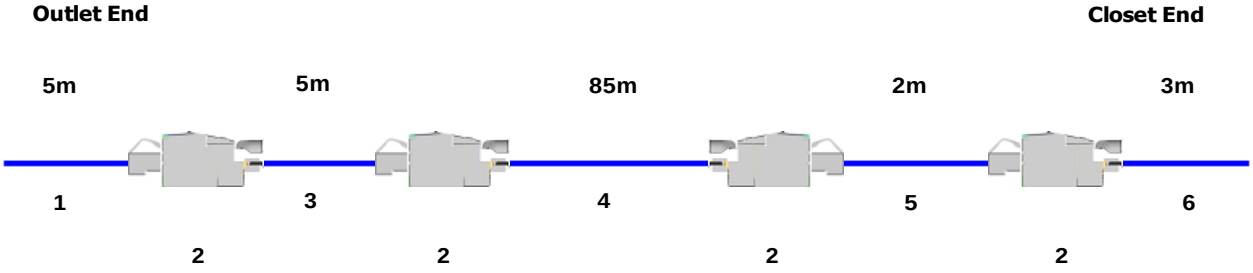
Channel Description
Shielded 100 Meter

Date of Tests: March 29, 2011
Reference ITS Report # 100366206CRT-001c



Number	Description	Part Number
1	Outlet Patch Cord	Panduit STP6X5MBBL
2	Outlet & Closet Hardware	Panduit CJS6X88TGY
3	Zone Cord	Panduit SAJLWH5MBL
4	Horizontal Cable	Panduit PFFL6X04
5	Cross-Connect Cord	Panduit STP6X2MBBL
6	Equipment Cord	Panduit STP6X3MBU

Equipment List	Description	Model #
	Hewlett Packard Automatic Test System	HP 46152A

Procedure & Measurements

Insertion Loss
The Insertion Loss of all four conductor pairs was measured in accordance with ASTM D4566-98, Paragraph 26. Losses due to reflection, radiation, etc. are assumed to be part of the insertion loss.

Near End Crosstalk (NEXT)
NEXT measurements were made between the six combinations of the four conductor pairs from both ends in accordance with ASTM D4566-98, Paragraph 24.

Far End Crosstalk (FEXT)
FEXT was measured on twelve permutations of four conductor pairs, from one end only, in accordance with ASTM D4566-98.

