

InfiniBand Trade Association RoCE Integrators' List

October 2019







IBTA RoCE Integrators' List PlugFest 36 October 2019

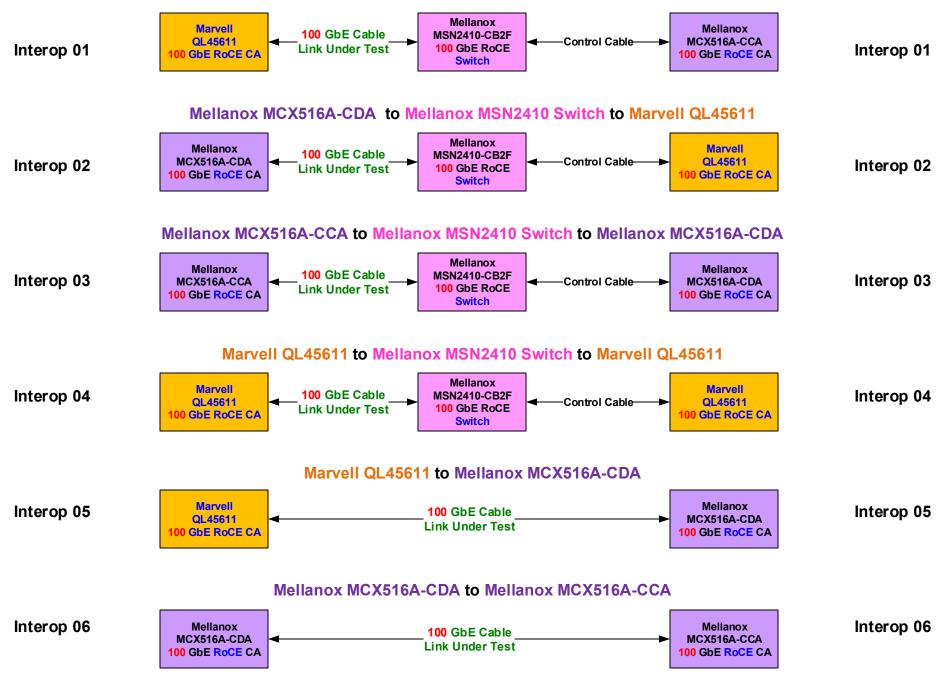


Manufacturer	Description	Model	Type	Speed	FW	SW
Marvell	FastLinQ Single-Port QSFP28	QL45611HL	RNIC	100 GbE	8.50.9.0	OFED 4.17-1
Marvell	FastLinQ Dual-Port QSFP+	QL45412HL	RNIC	40 GbE	8.50.9.0	OFED 4.17-1
Marvell	FastLinQ Dual-Port SFP28	QL45212HL	RNIC	25 GbE	8.50.9.0	OFED 4.17-1
Marvell	FastLinQ Dual-Port SFP28	QL41212HL	RNIC	25 GbE	8.50.9.0	OFED 4.17-1
Marvell	FastLinQ Quad-Port SFP28	QL41234HL	RNIC	25 GbE	8.50.9.0	OFED 4.17-1
Mellanox	ConnectX®-5 EN Dual-Port QSFP28	MCX516A-CCA	RNIC	100 GbE	16.26.1040	MLNX OFED 4.7-1.0.0.1
Mellanox	ConnectX®-5 EN Dual-Port QSFP28	MCX516A-CDA	RNIC	100 GbE	16.26.1040	MLNX OFED 4.7-1.0.0.1
Mellanox	ConnectX®-4 EN Dual-Port QSFP28	MCX4121A-ACA	RNIC	25 GbE	14.26.1040	MLNX OFED 4.7-1.0.0.1
Mellanox	SwitchX®-2 InfiniBand to Ethernet gateway, 36 QSFP+ ports	MSX6036G-2SFS	Switch	40 GbE	9.4.5110	MLNX OS 3.6.6003
Mellanox	Spectrum 48 SFP28 ports, 8 QSFP28 ports, Supports 10 to 100GbE	MSN2410-CB2F	Switch	100 GbE	13.2000.1862	MLNX OS 3.8.1304

