

## Nano 360® Cat6a High-Speed Characterization

T180113 Rev1 April 12, 2018



### 1. Product Description

- 1.1. **Assembly P/N:** A79917-610
- 1.2. **Connector Description:** 1-meter Ethernet Nano Circular Jumper
- 1.3. **Cable Primaries<sup>1</sup>:** 30 AWG SPC ePTFE/FEP Shielded Twisted Pairs (STP)
- 1.4. **Cable Shield:** Braided Shielded (85% Min coverage) + Foil
- 1.5. **Cable Jacket:** Polyurethane UL94 V0 & LSZH Jacket
- 1.6. **Insulator:** Custom 13-position (8 signal pins, 5 ground pins)

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

- 2.1. **Cable Differential Impedance:** 100  $\Omega$  +/-10  $\Omega$
- 2.2. **Differential Insertion Loss:** Less than 44 dB to 500 MHz
- 2.3. **Differential Return Loss:** Less than -8 dB to 500 MHz
- 2.4. **Differential Near-End Crosstalk:** Less than -27 dB to 500 MHz
- 2.5. **Differential Power Sum Near-End Crosstalk:** Less than -24 dB to 500 MHz

	Parameter	Spec	1-meter	3-meter	
2.1	Cable Differential Impedance	Z <sub>MIN</sub>	90 $\Omega$	96 $\Omega$	
		Z <sub>MAX</sub>	110 $\Omega$	99 $\Omega$	
2.2	Differential Insertion Loss	Loss <sub>500MHz</sub>	< 44 dB	1 dB	3 dB
2.3	Differential Return Loss	Loss <sub>500MHz</sub>	< -8 dB	-16 dB	-17 dB
2.4	Differential Far-End Crosstalk	NEXT <sub>500MHz</sub>	< -27 dB	-50 dB	-51 dB
2.5	Differential Power Sum Far-End Crosstalk	PSNEXT <sub>500MHz</sub>	< -24 dB	-48 dB	-49 dB

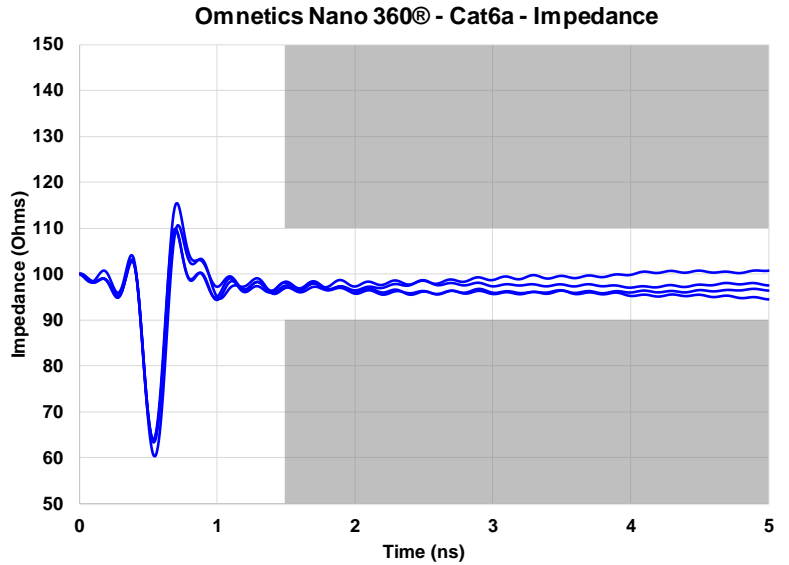
<sup>1</sup> Various cable options are available. Measurements shown above with cables manufactured in Asia.

<sup>2</sup> Per "TIA-568-C.2", Tables 31, 33, 35, 37; August, 2009. Only max frequency target is shown here. Plots and tables on subsequent pages show full limits.

## 2.1 Cable Differential Impedance

TDR (Time Domain Reflectometer) measures the impedance.

