

## Nano 360® USB 3.0 (USB 3.1 Gen 1) High-Speed Characterization

T170122 Rev1 – April 12, 2018



### 1. Product Description

- 1.1. **Assembly P/N:** A79922-610
- 1.2. **Connector Description:** 1-meter USB Circular Jumper
- 1.3. **Cable Primaries<sup>1</sup>:** 26 AWG TPC (Power) 30 AWG SPC (Signal); PFA Insulation
- 1.4. **Cable Shield:** Braided Shielded (85% Min coverage) + Foil
- 1.5. **Cable Jacket:** Polyurethane UL94 V0 & LSZH Jacket
- 1.6. **Insulator:** Custom 9-position (2 Micro, 7 Nano)

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

- 2.1. **Connector Differential Impedance:** 90  $\Omega$  +/-15  $\Omega$  based on 50 ps (20%-80%)  $t_{RISE}$
- 2.2. **Differential Insertion Loss:** Less than 25 dB to 7.5 GHz
- 2.3. **Differential Near-End Crosstalk:** Less than 23 dB to 7.5 GHz
- 2.4. **Differential-to-Common-Mode Conversion:** Less than -20 dB to 7.5 GHz

	Parameter	Spec	1-meter
2.1	Connector Differential Impedance	$Z_{MIN}$	75 $\Omega$
		$Z_{MAX}$	105 $\Omega$
2.2	Differential Insertion Loss	$Loss_{7.5GHz}$	< 25 dB
2.3	Differential Far-End Crosstalk	$FEXT_{7.5GHz}$	< -23 dB
2.4	Diff-to-Common Mode Conversion	$DCM_{7.5GHz}$	< -20 dB

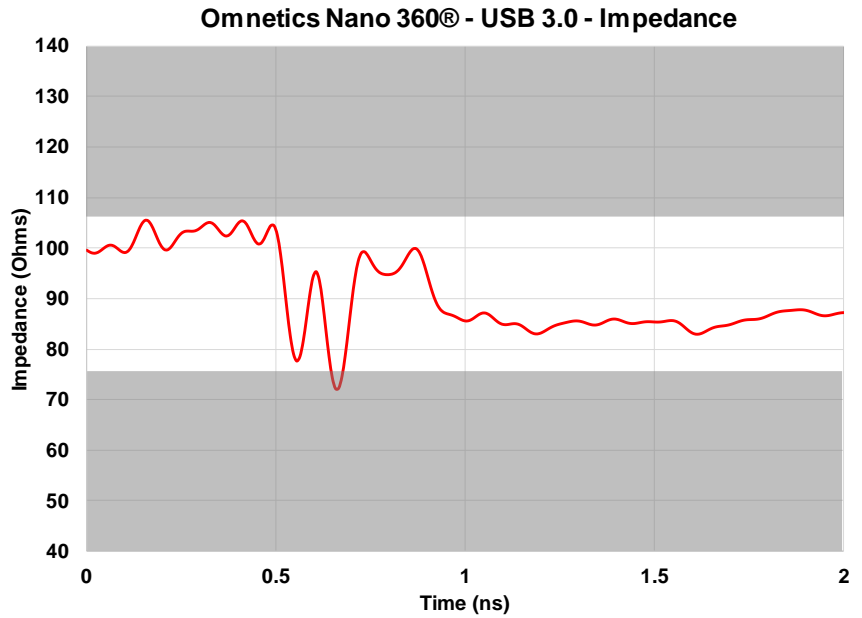
<sup>1</sup> Various cable options are available. Measurements shown above with cables manufactured in Asia.

<sup>2</sup> Per "Universal Serial Bus 3.0 Specification", June 6, 2011. Only max frequency target is shown here. Plots and tables on subsequent pages show full limits.

## 2.1 Connector Differential Impedance

TDR (Time Domain Reflectometer) measures the impedance based on a 50ps (20%-80%) rise time.

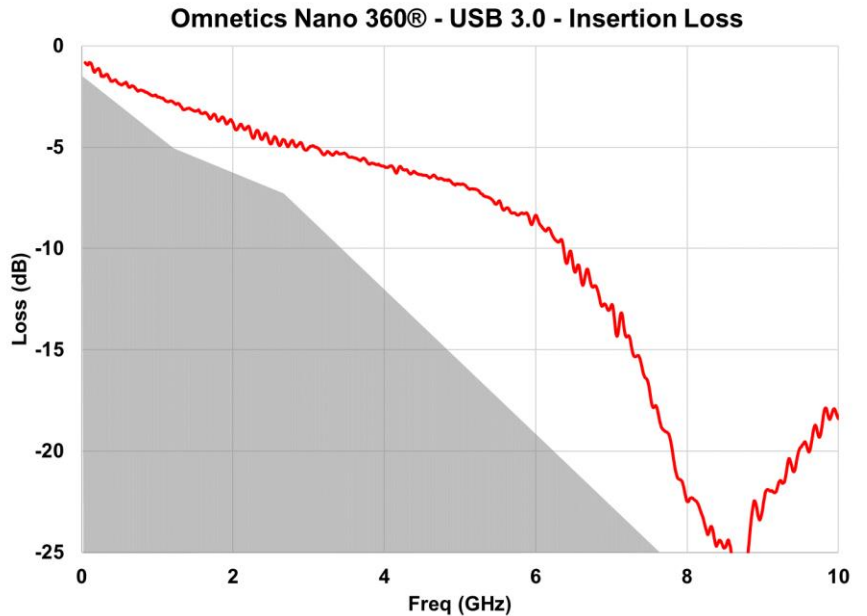
	SPEC	1-METER
Z <sub>MIN</sub>	75 Ω	72 Ω
Z <sub>MAX</sub>	105 Ω	100 Ω



