

## Nano Coax Connector – Standalone Board Mount – RF Characterization

T160114 Rev2 – July 11, 2018



### 1. Product Description

- 1.1. **Assembly P/N:** A75593-001 mated to A75590-001 & A75592-001
- 1.2. **Connector Description:** Nano Coax Board Mount connectors
- 1.3. **Cable:** Temp-Flex 047SC-2901

### 2. Test Summary

- 2.1. **VSWR:** 1.3:1 to 20 GHz (Edge Launch); 1.3:1 to 10 GHz (Through Hole)
- 2.2. **Return Loss:** -19 dB to 20 GHz (Edge Launch); -15 dB to 10 GHz (Through Hole)
- 2.3. **Insertion Loss:** -1.9 dB to 20 GHz (Edge Launch); -2.0 dB to 10 GHz (Through Hole)
- 2.4. **Impedance:**  $50\Omega \pm 2.5\Omega$  (Edge Launch);  $50\Omega \pm 5\Omega$  (Through Hole)

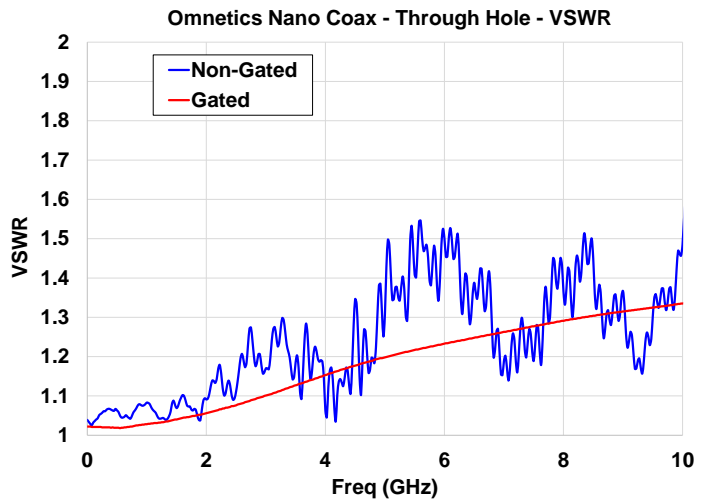
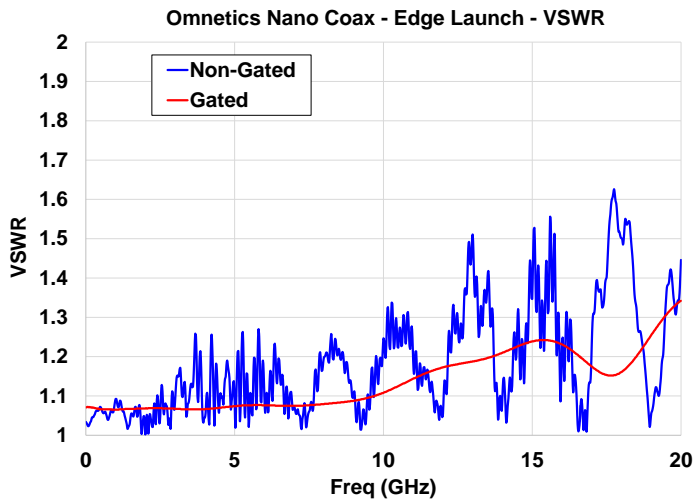
|                 |                 | Edge Launch              |           | Through Hole           |           |
|-----------------|-----------------|--------------------------|-----------|------------------------|-----------|
| Frequency Range |                 | DC to 20 GHz             |           | DC to 10 GHz           |           |
| Impedance       |                 | $50\Omega \pm 2.5\Omega$ |           | $50\Omega \pm 5\Omega$ |           |
|                 |                 | Gated <sup>1</sup>       | Non-Gated | Gated                  | Non-Gated |
| VSWR            | DC - 10 GHz     | 1.1:1                    | 1.3:1     | 1.3:1                  | 1.55:1    |
|                 | 10 GHz - 20 GHz | 1.3:1                    | 1.6:1     | N/A                    | N/A       |
| Return Loss     | DC - 10 GHz     | -23 dB                   | -19 dB    | -15 dB                 | -13 dB    |
|                 | 10 GHz - 20 GHz | -19 dB                   | -13 dB    | N/A                    | N/A       |
| Insertion Loss  | DC - 10 GHz     | -0.7 dB                  | -1.5 dB   | -2.0 dB                | -2.9 dB   |
|                 | 10 GHz - 20 GHz | -1.9 dB                  | -3.0 dB   | N/A                    | N/A       |

<sup>1</sup> See Appendix 3 for explanation of gating.

