

## Nano 360® HDMI High-Speed Characterization

T180115 Rev1 – April 12, 2018



### 1. Product Description

- 1.1. **Assembly P/N:** A79925-6XX
- 1.2. **Connector Description:** 1-meter & 3-meter HDMI Nano Circular Jumper
- 1.3. **Cable Primaries<sup>1</sup>:** 32 AWG SPA ePTFE/PFA
- 1.4. **Cable Shield:** Braided Shielded (85% Min coverage) + Foil
- 1.5. **Cable Jacket:** Polyurethane UL94 V0 & LSZH Jacket
- 1.6. **Insulator:** Custom 19-position

### 2. High-Speed Performance Targets<sup>2</sup>

- 2.1. **Connector Differential Impedance:**  $100\Omega \pm 25\Omega$  based on 200 ps (10%-90%)  $T_{RISE}$
- 2.2. **Cable Differential Impedance:**  $100\Omega \pm 10\Omega$  based on 200 ps (10%-90%)  $T_{RISE}$
- 2.3. **Differential Insertion Loss:** Defined by the following vertices:
  - (825 MHz, -5 dB)
  - (2.475 GHz, -12 dB)
  - (4.125 GHz, -20 dB)
  - (5.1 GHz, -25 dB)
- 2.4. **Differential Far-End Crosstalk:** Less than -20 dB to 5.0 GHz
- 2.5. **Intra-Pair Skew:** Total skew less than 112ps

	Parameter	SPEC	1-METER	3-METER	
2.1	Connector Differential Impedance	$Z_{MIN}$	75 $\Omega$	85 $\Omega$	87 $\Omega$
		$Z_{MAX}$	125 $\Omega$	108 $\Omega$	110 $\Omega$
2.2	Cable Differential Impedance	$Z_{MIN}$	90 $\Omega$	95 $\Omega$	95 $\Omega$
		$Z_{MAX}$	100 $\Omega$	104 $\Omega$	103 $\Omega$
2.3	Differential Insertion Loss	0.825 GHz	5 dB	2 dB	5 dB
		2.475 GHz	12 dB	5 dB	9 dB
		4.125 GHz	20 dB	7 dB	12 dB
		5.100 GHz	25 dB	9 dB	15 dB
2.4	Differential Far-End Crosstalk	$FEXT_{MAX}$	< -20dB	-32 dB	-38 dB
2.5	Intra-Pair Skew	$Skew_{MAX}$	112ps	34 ps	79 ps

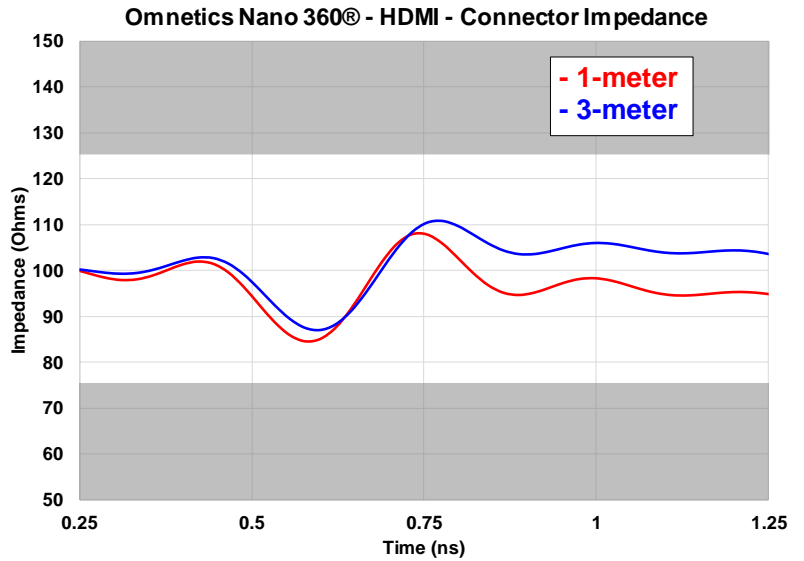
<sup>1</sup> Various cable options are available. Measurements shown above with cables manufactured in Asia.

