



# IBTA RoCE Interoperability List

## April 2017



These Interoperability results represent system tests and include the testing of the entire environment including device transmitters, cable media and device receivers. The Interoperability results include 10, 25, 40, 50 and 100 GbE RoCE devices and SFP28 and QSFP28 cables.

While every effort was made to test worst-case conditions, results may vary with alternative port configurations, device and cable manufacturing variation, device firmware and software, traffic density and data patterns, temperature variation, etc. The following documentation identifies the test conditions used to obtain these Interoperability results.

### Hardware used to test Interoperability

Manufacturer	Description of Hardware	Model	Type	FW	SW	Speed
Broadcom	BCM957414A4140-40	BCM957414A4140-40	RNIC	20.6.57	20.6.1.0	40 GbE
Broadcom	BCM957414A4140-50	BCM957414A4140-50	RNIC	20.6.57	20.6.1.0	50 GbE
Cavium	QLogic FastLinQ Dual-Port 10G RNIC	QL45212HL	RNIC	8.18.21.0	8.18.19.1	10 GbE
Cavium	QLogic FastLinQ Dual-Port 25G RNIC	QL45212HL	RNIC	8.18.21.0	8.18.19.1	25 GbE
Cavium	QLogic FastLinQ Dual-Port 40G RNIC	QL45412HL	RNIC	8.18.21.0	8.18.19.1	40 GbE
Cavium	QLogic FastLinQ Single-Port 100G RNIC	QL45611HL	RNIC	8.18.21.0	8.18.19.1	100 GbE
Mellanox	ConnectX@-3 Pro EN network interface card, 10GbE, dual-port SFP+	MCX312B-XCCT	RNIC	2.40.5030	4.0-2.0.0.1	10 GbE
Mellanox	ConnectX@-3 Pro EN network interface card, 40/56GbE, dual-port QSFP	MCX314A-BCCT	RNIC	2.40.5030	4.0-2.0.0.1	40 GbE
Mellanox	ConnectX@-3 Pro VPI adapter card, dual-port QSFP, FDR IB (56Gb/s) and 40/56GbE	MCX354A-FCCT	RNIC	2.40.5030	4.0-2.0.0.1	40 GbE
Mellanox	ConnectX@-4 Lx EN network interface card, 25GbE dual-port SFP28	MCX4121A-ACAT	RNIC	14.18.2000	4.0-2.0.0.1	25 GbE
Mellanox	ConnectX@-4 Lx EN network interface card, 10GbE dual-port SFP+	MCX4121A-XCAT	RNIC	14.18.2000	4.0-2.0.0.1	10 GbE
Mellanox	ConnectX@-4 Lx EN network interface card, 40GbE single-port QSFP28	MCX4131A-BCAT	RNIC	14.18.2000	4.0-2.0.0.1	40 GbE
Mellanox	ConnectX@-4 Lx EN network interface card, 50GbE single-port QSFP28	MCX4131A-GCAT	RNIC	14.18.2000	4.0-2.0.0.1	50 GbE
Mellanox	ConnectX@-4 EN network interface card, 50GbE dual-port QSFP28	MCX414A-GCAT	RNIC	12.18.2000	4.0-2.0.0.1	50 GbE
Mellanox	ConnectX@-4 EN network interface card, 40/56GbE dual-port QSFP28	MCX416A-BCAT	RNIC	12.18.2000	4.0-2.0.0.1	40 GbE
Mellanox	ConnectX@-4 EN network interface card, 100GbE dual-port QSFP28	MCX416A-CCAT	RNIC	12.18.2000	4.0-2.0.0.1	100 GbE
Mellanox	ConnectX@-5 EN network interface card, 100GbE dual-port QSFP28	MCX516A-CCAT	RNIC	16.19.1200	4.0-2.0.0.1	100 GbE
Mellanox	ConnectX@-5 VPI adapter card; EDR IB (100Gb/s) and 100GbE; single-port QSFP28	MCX555A-ECAT	RNIC	16.19.1200	4.0-2.0.0.1	100 GbE
Mellanox	Half-Width 12-port Non-blocking 40/56GbE	MSX1012B-2BFS	Switch	13.1300.0130	3.6.3004	40 GbE
Mellanox	SwitchX@-2 InfiniBand to Ethernet gateway, 36 QSFP ports	MSX6036G-2SFS	Switch	13.1300.0130	3.6.3004	40 GbE
Mellanox	32-port Non-blocking 100GbE Supports speeds of 10/25/40/50/56/100GbE	MSN2700-CS2F	Switch	13.1310.170	3.6.3004	100 GbE

