



3933 US ROUTE 11, CORTLAND, NEW YORK 13045, U.S.A.  
Phone Number: 1-800-345-3851 Fax Number: 607-758-3648

PROJECT NO.: 3145779-311

DATE: March 4, 2008

TEST REPORT NO.: 3145779CRT-002c

RENDERED TO:

**HellermannTyton**

HellermannTyton Corporate  
7930 North Faulkner Road  
Milwaukee, WI 53224  
USA

**HCM**

Hitachi Cable Manchester

Hitachi Cable Manchester  
900 Holt Avenue  
Manchester, NH 03109  
USA

**TEST:**

Performance testing of the cabling configurations as defined in and to the requirements of ANSI/TIA/EIA-568-B.2-1, Transmission Performance Specification for 4 Pair 100  $\Omega$  Category 6 Cabling.

**STATEMENT OF LIMITATIONS:**

At the client's request, the purpose of this report is to provide electrical performance data on the test sample. It is not valid to use this report for any other purpose.

**STANDARDS USED:**

ASTM D4566-98, Standard Test Methods for Electrical Performance Properties of Insulations and Jackets for Telecommunications Wire and Cable, dated December 10, 1998.

ANSI/TIA/EIA-568-B.2-1, Addendum 1: Transmission Performance Specification for 4 Pair 100  $\Omega$  Category 6 Cabling, dated June 2002.

**AUTHORIZATION:**

The project was authorized by, HellermannTyton Corporation & Hitachi Cable Manchester, Inc. with Purchase Order No. 24775.

**DATE OF TEST:**

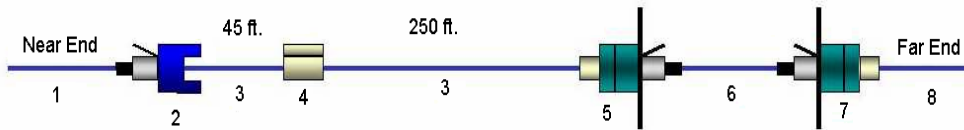
March 4, 2008

**TEST REPORT REVISION HISTORY:**

First Issue: March 4, 2008 Original Document

**SAMPLE DESCRIPTION:**

Channel (4 Connector)



<u>Component ID</u>	<u>Manufacturer</u>	<u>Part Number</u>	<u>Description</u>
1, 8	Hellermann Tyton	PC6BLU10	Equipment Cord 10 ft.
2	Hellermann Tyton	RJ45FC6BLU	Wall Outlet
3	Hitachi	30022-8	Horizontal Cable
4	Hellermann Tyton	T110KIT964	110 Block
5, 7	Hellermann Tyton	PP110C624	Patch Panel
6	Hellermann Tyton	PC6BLU10	Cross Connect 10 ft.

The samples were received on February 19, 2008 and were in good condition. All samples were supplied by the client.

**EQUIPMENT LIST:**

The following equipment was employed in conducting the tests.

<u>Equipment Used</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Hewlett Packard Automatic Cable Test System	HP46152A	3903U01003	03/07/2007

**PROCEDURE:** The testing was measured in accordance with the measurements and calculations list below:

**Measurements**

- Attenuation (Insertion Loss): ASTM D4566-98 Paragraph 26
- Near End Cross Talk (NEXT): ASTM D4566-98 Paragraph 24
- Far End Cross Talk (FEXT): ASTM D4566-98 Paragraph 25
- Return Loss: ASTM D4566-98 Paragraph 45.3

**Calculations**

- Power Sum NEXT: ASTM D4566-98 Paragraph 24.6 and ANSI/TIA/EIA- 568-B.2-1 Paragraph 7.2.2
- Equal Level FEXT (ELFEXT): ASTM D4566-98 Paragraph 25 and ANSI/TIA/EIA-568-B.2-1 Paragraph 7.3.1.3
- Power Sum ELFEXT: ASTM D4566-98 Paragraph 25 and ANSI/TIA/EIA 568-B.2-1 Paragraph 7.3.2.2
- Attenuation to Cross Talk Ratio (ACR): Attenuation to Cross Talk Ratio was determined by subtracting the NEXT from the Attenuation

**Calculations (Cont'd)**

- Power Sum ACR: The Power Sum ACR was determined using the same procedure as ACR except that the Power Sum Near-End Cross Talk was used in the computation in lieu of the NEXT
- Propagation Delay: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.5.2
- Delay Skew: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.5.4