Software	Versions	Performance	Software
Operating System	OFED Systems: CentOS 7.6.1810, MLNX Systems: CentOS 7.7-1908	HPC-Performance Monitor	HPC-PM-2.0.80
OFED	OFED 4.17-1	Perftest (OFED)	<u>4.4-0.9</u>
Mellanox OFED	MLNX OFED 4.7-1.0.0.1		
Open MPI	<u>Open MPI 3.1.4</u>	Benchmarks I	Performed
Benchmark	Intel MPI Benchmarks	PingPong	Gather
Test Plan	Software Forge RoCE Interoperability MOI	PingPing	Gatherv
Duration	1-3 minutes	Sendrecv	Scatter
		Exchange	Scatterv
	Conditions for Passing Interoperability Testing	Allreduce	Alltoall
Performance	Devices must perform at advertised rates and latencies	Reduce	Alltoallv
Link Status	Link rate and width show expected values - i.e. 100GbE (4x)	Reduce_scatter	Bcast
Errors	There must be no errors recorded during any test phases	Allgather	Barrier
MPI Test	The MPI Benchmark must run to completion	Allgatherv	

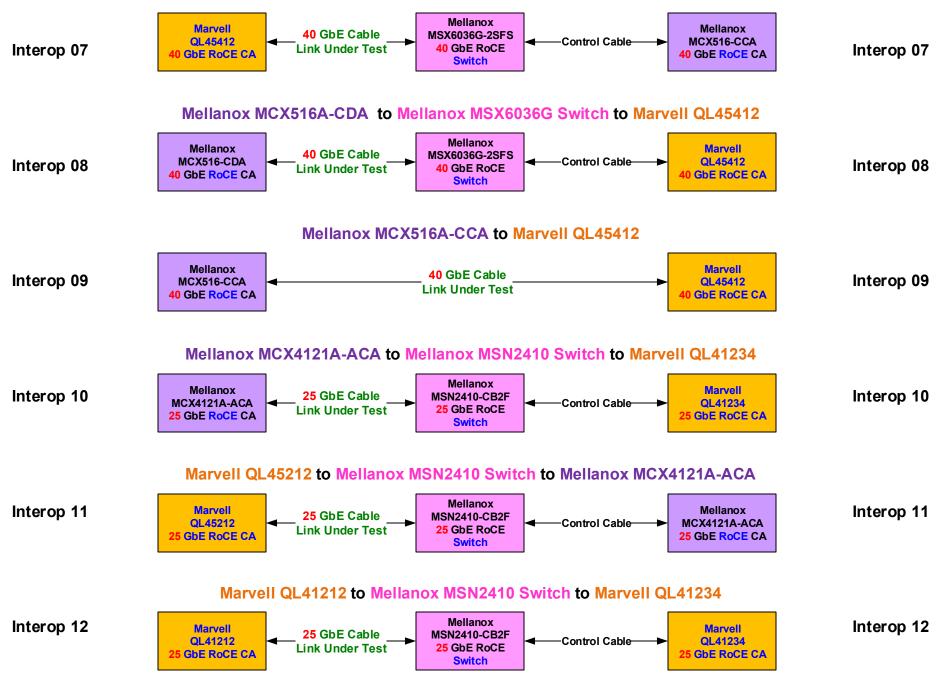
RDMA over Converged Ethernet (RoCE) Interop Testing

