visual engineering LIGHTWARE

BELDEN INDUSTRIAL ETHERNET 74004PU

Lightware Testing Lab

Cable Testing Method

HDBT™

Peterdy 15, Budapest H-1071, Hungary +36 1 255 3800 sales@lightware.com www.lightware.com

Professional Cable Performance Analysis

We use Fluke DSX-5000 cable analyzers in the Lightware Testing Lab to measure the properties of the cable relevant to signal transmission. Measured data include the DC resistance of the cable, the loss of signal strength of a signal (attenuation) at one or more frequencies, measuring the isolation between pairs of multi-pair cable threads, cross talk and many more.

This phase of testing can outline the general performance of the cable itself, without the modifying effects of a connected HDBaseT™ device.

Application Tests

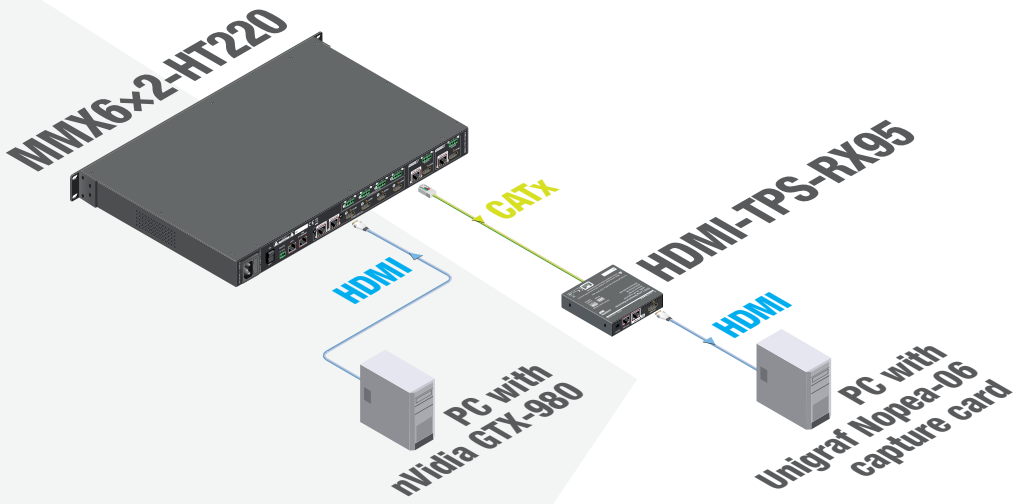
Measuring the performance of CAT cables is generally important, but it is even more useful to test the cables in a system containing HDBaseT™ transmitters and receivers.

These devices along with the used cable greatly affect the overall system performance. HDBaseT™ transmitters and receivers have HDMI input/output stage, reclocking features and other factors that can modify system performance.

We believe that in order to provide the most valuable information for integrators about the HDBaseT™ chain, it is best to test the cables together with HDBaseT™ compatible Lightware TPS products.

Therefore we always run cable performance tests in working applications as well.

Test criteria: Bit Error Rate is under 10^{-9}



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Test Results

	TX	RX	Test Pattern	Length (m)	Pixel errors over 200 sec			
					Red	Green	Blue	Total
Lightware Long Reach Mode	**MMX6x2**	**HDMI-TPS-RX95** ENG-2068	**1080p60** pseudorandom	**150 m** +2×0,3 m patch cable	2	2	2	6
HDBaseT™	**MMX6x2**	**HDMI-TPS-RX95** ENG-2068	**2160p30** pseudorandom	**95 m** +2×0,3 m patch cable	3	8	5	16

	Bit Error Rate				Tx Error Rate				Rx Error Rate			
	total_ber (tx side)	video_ber (rx side)	audio_ber (rx side)	control_ber (rx_side)	A	B	C	D	A	B	C	D
Lightware Long Reach Mode	10^{-09}	2.13^{-08}	10^{-09}	10^{-09}	47.4	47.4	47.4	47.4	61,0	61,0	61,0	61,0
HDBaseT™	10^{-09}	5.59^{-09}	10^{-09}	10^{-09}	37,0	37,0	37,0	37,0	58.9	58.9	58.9	58.9

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Cable ID: 7 BELDEN INDUSTRIAL ETH

Test Summary: PASS

Date / Time: 2017-01-24 01:47:49 PM
Test Limit: Measure All
Cable Type: Cat 6A F/UTP
NVP: 74.0%

Software Version: V4.8 Build 1
Limits Version: V4.8
Calibration Date:
Main (Module): 2016-02-03
Remote (Module): 2016-02-03