**REQUIREMENTS:** The testing was computed with the measurements and calculations list below:

**Measurements**

- Insertion Loss: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.1 using equation 8
- Near End Cross Talk (NEXT): ANSI/TIA/EIA-568-B.2-1 Paragraph 7.2.1.4
- Return Loss: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.4.5

**Calculations**

- Power Sum NEXT: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.2.2.2
- Equal Level FEXT (ELFEXT): ANSI/TIA/EIA-568-B.2-1 Paragraph 7.3.1.3
- Power Sum ELFEXT: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.3.2
- Propagation Delay: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.5.2
- Delay Skew: ANSI/TIA/EIA-568-B.2-1 Paragraph 7.5.4

**RESULTS:**

See appendix A for the test results.

**CONCLUSION:**

The channel configurations, as previously described and supplied by the client, were tested in accordance with the procedures contained herein, and did comply with the indicated applicable transmission requirements. The testing was performed at Intertek located in Cortland, New York.

These procedures and requirements were taken from the standards referred to on page 1.

Reviewed and Approved By:



Antoine Pelletier  
Engineer  
Global Cabling Products Testing



John Cash  
Technician  
Global Cabling Products Testing

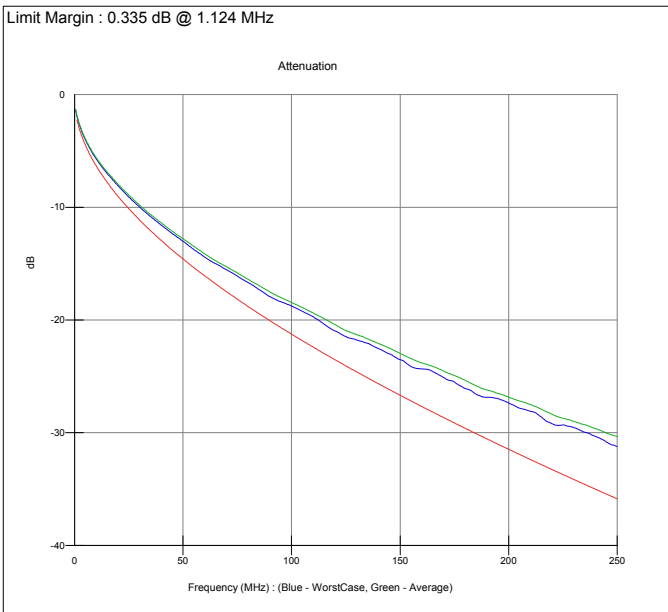


Kathy Heath  
Project Coordinator  
Global Cabling Products Testing

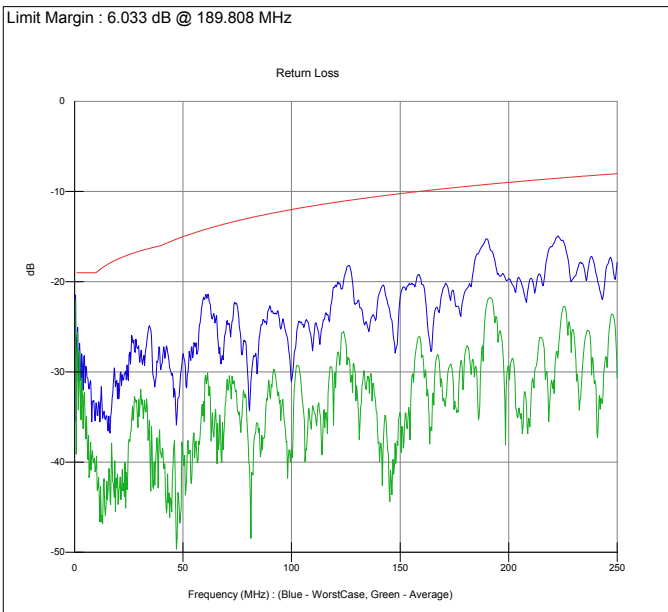


## Summary

<b>Client</b>	Hellermann	<b>Report No</b>	3145779CRT-002c
<b>Specification</b>	TIA 568B2-1 - Cat 6 Chan Swept250 Limits250MHz	<b>Length</b>	100
<b>Part No</b>	Cat 6 Supra Riser	<b>Temperature</b>	20 °C
<b>Test Started</b>	3/4/2008 8:01:05 AM	<b>Test Status</b>	Complies
<b>Description</b>	4x23 UTP-CMR-Solid		A
<b>Technician</b>	John Cash		