## 2.2 Differential Insertion Loss

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

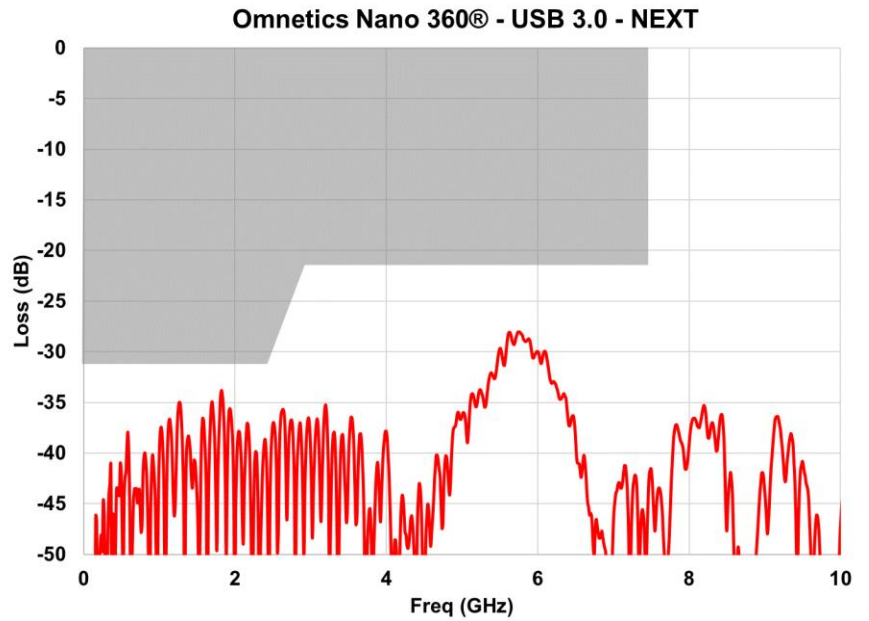
LOSS	SPEC	1-METER
0.10 GHz	-1.5 dB	-1.5 dB
1.25 GHz	-5.0 dB	-2.8 dB
2.50 GHz	-7.5 dB	-4.8 dB
7.50 GHz	-25.0 dB	-16.0 dB



## 2.3 Differential Near-End Crosstalk

Crosstalk measures the unwanted coupling between differential pairs.

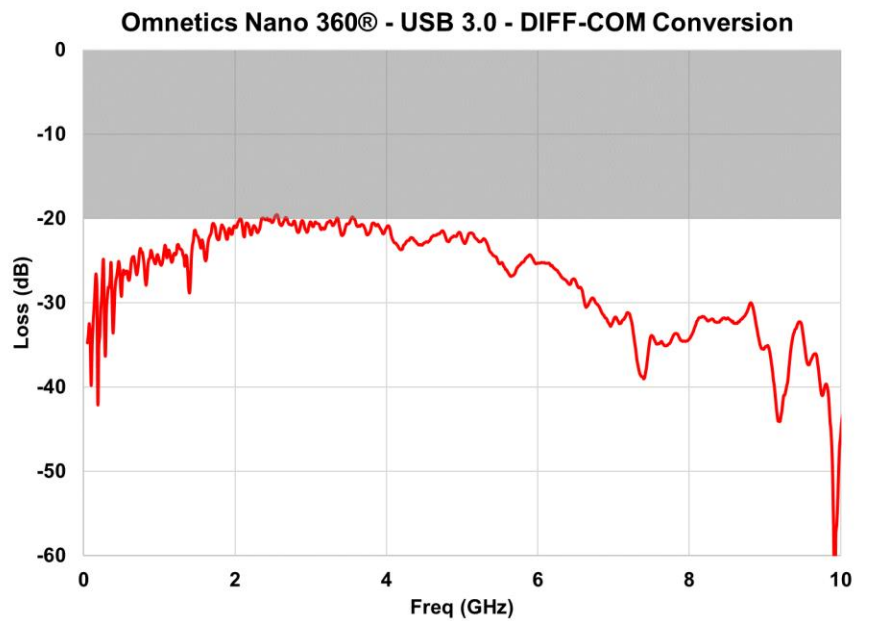
NEXT	SPEC	1-METER
0.10 GHz	-32 dB	-51 dB
2.50 GHz	-32 dB	-34 dB
3.00 GHz	-23 dB	-34 dB
7.50 GHz	-23 dB	-28 dB



## 2.4 Differential-to-Common-Mode Conversion

Differential-to-Common-Mode conversion is an indicator of intra-pair skew and EMI.

DCM	SPEC	1-METER
7.5 GHz	-20 dB	-20 dB



## Appendix 1 - Equipment List:

<b>VNA</b>	Agilent 8722ES
<b>Test Fixtures</b>	Omnetics Custom

## Revision Control:

<b>Rev1</b>	April 12, 2018
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