USB4™ 40Gbps Certified Cable Harness and Plug Connector

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Introduction

This document introduces cable harnesses that have been certified by USB4, the most recent USB-compliant standard, and the plug connectors used in those harnesses.

Changes to Connectors and Harnesses

The same USB Type-C® connector geometry as before is inherited to ensure backward compatibility. However, USB4 has new requirements for signal-quality, and vendors need to use newly improved connectors and harnesses for USB4.
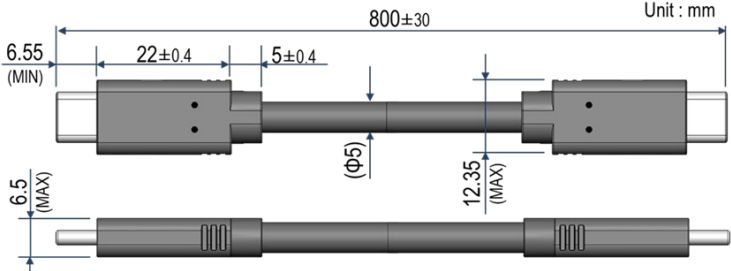
For certification receptacles used in USB4 40Gbps devices, requirements related to signal-quality have been added to certification tests for the first time as mandatory items.

In harnesses, they were more mandatory than before, but in receptacle connectors, they were formerly certified as part of final devices such as computers, harnesses, and docking stations. Receptacle connectors are short parts when viewed from the entire USB signal transmission path, including board traces and harnesses, but can be a major cause of unwanted signal reflection and crosstalk. To avoid bottlenecks throughout the entire USB signal transmission line, products produced through proper design and precision manufacturing are essential.

Also, because the requirements for USB4 40Gbps certified harnesses are much more stringent than previous versions, the maximum transmissible length of passive harnesses has been reduced to 0. 8m.

USB4 40Gbps Certified Cable Harness

The specifications of the passive harness are as follows. Developed for evaluation of the transmission characteristics of receptacle connectors, we will consider mass production in the future.

USB4 40Gbps Certified Cable Harness	
P/N	DX07880B80******
TID	4636
Length	80cm
Cable	O.D. 5mm, Coaxial Cable
Rated Current	5A Max.
Mold(Material/Color)	TPE/Black
Product Image & Dimensions	

Performance of USB4 40Gbps Certified Cable Harness

All SI test items have passed with a margin.

	Limit	TX1(L)	TX1(R)	RX1(L)	RX1(R)	TX2(L)	TX2(R)	RX2(L)	RX2(R)	Pass/Fail
ILfit@0.1GHz, dB	-1	-0.47	-0.47	-0.43	-0.43	-0.44	-0.44	-0.45	-0.45	Pass
ILfit@2.5GHz, dB	-4.2	-2.63	-2.63	-2.58	-2.58	-2.57	-2.57	-2.56	-2.56	Pass
ILfit@5GHz, dB	-6	-4.01	-4.01	-3.9	-3.9	-3.87	-3.87	-3.89	-3.89	Pass
ILfit@10GHz, dB	-7.5	-6.05	-6.05	-5.97	-5.97	-5.92	-5.92	-5.98	-5.98	Pass
ILfit@12.5GHz, dB	-9.3	-7.02	-7.02	-6.97	-6.97	-6.92	-6.92	-6.99	-6.99	Pass
ILfit@15GHz, dB	-11	-8.07	-8.07	-8.03	-8.03	-7.99	-7.99	-8.07	-8.07	Pass
IMR, dB	-35.51	-37.83	-37.83	-40.02	-40.02	-38.68	-38.68	-38.98	-38.98	Pass
IRL, dB	-18.05	-18.28	-18.28	-19.8	-19.8	-19.79	-19.79	-19.39	-19.39	Pass
C2D, dB	-17	-23.85	-22.75	-28.55	-32.05	-25.67	-27.44	-30.15	-31.22	Pass
D2C, dB	-17	-23.92	-22.76	-28.48	-32.13	-25.62	-27.55	-30.18	-31.32	Pass
IXT_DP, dB	-40.1	-48.09	-47.41	-46.95	-46.99	-46.77	-46.61	-47.08	-47.85	Pass
IXT_USB, dB	-40.17	-48.18	-48.2	-48.5	-48.72	-48.66	-48.66	-48.39	-48.2	Pass

	Limit	Tx1/RX1	Tx2/Rx2	Pass/Fail
USB2(L):IDDXT_1NEXT+FEXT, dB	-34.5	-66.99	-71.82	Pass
USB2(R):IDDXT_1NEXT+FEXT, dB	-34.5	-68.52	-72.14	Pass
USB2(L):2NEXT, dB	-33	-67.04	-67.95	Pass
USB2(R):2NEXT, dB	-33	-68.53	-68.63	Pass

Plug Connector for USB4 Cable Harness

The name and specifications of the plug connectors used at both ends of USB4 passive harness are as follows. Uncertified by USB4 Gen3 standard and has obtained USB 3.2 Gen 2 certification.(TID:4025)

Smaller size and superior electrical characteristics than conventional products by shortening the terminal length by 2.35mm.

