



## InfiniBand Compliance Testing of Meritec Unequalized 4X/12X DDR (5Gb/s) and QDR (10Gb/s) Cable Assemblies

Test 552 rev. C1

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### Purpose

To determine InfiniBand DDR and QDR compliance of Meritec 4X/12X cable assemblies. Actual and simulation measurements are presented to validate the Oculus simulations.

### Samples Tested

4.5m 30awg 4X assy. (Date Code: 6352) Cable P/N 700423-30-08

7m 30awg 4X assy. (Date Code: 6352) Cable P/N 700423-30-08

6m 28awg 4X assy. (Date Code: 6341) Cable P/N 700428-08

9.5m 28awg 4X assy. (Date Code: 6341) Cable P/N 700428-08

6.5m 26awg 4X assy. (Date Code: 6341) Cable P/N 700426-08

11m 26awg 4X assy. (Date Code: 6341) Cable P/N 700426-08

7.5m 24awg 4X assy. (Date Code: 6341) Cable P/N 700424-08

12m 24awg 4X assy. (Date Code: 6341) Cable P/N 700424-08

Meritec 4X test boards P/N 986011 and 986021

### Specific Results

According to Table 2, all selected cable length samples pass the InfiniBand DDR attenuation requirements at all frequencies. The actual and simulated measurements are very similar to each other and confirm that the simulations are valid.

According to Table 3, all selected cable length samples pass the InfiniBand QDR attenuation requirements at all frequencies. The simulations and actual measurements correlate in this case as well.

	<b>30 awg</b>	<b>28 awg</b>	<b>26 awg</b>	<b>24 awg</b>
<b>DDR</b>	7 meters	9.5 meters	11 meters	12 meters
<b>QDR</b>	4.5 meters	6 meters	6.5 meters	7.5 meters

**Table 1) Maximum lengths tested for DDR and QDR**

### Test Equipment

Tektronix CSA8200 Digital Sampling Oscilloscope with 80E04 TDR sampling heads atSpeed's *Oculus*<sup>TM</sup> for S-parameter extraction from TDR measurements

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Freq (MHz)	IB S21 dB max	7.0m 30awg		9.5m 28awg		11m 26awg		12m 24awg	
		actual	simulate	actual	simulate	actual	simulate	actual	simulate
100	-8.0	-2.8	-2.7	-2.9	-2.5	-2.6	-2.6	-2.3	-2.4
200	-8.0	-3.9	-3.9	-4.1	-4.0	-3.7	-3.8	-3.4	-3.5
625	-8.5	-7.3	-7.1	-7.8	-8.0	-7.0	-7.2	-6.4	-6.7
1250	-12.1	-10.6	-10.4	-11.4	-11.0	-10.0	-10.5	-9.2	-9.7
1875	-14.7	-13.3	-13.2	-14.2	-13.2	-12.3	-13.3	-11.4	12.2
2500	-17	-15.7	-15.8	-16.6	-16.4	-16.2	-16.7	-14.3	-15.1

**Table 2) DDR attenuation values** for actual and simulated assemblies. The blue values are the DDR InfiniBand attenuation specifications.

