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[1]:** 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[2]

2.1. **Connector Differential Impedance:** 90 Ω +/-15 Ω 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

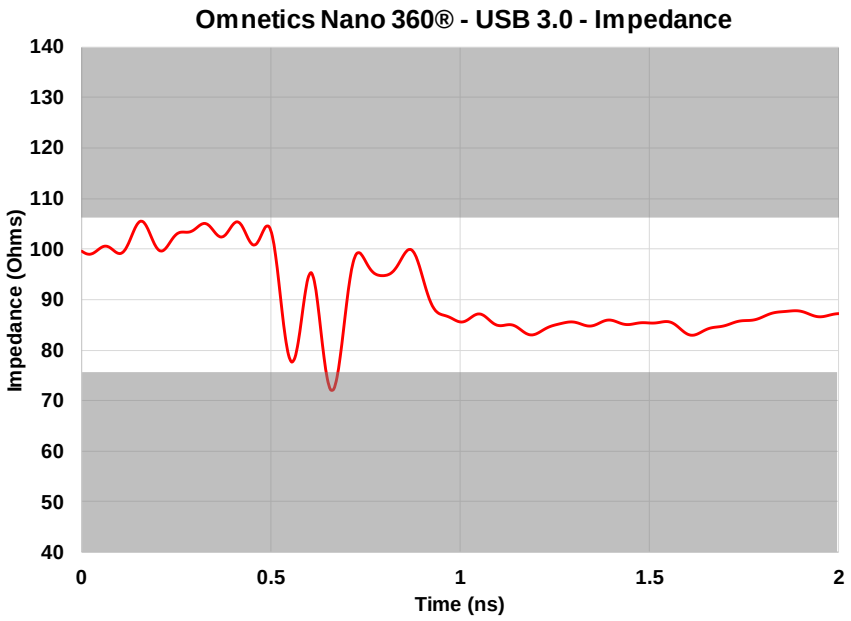
	Parameter		Spec	1-meter
2.1	Connector Differential Impedance	Z_{MIN}	75 Ω	72 Ω
		Z_{MAX}	105 Ω	100 Ω
2.2	Differential Insertion Loss	$Loss_{7.5GHz}$	< 25 dB	16 dB
2.3	Differential Far-End Crosstalk	$FEXT_{7.5GHz}$	< -23 dB	-28 dB
2.4	Diff-to-Common Mode Conversion	$DCM_{7.5GHz}$	< -20 dB	-20 dB

[1] Various cable options are available. Measurements shown above with cables manufactured in Asia.
[2] 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.

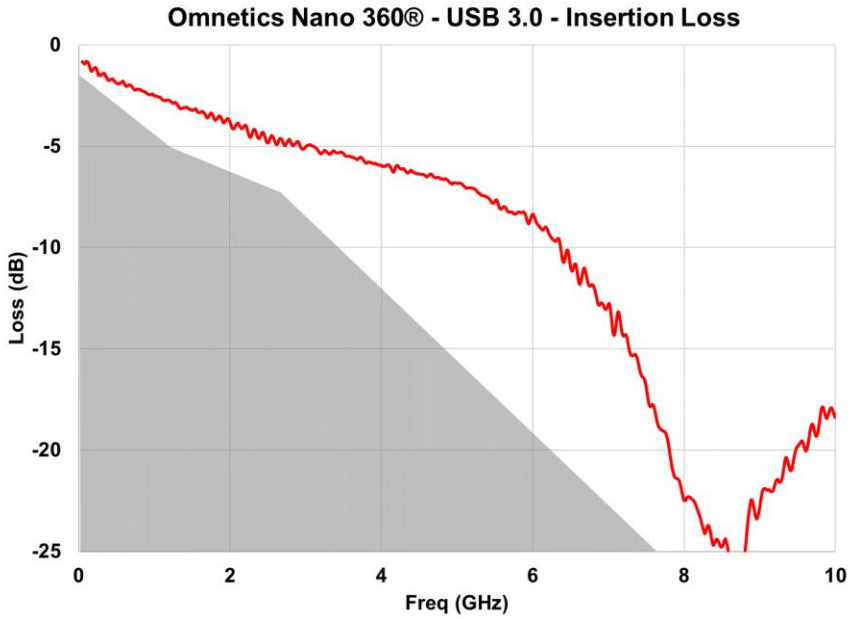
	SPEC	1-METER
Z_{MIN}	75 Ω	72 Ω
Z_{MAX}	105 Ω	100 Ω



