

USB 3.2 ENGINEERING CHANGE NOTICE

Title: TxEQ Equalization Settings

Applied to: USB 3.2 Revision 1.0

Brief description of the functional changes:

This ECN makes the normative transmitter equalization settings as minimum requirement. The current specification may constrain the routing space in system designs in order to meet the normative transmitter equalization setting requirements and conform to TD1.5.

Benefits as a result of the changes:

Allow system implementations the flexibility to select TxEQ settings based on the channel loss in order to comply with the electrical and timing requirements required by the transmitter.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:

None

An analysis of the hardware implications:

None

An analysis of the software implications:

None

An analysis of the compliance testing implications:

TD1.5 to remain the same to check if the TxEQ setting within the range defined.

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Actual Change

(a)Section 6.7.5.2 Gen 2 (10GT/sec)

From Text:

Gen 2 transmitters employ a 3-tap FIR-based equalizer, the structure of which is shown in Figure 6-22. An example waveform from the 3-tap equalizer is shown in Figure 6-23. In the figure, the pre-cursor (Vc) is referred to as pre-shoot, while the post-cursor (Vb) is referred to as de-emphasis. This convention allows pre-shoot and de-emphasis to be defined independently of one another. The maximum swing, Vd, is also shown to illustrate that, when both C+1 and C-1 are nonzero, the swing of Va does not reach the maximum as defined by Vd. Figure 6-23 is shown as an example of TxEQ and is not intended to represent the signal as it would appear for measurement purposes.

Table 6-21 provides the normative pre-shoot and de-emphasis values along with the corresponding tap coefficient values (C-1 and C1) and output amplitudes.

Table 6-21. Gen 2 Transmitter Equalization Settings

Parameter	Value	Comments
Preshoot (dB)	2.2 ± 1.0	Normative requirement ¹
De-emphasis (dB)	-3.1 ± 1.0	Normative requirement ¹
C-1	-0.083	Informative – for reference only
C1	-0.125	Informative – for reference only
Nominal Boost (dB)	4.7	Informative – for reference only
Va/Vd	0.834	Informative – for reference only
Vb/Vd	0.584	Informative – for reference only
Vc/Vd	0.750	Informative – for reference only

Notes:

1. Measured at the output of the compliance breakout board in Figure 6-24.

To Text:

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Table 6-21 provides the normative range of pre-shoot and de-emphasis values.

Table 6-21. Gen 2 Transmitter Equalization Settings

Parameter	Value		Comments
	Min	Max	
Preshoot (dB)	1.2	3.2	Normative requirement ¹
De-emphasis (dB)	2.1	7.0	Normative requirement ¹

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Notes:

1. Measured at the output of the compliance breakout board in Figure 6-24.