## 2.1 Voltage Standing Wave Ratio (VSWR)

Voltage Standing Wave Ratio (VSWR) measures the amount of signal that is reflected back to the source.

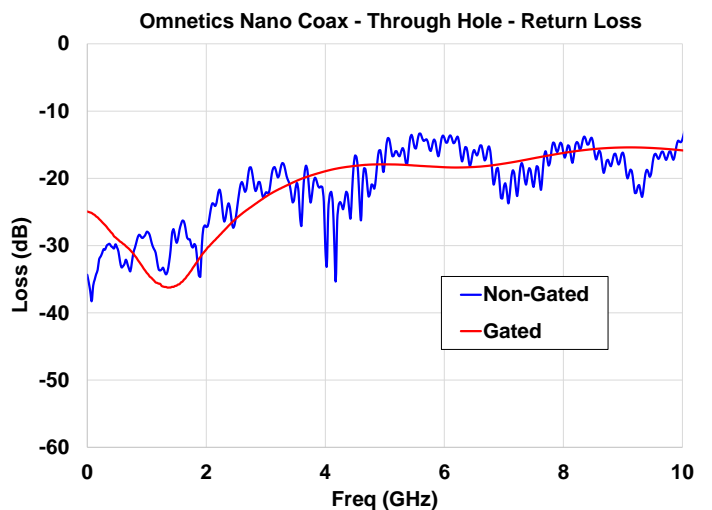
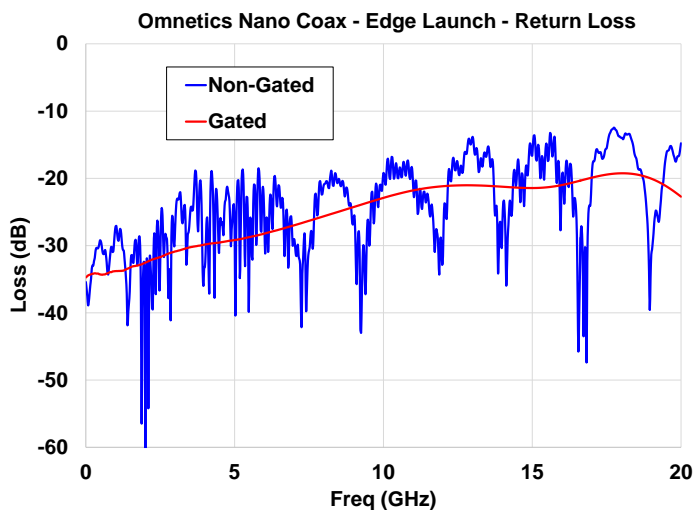
|      |                 | Edge Launch |           | Through Hole |           |
|------|-----------------|-------------|-----------|--------------|-----------|
| VSWR | Freq Range      | Gated       | Non-Gated | Gated        | Non-Gated |
|      | DC - 10 GHz     | 1.1:1       | 1.3:1     | 1.3:1        | 1.55:1    |
|      | 10 GHz - 20 GHz | 1.3:1       | 1.6:1     | N/A          | N/A       |



## 2.2 Return Loss

Return loss is the ratio of the reflected signal to the incident signal.