### Software Used to Test Interoperability

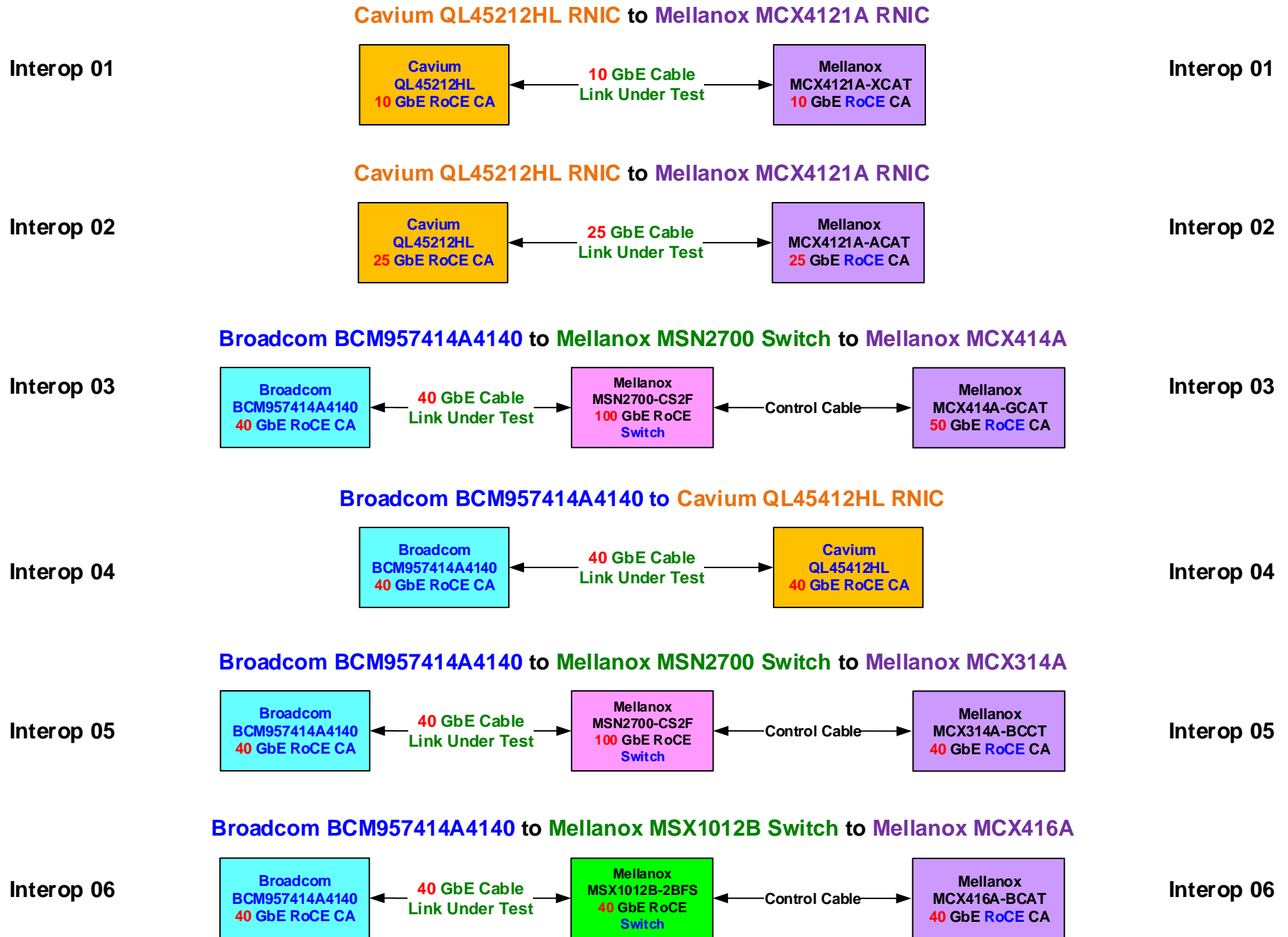
Software	Versions
Mellanox OFED Version	4.0-2.0.0.1
Open MPI Used	Open MPI 2.1
Open MPI Documentation	<a href="https://www.open-mpi.org/doc/">https://www.open-mpi.org/doc/</a>
Intel Benchmarks	<a href="https://software.intel.com/en-us/imb-user-guide">https://software.intel.com/en-us/imb-user-guide</a>
Test Plan version	<a href="https://cw.infinibandta.org/wg/CIWG/document/8069">https://cw.infinibandta.org/wg/CIWG/document/8069</a>
Test Duration	3-15 minutes

Software	Versions
Software Forge HPC-PM	<a href="#">HPC-PM-2.0.70</a>

Conditions for passing Interoperability Testing	
Link Width	Link width is @ expected width - i.e. 1x,4x, etc
Link Speed	Link speed is @ expected speed - e.g. 100 GbE
Symbol Errors	There must be no errors during the MPI Run
Link and Port Errors	There must be no errors during the MPI Run
MPI Test	The MPI test must run to completion without error

Open MPI Intel Benchmark Tests	
PingPong	Gather
PingPing	Gatherv
Sendrecv	Scatter
Exchange	Scatterv
Allreduce	Alltoall
Reduce	Alltoallv
Reduce_scatter	Bcast
Allgather	Barrier
Allgatherv	

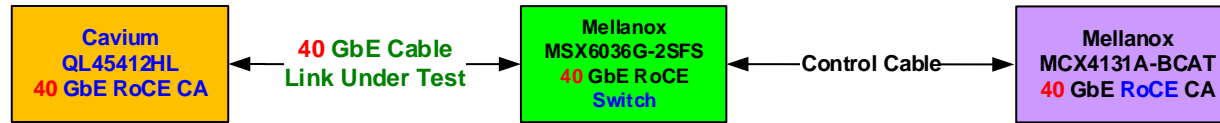
# RDMA over Converged Ethernet (RoCE) Interop Testing



# RDMA over Converged Ethernet (RoCE) Interop Testing

## Cavium QL45412HL RNIC to Mellanox MSX6036G Switch to Mellanox MCX4131A-BCAT

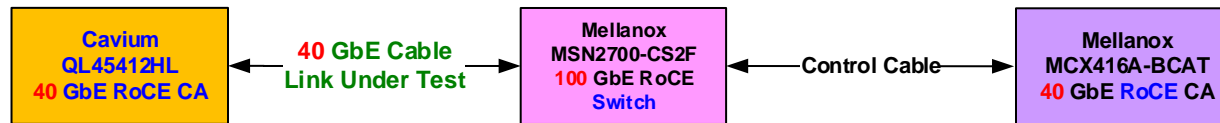
Interop 07



Interop 07

## Cavium QL45611HL RNIC to Mellanox MSN2700 Switch to Mellanox MCX416A RNIC

Interop 08



Interop 08

## Broadcom BCM957414A4140 to Mellanox MCX414A

Interop 09



Interop 09

## Broadcom BCM957414A4140 to Mellanox MCX555A

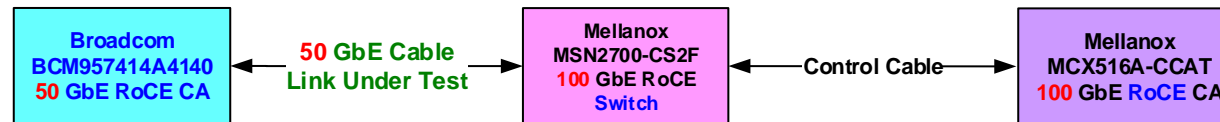
Interop 10



Interop 10

## Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX516A

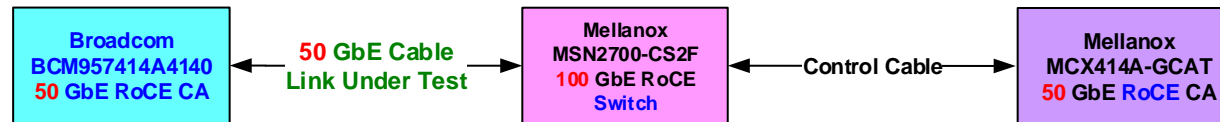
Interop 11



Interop 11

## Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX414A

Interop 12

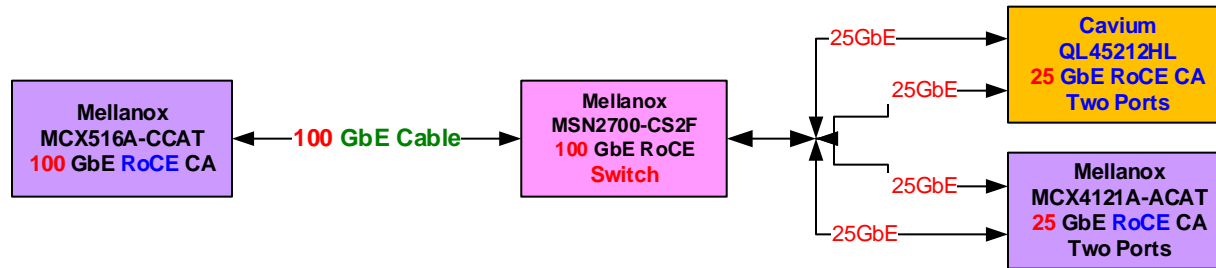


Interop 12

# RDMA over Converged Ethernet (RoCE) Interop Testing

Mellanox MCX516A ConnectX®-5 to Mellanox MSN2700 Switch  
2 Port SFP28 Cavium QL45212HL and 2 Port SFP28 Mellanox MCX4121A