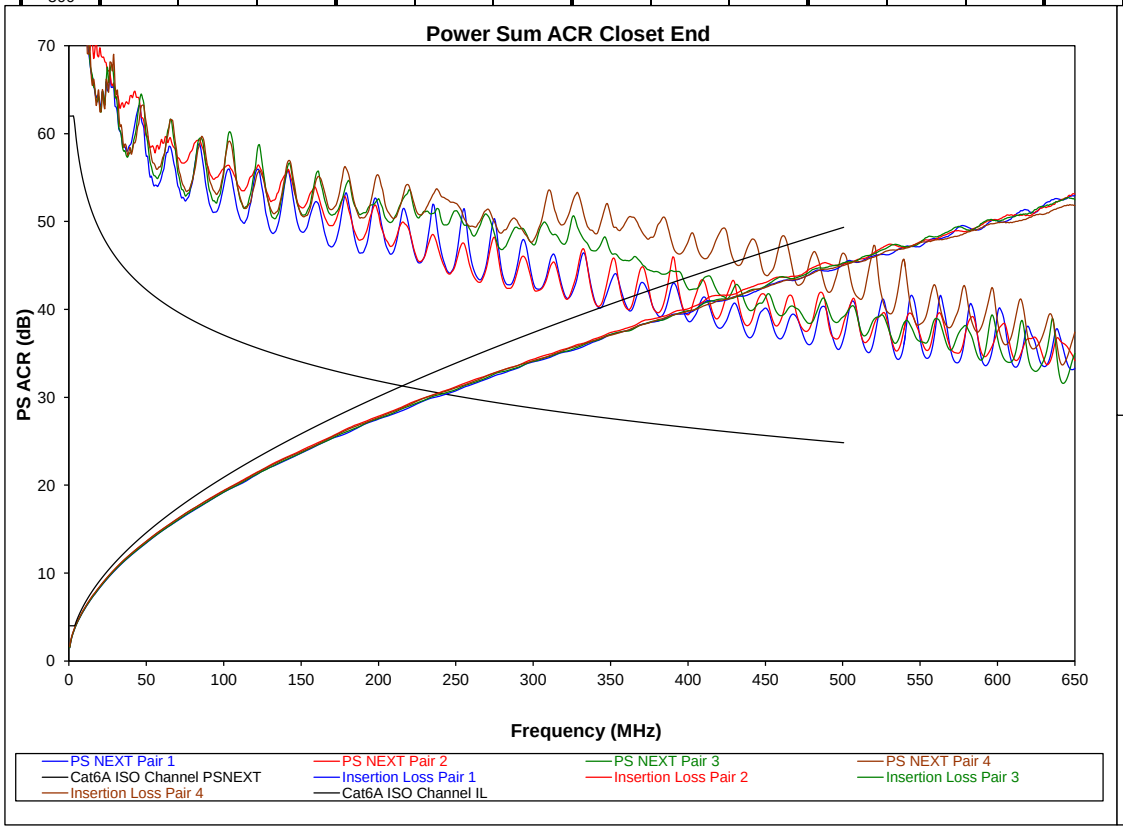
Return Loss (RL)
Return Loss measurements were made on all four pairs, from both ends, in accordance with ASTM D4566-98, Paragraph 45.

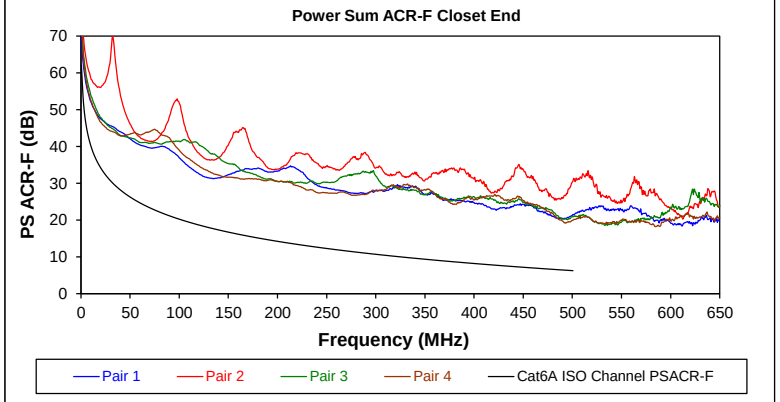
Conclusions

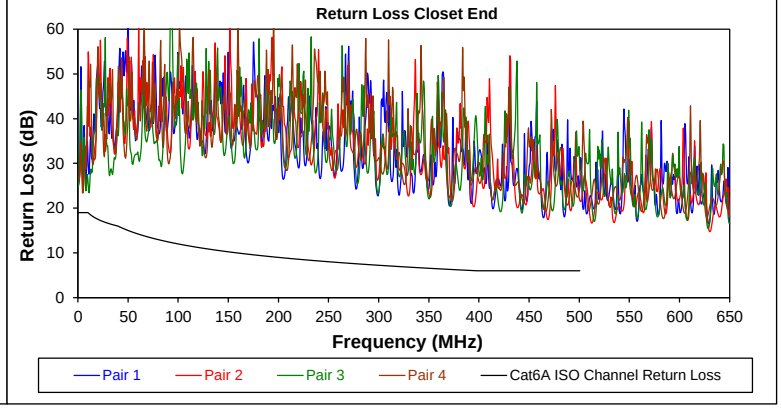
Worst case channel performance exceeded all ISO/IEC 11801, Edition 2, Amendment 1 and 2, Class EA performance requirements.

