

# USB4 1.0 ENGINEERING CHANGE NOTICE FORM

**Title: SET\_TX\_COMPLIANCE Requirement for Skew Between Lanes**

**Applied to: USB4 Specification Version 1.0**

<b>Brief description of the functional changes:</b>
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A new requirement when sending Compliance patterns on both TX Lanes to allow cross talk similar to regular functionality.
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<b>Benefits as a result of the changes:</b>
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Better Electrical Compliance.
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<b>An assessment of the impact to the existing revision and systems that currently conform to the USB specification:</b>
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<b>An analysis of the hardware implications:</b>
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Controlling the skew between the two Lanes in Compliance mode.
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<b>An analysis of the software implications:</b>
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None
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<b>An analysis of the compliance testing implications:</b>
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A better noise behavior of the transmitter
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## Actual Change

### (a). Table 8-56, Page 365

#### From Text:

DW	Bit(s)	Field Name and Description
0	5:0	<b>Port</b> – Identifies the target USB4 Port. For a Router: This field contains the Adapter Number of the Lane 0 Adapter of the target USB4 Port. For a Re-timer: 0h: Target is the USB4 Port whose SB Register Space is written to. 1h: Target is the USB4 Port whose SB Register Space is not written to.
	8:6	<b>Adapter</b> – Identifies the affected Adapter (s) within the USB4 Port. 000b: Lane 0 Adapter 001b: Lane 1 Adapter 111b: All Adapters All other values are reserved.
	12:9	<b>Pattern</b> – Sets the transmitting pattern. 0000b: PRBS31 - a polynomial $G(x) = x^{31} + x^{28} + 1$ shall be used. 0001b: PRBS15 - a polynomial $G(x) = x^{15} + x^{14} + 1$ shall be used. 0010b: PRBS9 - a polynomial $G(x) = x^9 + x^5 + 1$ shall be used. 0011b: PRBS7 - a polynomial $G(x) = x^7 + x^6 + 1$ shall be used. 0100b: SQ2 - a repeating pattern of bits “101010...”. 0101b: SQ4 - a repeating pattern of bits where the repeating pattern is 2 copies of 1b followed by 2 copies of 0b (“1100...”). 0110b: SQ32 - a repeating pattern of bits where the repeating pattern is 16 copies of 1b followed by 16 copies of 0b. 0111b: SQ128 - a repeating pattern of bits where the repeating pattern is 64 copies of 1b followed by 64 copies of 0b. 1111b: SLOS1.  For Example: PRBS7 equals 1000 0011 0000 1010 0011 1100 1000 1011 0011 1010 1001 1111 0100 0011 1000 1001 0011 0110 1011 0111 1011 0001 1010 0101 1101 1100 1100 1010 1011 1111 1000 000b All other values are reserved.
	16:13	<b>Preset</b> – Sets the preset number for TxFFE parameters at the transmitter (see <b>Error! Reference source not found.</b> ).
	17	<b>Set Modifications</b> – Enables non-default values for Preset and for Modifications. 0b: Load default TxFFE parameters and ignore the <i>Modifications</i> field. 1b: Load TxFFE parameters from the <i>Preset</i> field and load any signal shaping parameters based on the <i>Modifications</i> field.
	25:18	<b>Modifications</b> – Sets other signal shaping parameters. Bit 0: Disable de-emphasis (0b), or enable de-emphasis (1b). Bit 1: Disable pre-shoot (0b), or enable pre-shoot (1b). All other bits are reserved.
	31:26	<b>Reserved</b>

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## To Text:

DW	Bit(s)	Field Name and Description
0	5:0	<b>Port</b> – Identifies the target USB4 Port. For a Router: This field contains the Adapter Number of the Lane 0 Adapter of the target USB4 Port. For a Re-timer: 0h: Target is the USB4 Port whose SB Register Space is written to. 1h: Target is the USB4 Port whose SB Register Space is not written to.
	8:6	<b>Adapter</b> – Identifies the affected Adapter (s) within the USB4 Port. 000b: Lane 0 Adapter 001b: Lane 1 Adapter 111b: All Adapters All other values are reserved. <u>When this field is set to 111b, the pattern on the Lanes shall have skew between 16 UI and 128 UI.</u>
	12:9	<b>Pattern</b> – Sets the transmitting pattern. 0000b: PRBS31 - a polynomial $G(x) = x^{31} + x^{28} + 1$ shall be used. 0001b: PRBS15 - a polynomial $G(x) = x^{15} + x^{14} + 1$ shall be used. 0010b: PRBS9 - a polynomial $G(x) = x^9 + x^5 + 1$ shall be used. 0011b: PRBS7 - a polynomial $G(x) = x^7 + x^6 + 1$ shall be used. 0100b: SQ2 - a repeating pattern of bits “101010...”. 0101b: SQ4 - a repeating pattern of bits where the repeating pattern is 2 copies of 1b followed by 2 copies of 0b (“1100...”). 0110b: SQ32 - a repeating pattern of bits where the repeating pattern is 16 copies of 1b followed by 16 copies of 0b. 0111b: SQ128 - a repeating pattern of bits where the repeating pattern is 64 copies of 1b followed by 64 copies of 0b. 1111b: SLOS1.  For Example: PRBS7 equals 1000 0011 0000 1010 0011 1100 1000 1011 0011 1010 1001 1111 0100 0011 1000 1001 0011 0110 1011 0111 1011 0001 1010 0101 1101 1100 1100 1010 1011 1111 1000 000b All other values are reserved.
	16:13	<b>Preset</b> – Sets the preset number for TxFFE parameters at the transmitter (see <b>Error! Reference s ource not found.</b> ).
	17	<b>Set Modifications</b> – Enables non-default values for Preset and for Modifications. 0b: Load default TxFFE parameters and ignore the <i>Modifications</i> field. 1b: Load TxFFE parameters from the <i>Preset</i> field and load any signal shaping parameters based on the <i>Modifications</i> field.
	25:18	<b>Modifications</b> – Sets other signal shaping parameters. Bit 0: Disable de-emphasis (0b), or enable de-emphasis (1b). Bit 1: Disable pre-shoot (0b), or enable pre-shoot (1b). All other bits are reserved.
	31:26	<b>Reserved</b>