Marvell QL45611 to Mellanox MSN2410 Switch to Mellanox MCX516A-CCA



RDMA over Converged Ethernet (RoCE) Interop Testing

Marvell QL45412 to Mellanox MSX6036G Switch to Mellanox MCX516A-CCA

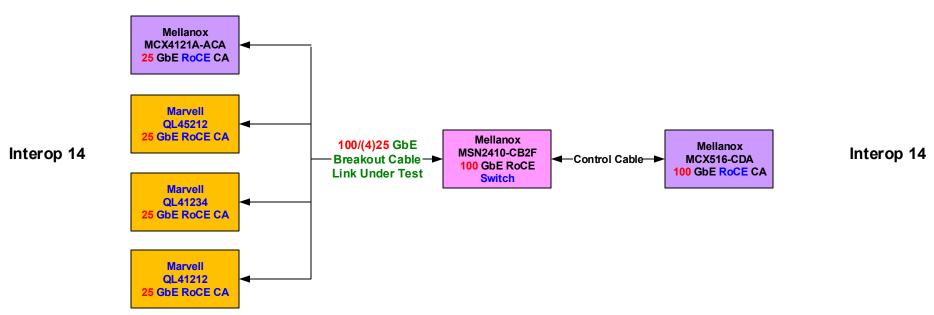


RDMA over Converged Ethernet (RoCE) Interop Testing

Mellanox MCX4121A-ACA to Mellanox MSN2410 Switch to Marvell QL41212



Mixed 25 GbE RNICs to Mellanox MSN2410 Switch to Mellanox MCX516A-CDA





IBTA RoCE Compliance October 2019



Manufacturer	Product Description	Model	FW	SW	Transport	DCB
	Low Profile Single-Port QSFP28 100GbE Ethernet PCIe Adapter	QL45611	8.50.09.00	OFED 4.17-1	✓	✓
	Low Profile Dual-Port QSFP+ 40GbE Ethernet PCIe Adapter	QL45412	8.50.09.00	OFED 4.17-1	✓	✓
Marvell	Low Profile Dual-Port SFP28 25GbE Ethernet PCIe Adapter	QL45212	8.50.09.00	OFED 4.17-1	✓	✓
	Low Profile Dual-Port SFP28 25GbE Ethernet PCIe Adapter	QL41212	8.50.09.00	OFED 4.17-1	✓	✓
	Low Profile Quad-Port SFP28 25GbE Ethernet PCIe Adapter	QL41234	8.50.09.00	OFED 4.17-1	✓	✓

		Model	QL45611	QL45412	QL45212	QL41212	QL41234
	Marvell RoCE RNICs	Date	11/22/2019	11/22/2019	11/22/2019	11/22/2019	11/25/2019
	IVIAI VEII ROCE RIVICS	Firmware Version	8.50.09.00	8.50.09.00	8.50.09.00	8.50.09.00	8.50.09.00
		Overall Results	Pass	Pass	Pass	Pass	Pass
Test Class	Name	Number	Results	Results	Results	Results	Results
	RC RDMA Send Only after RDMA Read	C09_027_01	Pass	Pass	Pass	Pass	Pass
	RC RDMA Write Only after RDMA Read	C09_027_02	Pass	Pass	Pass	Pass	Pass
	RC RDMARead Only after RDMA Read	C09_027_03	Pass	Pass	Pass	Pass	Pass
	RC Atomic FetchAdd after RDMA Read	C09_027_04	Pass	Pass	Pass	Pass	Pass
	RC Atomic CompSwap after RDMA Read	C09_027_05	Pass	Pass	Pass	Pass	Pass
	RC Atomic CompSwap after Atomic CompSwap	C09_027_06	Pass	Pass	Pass	Pass	Pass
	RC Atomic FetchAdd after Atomic CompSwap	C09_027_07	Pass	Pass	Pass	Pass	Pass
	RC Atomic FetchAdd after Atomic FetchAdd	C09_027_08	Pass	Pass	Pass	Pass	Pass
	RC Atomic CompSwap after Atomic FetchAdd	C09_027_09	Pass	Pass	Pass	Pass	Pass
	RC RDMA Send Only after Atomic CompSwap	C09_027_10	Pass	Pass	Pass	Pass	Pass
	RC RDMA Write Only after Atomic CompSwap	C09_027_11	Pass	Pass	Pass	Pass	Pass
Transport	RC RDMA Send Only after Atomic FetchAdd	C09_027_12	Pass	Pass	Pass	Pass	Pass
-	RC RDMA Write Only after Atomic Fetch Add	C09_027_13	Pass	Pass	Pass	Pass	Pass
Layer	Completion Rules - RC RDMA Send Case	C09_060_01	Pass	Pass	Pass	Pass	Pass
	Completion Rules - RC RDMA Send Case (inverted)	C09_060_01_01	Pass	Pass	Pass	Pass	Pass
	Completion Rules - RC RDMA Write Case	C09_060_03	Pass	Pass	Pass	Pass	Pass
	Completion Rules - RC RDMA Write Case (inverted)	C09_060_03_01	Pass	Pass	Pass	Pass	Pass
	Completion Rules - RC RDMA Read Case	C09_060_05	Pass	Pass	Pass	Pass	Pass
	Completion Rules - RC RDMA Read Case (inverted)	C09_060_05_01	Pass	Pass	Pass	Pass	Pass
	Completion Rules - Atomic FetchAdd Case	C09_060_07	Pass	Pass	Pass	Pass	Pass
	Completion Rules - Atomic FetchAdd Case (inverted)	C09_060_07_01	Pass	Pass	Pass	Pass	Pass
	Completion Rules - Atomic CompSwap Case	C09_060_09	Pass	Pass	Pass	Pass	Pass
	Completion Rules - Atomic CompSwap Case (inverted)	C09_060_09_01	Pass	Pass	Pass	Pass	Pass
	Requester/Responder RNR NAK Behavior	C09_130_01	Pass	Pass	Pass	Pass	Pass
	Outstanding Request Timeout	C09_142_01	Pass	Pass	Pass	Pass	Pass
DCB	IEEE 802.1Q	36.2.2#1	Pass	Pass	Pass	Pass	Pass