2.2 Differential Insertion Loss

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

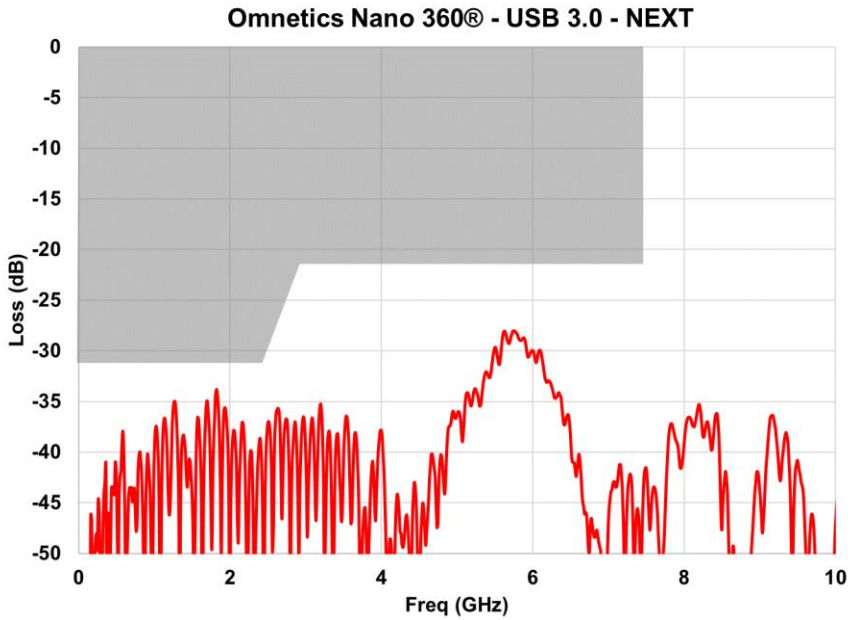
LOSS	SPEC	1-METER
0.10 GHz	-1.5 dB	-1.5 dB
1.25 GHz	-5.0 dB	-2.8 dB
2.50 GHz	-7.5 dB	-4.8 dB
7.50 GHz	-25.0 dB	-16.0 dB



2.3 Differential Near-End Crosstalk

Crosstalk measures the unwanted coupling between differential pairs.

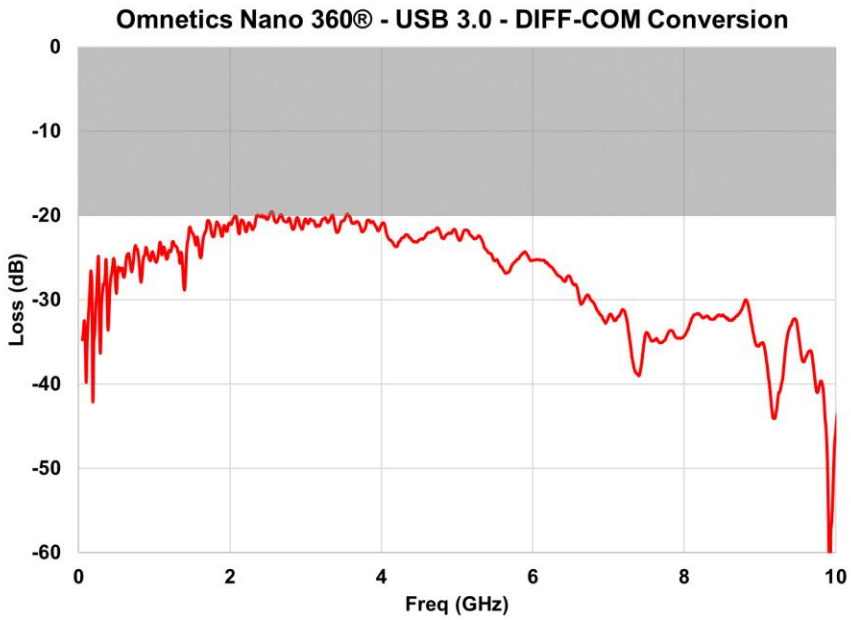
NEXT	SPEC	1-METER
0.10 GHz	-32 dB	-51 dB
2.50 GHz	-32 dB	-34 dB
3.00 GHz	-23 dB	-34 dB
7.50 GHz	-23 dB	-28 dB



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



OMNETICS
CONNECTOR CORPORATION

Appendix 1 - Equipment List:

VNA	Agilent 8722ES
Test Fixtures	Omnetics Custom

Revision Control:

Rev1	April 12, 2018

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