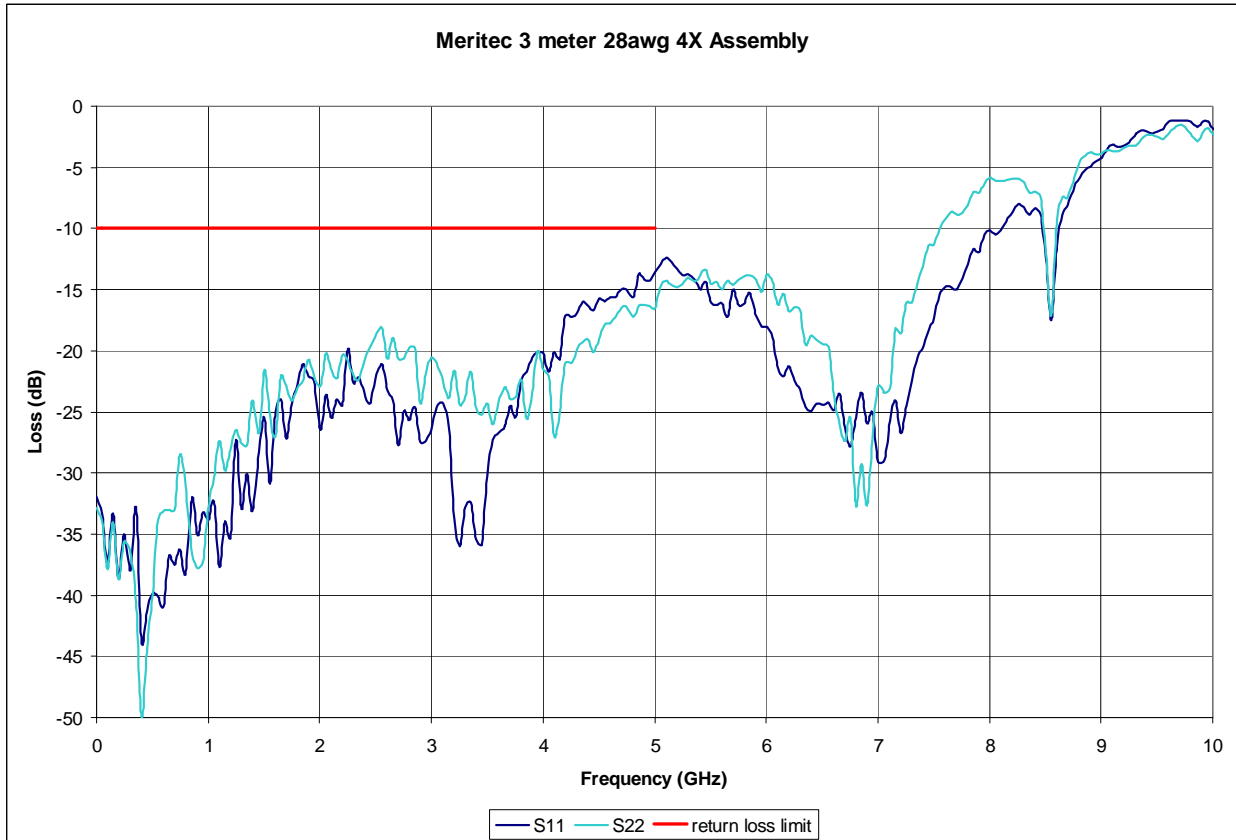
Freq (MHz)	IB S21 dB max	4.5m 30awg		6.0m 28awg		6.5m 26awg		7.5m 24awg	
		actual	simulate	actual	simulate	actual	simulate	actual	simulate
100	-8.0	-1.8	-1.8	-1.9	-1.7	-1.6	-1.6	-1.5	-1.5
200	-8.0	-2.6	-2.5	-2.7	-2.6	-2.3	-2.3	-2.2	-2.2
625	-8.0	-4.9	-4.7	-5.1	-5.1	-4.4	-4.4	-4.1	-4.3
1250	-9.0	-7.1	-6.9	-7.4	-7.1	-6.2	-6.4	-5.8	-6.2
1875	-10.4	-8.9	-8.8	-9.4	-8.6	-7.8	-8.0	-7.3	-7.7
2500	-12.1	-11.0	-10.7	-11.8	-11.8	-10.0	-10.2	-10.1	-9.7
3750	-14.7	-14.0	-13.4	-14.0	-14.3	-12.9	-12.3	-13.3	-12.5
5000	-17.0	-15.7	-16.2	-16.9	-16.1	-15.0	-16.2	-14.2	-15.7

**Table 3) QDR attenuation values** for actual and simulated assemblies. The blue values are the QDR InfiniBand attenuation specifications.

Note: these S21 specifications are taken from InfiniBand Architecture Specification Volume 2 Release 1.2.1, dated October 2006

### Return Loss (S11 and S22)

The following measurements were made by atSpeed using Oculus and atSpeed's custom coaxial test fixtures. The part tested was a 3 meter 28awg Meritec 4X cable assembly.



**Figure 9) Return Loss**

The measurements for S11 and S22 show that the Meritec assembly meets both of the InfiniBand DDR and QDR return loss requirements of a maximum of -10dB from 0 to 2.5GHz (DDR) and from 0 to 5GHz (QDR). The worst case as shown does not exceed -10dB until 7.5GHz.

Note: these S11 specifications are taken from InfiniBand Architecture Specification Volume 2 Release 1.2.1, dated October 2006

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