*Shielded 100 Meter Four Connector Performance With Panduit PFFL6X04 **

Frequency (MHz)	Insertion Loss (dB)	Class EA ISO Channel Insertion Loss Specification (dB)*	Margin (dB)	Return Loss (dB)	Class EA ISO Channel Return Loss Specification (dB)	Margin (dB)	P-P NEXT [dB]	Class EA ISO Channel P-P NEXT Specification (dB)	Margin (dB)	P-P ACR-F (ELFEXT) (dB)	Class EA ISO Channel P-P ACR-F Specification (dB)	Margin (dB)	Power Sum NEXT (dB)	Class EA ISO Channel PS NEXT Specification (dB)	Margin (dB)	Power Sum ACR-F (PSELFEXT) (dB)	Class EA ISO Channel PSACR-F Specification (dB)	Margin (dB)	Power Sum ACR (dB)	Class EA ISO Channel PS ACR Specification (dB)	Margin (dB)
1	2.4	4.0	1.6	26.2	19.0	7.2	83.8	65.0	18.8	72.9	60.9	12.0	81.0	62.0	19.0	69.9	57.9	12.0	74.1	57.0	17.2
4	3.8	4.0	0.2	29.7	19.0	10.7	81.5	63.5	18.0	63.9	51.8	12.1	77.9	61.0	16.9	61.0	48.8	12.2	74.1	57.0	17.2
8	5.3	5.7	0.4	24.0	19.0	5.0	75.0	58.3	16.7	57.6	45.4	12.2	71.4	55.8	15.7	54.7	42.4	12.3	66.1	50.0	16.1
10	5.8	6.3	0.5	27.5	19.0	8.5	75.2	57.0	18.2	56.0	43.8	12.2	71.5	54.4	17.1	53.1	40.8	12.3	65.7	48.1	17.6
16	7.6	8.2	0.6	31.0	18.0	13.1	69.0	53.3	15.7	51.5	39.2	12.3	65.3	50.6	14.7	48.7	36.2	12.4	57.8	42.5	15.3
20	8.5	9.2	0.7	48.4	17.5	30.9	65.4	51.6	13.8	49.3	37.2	12.1	62.5	49.0	13.5	46.6	34.2	12.4	54.0	39.8	14.2
25	9.5	10.2	0.7	38.2	17.0	21.2	69.8	50.1	19.8	47.8	35.3	12.4	64.9	47.4	17.5	45.2	32.3	12.9	55.4	37.2	18.2
31.25	10.6	11.3	0.7	29.8	16.6	13.2	66.8	48.6	18.2	46.3	33.6	12.7	63.0	45.9	17.1	44.2	30.6	13.6	52.4	34.5	17.9
62.5	15.2	16.3	1.1	31.7	14.1	17.7	60.8	43.4	17.4	42.3	27.4	14.9	57.1	40.6	16.5	40.3	24.4	15.9	41.9	24.3	17.6
100	19.3	20.8	1.5	44.5	12.0	32.5	57.6	40.0	17.7	39.4	23.3	16.1	53.6	37.1	16.5	37.4	20.3	17.1	34.3	16.3	18.0
200	27.8	30.0	2.2	37.7	9.0	28.7	54.8	34.8	20.0	30.8	17.3	13.5	51.2	31.9	19.3	30.6	14.3	16.3	23.4	1.8	21.6
250	31.2	33.9	2.7	34.9	8.0	26.9	46.2	33.1	13.1	30.3	15.3	14.9	45.1	30.2	14.9	27.4	12.3	15.1	13.9	-3.7	17.6
300	34.3	37.3	3.0	22.7	7.2	15.5	45.1	31.8	13.3	29.3	13.7	15.6	43.1	28.8	14.3	27.7	10.7	17.0	8.8	-8.5	17.3
400	40.1	43.7	3.6	26.0	6.0	20.0	40.3	29.6	10.7	27.6	11.2	16.4	38.7	26.6	12.2	24.8	8.2	16.6	-1.3	-17.1	15.7
500	45.3	49.3	4.0	22.6	6.0	16.6	38.7	27.9	10.8	22.5	9.3	13.2	36.2	24.8	11.4	19.9	6.3	13.6	-9.0	-24.5	15.4