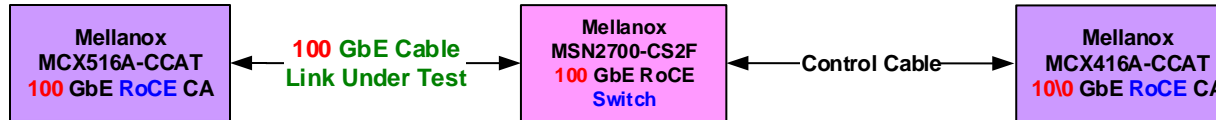
Interop 13



Interop 13

Mellanox MCX516A RNIC to Mellanox MSN2700 Switch to Mellanox MCX416A RNIC

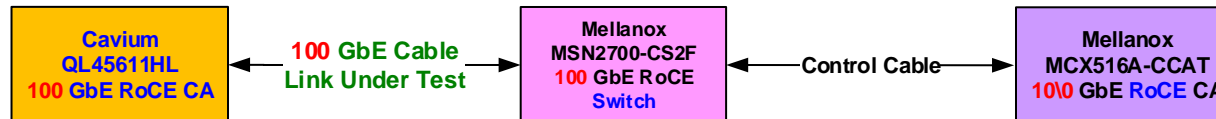
Interop 14



Interop 14

Cavium QL45611HL RNIC to Mellanox MSN2700 Switch to Mellanox MCX516A RNIC

Interop 15



Interop 15



# IBTA PF31 RoCE Interoperability

## 10 Gigabit Ethernet

### Interop 01



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
Mellanox	2	30	Copper - Unequalized	SFP	QL45212HL	MCP2M00-A002(25G)	MCX4121A-XCAT	10	Pass

#### Cavium QL45212HL RNIC to Mellanox MCX4121A RNIC





# IBTA PF31 RoCE Interoperability

## 25 Gigabit Ethernet

### Interop 02



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
Mellanox	2	30	Copper - Unequalized	SFP	QL45212HL	MCP2M00-A002(25G)	MCX4121A-ACA1	25	Pass

#### Cavium QL45212HL RNIC to Mellanox MCX4121A RNIC





# IBTA PF31 RoCE Interoperability

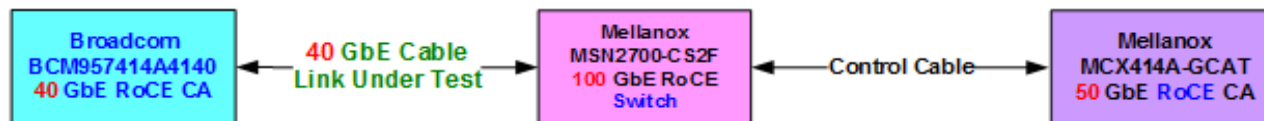
## 40 Gigabit Ethernet

### Interop 03



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-40	AQPA9N70ADLN0851	MSN2700-CS2F	MCX414A-GCAT	40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
Finisar	2	N/A	Fiber - Active	QSFP		FCBN410QD3C02			40	Pass
Finisar	35	N/A	Fiber - Active	QSFP		FCBN410QD3C35			40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			40	Pass
Mellanox	3	NA	Active - Fiber	QSFP		MC220731V-003			40	Pass
Mellanox	30	NA	Active - Fiber	QSFP		MC220731V-030			40	Pass
Mellanox	50	NA	Active - Fiber	QSFP		MC220731V-050			40	Pass
Mellanox	100	NA	Active - Fiber	QSFP		MC220731V-100			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1			40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP		MC2207130-002			40	Pass
Mellanox	2.5	28	Copper - Unequalized	QSFP		MC2207128-0A2			40	Pass
Mellanox	3	28	Copper - Unequalized	QSFP		MC2207128-003			40	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			40	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			40	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			40	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			40	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			40	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			40	Pass

### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX414A





# IBTA PF31 RoCE Interoperability

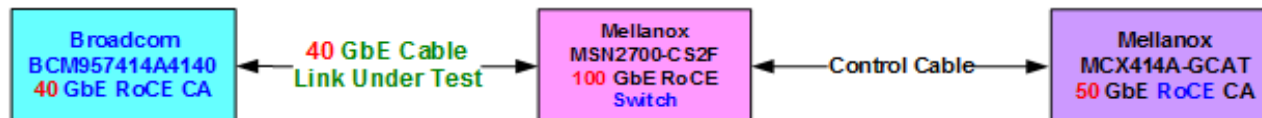
## 40 Gigabit Ethernet

### Interop 03



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Molex LLC	2	26	Copper - Unequalized	QSFP28	BCM957414A4140-40	100297-3704	MSN2700-CS2F	MCX414A-GCAT	40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			40	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			40	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			40	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			40	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			40	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			40	Pass

### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX414A







# IBTA PF31 RoCE Interoperability

## 40 Gigabit Ethernet

### Interop 04



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP	BCM957414A4140-40	AQKA9N70ADLN0874	QL45412HL	40	Pass
AOI	70	NA	Fiber - Active	QSFP		AQKA9N70ADLN0874		40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851		40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851		40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		40	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01		40	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0		40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0		40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0		40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R		40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R		40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R		40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R		40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R		40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R		40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R		40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R		40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A		40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001		40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A		40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002		40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A		40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003		40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A		40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A		40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001		40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1		40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP		MC2207130-002		40	Pass
Mellanox	2.5	28	Copper - Unequalized	QSFP		MC2207128-0A2		40	Pass
Mellanox	3	28	Copper - Unequalized	QSFP		MC2207128-003		40	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002		40	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206		40	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101		40	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002		40	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015		40	Pass