Attenuation			
Freq	Worst Case	Average	Spec
1.	1.8	1.7	2.2
4.	3.6	3.5	4.0
8.	5.1	5.0	5.7
10.	5.7	5.6	6.3
16.	7.2	7.1	8.0
20.	8.1	7.9	9.0
25.	9.1	8.9	10.1
31.25	10.2	10.0	11.4
62.5	14.7	14.5	16.4
100.	18.8	18.5	21.3
200.	27.4	26.8	31.5
250.	31.2	30.4	35.9

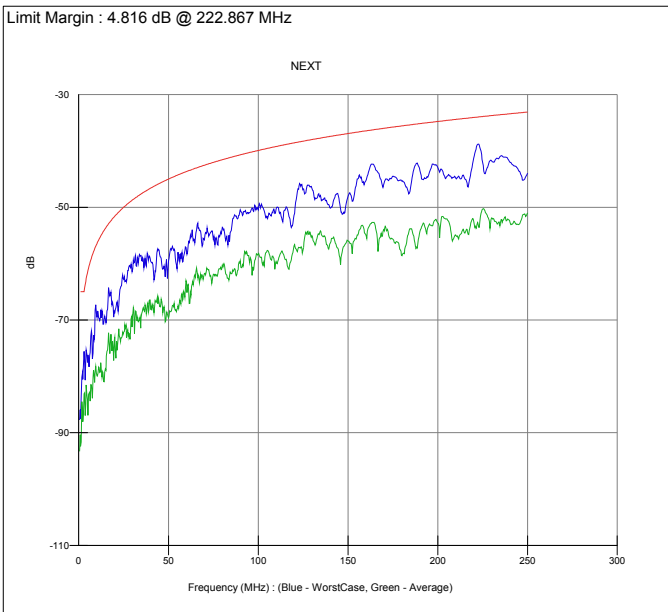


Return Loss			
Freq	Worst Case	Average	Spec
1.	31.8	32.7	19.0
4.	31.2	35.5	19.0
8.	35.5	39.5	19.0
10.	33.5	40.0	19.0
16.	36.0	41.1	18.0
20.	32.1	43.1	17.5
25.	29.4	37.7	17.0
31.25	29.7	33.3	16.5
62.5	22.5	32.7	14.0
100.	31.0	38.6	12.0
200.	19.7	29.3	9.0
250.	17.9	30.7	8.0

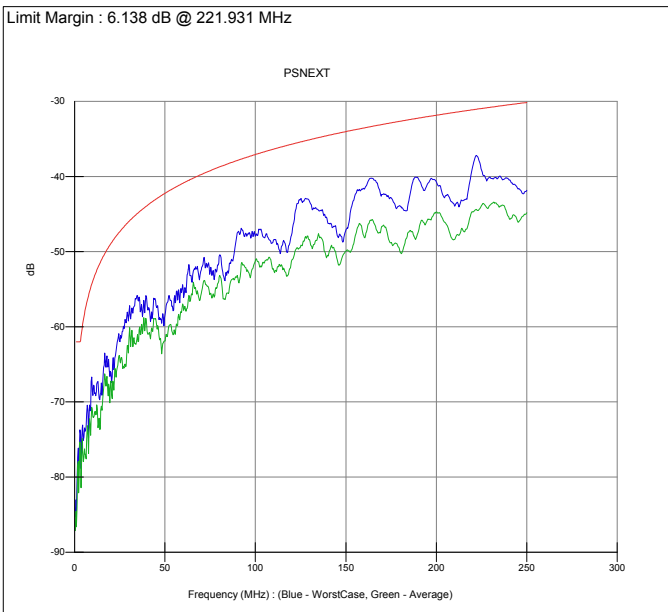


## Summary

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<b>Specification</b>	TIA 568B2-1 - Cat 6 Chan Swept250 Limits250MHz	<b>Length</b>	100
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<b>Test Started</b>	3/4/2008 8:01:05 AM	<b>Test Status</b>	Complies
<b>Description</b>	4x23 UTP-CMR-Solid		
<b>Technician</b>	John Cash		



NEXT			
Freq	Worst Case	Average	Spec
1.	87.5	91.6	65.0
4.	76.3	84.1	63.0
8.	75.9	80.2	58.2
10.	69.2	79.7	56.6
16.	68.2	75.4	53.2
20.	68.8	73.3	51.6
25.	62.7	72.3	50.0
31.25	59.4	71.0	48.4
62.5	55.2	65.5	43.4
100.	50.5	58.2	39.9
200.	42.9	52.7	34.8
250.	43.9	51.0	33.1

