Adapter In-series / Between Series

1. INTRODUCTION

1.1 Purpose

Testing was performed on the TE Connectivity (TE) 3.5mm series, 2.92mm series, 2.4mm series, 1.85mm series, 1.35mm series, 1.0mm series , SMA 27GHz adapter to determine their conformance to the requirements of Product Specification 108-160152.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the 3.5mm series, 2.92mm series, 2.4mm series, 1.85mm series, 1.35mm series, 1.0mm series , SMA 27GHz adapter. Testing was performed at the Engineering Assurance Product Test Laboratory between January 13, 2021 and February 8, 2021. The test file numbers for the testing are TP-20-02976 and TP-21-01797. (For the 1.0mm series and 1.35mm series, only the SI test results provided for this 501 document are available for the time being). This documentation is on file at and available from the Engineering Assurance Product Test Laboratory.

1.3 Conclusion

All of the 3.5mm series, 2.92mm series, 2.4mm series, 1.85mm series, 1.35mm series, 1.0mm series , SMA 27GHz adapter part numbers listed in Table 1 of paragraph 1.5 conformed to the electrical, mechanical and environmental performance requirements of Product Specification 108-160152.

1.4 Product Description

The TE Connectivity (TE) 3.5mm series, 2.92mm series, 2.4mm series, 1.85mm series, 1.35mm series, 1.0mm series , SMA 27GHz adapter products are designed with innovative features, optimized performance, and full compatibility with all industry standard related products.

1.5 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature:	15°C to 35°C
Relative Humidity	20% to 80%

1.6 Test Specimens

Table 1 – Test Specimens

Test Group	Part Number	Description	Qty
1	2081584-1	Adapter, 2.4mm Plug to 2.4mm Plug	3 each
	2081944-1	Adapter, 2.92mm Plug to 2.92mm Plug	
	2081923-1	Adapter, 1.85mm Plug to 1.85mm Plug	
	2081920-1	Adapter, 3.5mm Plug to 3.5mm Plug	
2	2081584-1	Adapter, 2.4mm Plug to 2.4mm Plug	3 each
	2081944-1	Adapter, 2.92mm Plug to 2.92mm Plug	
	2081923-1	Adapter, 1.85mm Plug to 1.85mm Plug	
	2081920-1	Adapter, 3.5mm Plug to 3.5mm Plug	
3	2081584-1	Adapter, 2.4mm Plug to 2.4mm Plug	3 each
	2081944-1	Adapter, 2.92mm Plug to 2.92mm Plug	
	2081923-1	Adapter, 1.85mm Plug to 1.85mm Plug	
	2081920-1	Adapter, 3.5mm Plug to 3.5mm Plug	
SMA 27GHz	2081888-1	Adapter, EP-SMA Plug to EPSMA Jack	3 each
	2081889-1	Adapter, EP-SMA Jack to EPSMA Jack	
	2081890-1	Adapter, EP-SMA Plug to EPSMA Plug	
110GHz	2388687-1	Adapter, 1.0mm Female to 1.0mm Female	5 each
	2081773-1	Adapter, 1.0mm Male to 1.0mm Male	
	2081774-1	Adapter, 1.0mm Male to 1.0mm Female	
90GHz	2385340-1	Adapter, 1.35mm Male to 1.85mm Male	5 each
	2385341-1	Adapter, 1.35mm Female to 1.85mm Male	
	2385342-1	Adapter, 1.35mm Male to 1.35mm Male	
	2385343-1	Adapter, 1.35mm Female to 1.35mm Female	
	2385344-1	Adapter, 1.35mm Male to 1.35mm Female	
	2385345-1	Adapter, 1.0mm Male to 1.35mm Female	
	2385346-1	Adapter, 1.35mm Female to 1.0mm Female	
	2385347-1	Adapter, 1.35mm Male to 1.0mm Female	
	2385349-1	Adapter, 1.0mm Male to 1.35mm Male	
	2385352-1	1.35mm Female, 2 holes flange, for PCB	

1.7 Test Sequence

Table 2 - Test Sequences

Test or Examination	Test Group (a)			
	1	2	3	4
Initial examination of product	1	1	1	1
LLCR	2,7	2,4	2,11,	
Insulation Resistance	3,8		3,15,	
Withstanding Voltage	4,9		4,12,16,	
VSWR and Insertion Loss			18	2
Durability		3		
Vibration			5	
Shock			7	
Center contact captivation	5			
Thermal Shock			9	
Moisture resistance			13	
Corrosion Test/Salt Spray	6			
Final examination of product	10	5	6,8,10,14,17,19	3

