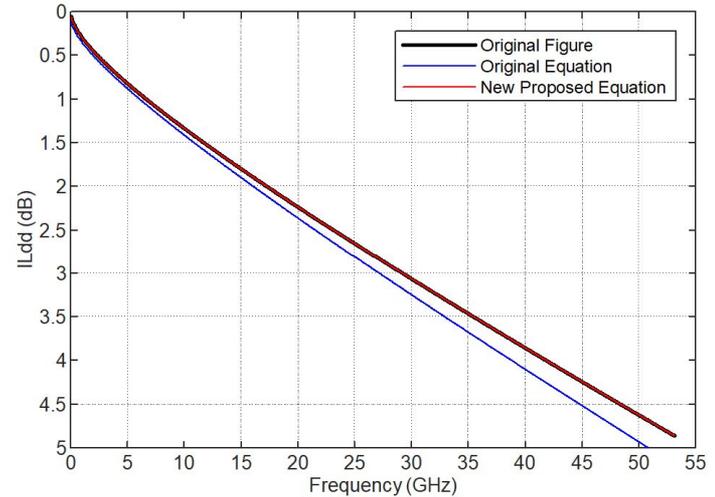
https://www.ieee802.org/3/ck/public/21_01/ran_3ck_01_0121.pdf

Change the coefficients of equation 163B-1 as suggested.

For task force discussion

The differential-mode to differential-mode insertion loss of the example test fixture is approximated by Equation (163B-1) which is illustrated in Figure 163B-1.

$$IL_{dd}(f) = 0.074 + 0.2104\sqrt{f} + 0.0674f \quad 0.05 \leq f \leq 53.125 \quad (163B-1)$$



The figure is based on PCB trace model