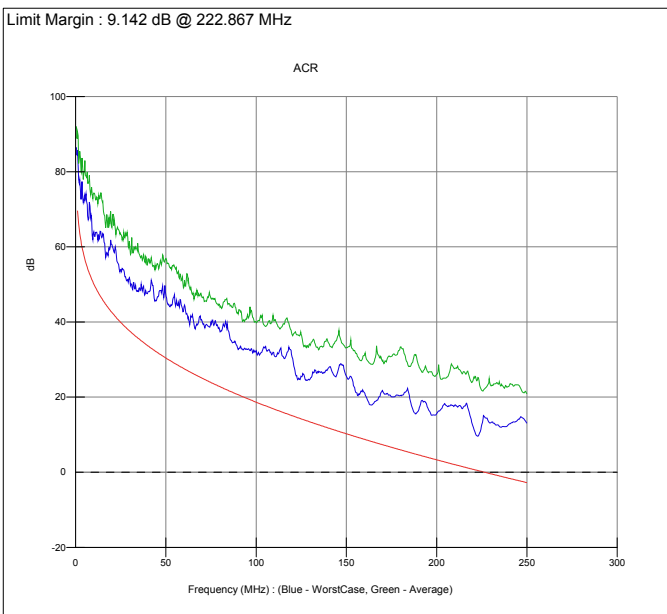


PSNEXT			
Freq	Worst Case	Average	Spec
1.	84.6	85.8	62.0
4.	74.7	76.7	60.5
8.	72.6	74.4	55.6
10.	68.9	71.6	54.0
16.	65.8	68.5	50.6
20.	66.2	67.5	49.0
25.	62.0	64.3	47.3
31.25	58.5	61.9	45.7
62.5	53.0	57.4	40.6
100.	48.0	51.3	37.1
200.	40.7	44.7	31.9
250.	41.8	44.8	30.2

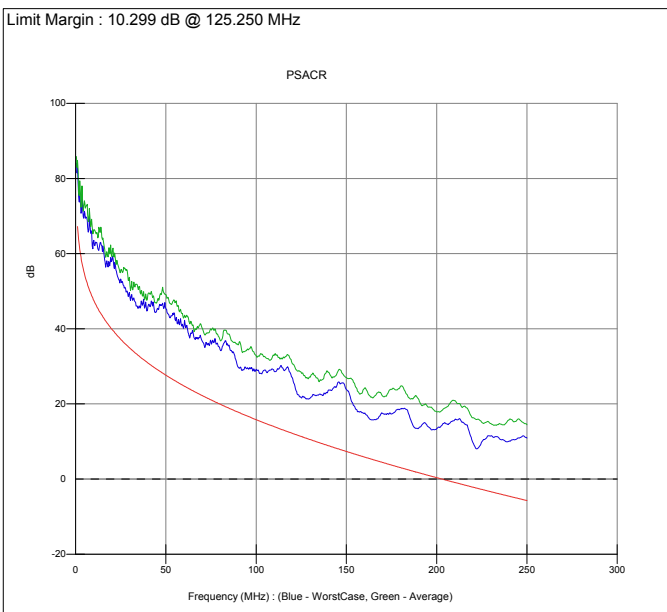


## Summary

<b>Client</b>	Hellermann	<b>Report No</b>	3145779CRT-002c
<b>Specification</b>	TIA 568B2-1 - Cat 6 Chan Swept250 Limits250MHz	<b>Length</b>	100
<b>Part No</b>	Cat 6 Supra Riser	<b>Temperature</b>	20 °C
<b>Test Started</b>	3/4/2008 8:01:05 AM	<b>Test Status</b>	Complies
<b>Description</b>	4x23 UTP-CMR-Solid		A
<b>Technician</b>	John Cash		



ACR			
Freq	Worst Case	Average	Spec
1.	85.8	89.9	70.4
4.	72.8	80.6	59.0
8.	70.9	75.2	52.5
10.	63.7	74.1	50.3
16.	61.0	68.4	45.2
20.	60.8	65.4	42.6
25.	53.9	63.4	39.9
31.25	49.6	61.0	37.0
62.5	41.1	51.2	26.9
100.	32.4	39.9	18.7
200.	15.6	26.0	3.3
250.	13.0	20.9	-2.8