NOTE

(a) See paragraph 4.1.A
(b) Numbers indicate sequence in which tests were performed

2. SUMMARY OF TESTING

2.1 Initial Examination of Product – Test Groups 1, 2, 3

A Certificate of Conformance stating that all specimens submitted for testing were representative of normal production lots and met the requirements of the applicable product drawing was provided. Where specified, specimens were visually examined, and no evidence of physical damage detrimental to product performance was observed.

2.2 Low Level Contact Resistance – Test Groups 1, 2, 3

All low level contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than requirements.

2.3 Insulation Resistance – Test Group 1, 3

Insulation resistance measurements on all specimens were greater than the 5000 Megohms minimum resistance requirement both initially and finally.

2.4 Withstanding Voltage – Test Group 1, 3

There was no dielectric breakdown or flashover.

2.5 VSWR and Insertion Loss – Test Group 3, 4

All VSWR and IL measurements were less than the maximum requirements and all testing results were listed in Appendix 1.

2.6 Durability – Test Group 2

No evidence of physical damage detrimental to product performance was visible as a result of mating and unmating the specimens 500 times.

2.7 Vibration – Test Group 3

No apparent physical damage or discontinuities of one microsecond or greater occurred during the vibration testing.

2.8 Shock – Test Group 3

No apparent physical damage or discontinuities of one microsecond or greater occurred during the mechanical shock testing.

2.9 Center contact captivation – Test Group 1

No physical damage occurred and meet interface dimensions requirement as a result after withstanding certain force defined in spec.

2.10 Thermal shock – Test Group 3

No evidence of physical damage was visible as a result of thermal shock testing.

2.11 Moisture resistane – Test Group 3

No evidence of physical damage was visible as a result of humidity-temperature cycling

2.12 Corrosion test – Test Group 1

No evidence of physical damage was visible as a result of exposure to a salt-laden atmosphere.

2.13 Final Examination – Test Groups 1, 2, 3

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1 Initial Visual Examination

A Certificate of Conformance was issued stating that all specimens have been produced, inspected, and accepted as conforming to product drawing requirements, and made using the same core manufacturing processes and technologies as production parts. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed. Testing was performed in accordance with Test Specification EIA-364-18B.

3.2 Low Level Contact Resistance

Low level contact resistance measurements at low level current were made using a four terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage. Testing was performed in accordance with Test Specification EIA-364-23C. See Figures 1 and 2 for typical setups.

Figure 1 – Typical LLCR Setup, Center Contact

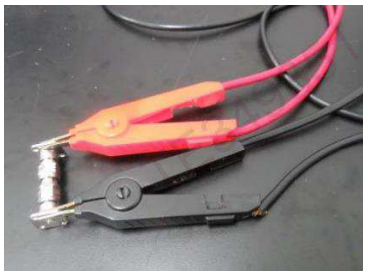


Figure 2 – Typical LLCR Setup, Outer Contact

3.3 Insulation Resistance

Insulation resistance was measured between the center contact and ground shield of mated unmounted specimens. A test voltage of 500 volts DC was applied for two minutes before the resistance was measured. Testing was performed in accordance with Test Specification EIA-364-21E.

3.4 Withstanding Voltage

A test potential of definition volts AC was applied between the center conductor and outer shell of unmated and unmounted jack specimens. The potentials were applied for one minute and then returned to zero. Testing was performed in accordance with Test Specification EIA-364-20F.

3.5 VSWR and Insertion Loss

VSWR was measured using an KeySight network analyzer between 10MHz and 70GHz

3.6 Vibration

The test specimens were subjected to a high frequency vibration test as stated in accordance with specification MIL-STD-202H, METH.204, COND D. See Figure 3 below for vibration setup photographs

The parameters of this test condition are a simple harmonic motion having an amplitude of either 0.06 inch double amplitude (maximum total excursion) or 20 gravity unit (g's peak) whichever is less.