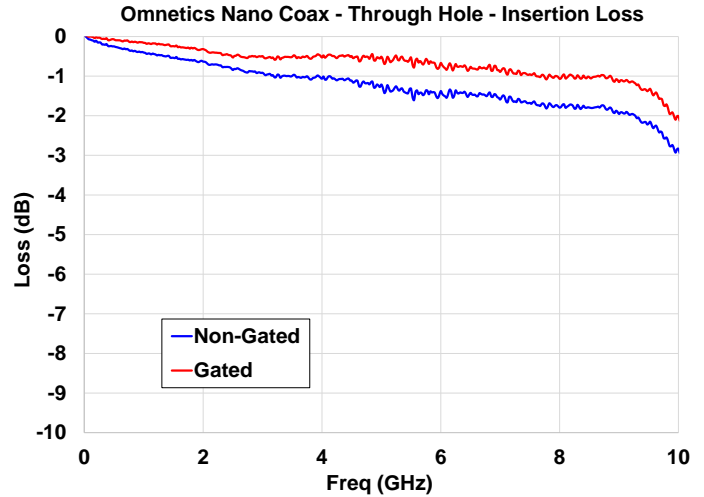
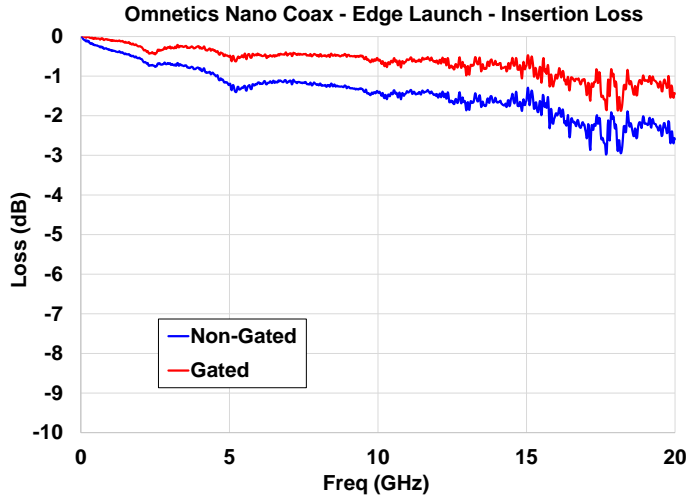
|             |                 | Edge Launch |           | Through Hole |        |
|-------------|-----------------|-------------|-----------|--------------|--------|
| Return Loss | Freq Range      | Gated       | Non-Gated | Gated        | Gated  |
|             | DC - 10 GHz     | -23 dB      | -19 dB    | -15 dB       | -13 dB |
|             | 10 GHz - 20 GHz | -19 dB      | -13 dB    | N/A          | N/A    |



## 2.3 Insertion Loss

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

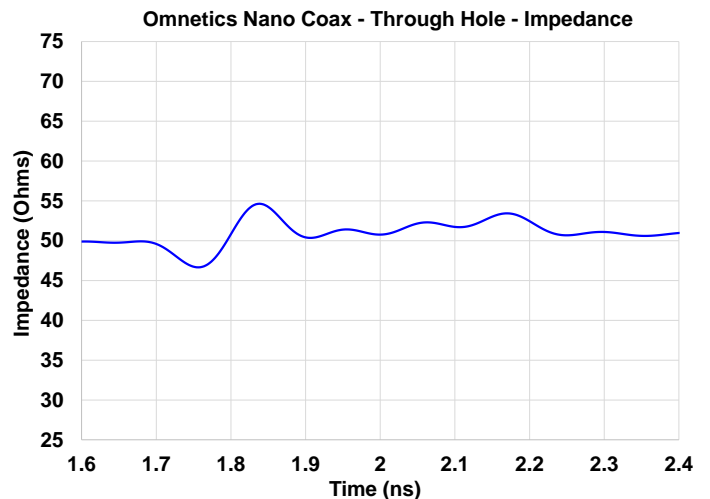
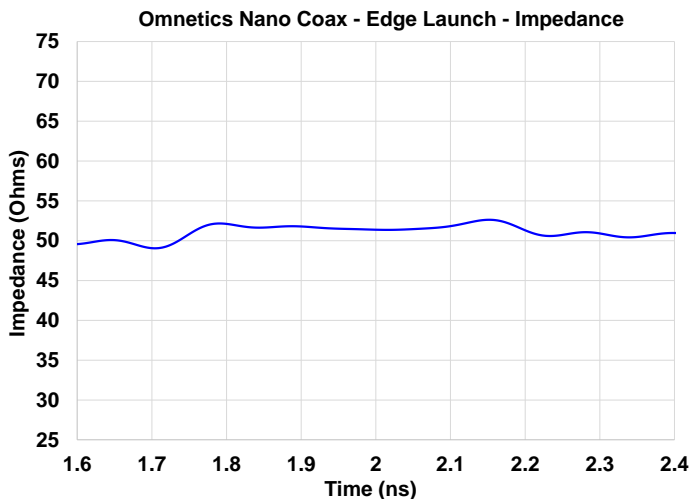
|             |                 | Edge Launch |           | Through Hole |           |
|-------------|-----------------|-------------|-----------|--------------|-----------|
| Return Loss | Freq Range      | Gated       | Non-Gated | Gated        | Non-Gated |
|             | DC - 10 GHz     | -0.7 dB     | -1.5 dB   | -2.0 dB      | -2.9 dB   |
|             | 10 GHz - 20 GHz | -1.9 dB     | -3.0 dB   | N/A          | N/A       |