IBTA RoCE Compliance October 2019



Manufacturer	Product Description	Model	FW	SW	Transport	DCB
	ConnectX®-4 Lx EN Dual-Port SFP28 25GbE Ethernet PCIe Adapter	MCX4121A-ACAT	14.26.1040	MLNX_OFED 4.7-1.0.0.1	✓	✓
Mellanox	ConnectX®-5 EN Dual-Port QSFP28 100GbE Ethernet PCle Adapter	MCX516A-CCAT	16.26.1040	MLNX_OFED 4.7-1.0.0.1	✓	✓
	ConnectX®-5 EN Dual-Port QSFP28 100GbE Ethernet PCle Adapter	MCX516A-CDAT	16.26.1040	MLNX_OFED 4.7-1.0.0.1	✓	✓

		Model	MCX4121A-ACAT	MCX516A-CCAT	MCX516A-CDAT
	Mellanox RoCE RNICs	Date	11/5/2019	10/31/2019	11/1/2019
	INICHATION ROCE RIVICS	Firmware Version	14.26.1040	16.26.1040	16.26.1040
		Overall Results	Pass	Pass	Pass
Test Class	Name	Number	Results	Results	Results
	RC RDMA Send Only after RDMA Read	C09_027_01	Pass	Pass	Pass
	RC RDMA Write Only after RDMA Read	C09_027_02	Pass	Pass	Pass
	RC RDMARead Only after RDMA Read	C09_027_03	Pass	Pass	Pass
	RC Atomic FetchAdd after RDMA Read	C09_027_04	Pass	Pass	Pass
	RC Atomic CompSwap after RDMA Read	C09_027_05	Pass	Pass	Pass
	RC Atomic CompSwap after Atomic CompSwap	C09_027_06	Pass	Pass	Pass
	RC Atomic FetchAdd after Atomic CompSwap	C09_027_07	Pass	Pass	Pass
	RC Atomic FetchAdd after Atomic FetchAdd	C09_027_08	Pass	Pass	Pass
	RC Atomic CompSwap after Atomic FetchAdd	C09_027_09	Pass	Pass	Pass
	RC RDMA Send Only after Atomic CompSwap	C09_027_10	Pass	Pass	Pass
	RC RDMA Write Only after Atomic CompSwap	C09_027_11	Pass	Pass	Pass
Transport	RC RDMA Send Only after Atomic FetchAdd	C09_027_12	Pass	Pass	Pass
•	RC RDMA Write Only after Atomic Fetch Add	C09_027_13	Pass	Pass	Pass
Layer	Completion Rules - RC RDMA Send Case	C09_060_01	Pass	Pass	Pass
	Completion Rules - RC RDMA Send Case (inverted)	C09_060_01_01	Pass	Pass	Pass
	Completion Rules - RC RDMA Write Case	C09_060_03	Pass	Pass	Pass
	Completion Rules - RC RDMA Write Case (inverted)	C09_060_03_01	Pass	Pass	Pass
	Completion Rules - RC RDMA Read Case	C09_060_05	Pass	Pass	Pass
	Completion Rules - RC RDMA Read Case (inverted)	C09_060_05_01	Pass	Pass	Pass
	Completion Rules - Atomic FetchAdd Case	C09_060_07	Pass	Pass	Pass
	Completion Rules - Atomic FetchAdd Case (inverted)	C09_060_07_01	Pass	Pass	Pass
	Completion Rules - Atomic CompSwap Case	C09_060_09	Pass	Pass	Pass
	Completion Rules - Atomic CompSwap Case (inverted)	C09_060_09_01	Pass	Pass	Pass
-	Requester/Responder RNR NAK Behavior	C09_130_01	Pass	Pass	Pass
	Outstanding Request Timeout	C09_142_01	Pass	Pass	Pass
DCB	IEEE 802.1Q	36.2.2#1	Pass	Pass	Pass





Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Mellanox	Link	Device Link	SFI Perf	Open MPI +	Overall
' ' '	Meters		1	Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001	_		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003	MSN241	MC	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003	<u>S</u>	C	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	5	RE4F7TF7T60003	~	X5	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56		RIHF7TF7T10001	24	51	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	.4561	RIHF7TF7T15001	1	6A	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	တ္	RIHF7TF7T20001	0_	Þ	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	= =	RIHF7TF7T20003	<u>C</u>	Ċ.	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56		RIHF7TF7T30003	B2F	Ö	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56		RIHF7TF7T35003	2F	CA	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56		RIHF7TF7T40003			100	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30			100	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30			100	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30			100	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			100	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			100	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			100	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			100	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			100	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			100	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			100	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass	Pass	Pass	Pass