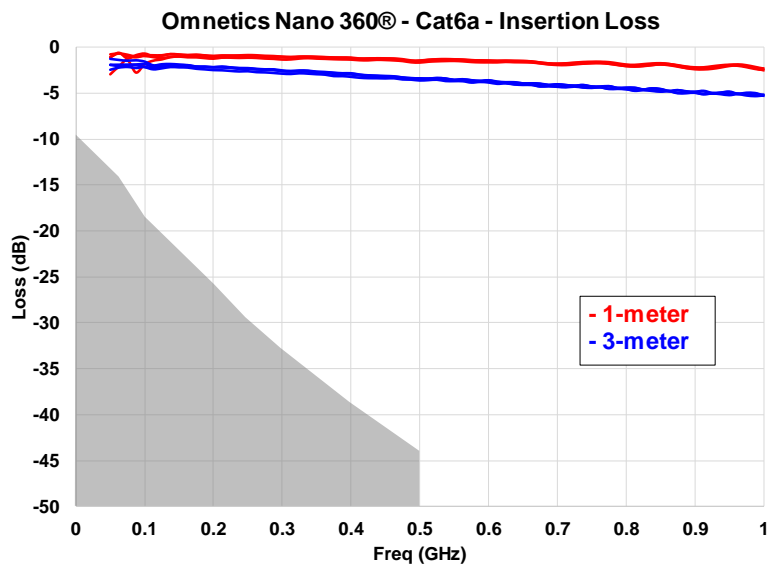
	Spec
$Z_{MAX}$	90 $\Omega$
$Z_{MAX}$	110 $\Omega$
$Z_{PAIR1}$	97 $\Omega$
$Z_{PAIR2}$	96 $\Omega$
$Z_{PAIR3}$	99 $\Omega$
$Z_{PAIR4}$	96 $\Omega$



## 2.2 Differential Insertion Loss

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

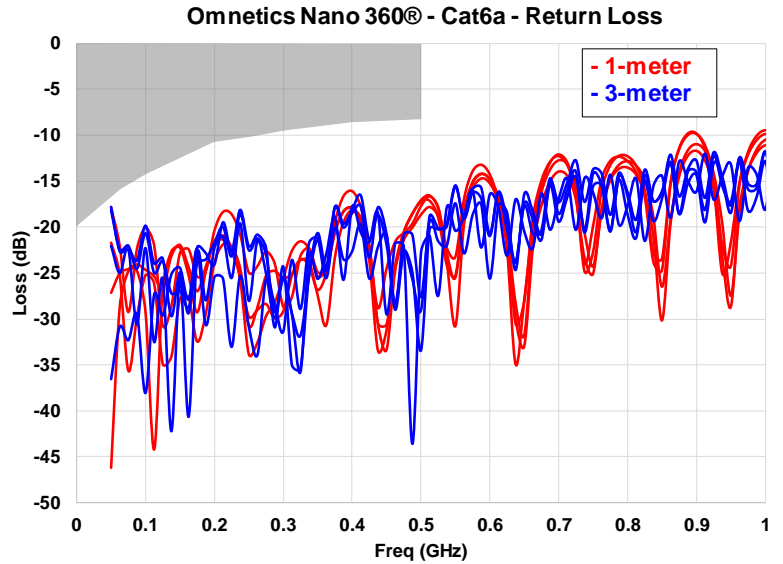
LOSS	SPEC	1-METER	3-METER
62.5 MHz	14.0 dB	1.2 dB	1.9 dB
100 MHz	18.0 dB	1.2 dB	2.0 dB
200 MHz	26.1 dB	1.0 dB	2.2 dB
250 MHz	29.5 dB	1.0 dB	2.4 dB
300 MHz	32.7 dB	1.1 dB	2.6 dB
400 MHz	38.4 dB	1.2 dB	3.0 dB
500 MHz	43.8 dB	1.5 dB	3.5 dB