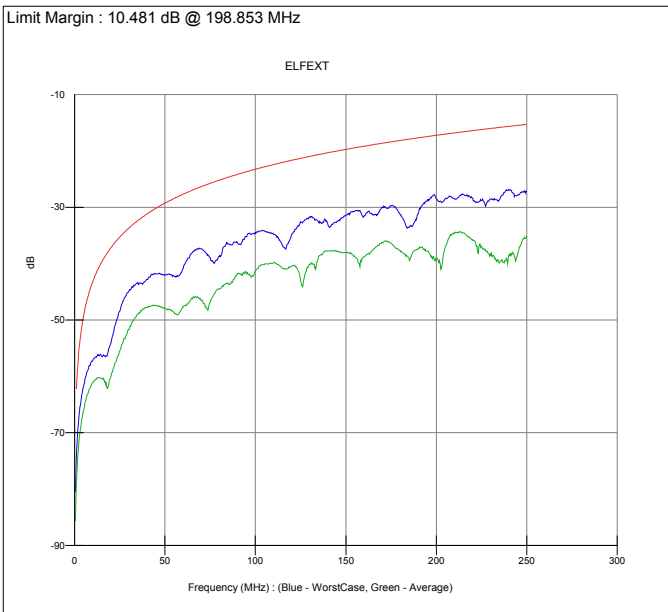


PSACR			
Freq	Worst Case	Average	Spec
1.	82.8	84.1	68.0
4.	71.3	73.2	56.5
8.	67.5	69.4	49.9
10.	63.3	66.0	47.7
16.	58.7	61.5	42.6
20.	58.1	59.5	40.0
25.	53.2	55.4	37.2
31.25	48.6	51.8	34.3
62.5	38.9	42.9	24.1
100.	29.2	32.8	15.8
200.	13.4	17.9	0.4
250.	10.9	14.5	-5.7

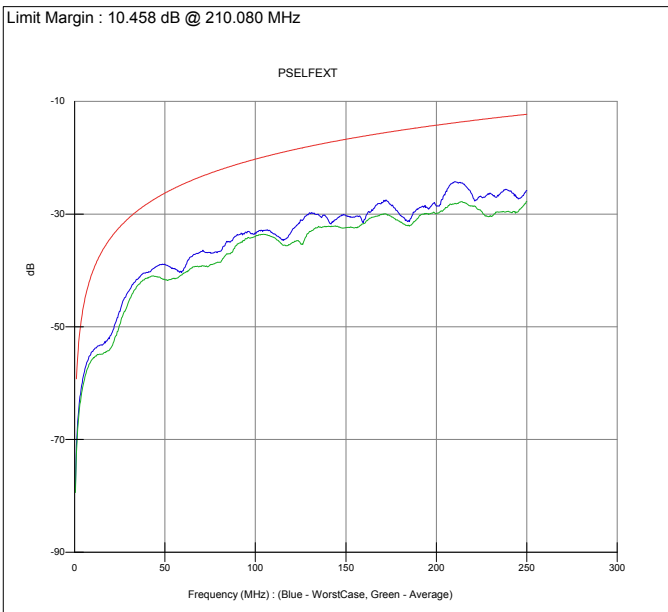


## Summary

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<b>Part No</b>	Cat 6 Supra Riser	<b>Temperature</b>	20 °C
<b>Test Started</b>	3/4/2008 8:01:05 AM	<b>Test Status</b>	Complies
<b>Description</b>	4x23 UTP-CMR-Solid		A
<b>Technician</b>	John Cash		



ELFEXT			
Freq	Worst Case	Average	Spec
1.	75.0	79.7	63.1
4.	63.3	67.6	51.2
8.	58.2	62.4	45.2
10.	57.3	61.2	43.3
16.	56.2	60.4	39.2
20.	54.2	60.2	37.2
25.	48.4	55.4	35.3
31.25	44.5	50.9	33.4
62.5	39.1	47.2	27.3
100.	34.5	41.3	23.3
200.	28.5	39.0	17.2
250.	27.2	35.1	15.3



PSELFEXT			
Freq	Worst Case	Average	Spec
1.	72.0	73.2	60.1
4.	60.3	61.5	48.2
8.	55.3	56.7	42.2
10.	54.4	55.7	40.3
16.	53.1	54.7	36.2
20.	51.5	53.8	34.2
25.	47.3	49.6	32.3
31.25	43.0	44.7	30.4
62.5	38.3	40.1	24.3
100.	33.3	34.0	20.3
200.	28.5	29.9	14.2
250.	25.8	27.8	12.3