Marvell QL45611 to Mellanox MSN2410 Switch to Mellanox MCX516A-CCA







Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Mellanox	Marvell	Link	Device Link	SFI Perf	Open MPI +	Overall							
- Сриу	Meters	7		Type	RNIC	Test	Switch	RNIC	Speed	201100 211111	Testing	IMB Testing	Result							
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1			100	Pass	Pass	Pass	Pass							
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1			100	Pass	Pass	Pass	Pass							
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001			100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28	7	RIEF4TF4T30003	< <		100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28	MCX516A-	RE4F4TF4T55003	MSN2410-		100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	\sim	RE4F7TF7T60003	Ž	O	100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56	ં છે	RIHF7TF7T10001	2	ည	100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56		RIHF7TF7T15001	44	4	100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	85	RIHF7TF7T20001	0	45611	100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56		RIHF7TF7T20003	-0	2	100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	Ω	RIHF7TF7T30003	H		100	Pass	Pass	Pass	Pass							
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	D	Q	D	Q	Q	CDA	Q	Q	RIHF7TF7T35003	B2F		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	D	RIHF7TF7T40003	П		100	Pass	Pass	Pass	Pass							
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30			100	Pass	Pass	Pass	Pass							
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30			100	Pass	Pass	Pass	Pass							
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30			100	Pass	Pass	Pass	Pass							
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			100	Pass	Pass	Pass	Pass							
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			100	Pass	Pass	Pass	Pass							
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			100	Pass	Pass	Pass	Pass							
Mellanox	2	26	Copper - Unequalized	QSFP56		MCP1650-H002E26			100	Pass	Pass	Pass	Pass							
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			100	Pass	Pass	Pass	Pass							
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			100	Pass	Pass	Pass	Pass							
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			100	Pass	Pass	Pass	Pass							
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			100	Pass	Pass	Pass	Pass							
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass	Pass	Pass	Pass							

Mellanox MCX516A-CDA to Mellanox MSN2410 Switch to Marvell QL45611



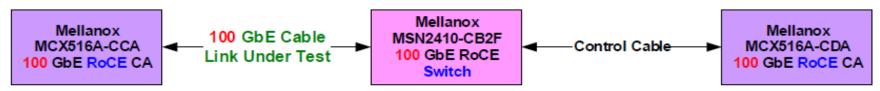


Scenario 03



Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Mellanox	Mellanox	Link	Device Link	SFI Perf	Open MPI +	Overall
, ,	Meters		·	Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28	-	RIEF4TF4T30003	~	7	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28	<u> </u>	RE4F4TF4T55003	S		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	MCX516A	RE4F7TF7T60003	MSN2410	- ¥	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56	6	RIHF7TF7T10001	2,	ં છે	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	<u> </u>	RIHF7TF7T15001	44	_	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	76	RIHF7TF7T20001	0	8	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	1	RIHF7TF7T20003	-C	MCX516A-CDA	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	ဂ္ဂ	RIHF7TF7T30003	ä	Ω	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	(2)	RIHF7TF7T35003	82F	Q	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	D	RIHF7TF7T40003	П	Þ	100	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30			100	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30			100	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30			100	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			100	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			100	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			100	Pass	Pass	Pass	Pass
Mellanox	2	26	Copper - Unequalized	QSFP56		MCP1650-H002E26			100	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			100	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			100	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			100	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			100	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass	Pass	Pass	Pass

Mellanox MCX516A-CCA to Mellanox MSN2410 Switch to Mellanox MCX516A-CDA







Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Marvell	Link	Device Link	SFI Perf	Open MPI +	Overall
' ' '	Meters		1	Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1			100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001	_		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003	MSN241		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003	<u>S</u>		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	5	RE4F7TF7T60003	~	ည	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56		RIHF7TF7T10001	24	The second second	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	.4561	RIHF7TF7T15001		45611	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	တ္	RIHF7TF7T20001	0_	တ္	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	= =	RIHF7TF7T20003	<u>C</u>	= =	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56		RIHF7TF7T30003	B2F		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56		RIHF7TF7T35003	2F		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56		RIHF7TF7T40003			100	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30			100	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30			100	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30			100	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			100	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			100	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			100	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			100	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			100	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			100	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			100	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass	Pass	Pass	Pass

Marvell QL45611 to Mellanox MSN2410 Switch to Marvell QL45611







Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Link	Device Link	SFI_Perf	Open MPI +	Overall
	Meters		•	Type	RNIC	Test	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1		100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1		100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003	3	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003	C	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	Q	RE4F7TF7T60003	×	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56		RIHF7TF7T10001	2	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	QL45611	RIHF7TF7T15001	MCX516A-	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	Ō	RIHF7TF7T20001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	7	RIHF7TF7T20003	.	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	_	RIHF7TF7T30003	CDA	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56		RIHF7TF7T35003	A	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56		RIHF7TF7T40003		100	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30		100	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30		100	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30		100	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30		100	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26		100	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26		100	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050		100	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100		100	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030		100	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003		100	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100		100	Pass	Pass	Pass	Pass