<sup>2</sup> Per "High-Definition Multimedia Interface Specification Version 1.4", pages 21 (2.1-2.2), 65-66 (2.3-2.5), June 5, 2009.

## 2.1 Connector Differential Impedance

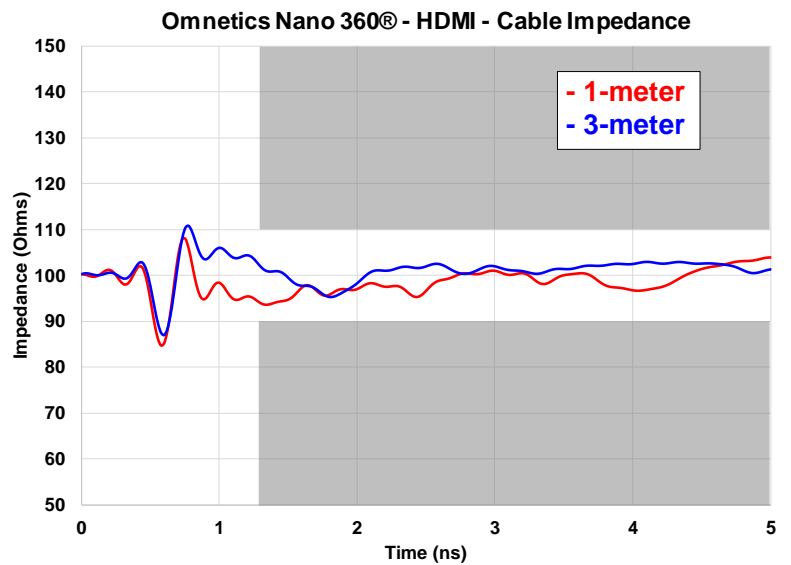
TDR (Time Domain Reflectometer) measures the impedance based on a 200ps (10%-90%) rise time.

	Spec	1-meter	3-meter
$Z_{MIN}$	75 $\Omega$	85 $\Omega$	87 $\Omega$
$Z_{MAX}$	125 $\Omega$	108 $\Omega$	110 $\Omega$



## 2.2 Cable Differential Impedance

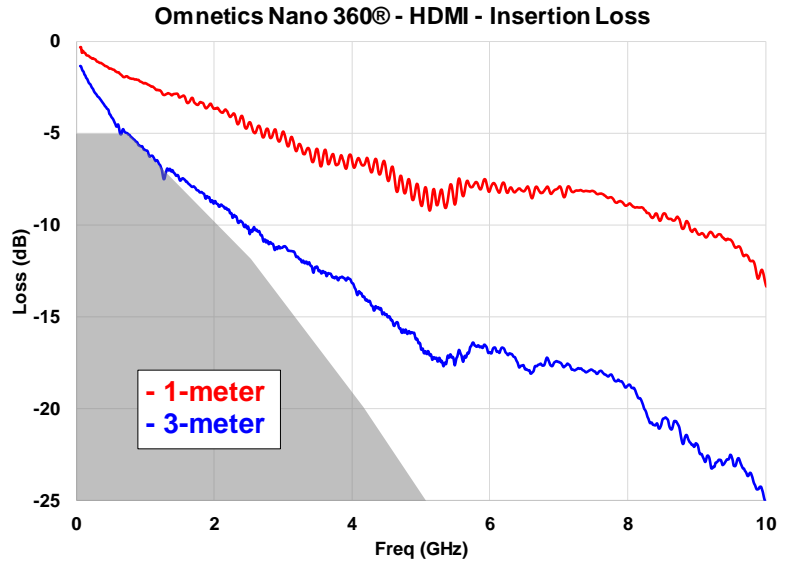
	Spec	1-meter	3-meter
$Z_{MIN}$	90 $\Omega$	95 $\Omega$	95 $\Omega$
$Z_{MAX}$	100 $\Omega$	104 $\Omega$	103 $\Omega$



## 2.3 Differential Insertion Loss

Insertion loss is the ratio of the transmitted signal to the incident signal.