### Broadcom BCM957414A4140 to Cavium QL45412HL RNIC





# IBTA PF31 RoCE Interoperability

## 40 Gigabit Ethernet

### Interop 04



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
Molex LLC	3	30	Copper - Unequalized	QSFP28	BCM957414A4140-40	100297-1301	QL45412HL	40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051		40	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704		40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705		40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706		40	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501		40	Pass
Voelx	1	30	Copper - Unequalized	QSFP28		VQ2830LP100		40	Pass
Voelx	2	30	Copper - Unequalized	QSFP28		VQ2830LP200		40	Pass
Voelx	2	26	Copper - Unequalized	QSFP28		VQ2826AP200		40	Pass
Voelx	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250		40	Pass
Voelx	3	26	Copper - Unequalized	QSFP28		VQ2826AP300		40	Pass

### Broadcom BCM957414A4140 to Cavium QL45412HL RNIC





# IBTA PF31 RoCE Interoperability

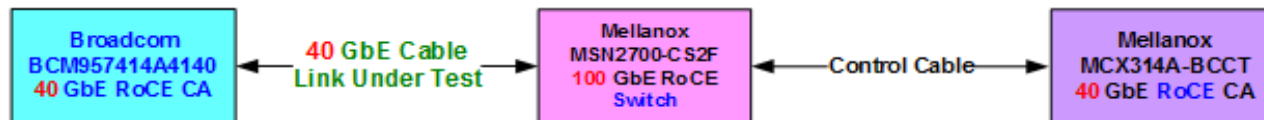
## 40 Gigabit Ethernet

### Interop 05



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-40	AQPA9N70ADLN0851	MSN2700-CS2F	MCX314A-BCCT	40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
Finisar	2	N/A	Fiber - Active	QSFP		FCBN410QD3C02			40	Pass
Finisar	35	N/A	Fiber - Active	QSFP		FCBN410QD3C35			40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			40	Pass
Mellanox	3	NA	Active - Fiber	QSFP		MC220731V-003			40	Pass
Mellanox	30	NA	Active - Fiber	QSFP		MC220731V-030			40	Pass
Mellanox	50	NA	Active - Fiber	QSFP		MC220731V-050			40	Pass
Mellanox	100	NA	Active - Fiber	QSFP		MC220731V-100			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1			40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP		MC2207130-002			40	Pass
Mellanox	2.5	28	Copper - Unequalized	QSFP		MC2207128-0A2			40	Pass
Mellanox	3	28	Copper - Unequalized	QSFP		MC2207128-003			40	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			40	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			40	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			40	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			40	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			40	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			40	Pass

### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX314A





# IBTA PF31 RoCE Interoperability

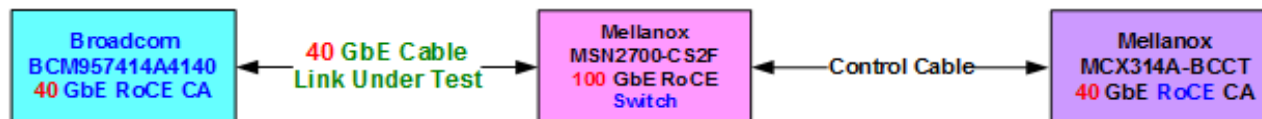
## 40 Gigabit Ethernet

### Interop 05



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Molex LLC	2	26	Copper - Unequalized	QSFP28	BCM957414A4140-40	100297-3704	MSN2700-CS2F	MCX314A-BCCT	40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			40	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			40	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			40	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			40	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			40	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			40	Pass

#### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX314A





# IBTA PF31 RoCE Interoperability

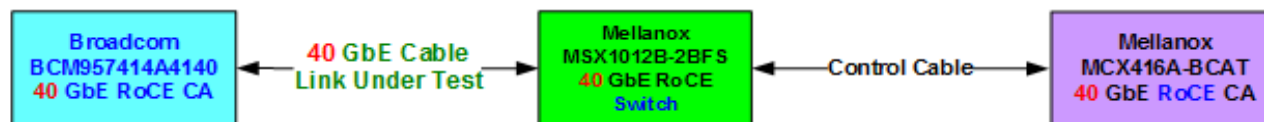
## 40 Gigabit Ethernet

### Interop 06



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP	BCM957414A4140-40	AQKA9N70ADLN0874	MSX1012B-2BFS	MCX416A-BCAT	40	Pass
AOI	70	NA	Fiber - Active	QSFP		AQKA9N70ADLN0874			40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
Finisar	2	N/A	Fiber - Active	QSFP		FCBN410QD3C02			40	Pass
Finisar	35	N/A	Fiber - Active	QSFP		FCBN410QD3C35			40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			40	Pass
Mellanox	3	NA	Active - Fiber	QSFP		MC220731V-003			40	Pass
Mellanox	30	NA	Active - Fiber	QSFP		MC220731V-030			40	Pass
Mellanox	50	NA	Active - Fiber	QSFP		MC220731V-050			40	Pass
Mellanox	100	NA	Active - Fiber	QSFP		MC220731V-100			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1			40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP	MC2207130-002	40	Pass			
Mellanox	2.5	28	Copper - Unequalized	QSFP	MC2207128-0A2	40	Pass			
Mellanox	3	28	Copper - Unequalized	QSFP	MC2207128-003	40	Pass			
Molex LLC	2	32	Copper - Unequalized	QSFP28	100297-1002	40	Pass			
Molex LLC	4	28	Copper - Unequalized	QSFP28	100297-9206	40	Pass			
Molex LLC	1	30	Copper - Unequalized	QSFP28	100297-1101	40	Pass			
Molex LLC	2	28	Copper - Unequalized	QSFP28	100297-2002	40	Pass			
Molex LLC	0.5	32	Copper - Unequalized	QSFP28	100297-1015	40	Pass			

**Broadcom BCM957414A4140 to Mellanox MSX1012B Switch to Mellanox MCX416A**





# IBTA PF31 RoCE Interoperability

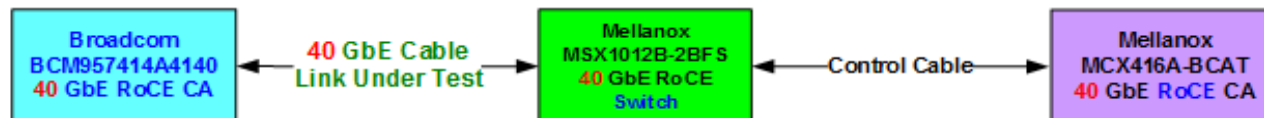
## 40 Gigabit Ethernet

### Interop 06



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Molex LLC	3	30	Copper - Unequalized	QSFP28	BCM957414A4140-40	100297-1301	MSX1012B-2BFS	MCX416A-BCAT	40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			40	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			40	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			40	Pass
Voilex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass
Voilex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			40	Pass
Voilex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			40	Pass
Voilex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			40	Pass
Voilex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			40	Pass