## 2.4 TDR (Impedance)

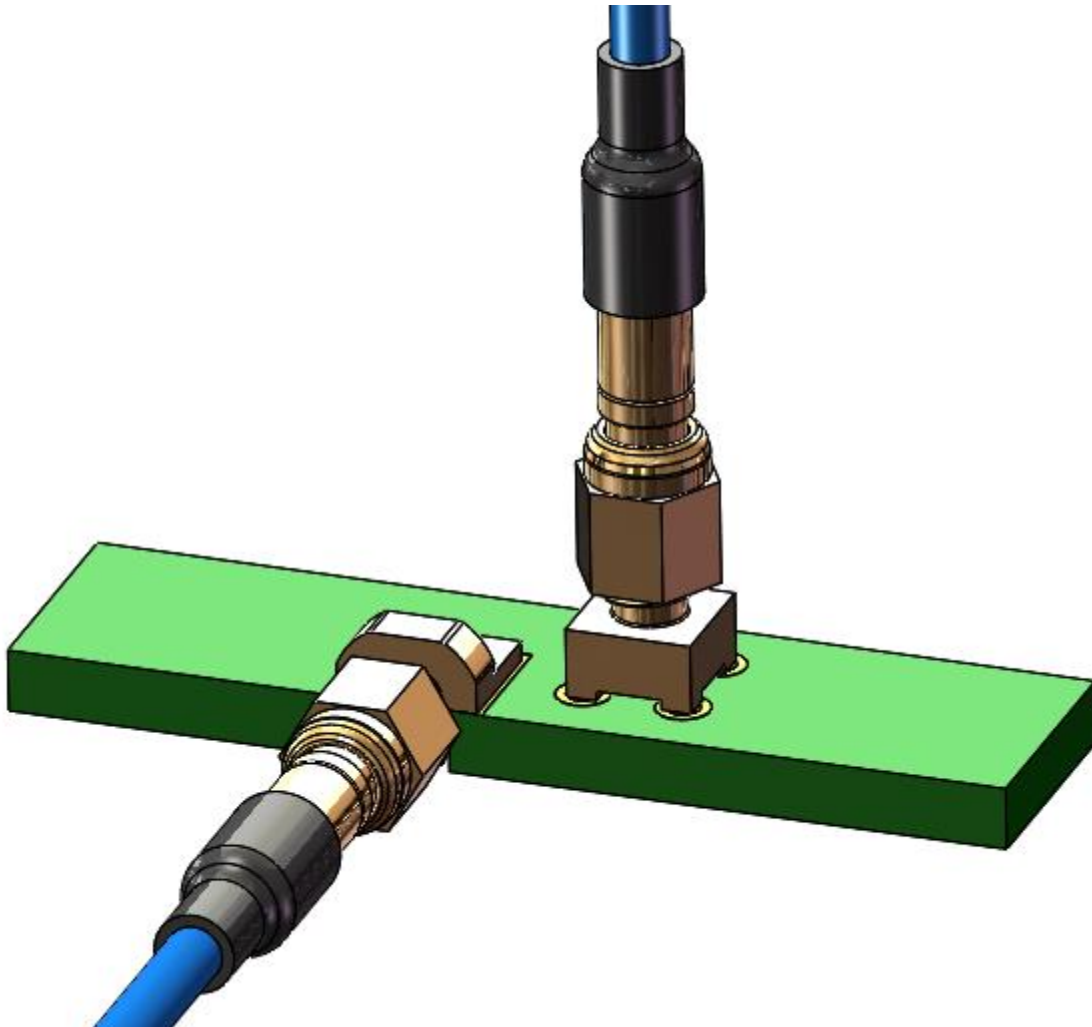
TDR (Time Domain Reflectometer) is a measure of the impedance through the cable/coax assembly. TDR results are provided below based on a 100ps rise time (0%-100%).