## 2.3 Differential Return Loss

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

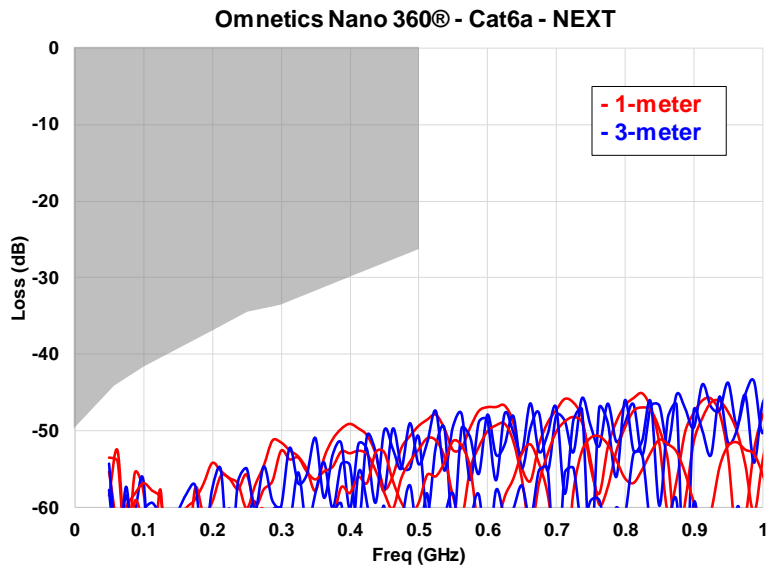
LOSS	SPEC	1-METER	3-METER
62.5 MHz	-16.0 dB	-27.3 dB	-24.5 dB
100 MHz	-14.0 dB	-20.1 dB	-19.8 dB
200 MHz	-11.0 dB	-20.1 dB	-19.8 dB
250 MHz	-10.0 dB	-18.4 dB	-18.1 dB
300 MHz	-9.2 dB	-18.4 dB	-18.1 dB
400 MHz	-8.0 dB	-16.1 dB	-17.8 dB
500 MHz	-8.0 dB	-16.1 dB	-16.5 dB



## 2.4 Differential Near-End Crosstalk (NEXT)

Crosstalk measures the unwanted coupling between differential pairs.

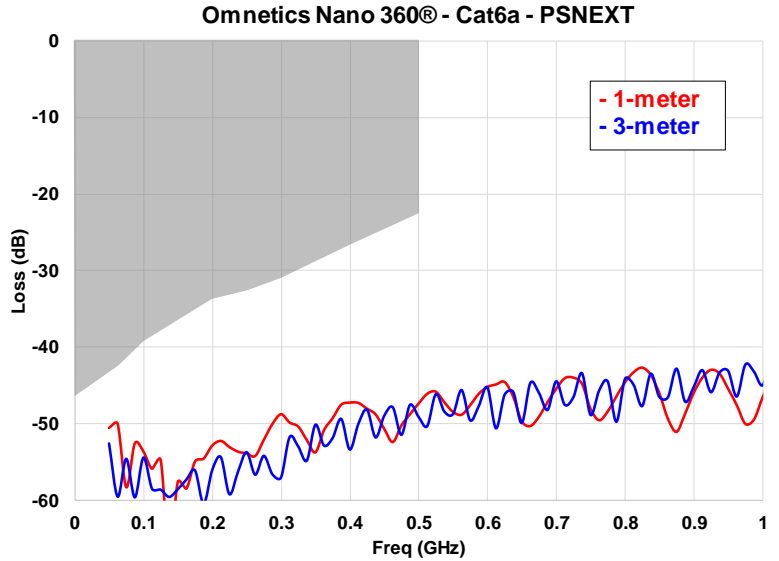
NEXT	SPEC	1-METER	3-METER
62.5 MHz	-45.1 dB	-58.3 dB	-61.7 dB
100 MHz	-41.8 dB	-61.4 dB	-61.6 dB
200 MHz	-36.9 dB	-56.3 dB	-60.6 dB
250 MHz	-35.3 dB	-57.0 dB	-59.0 dB
300 MHz	-34.0 dB	-52.7 dB	-56.6 dB
400 MHz	-29.9 dB	-50.1 dB	-53.8 dB
500 MHz	-26.7 dB	-49.8 dB	-51.4 dB



## 2.5 Differential Power Sum Near-End Crosstalk (PSNEXT)

Power Sum Crosstalk measures total crosstalk on one signal from all adjacent signals.

PSNEXT	SPEC	1-METER	3-METER
62.5 MHz	-42.7 dB	-53.0 dB	-56.1 dB
100 MHz	-39.3 dB	-55.0 dB	-57.1 dB
200 MHz	-34.3 dB	-53.5 dB	-57.2 dB
250 MHz	-32.7 dB	-53.4 dB	-56.0 dB
300 MHz	-31.4 dB	-50.2 dB	-54.5 dB
400 MHz	-27.1 dB	-47.9 dB	-50.5 dB
500 MHz	-23.8 dB	-47.6 dB	-48.9 dB



### Appendix 1 - Equipment List:

VNA	Agilent 8722ES
Test Fixtures	Omnetics Custom

### Revision Control:

Rev1	April 12, 2018
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