### Broadcom BCM957414A4140 to Mellanox MSX1012B Switch to Mellanox MCX416A





# IBTA PF31 RoCE Interoperability

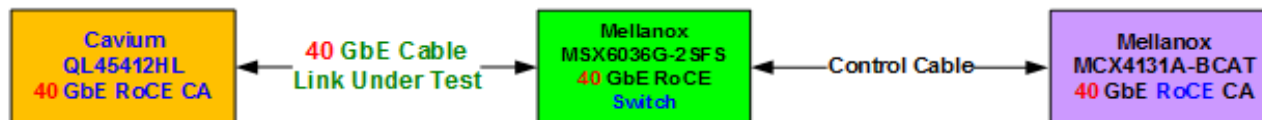
## 40 Gigabit Ethernet

### Interop 07



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP	QL45412HL	AQKA9N70ADLN0874	MSX6036G-2SFS	MCX4131A-BCAT	40	Pass
AOI	70	NA	Fiber - Active	QSFP		AQKA9N70ADLN0874			40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01			40	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0			40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1			40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP		MC2207130-002			40	Pass
Mellanox	2.5	28	Copper - Unequalized	QSFP		MC2207128-0A2			40	Pass
Mellanox	3	28	Copper - Unequalized	QSFP		MC2207128-003			40	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			40	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			40	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			40	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			40	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			40	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			40	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			40	Pass

Cavium QL45412HL RNIC to Mellanox MSX6036G Switch to Mellanox MCX4131A-BCAT





# IBTA PF31 RoCE Interoperability

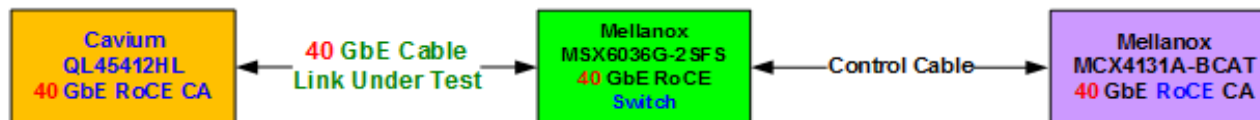
## 40 Gigabit Ethernet

### Interop 07



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Molex LLC	5	26	Copper - Unequalized	QSFP28	QL45412HL	100297-3501	MSX6036G-2SFS	MCX4131A-BCAT	40	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			40	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			40	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			40	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			40	Pass

### Cavium QL45412HL RNIC to Mellanox MSX6036G Switch to Mellanox MCX4131A-BCAT







# IBTA PF31 RoCE Interoperability

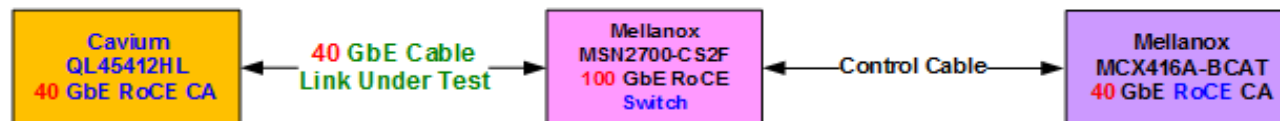
## 40 Gigabit Ethernet

### Interop 08



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	QL45412HL	AQPA9N70ADLN0851	MSN2700-CS2F	MCX416A-BCAT	40	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			40	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			40	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			40	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			40	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			40	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			40	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			40	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			40	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			40	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			40	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			40	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			40	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			40	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			40	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			40	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP		MC2207130-00A			40	Pass
Mellanox	1	30	Copper - Unequalized	QSFP		MC2207130-001			40	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP		MC2207130-0A1			40	Pass
Mellanox	2	30	Copper - Unequalized	QSFP		MC2207130-002			40	Pass
Mellanox	2.5	28	Copper - Unequalized	QSFP		MC2207128-0A2			40	Pass
Mellanox	3	28	Copper - Unequalized	QSFP		MC2207128-003			40	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			40	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			40	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			40	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			40	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			40	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			40	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			40	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			40	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			40	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			40	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			40	Pass
Voilex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			40	Pass

Cavium QL45611HL RNIC to Mellanox MSN2700 Switch to Mellanox MCX416A RNIC





# IBTA PF31 RoCE Interoperability

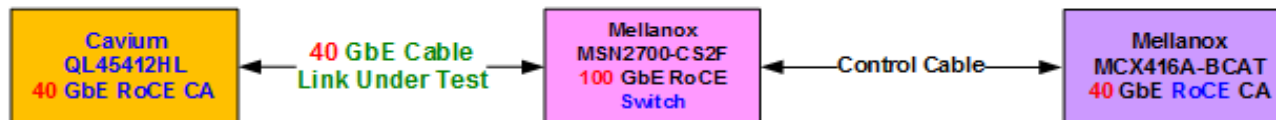
## 40 Gigabit Ethernet

### Interop 08



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Voxx	2	30	Copper - Unequalized	QSFP28	QL45412HL	VQ2830LP200	MSN2700-CS2F	MCX416A-BCAT	40	Pass
Voxx	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			40	Pass
Voxx	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			40	Pass
Voxx	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			40	Pass

Cavium QL45611HL RNIC to Mellanox MSN2700 Switch to Mellanox MCX416A RNIC





# IBTA PF31 RoCE Interoperability

## 50 Gigabit Ethernet

### Interop 09



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-50	AQPA9N70ADLN0851	MCX414A-GCAT	50	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851		50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		50	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01		50	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0		50	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0		50	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0		50	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R		50	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R		50	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R		50	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R		50	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R		50	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R		50	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R		50	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R		50	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A		50	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001		50	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A		50	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002		50	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A		50	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003		50	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A		50	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002		50	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206		50	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101		50	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002		50	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015		50	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301		50	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051		50	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704		50	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705		50	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28	100297-3706	50	Pass		
Molex LLC	5	26	Copper - Unequalized	QSFP28	100297-3501	50	Pass		
Volet	1	30	Copper - Unequalized	QSFP28	VQ2830LP100	50	Pass		

### Broadcom BCM957414A4140 to Mellanox MCX414A





# IBTA PF31 RoCE Interoperability

## 50 Gigabit Ethernet

### Interop 09



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
Volex	2	30	Copper - Unequalized	QSFP28	BCM957414A4140-50	VQ2830LP200	MCX414A-GCAT	50	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200		50	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250		50	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300		50	Pass