|           | Edge Launch | Through Hole |
|-----------|-------------|--------------|
| Impedance | 50Ω ± 2.5Ω  | 50Ω ± 5Ω     |



## Appendix 1 – Nano Coax Model

Below is a 3D-view of the two standalone coax board mount versions: Edge Launch (left) and Through Hole (right).



## Appendix 2 – Measured Path

A basic diagram for the measured path is shown below. The assembly uses a Molex 73252-0130 2.92mm connector, a Temp-Flex 047SC-2901 50Ω cable, and custom Omnetics PCB with 50 Ohm traces.



## Appendix 3 – What is Gating?

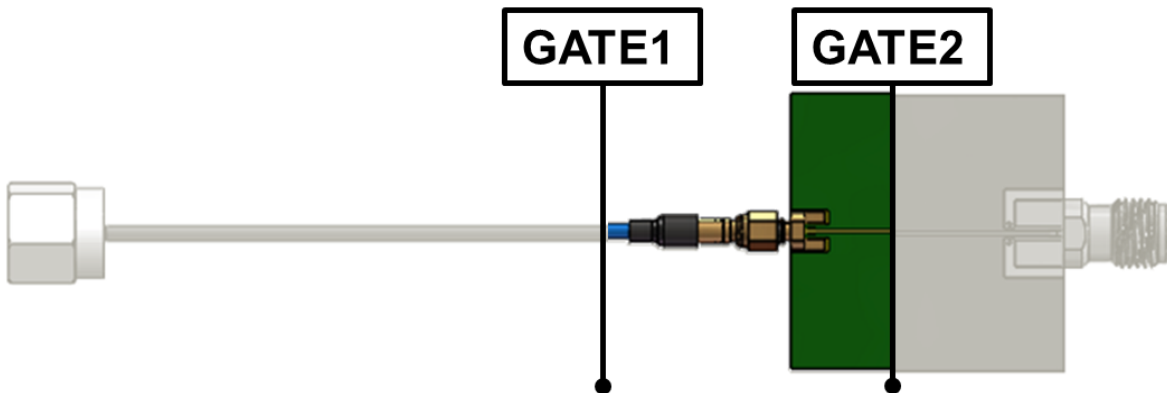
Gating is a mathematical function that removes undesired responses from portions of the measured path. In the case of this report, the focus was the mated Nano Coax. In order to achieve the performance of this specific portion of the path, the remaining portion was gated out.

The initial measurement was for the entire path shown in **Figure A 1**:



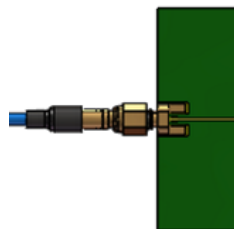
*Figure A 1. Full measured assembly.*

The gate function removed the impact from the portions shown in **Figure A 2**:



*Figure A 2. Measured assembly with gating enabled.*

The results is the performance of the path shown in **Figure A 3**:



*Figure A 3. The path of the measured gated results.*

## Appendix 4 - Equipment List:

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

## Revision Control:

|             |                                                                           |
|-------------|---------------------------------------------------------------------------|
| <b>Rev1</b> | August 16, 2016                                                           |
| <b>Rev2</b> | July 11, 2018 – Modified format to standardize for all high-speed reports |