Model: DSX-5000
Main S/N: 2797178
Remote S/N: 2797197
Main Adapter: DSX-PLA004
Remote Adapter: DSX-PLA004

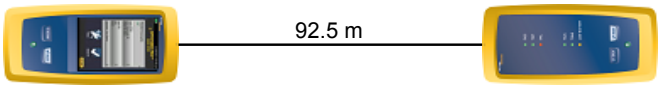
Length (m)	[Pair 78]	92.5
Prop. Delay (ns)	[Pair 45]	423
Delay Skew (ns)	[Pair 45]	6
Resistance (ohms)	[Pair 45]	13.35
Resist. Unbal. (ohms)	[Pair 12]	0.018
Resist. P2P Unbal. (ohms)	[Pair 45-78]	0.070
Impedance (ohms)	[Pair 45]	102
Insertion Loss Margin (dB)	[Pair 45]	
Frequency (MHz)	[Pair 45]	1101.0
Limit (dB)	[Pair 45]	

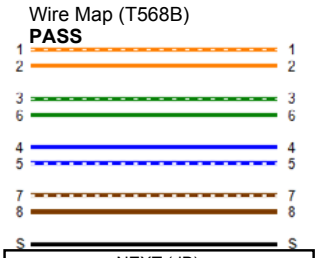
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			36-45	36-45
NEXT (dB)			16.6	16.3
Freq. (MHz)			987.0	995.0
Limit (dB)				
Worst Pair			36	36
PS NEXT (dB)			16.2	15.8
Freq. (MHz)			985.0	995.0
Limit (dB)				

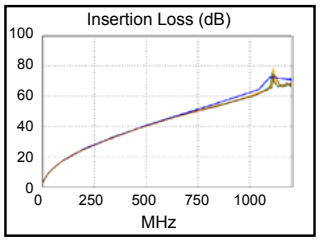
N/A	MAIN	SR	MAIN	SR
Worst Pair			36-45	36-45
ACR-F (dB)			1.3	2.2
Freq. (MHz)			1101.	1101.
Limit (dB)				
Worst Pair			45	45
PS ACR-F (dB)			1.0	0.8
Freq. (MHz)			1101.	1101.
Limit (dB)				

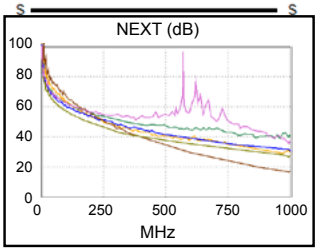
N/A	MAIN	SR	MAIN	SR
Worst Pair			36-45	36-45
ACR-N (dB)			-45.2	-45.7
Freq. (MHz)			999.0	997.0
Limit (dB)				
Worst Pair			45	45
PS ACR-N (dB)			-45.2	-45.7
Freq. (MHz)			999.0	997.0
Limit (dB)				

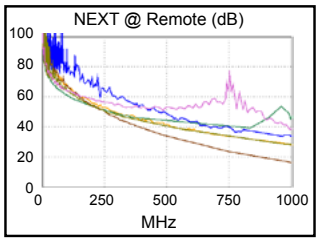
N/A	MAIN	SR	MAIN	SR
Worst Pair			45	45
RL (dB)			7.6	7.6
Freq. (MHz)			985.0	995.0
Limit (dB)				