### Broadcom BCM957414A4140 to Mellanox MCX414A





# IBTA PF31 RoCE Interoperability

## 50 Gigabit Ethernet

### Interop 10



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-50	AQPA9N70ADLN0851	MCX555A-ECAT	50	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851		50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851		50	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01		50	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0		50	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0		50	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0		50	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R		50	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R		50	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R		50	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R		50	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R		50	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R		50	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R		50	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R		50	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A		50	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001		50	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A		50	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002		50	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A		50	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003		50	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A		50	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002		50	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206		50	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101		50	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002		50	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015		50	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301		50	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051		50	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704		50	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705		50	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28	100297-3706	50	Pass		
Molex LLC	5	26	Copper - Unequalized	QSFP28	100297-3501	50	Pass		
Volet	1	30	Copper - Unequalized	QSFP28	VQ2830LP100	50	Pass		

### Broadcom BCM957414A4140 to Mellanox MCX555





# IBTA PF31 RoCE Interoperability

## 50 Gigabit Ethernet

### Interop 10



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	RoCE Card #2	Link Speed	Interop Result
Volex	2	30	Copper - Unequalized	QSFP28	BCM957414A4140-50	VQ2830LP200	MCX555A-ECAT	50	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200		50	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250		50	Pass
Volex	3	0	Copper - Unequalized	QSFP28		VQ2826AP300		50	Pass

### Broadcom BCM957414A4140 to Mellanox MCX555





# IBTA PF31 RoCE Interoperability

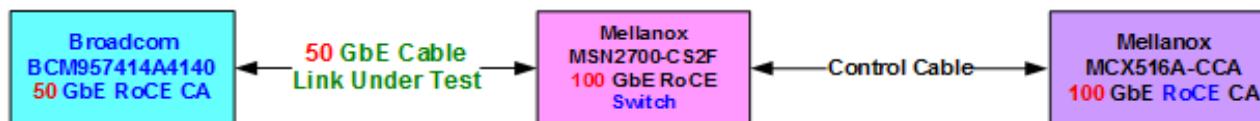
## 50 Gigabit Ethernet

### Interop 11



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-50	AQPA9N70ADLN0851	MSN2700-CS2F	MCX516A-CCA	50	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			50	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01			50	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0			50	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			50	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			50	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			50	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			50	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			50	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			50	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			50	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			50	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			50	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			50	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			50	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			50	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			50	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			50	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			50	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			50	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			50	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			50	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			50	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			50	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			50	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			50	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			50	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			50	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			50	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			50	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			50	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			50	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			50	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			50	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			50	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			50	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			50	Pass

### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX516A





# IBTA PF31 RoCE Interoperability

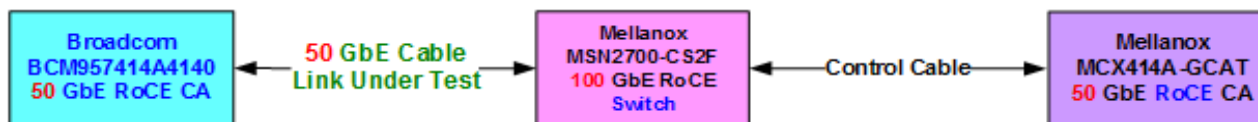
## 50 Gigabit Ethernet

### Interop 12



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	BCM957414A4140-50	AQPA9N70ADLN0851	MSN2700-CS2F	MCX414A-GCAT	50	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			50	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			50	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01			50	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0			50	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			50	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			50	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			50	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			50	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			50	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			50	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			50	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			50	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			50	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			50	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			50	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			50	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			50	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			50	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			50	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			50	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			50	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			50	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			50	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			50	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			50	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			50	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			50	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			50	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			50	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			50	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			50	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			50	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			50	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			50	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			50	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			50	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			50	Pass

### Broadcom BCM957414A4140 to Mellanox MSN2700 Switch to Mellanox MCX414A





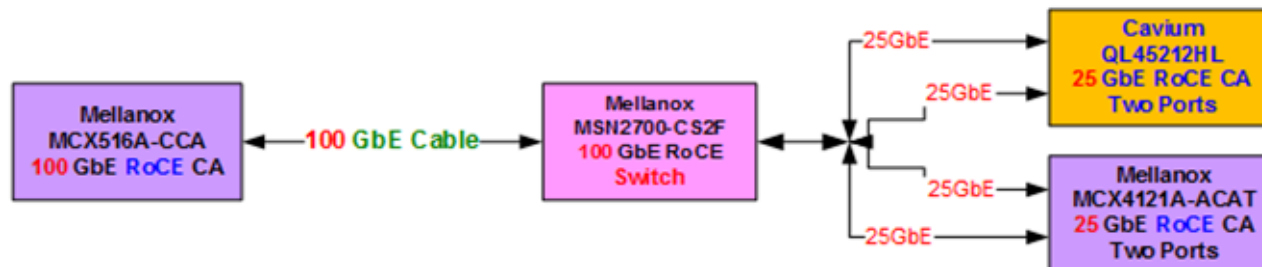


# IBTA PF31 RoCE Interoperability

## 100 Gigabit Ethernet Interop 13



Company	Length Meters	AWG	Equalization	Connector Type	Mellanox	Link Speed	Mellanox Switch	Cable Under Test	Cavium & Mellanox 2 Port SFP28	Link Speed	Interop Result
Molex LLC	0.5	30	Copper Unequalized	QSFP28↔4-SFP28	MCX516A-CCA	100	MSN2700-CS2F	100345-1051	QL45212HL	25	Pass
									QL45212HL		
									MCX4121A-ACAT		
									MCX4121A-ACAT		
Molex LLC	1.5	30	Copper Unequalized	QSFP28↔4-SFP28	MCX516A-CCA	100	MSN2700-CS2F	100345-1151	QL45212HL	25	Pass
									QL45212HL		
									MCX4121A-ACAT		
									MCX4121A-ACAT		
Molex LLC	3	30	Copper Unequalized	QSFP28↔4-SFP28	MCX516A-CCA	100	MSN2700-CS2F	100345-1301	QL45212HL	25	Pass
									QL45212HL		
									MCX4121A-ACAT		
									MCX4121A-ACAT		