Marvell QL45611 to Mellanox MCX516A-CDA







Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Mellanox	Link	Device Link	SFI_Perf	Open MPI +	Overall
. ,	Meters		•	Type	RNIC	Test	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	QSFP28		117G0-060989-R1		100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-060997-R1		100	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP28		117G0-059874-R1		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AE4AF4F4L30TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AE4AF4F4L50TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AE4CF4F4L10HXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	30	NA	Fiber - Active	QSFP28		AIEAF7F7L30TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	50	NA	Fiber - Active	QSFP28		AIEAF7F7L50TXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	100	NA	Fiber - Active	QSFP28		AIECF7F7L10HXX		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28	-	RIEF4TF4T30003	-	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28	>	RE4F4TF4T55003	>	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28	MCX516A-	RE4F7TF7T60003	MCX516A-	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56	6	RIHF7TF7T10001	<u> </u>	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	<u> </u>	RIHF7TF7T15001	=	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	76	RIHF7TF7T20001	62	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56		RIHF7TF7T20003		100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	CDA	RIHF7TF7T30003	ဂ္ဂ	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	D/	RIHF7TF7T35003	CA	100	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	\triangleright	RIHF7TF7T40003	D	100	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30		100	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30		100	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30		100	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30		100	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26		100	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26		100	Pass	Pass	Pass	Pass
Mellanox	2	26	Copper - Unequalized	QSFP56		MCP1650-H002E26		100	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050		100	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100		100	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030		100	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003		100	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100		100	Pass	Pass	Pass	Pass

Mellanox MCX516A-CDA to Mellanox MCX516A-CCA



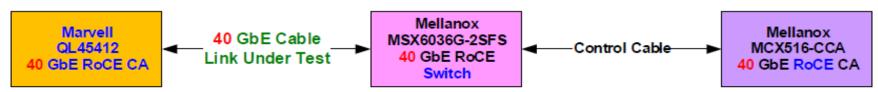


40 Gigabit Ethernet Scenario 07



Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Mellanox	Link	Device Link	SFI_Perf	Open MPI +	Overall
. ,	Meters		,	Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-060995-R1			40	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	QSFP+		117G0-060993-R1			40	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-061616-R1			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28		RE4F7TF7T60003	7		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56		RIHF7TF7T10001	MSX6036	7	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	_	RIHF7TF7T15001	×	MCX5	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	ည	RIHF7TF7T20001	6	×	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56		RIHF7TF7T20003	03	5	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	45	RIHF7TF7T30003	96	_	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	4	RIHF7TF7T35003	Ð	6-	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	2	RIHF7TF7T40003	-2	C	40	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00AE30	SF	CA	40	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001E30			40	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30	S		40	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			40	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			40	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			40	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			40	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			40	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			40	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			40	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass	Pass	Pass	Pass

Marvell QL45412 to Mellanox MSX6036G Switch to Mellanox MCX516A-CCA



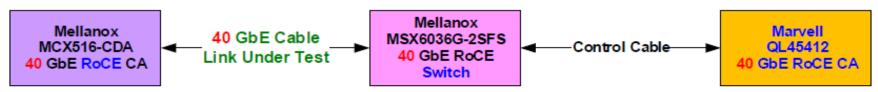


40 Gigabit Ethernet Scenario 08



Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Mellanox	Marvell	Link	Device Link	SFI Perf	Open MPI +	Overall
	Meters		1	Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-060995-R1			40	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	QSFP+		117G0-060993-R1			40	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-061616-R1			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28		RIEF4TF4T20001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003			40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28		RE4F7TF7T60003	7		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56	7	RIHF7TF7T10001	20		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	7	RIHF7TF7T15001	×	_	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	MCX	RIHF7TF7T20001	MSX60	ည	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	O1	RIHF7TF7T20003	03		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56	<u> </u>	RIHF7TF7T30003	36	4541	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	ရ	RIHF7TF7T35003	O	4	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	<u>0</u>	RIHF7TF7T40003	-2	12	40	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28	D,	MCP1600-E00AE30	S		40	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28	A	MCP1600-E001E30	Ξ		40	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30	S		40	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30			40	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26			40	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26			40	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050			40	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100			40	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030			40	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003			40	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass	Pass	Pass	Pass