The vibration frequency was varied logarithmically between the approximate limits of 10 to 2000 Hertz (Hz). The entire frequency range of 10 to 2000 Hz and return to 10 Hz was traversed in approximately 20 minutes. This cycle was performed 12 times in all three mutually perpendicular axes (total of 36 times), so that the motion was applied for a total period of approximately 12 hours.

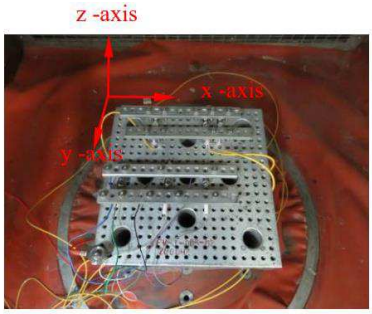


Figure - 3

The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.7 Mechanical Shock

The test specimens were subjected to a mechanical shock test as stated in TE Connectivity Specification 108-160152, Rev"2", in accordance with specification MIL-STD-202H, METH 213, COND C. See Figures 4 below for shock setup photographs

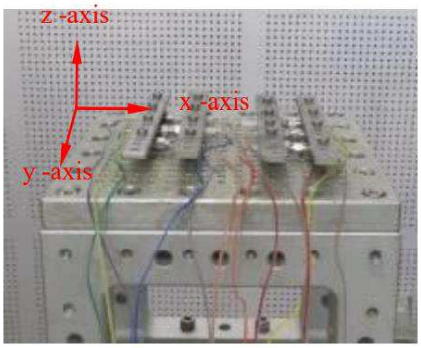


Figure - 4

The parameters of this test condition are a half-sine waveform with an acceleration amplitude of 100 gravity units (g's peak) and a duration of 6 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular axes of the test specimens, for a total of eighteen shocks.

The test specimens were monitored for discontinuities of 1 microsecond or greater using an energizing current of 100 milliamperes.

3.8 Durability

Specimens were mated and unmated by hand 500 times at a maximum rate of 12 cycles per minute in accordance with EIA-364-9D.

3.9 Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 15 minute dwells at -55 and 135°C. The transition between temperatures was less than one minute. Testing was conducted in accordance with MIL-STD-202H, METH 107, COND A.

3.10 Moisture resistance

Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity. Testing was conducted in accordance with MIL-STD-202H, METH 106.

3.11 Center contact captivation

Apply specified axial force to the center contact at a maximum rate of 4.45N per second and hold for 5 seconds. Maximum displacement 0,076 mm in each direction.

3.12 Corrosion test

Unmated specimens were exposed for 96 hours to a 5% salt solution with MIL-STD-202H, METH 101 COND A.