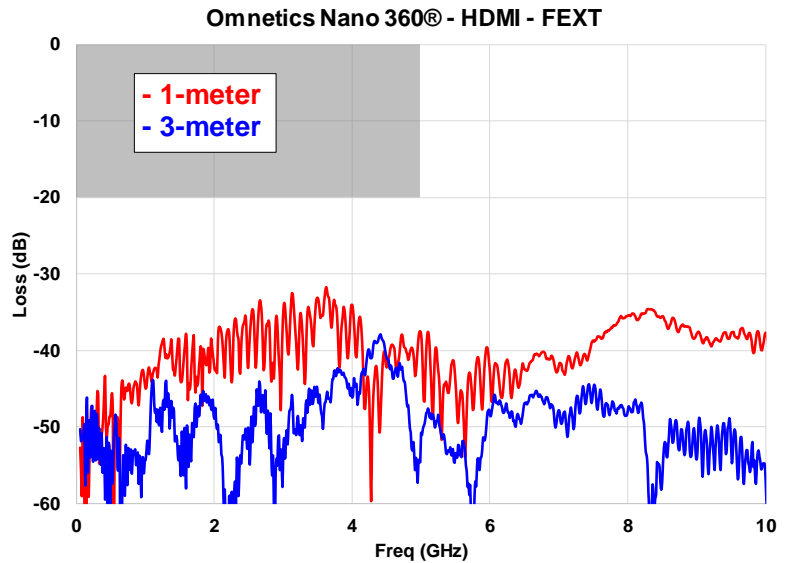
LOSS	SPEC	1-METER	3-METER
0.825 GHz	5 dB	2 dB	5 dB
2.475 GHz	12 dB	5 dB	9 dB
4.125 GHz	20 dB	7 dB	12 dB
5.100 GHz	25 dB	9 dB	15 dB



## 2.4 Differential Far-End Crosstalk

Crosstalk measures the unwanted coupling between differential pairs.

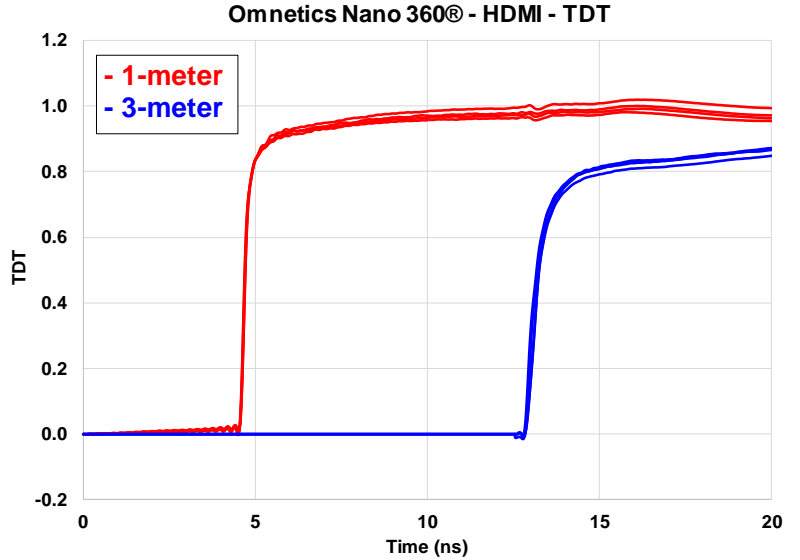
FEXT	SPEC	1-METER	3-METER
7.5 GHz	< -20dB	-32 dB	-38 dB



## 2.5 Intra-Pair Skew

TDT (Time Domain Transmissometry) measures intra-pair skew, which is the difference in electrical length between to signals within a pair.

SKEW <sub>MAX</sub>	SPEC	1-METER	3-METER
Pair 1	112 ps	34 ps	79 ps
Pair 2		26 ps	48 ps



## Appendix 1 - Equipment List:

VNA	Agilent 8722ES
Test Fixtures	Omnetics Custom

## Revision Control:

Rev1	April 12, 2018
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