Mellanox MCX516A-CDA to Mellanox MSX6036G Switch to Marvell QL45412





40 Gigabit Ethernet Scenario 09



Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Marvell	Link	Device Link	SFI Perf	Open MPI +	Overall
. ,	Meters		•	Туре	RNIC	Test	RNIC	Speed		Testing	IMB Testing	Result
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-060995-R1		40	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	QSFP+		117G0-060993-R1		40	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	QSFP+		117G0-061616-R1		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP28		RIEF4TF4T10001		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP28	28 28 28	RIEF4TF4T20001		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2.5	30	Copper - Unequalized	QSFP28		RIEF4TF4T25001		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP28		RIEF4TF4T30003		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	5.5	26	Copper - Unequalized	QSFP28		RE4F4TF4T55003		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	6	26	Copper - Unequalized	QSFP28		RE4F7TF7T60003		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	QSFP56	–	RIHF7TF7T10001		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1.5	30	Copper - Unequalized	QSFP56	<u> </u>	RIHF7TF7T15001	_	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	QSFP56	MCX5	RIHF7TF7T20001	P	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	26	Copper - Unequalized	QSFP56	ં છે	RIHF7TF7T20003		40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3	26	Copper - Unequalized	QSFP56		RIHF7TF7T30003	4541	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	3.5	26	Copper - Unequalized	QSFP56	ဝှ	RIHF7TF7T35003	4	40	Pass	Pass	Pass	Pass
CONNPRO,Ind.	4	26	Copper - Unequalized	QSFP56	ဂ္ဂ	RIHF7TF7T40003	12	40	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28	ĈA	MCP1600-E00AE30		40	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28	₽	MCP1600-E001E30		40	Pass	Pass	Pass	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01AE30		40	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	QSFP28		MCP1600-E002E30		40	Pass	Pass	Pass	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02AE26		40	Pass	Pass	Pass	Pass
Mellanox	4	26	Copper - Unequalized	QSFP28		MCP1600-E004E26		40	Pass	Pass	Pass	Pass
Mellanox	50	N/A	Fiber - Active	QSFP28		MFA1A00-E050		40	Pass	Pass	Pass	Pass
Mellanox	100	N/A	Fiber - Active	QSFP28		MFA1A00-E100		40	Pass	Pass	Pass	Pass
Mellanox	3	N/A	Fiber - Active	QSFP28		MFA1A00-E030		40	Pass	Pass	Pass	Pass
Mellanox	30	N/A	Fiber - Active	QSFP28		MFA1A00-E003		40	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100		40	Pass	Pass	Pass	Pass

Mellanox MCX516A-CCA to Marvell QL45412



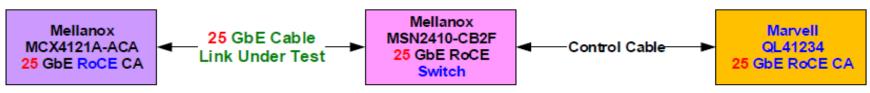


25 Gigabit Ethernet Scenario 10



Company	Length	AWG	Equalization	Connector	Mellanox	Cable Under	Mellanox	Marvell	Link	Device Link	SFI_Perf	Open MPI +	Overall
	Meters			Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	SFP28	7	117G0-060988-R1	7		25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28	10	117G0-060999-R1	25		25	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	SFP28	×	117G0-060992-R1	ž	0	25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28	4′	117G0-061139-R1	<u> </u>	~	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	20	NA	Fiber - Active	SFP28	12	AE4AF6F6L20TXX	4	4	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	SFP28	1/	RE4F6TF6T200XX	0	12	25	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	SFP28	Α_	MCP2M00-A00AE30N	6	ယ္လိ	25	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	SFP28	À	MCP2M00-A001E30N	Ö	4	25	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	SFP28	Ç	MCP2M00-A002E30N	2		25	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	SFP28	Þ	VS2830LP100	П		25	Pass	Pass	Pass	Pass

Mellanox MCX4121A-ACA to Mellanox MSN2410 Switch to Marvell QL41234



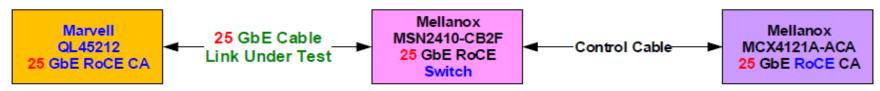


25 Gigabit Ethernet Scenario 11



Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Mellanox	Link	Device Link	SFI_Perf	Open MPI +	Overall
	Meters			Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	SFP28		117G0-060988-R1	1	7	25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28		117G0-060999-R1	25	C	25	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	SFP28	0	117G0-060992-R1	Ë	×	25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28	~	117G0-061139-R1	<u> </u>	. 4	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	20	NA	Fiber - Active	SFP28	4	AE4AF6F6L20TXX	2	12	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	SFP28	55	RE4F6TF6T200XX	0	2	25	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	SFP28	= ==	MCP2M00-A00AE30N	Ö	P	25	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	SFP28	N	MCP2M00-A001E30N	ä	Ď	25	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	SFP28		MCP2M00-A002E30N	2F	O	25	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	SFP28		VS2830LP100	П	Δ	25	Pass	Pass	Pass	Pass

