

# USB Type-C ENGINEERING CHANGE NOTICE

**Title: USB4 Gen3/Gen4 Integrated Crosstalk Test Update for Asymmetric Mode**

**Applied to: USB Type-C Spec R2.2 - October 2022**

<b>Brief description of the functional changes proposed:</b>
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For USB4 Gen3/Gen4 cable crosstalk.
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<b>Benefits as a result of the proposed changes:</b>
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To cover USB4 Gen4 USB asymmetrical mode
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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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The USB4 Gen3 cable to be checked for Gen4 use.
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<b>An analysis of the hardware implications:</b>
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USB4 Gen3 cable can be used for USB4 Gen4
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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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The compliance tool Get-iPar to be updated.
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## Actual Change Requested

### (a). 3.7.2.5.3 Integrated Crosstalk between TX/RX Pairs (Normative – USB4 Gen3/Gen4)

#### From Text:

The total crosstalk is defined for both the DP alt-mode and the USB mode. In DP alt-mode, all crosstalk is FEXT, while in the USB mode both FEXT and NEXT exist. The total crosstalk is defined in the equation below:

$$IXTi\_DP \text{ or } IXTi\_USB = dB \left( \sqrt{\frac{\int_0^{f_{max}} |Vin(f)|^2 \sum_j |SDDij|^2 df}{\int_0^{f_{max}} |Vin(f)|^2 df}} \right)$$

#### To Text:

The total crosstalk is defined for the DP alt-mode, the USB mode and the USB asymmetrical mode. In DP alt-mode, all crosstalk is FEXT, while in the USB mode and USB asymmetric mode both FEXT and NEXT exist. The total crosstalk is defined in the equation below:

$$IXTi\_DP \text{ or } IXTi\_USB \text{ or } IXTi\_ASYM = dB \left( \sqrt{\frac{\int_0^{f_{max}} |Vin(f)|^2 \sum_j |SDDij|^2 df}{\int_0^{f_{max}} |Vin(f)|^2 df}} \right)$$

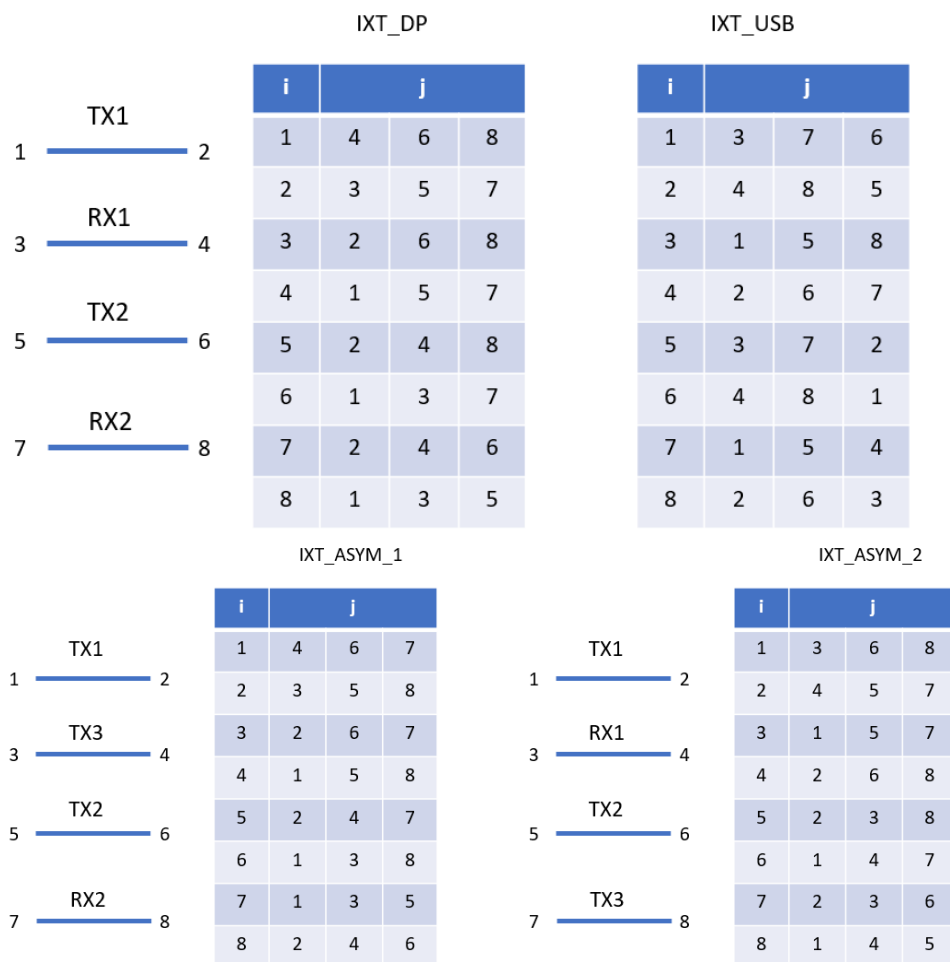
### (b). Fig 3-45 in Section 3.7.2.5.3

#### From Text:

		IXT_DP				IXT_USB			
		i	j			i	j		
1	Tx1	2	4	6	8	1	3	7	6
3	Rx1	4	2	6	8	2	4	8	5
5	Tx2	6	1	5	7	3	1	5	8
7	Rx2	8	2	4	8	4	2	6	7
			5	2	4	5	3	7	2
			6	1	3	6	4	8	1
			7	2	4	7	1	5	4
			8	1	3	8	2	6	3

#### To Text:

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## (C). 3.7.2.5.3 Integrated Crosstalk between TX/RX Pairs (Normative – USB4 Gen3/Gen4)

### From Text:

The total crosstalk for the DP Alternate Mode and USB4 operation shall be controlled. Its normative limit is defined in Figure 3-46.

**Figure 3-46 IXT\_DP and IXT\_USB Limit as Function of ILfit at 10 GHz (USB4 Gen3/Gen4)**

### To Text:

The total crosstalk for the DP Alternate Mode, USB4 and USB4 asymmetrical operation shall be controlled. Its normative limit is defined in Figure 3-46.

**Figure 3-46 IXT\_DP, IXT\_USB and IXT\_ASYM Limit as Function of ILfit at 10 GHz (USB4 Gen3/Gen4)**