We plan to sell it as an individual item in the future.

| Plug Connector for USB4 Cable Harness	
P/N	DX07P022FA1
Product Image & Dimensions	Unit : mm 8.45 8.25 Paddle board A12 ... A1 / B1 ... B12 2.4 / 10.7 / 8.9 / 3.2 For USB4 Plug DX07P022FA1 (10.7) Conventional product DX07P022AA6 (15) -2.35

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Performance of Plug Connector

As a result of measurement with the combination of the on-board receptacle and the plug connector for cable connection,　All SI test items have passed with a margin.

On-Board Receptacle
(DX07S024JAA)

Plug Connector
(DX07P022FA1)
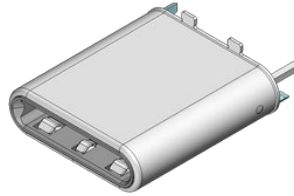
*Intepar software v0.90a

Victim Line	Limit	Tx1	Rx1	Tx2	Rx2	Min Margin	Pass/Fail
ILfit@2.5GHz, dB	-0.6	-0.36	-0.34	-0.34	-0.36	0.24	Pass
ILfit@5GHz, dB	-0.8	-0.49	-0.46	-0.45	-0.51	0.29	Pass
ILfit@10GHz, dB	-1	-0.67	-0.63	-0.59	-0.68	0.32	Pass
ILfit@12.5GHz, dB	-1.25	-0.77	-0.78	-0.72	-0.77	0.47	Pass
ILfit@15GHz, dB	-1.5	-0.92	-1	-0.93	-0.88	0.5	Pass
IMR, dB	-39	-43.19	-44.71	-44.39	-43.89	4.19	Pass
IRL, dB	-15	-18.25	-19.65	-20.36	-17.5	2.5	Pass
C2D, dB	-20	-26.06	-29.25	-31.12	-25.11	5.11	Pass
D2C, dB	-20	-25.11	-29.71	-31.43	-25.88	5.11	Pass

Victim Line		Limit	Tx1	Rx1	Tx2	Rx2			Min Margin	Pass/Fail
NEXT	Tx1	-43	NEXT(1,3) -48.98	NEXT(1,7) -55.27	NEXT(2,4) -45.89	NEXT(2,8) -54.39			2.89	Pass
	Rx1	-43	NEXT(3,1) -48.98	NEXT(3,5) -60.84	NEXT(4,2) -45.89	NEXT(4,6) -56.31			2.89	Pass
	Tx2	-43	NEXT(5,3) -60.84	NEXT(5,7) -49.12	NEXT(6,4) -56.31	NEXT(6,8) -45.86			2.86	Pass
	Rx2	-43	NEXT(7,1) -55.27	NEXT(7,5) -49.12	NEXT(8,2) -54.39	NEXT(8,6) -45.86			2.86	Pass
FEXT	Tx1	-43	FEXT(1,4) -49.36	FEXT(1,6) -56.95	FEXT(1,8) -54.82	FEXT(2,3) -47.86	FEXT(2,5) -60.2	FEXT(2,7) -54.81	4.86	Pass
	Rx1	-43	FEXT(3,2) -47.86	FEXT(3,6) -61.25	FEXT(3,8) -59.15	FEXT(4,1) -49.36	FEXT(4,5) -60.91	FEXT(4,7) -58.84	4.86	Pass
	Tx2	-43	FEXT(5,2) -60.2	FEXT(5,4) -60.91	FEXT(5,8) -47.26	FEXT(6,1) -56.95	FEXT(6,3) -61.25	FEXT(6,7) -49.55	4.26	Pass
	Rx2	-43	FEXT(7,2) -54.81	FEXT(7,4) -58.84	FEXT(7,6) -49.55	FEXT(8,1) -54.82	FEXT(8,3) -59.15	FEXT(8,5) -47.26	4.26	Pass

USB2.0	Limit	Tx1	Rx1	Tx2	Rx2	Min Margin	Pass/Fail
TX/RX to D+/D-(L)XTK	-50	-68.07	-81.09	-80.27	-67.94	17.94	Pass
TX/RX to D+/D-(R)XTK	-50	-68.05	-80.88	-79.5	-68.25	18.05	Pass

USB2.0	Limit	Tx1(L)	Tx1(R)	Rx1(L)	Rx1(R)	Min Margin	
D+/D- to TX/RX XTK	-50	-67.99	-68.13	-80.59	-81.43	17.99	Pass
		Tx2(L)	Tx2(R)	Rx2(L)	Rx2(R)		
		-79.91	-79.82	-68.03	-68.16		

End

As a global leader in interconnection technologies, JAE has actively contributed to USB-IF Working Group, which is in charge of developing new specifications. We develop and manufacture connectors and harnesses that meet these latest standards to support next-generation advanced electronic devices.

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