Marvell QL45212 to Mellanox MSN2410 Switch to Mellanox MCX4121A-ACA



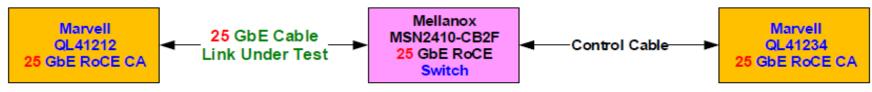


25 Gigabit Ethernet Scenario 12



Company	Length	AWG	Equalization	Connector	Marvell	Cable Under	Mellanox	Marvell	Link	Device Link	SFI_Perf	Open MPI +	Overall
	Meters			Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
BizLink	20	NA	Fiber - Active	SFP28		117G0-060988-R1	-		25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28		117G0-060999-R1	20		25	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	SFP28	0	117G0-060992-R1	ž	0	25	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP28	ĭ	117G0-061139-R1	2	2	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	20	NA	Fiber - Active	SFP28	4	AE4AF6F6L20TXX	4	4	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	2	30	Copper - Unequalized	SFP28	12	RE4F6TF6T200XX	0	12	25	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	SFP28	14:	MCP2M00-A00AE30N	,	ယ္လိ	25	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	SFP28	2	MCP2M00-A001E30N	ä	4	25	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	SFP28		MCP2M00-A002E30N	2		25	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	SFP28		VS2830LP100	п		25	Pass	Pass	Pass	Pass

Marvell QL41212 to Mellanox MSN2410 Switch to Marvell QL41234



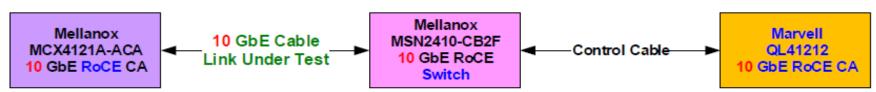


10 Gigabit Ethernet Scenario 13



Company	Length Meters	AWG	Equalization	Connector Type	Mellanox RNIC	Cable Under Test	Mellanox Switch	Marvell RNIC	Link Speed	Device Link	SFI_Perf Testing	Open MPI + IMB Testing	Overall Result
BizLink	3	30	Copper - Unequalized	SFP+	7	117G0-060991-R1	_		10	Pass	Pass	Pass	Pass
BizLink	5	26	Copper - Unequalized	SFP+	/IC	117G0-060998-R1	_ ≤	Q	10	Pass	Pass	Pass	Pass
BizLink	3	30	Copper - Unequalized	SFP+	×	117G0-061137-R1	<u>S</u>		10	Pass	Pass	Pass	Pass
Mellanox	0.5	30	Copper - Unequalized	SFP28	4	MCP2M00-A00AE30N	1 2	- 2	10	Pass	Pass	Pass	Pass
Mellanox	1	30	Copper - Unequalized	SFP28	12	MCP2M00-A001E30N	4	Ń	10	Pass	Pass	Pass	Pass
Mellanox	2	30	Copper - Unequalized	SFP28	1	MCP2M00-A002E30N	10	12	10	Pass	Pass	Pass	Pass
Volex	1	30	Copper - Unequalized	SFP28	A	VS2830LP100			10	Pass	Pass	Pass	Pass

Mellanox MCX4121A-ACA to Mellanox MSN2410 Switch to Marvell QL41212





25 Gigabit Ethernet Scenario 14



Company	Length	AWG	Equalization	Connector	Mixed	Cable Under	Mellanox	Mellanox	Link	Device Link	SFI_Perf	Open MPI +	Overall
	Meters			Type	RNIC	Test	Switch	RNIC	Speed		Testing	IMB Testing	Result
CONNPRO,Ind.	10	NA	Fiber - Active	Hybrid SFP/QSFP	Mella 8 Mar	AE4AF7F6L10TXX	MSN	MCX	25	Pass	Pass	Pass	Pass
CONNPRO,Ind.	1	30	Copper - Unequalized	Hybrid SFP/QSFP	anox & rvell	RE4F4TF64100XX	2410	516A	25	Pass	Pass	Pass	Pass

Mixed 25 GbE RNICs to Mellanox MSN2410 Switch to Mellanox MCX516A-CDA