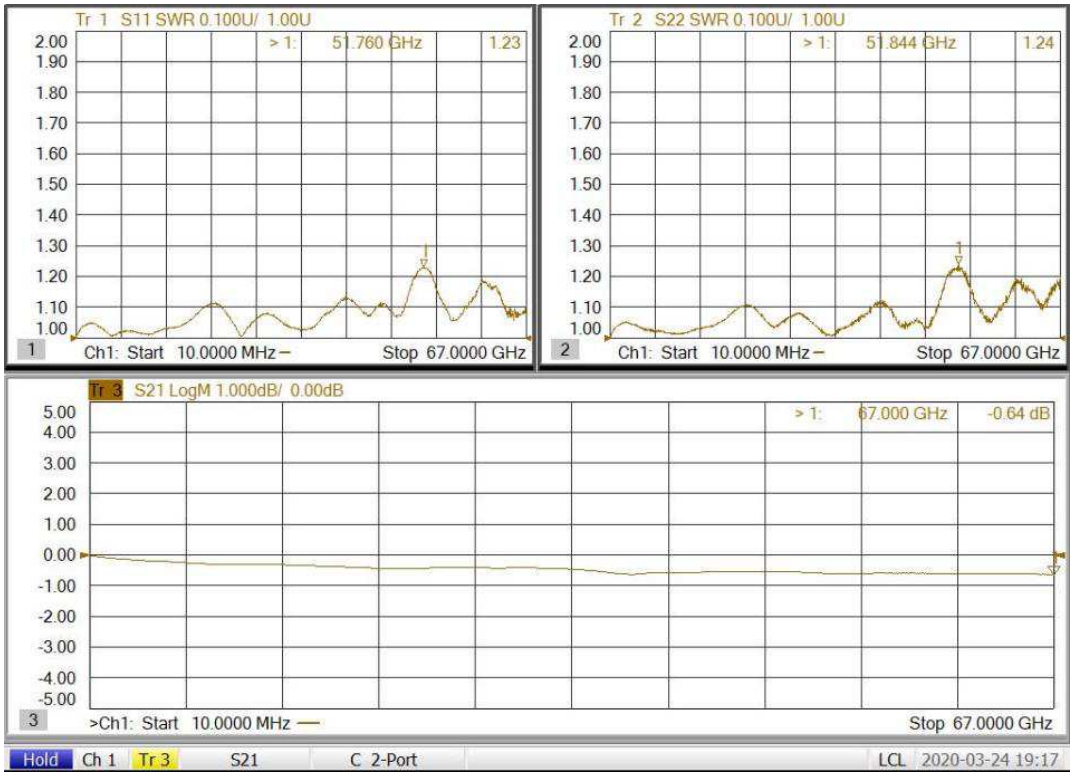
3.13 Final Examination

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

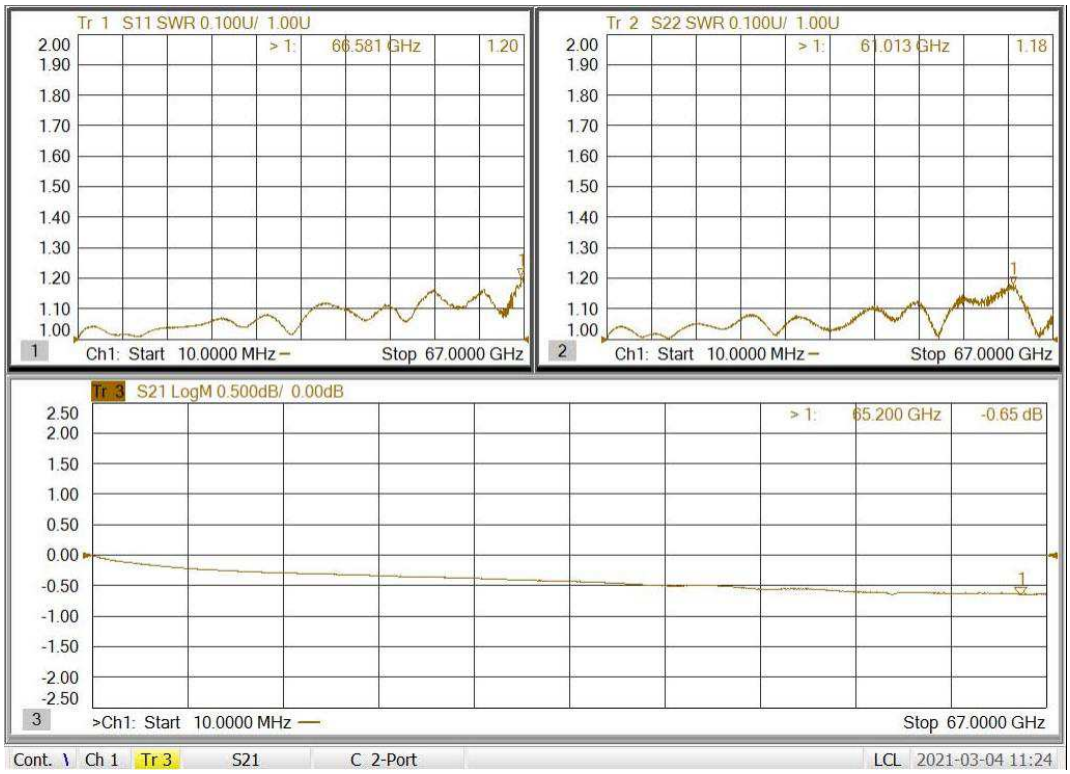