This is a Panduit report and all calculations and graphs were done by Panduit from data supplied by Intertek ETL SEMKO on 3 tests performed on the specific channel specified in report # 100366206CRT-001c.

* The table values shown indicate the worst pair performance at the closest measured data points relative to the specified frequency, from three separately tested channels averaged together.

Date of Tests: **March 29, 2011**
Reference ITS Report # **100366206CRT-001c**

Shielded 100 Meter Four Connector Performance With Panduit PFFL6X04 *

The purpose of this page is to help interpret the data from the first two pages of this report. As new technologies (e.g. Full Duplex Transmission) further push the limitations of your cabling system, it is no longer good enough to just pick data for one frequency point off a chart to characterize your system. A thorough analysis of all of the data at all frequency points is necessary. It is strongly recommended to use this method to evaluate Panduit channel performance as well as competitors.

Available Bandwidth is determined at the frequency where the PSACR is equal to zero.

Available Bandwidth =398MHz

Power Sum ACR is the difference between the Insertion Loss and the observed PSNEXT at a particular frequency. Simply stated, it is the signal-to-noise ratio of the cabling system.

This is important because as your **PSACR** is reduced, your receiver can have trouble distinguishing the signal from the noise. **PSACR** is a critical factor in judging the transmission quality of an installed channel.

PSACR

	ISO Specification	Worst Case	Margin
100 MHz	16.3	34.3	18.0
200 MHz	1.8	23.4	21.6
250 MHz	-3.7	13.9	17.6
500 MHz	-24.5	-9.0	15.4

PSNEXT is the ratio of the signal coupled onto a fourth pair at the near end when the three other pairs are powered, relative to the signal strength of the powered signal.

In full-duplex environments, **PSNEXT** is an important parameter because all pairs transmit and receive at the same time, and excessive NEXT can hurt your network performance. Superior **PSNEXT** performance ensures that if all of the other pairs are transmitting, the crosstalk onto any one pair will not be significant enough to drown out a simultaneous received signal.

PSNEXT

	ISO Specification	Worst Case	Margin
100 MHz	37.1	53.6	16.5
200 MHz	31.9	51.2	19.3
250 MHz	30.2	45.1	14.9
500 MHz	24.8	36.2	11.4

Return Loss is the ratio of the amount of signal that is reflected back at the transmitter relative to the original signal sent.

In full duplex transmission environments, significant **Return Loss** can cause errors in your network. Since a full duplex network can transmit and receive simultaneously, a large reflected signal can be perceived as a received signal even though there is no signal to receive.

Return Loss

	ISO Specification	Worst Case	Margin
100 MHz	12.0	44.5	32.5
200 MHz	9.0	37.7	28.7
250 MHz	8.0	34.9	26.9
500 MHz	24.8	36.2	11.4

PSACR-F (PSELFEXT) is a measure of the total crosstalk that is seen at the receiving end of the cabling system relative to the received transmitted signal.

PSACR-F can greatly affect network throughput in a full-duplex environment. If three pairs are transmitting simultaneously and a large **PSACR-F** signal is induced onto the fourth pair, a false signal can be received on the fourth pair, which could cause an error to occur.

PSACR-F

	ISO Specification	Worst Case	Margin
100 MHz	20.3	37.4	17.1
200 MHz	14.3	30.6	16.3
250 MHz	12.3	27.4	15.1
500 MHz	6.3	19.9	13.6