# IBTA PF31 RoCE Interoperability

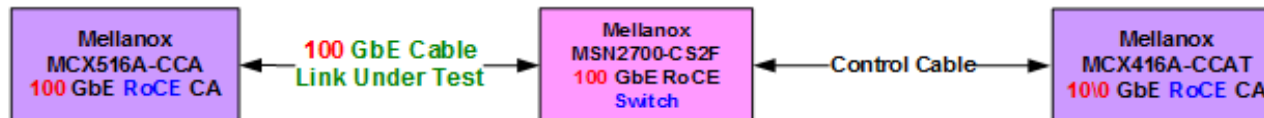
## 100 Gigabit Ethernet

### Interop 14



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
Finisar	1	N/A	Fiber - Active	QSFP28	MCX516A-CCA	FCBN425QE1C01	MSN2700-CS2F	MCX416A-CCAT	100	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0			100	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			100	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			100	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			100	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			100	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			100	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			100	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			100	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			100	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			100	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			100	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			100	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			100	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			100	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			100	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			100	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			100	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			100	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			100	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			100	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			100	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			100	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			100	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			100	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			100	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			100	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			100	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			100	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			100	Pass
Voilex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass
Voilex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			100	Pass
Voilex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			100	Pass
Voilex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			100	Pass
Voilex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			100	Pass

### Mellanox MCX516A RNIC to Mellanox MSN2700 Switch to Mellanox MCX416A RNIC





# IBTA PF31 RoCE Interoperability

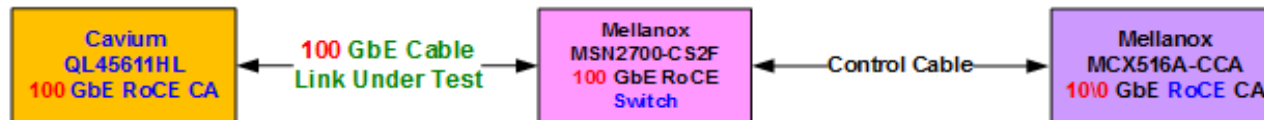
## 100 Gigabit Ethernet

### Interop 15



Company	Length Meters	AWG	Equalization	Connector Type	RoCE Card #1	Cable Under Test	Mellanox Switch	RoCE Card #2	Link Speed	Interop Result
AOI	70	NA	Fiber - Active	QSFP28	QL45611HL	AQPA9N70ADLN0851	MSN2700-CS2F	MCX516A-CCA	100	Pass
AOI	70	NA	Fiber - Active	QSFP28		AQPA9N70ADLN0851			100	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			100	Pass
AOI	100	NA	Fiber - Active	QSFP28		AQPA9N00ADLN0851			100	Pass
Finisar	1	N/A	Fiber - Active	QSFP28		FCBN425QE1C01			100	Pass
Finisar	100	N/A	Fiber - Active	QSFP28		FCBN425QE1CX0			100	Pass
Jess-Link Products Co., Ltd.	3.5	26	Copper - Unequalized	QSFP28		P4210UKR3500-0			100	Pass
Jess-Link Products Co., Ltd.	4	26	Copper - Unequalized	QSFP28		P4210UKR4000-0			100	Pass
Luxshare-ICT	0.5	30	Copper - Unequalized	QSFP28		LA0QF081-SD-R			100	Pass
Luxshare-ICT	1	30	Copper - Unequalized	QSFP28		LA0QF082-SD-R			100	Pass
Luxshare-ICT	2	30	Copper - Unequalized	QSFP28		LA0QF083-SD-R			100	Pass
Luxshare-ICT	1	28	Copper - Unequalized	QSFP28		LA0QF084-SD-R			100	Pass
Luxshare-ICT	2	28	Copper - Unequalized	QSFP28		LA0QF085-SD-R			100	Pass
Luxshare-ICT	1	26	Copper - Unequalized	QSFP28		LA0QF086-SD-R			100	Pass
Luxshare-ICT	2	26	Copper - Unequalized	QSFP28		LA0QF087-SD-R			100	Pass
Luxshare-ICT	3	26	Copper - Unequalized	QSFP28		LA0QF088-SD-R			100	Pass
Mellanox	0.5	30	Copper - Unequalized	QSFP28		MCP1600-E00A			100	Pass
Mellanox	1	30	Copper - Unequalized	QSFP28		MCP1600-E001			100	Pass
Mellanox	1.5	30	Copper - Unequalized	QSFP28		MCP1600-E01A			100	Pass
Mellanox	2	28	Copper - Unequalized	QSFP28		MCP1600-E002			100	Pass
Mellanox	2.5	26	Copper - Unequalized	QSFP28		MCP1600-E02A			100	Pass
Mellanox	3	26	Copper - Unequalized	QSFP28		MCP1600-E003			100	Pass
Mellanox	3.5	24	Copper - Unequalized	QSFP28		MCP1600-E03A			100	Pass
Molex LLC	2	32	Copper - Unequalized	QSFP28		100297-1002			100	Pass
Molex LLC	4	28	Copper - Unequalized	QSFP28		100297-9206			100	Pass
Molex LLC	1	30	Copper - Unequalized	QSFP28		100297-1101			100	Pass
Molex LLC	2	28	Copper - Unequalized	QSFP28		100297-2002			100	Pass
Molex LLC	0.5	32	Copper - Unequalized	QSFP28		100297-1015			100	Pass
Molex LLC	3	30	Copper - Unequalized	QSFP28		100297-1301			100	Pass
Molex LLC	0.5	30	Copper - Unequalized	QSFP28		100297-1051			100	Pass
Molex LLC	2	26	Copper - Unequalized	QSFP28		100297-3704			100	Pass
Molex LLC	2.5	26	Copper - Unequalized	QSFP28		100297-3705			100	Pass
Molex LLC	3	26	Copper - Unequalized	QSFP28		100297-3706			100	Pass
Molex LLC	5	26	Copper - Unequalized	QSFP28		100297-3501			100	Pass
Volex	1	30	Copper - Unequalized	QSFP28		VQ2830LP100			100	Pass
Volex	2	30	Copper - Unequalized	QSFP28		VQ2830LP200			100	Pass
Volex	2	26	Copper - Unequalized	QSFP28		VQ2826AP200			100	Pass
Volex	2.5	26	Copper - Unequalized	QSFP28		VQ2826AP250			100	Pass
Volex	3	26	Copper - Unequalized	QSFP28		VQ2826AP300			100	Pass