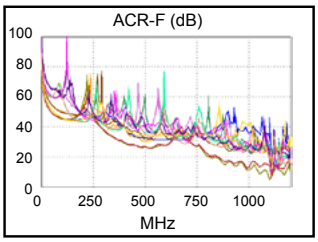


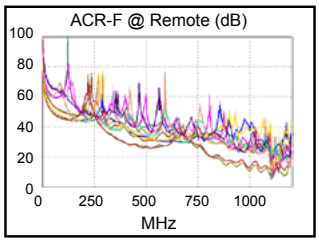


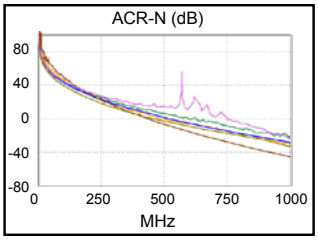


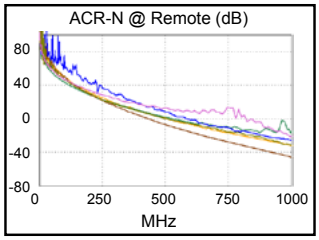


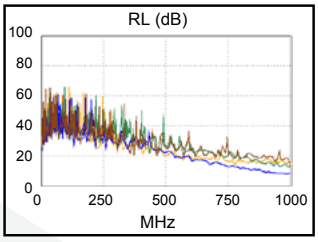


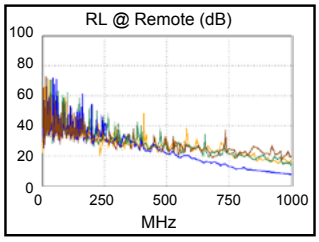












LinkWare™ PC Version 9.6

Cable ID: 7 BELDEN INDUSTRIAL ETH

Test Summary: PASS

Date / Time: 2017-01-24 01:47:49 PM
Test Limit: Measure All
Cable Type: Cat 6A F/UTP
NVP: 74.0%

Software Version: V4.8 Build 1
Limits Version: V4.8
Calibration Date:
Main (Module): 2016-02-03
Remote (Module): 2016-02-03

Model: DSX-5000
Main S/N: 2797178
Remote S/N: 2797197
Main Adapter: DSX-PLA004
Remote Adapter: DSX-PLA004

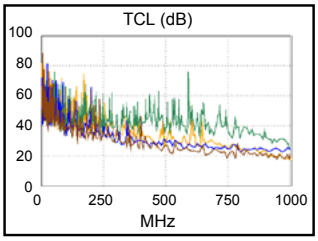
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			12	12
TCL (dB)			17.6	13.4
Freq. (MHz)			996.0	973.0
Limit (dB)				

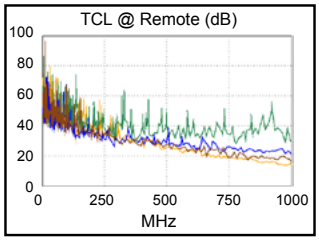
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			45	45
TCTL (dB)			32.0	32.1
Freq. (MHz)			26.9	24.6
Limit (dB)				

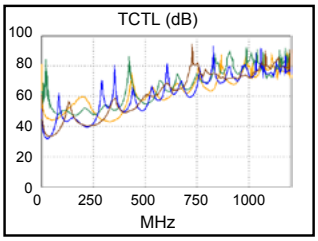
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			12-36	12-36
CDNEXT (dB)			19.1	18.0
Freq. (MHz)			968.0	877.0
Limit (dB)				

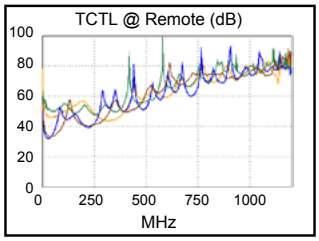
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			36	36
CMRL (dB)			3.6	4.5
Freq. (MHz)			943.0	1000.
Limit (dB)				

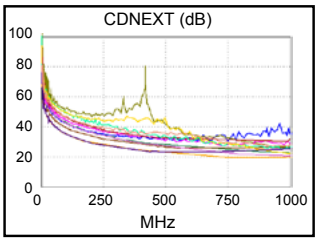
	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair			36	12
ELTCTL (dB)			-3.2	-3.3
Freq. (MHz)			1106.	1113.
Limit (dB)				

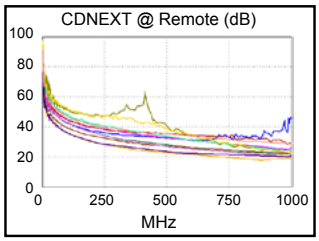


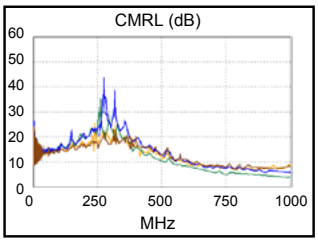


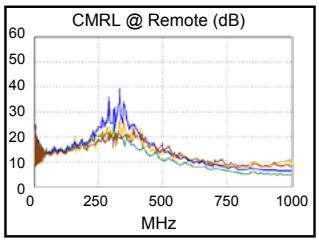


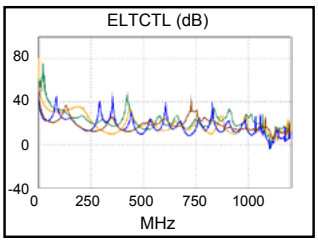


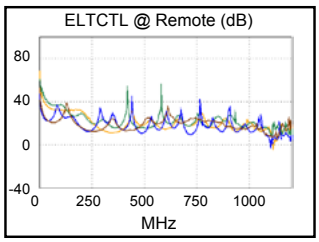












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