Cavium QL45611HL RNIC to Mellanox MSN2700 Switch to Mellanox MCX516A RNIC

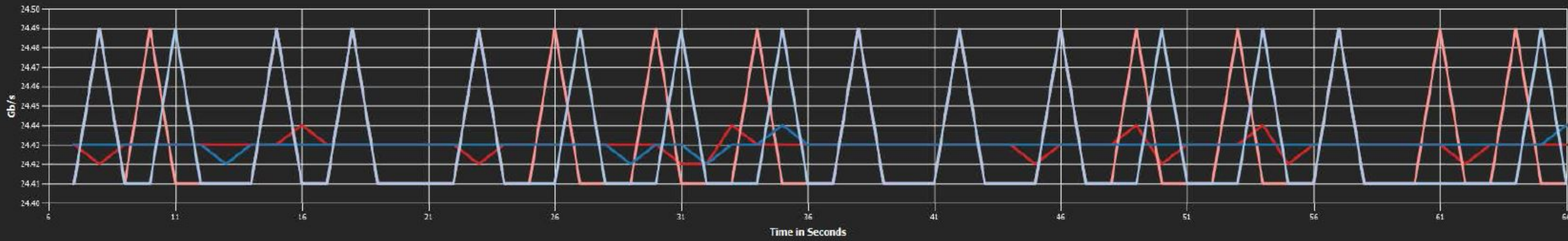




# HPC Performance Monitor

Bandwidth - Line

### Bandwidth vs Time

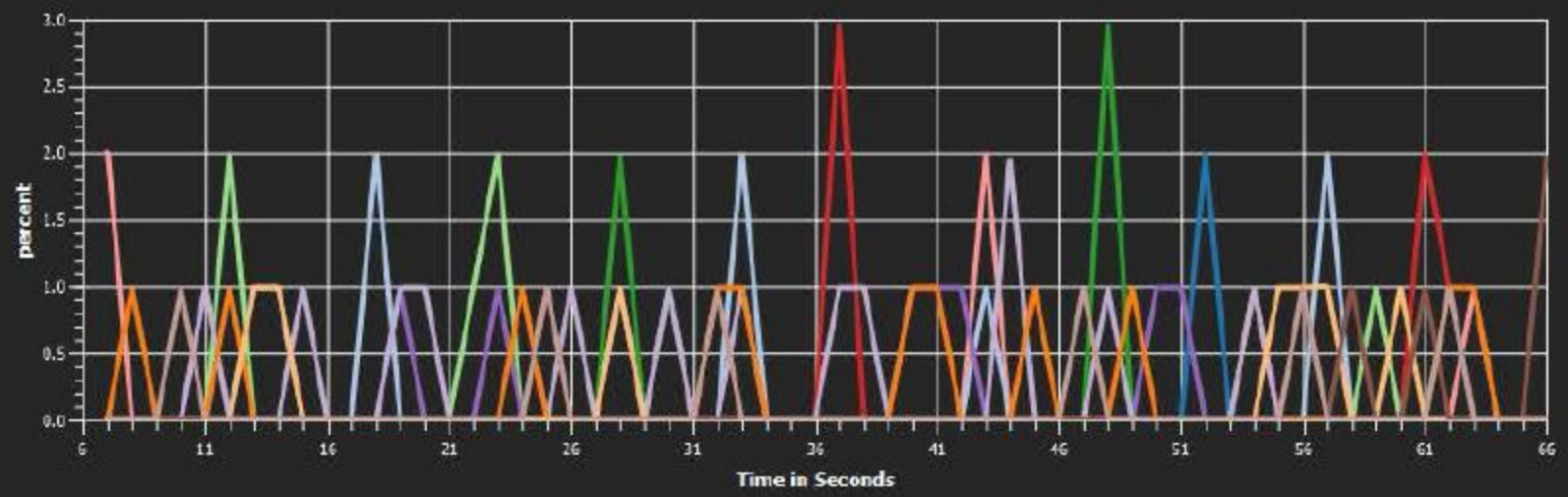


● 1:RoCE: BW - Read 
 ● 2:RoCE: BW - Read 
 ● 3:RoCE: BW - Read 
 ● 4:RoCE: BW - Read

Core Load - Line

### Core Load

8

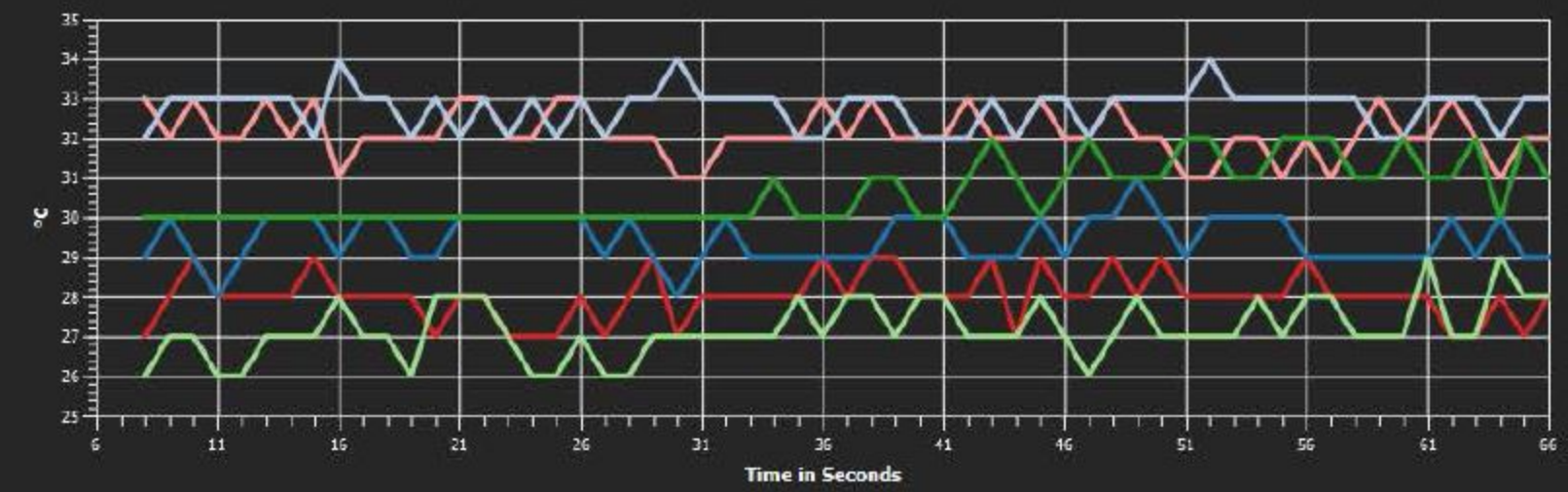


● Core: 0 
 ● Core: 1 
 ● Core: 2 
 ● Core: 3 
 ● Core: 4 
 ● Core: 5 
 ● Core: 6 
 ● Core: 7 
 ● Core: 8 
 ● Core: 9 
 ● Core: 10 
 ● Core: 11

Core Temp - Line

### Core Temperature

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● Core: 0 
 ● Core: 1 
 ● Core: 2 
 ● Core: 3 
 ● Core: 4 
 ● Core: 5