Appendix 1

1.1 SI result of 90GHz adapters:

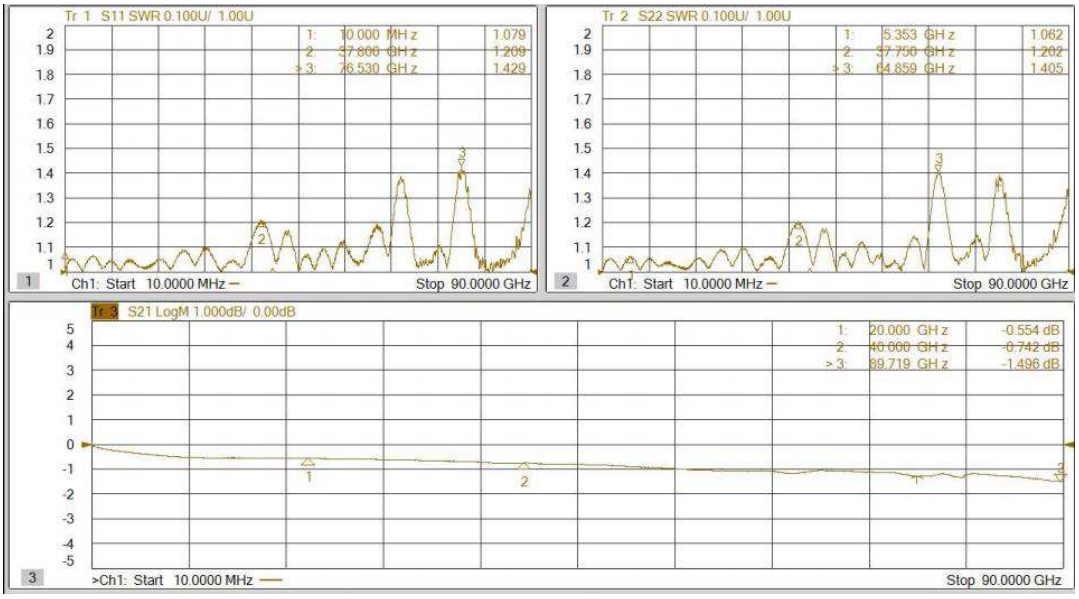
2385340-1:



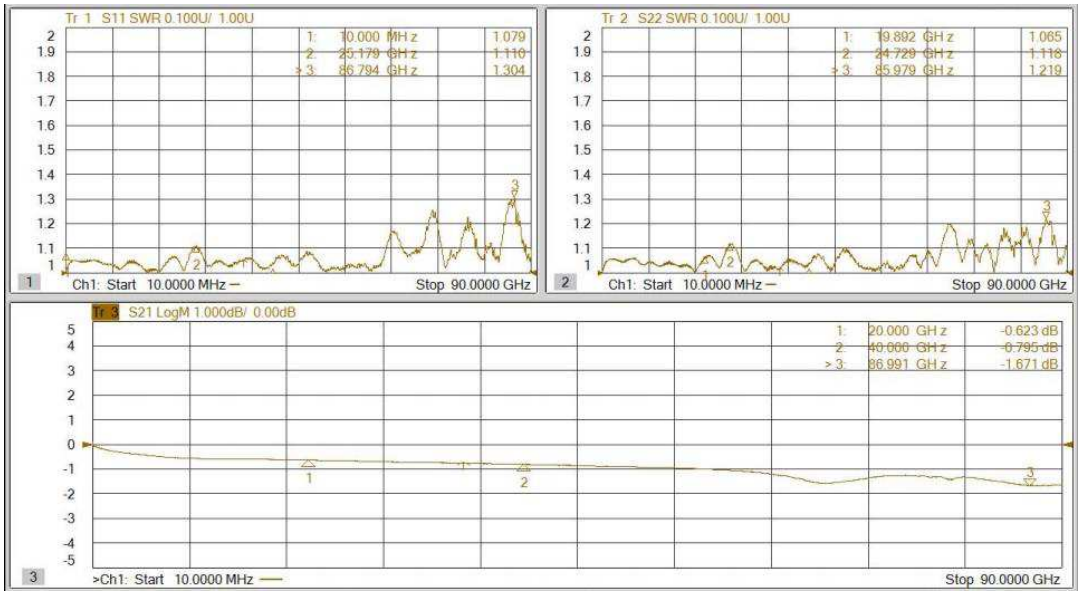
2385341-1:



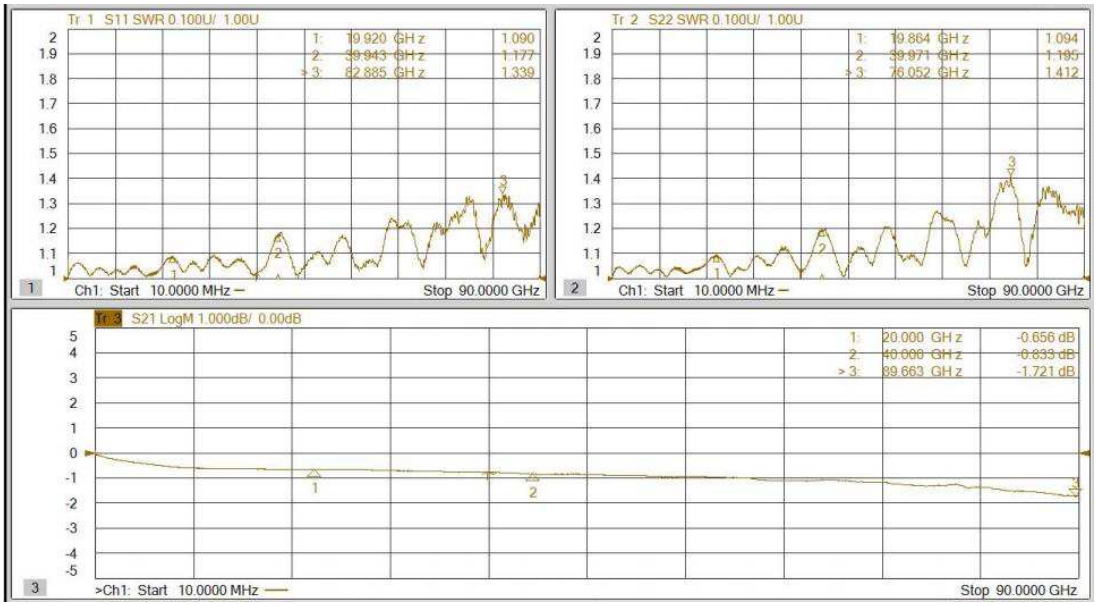
2385342-1:



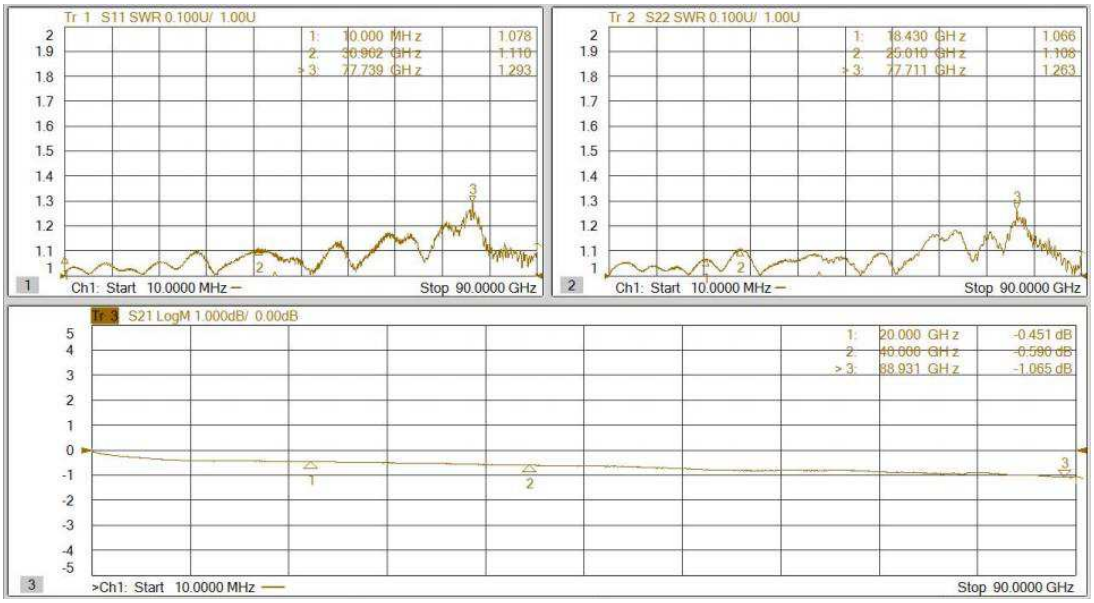
2385343-1:



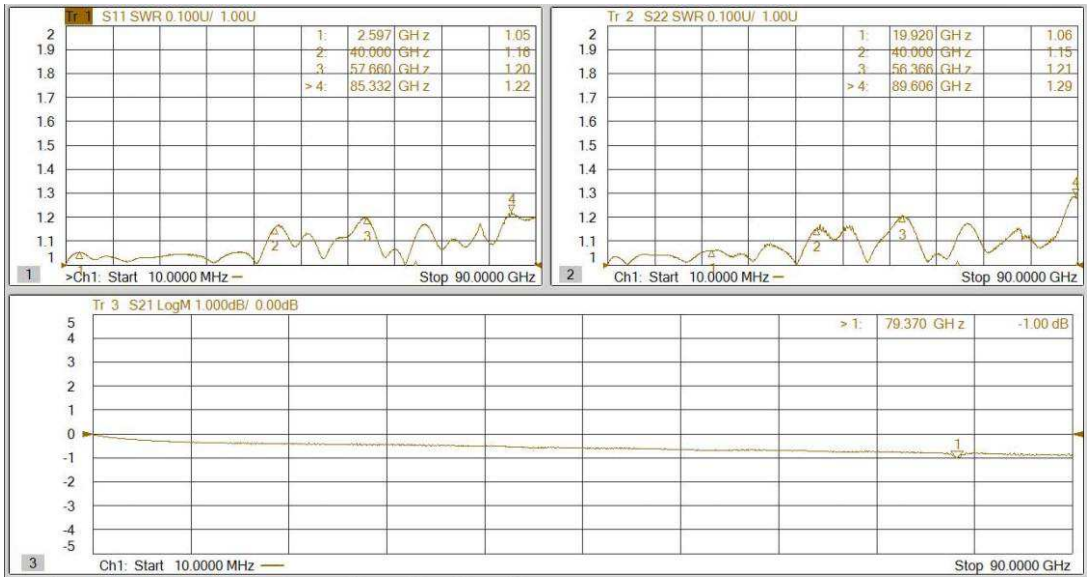
2385344-1:



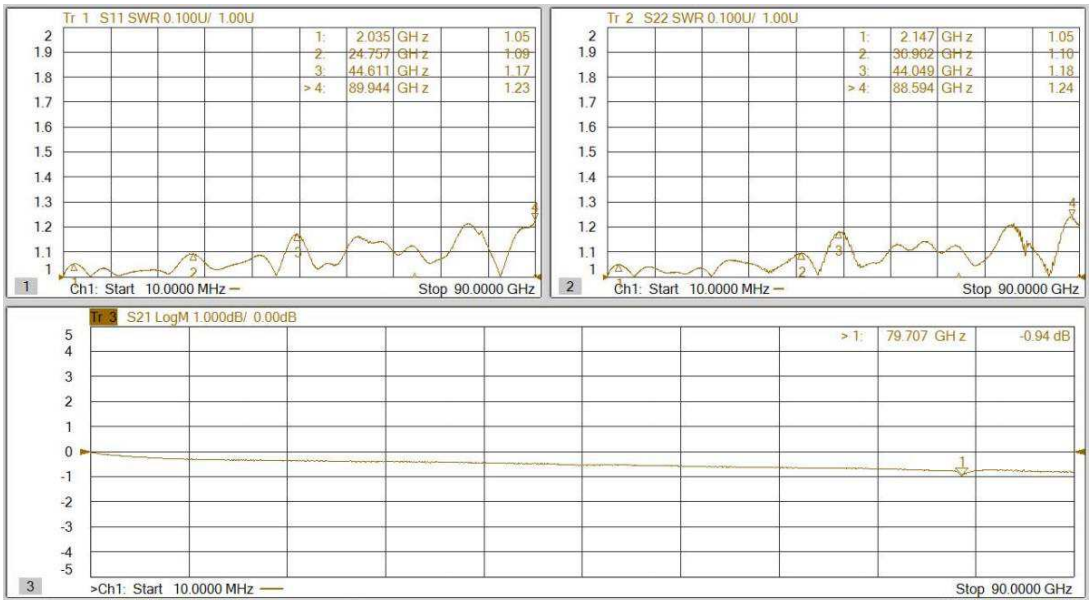
2385345-1:



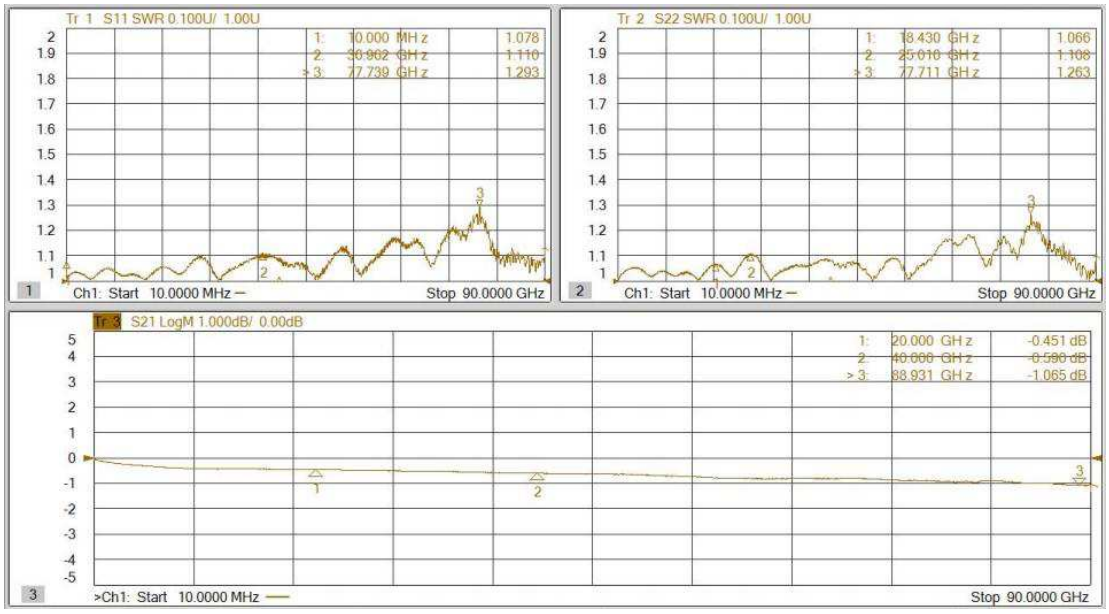
2385346-1:



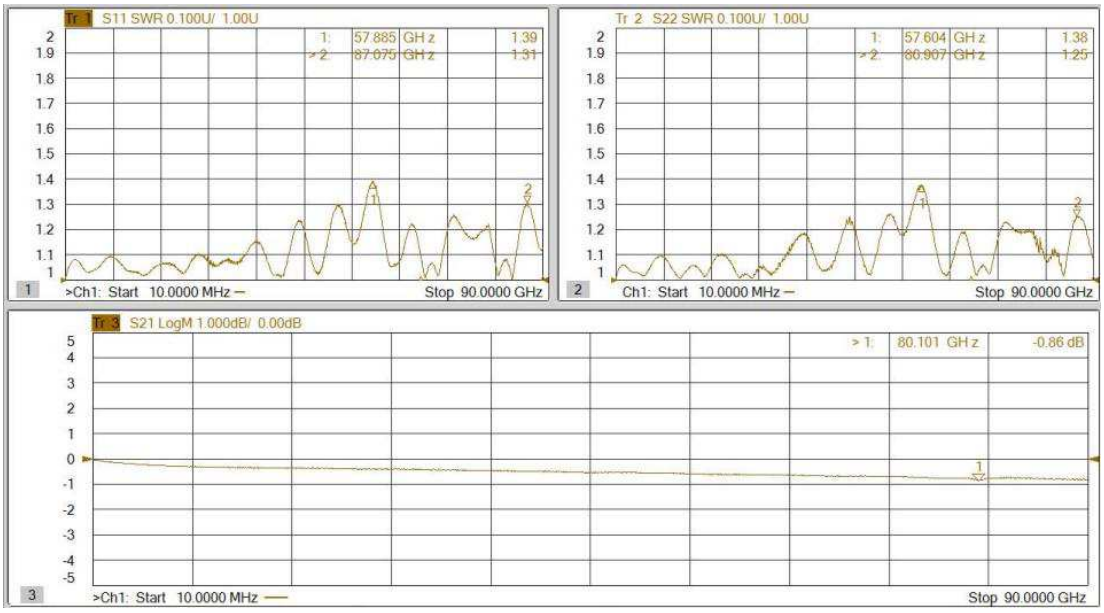
2385347-1:



2385349-1:

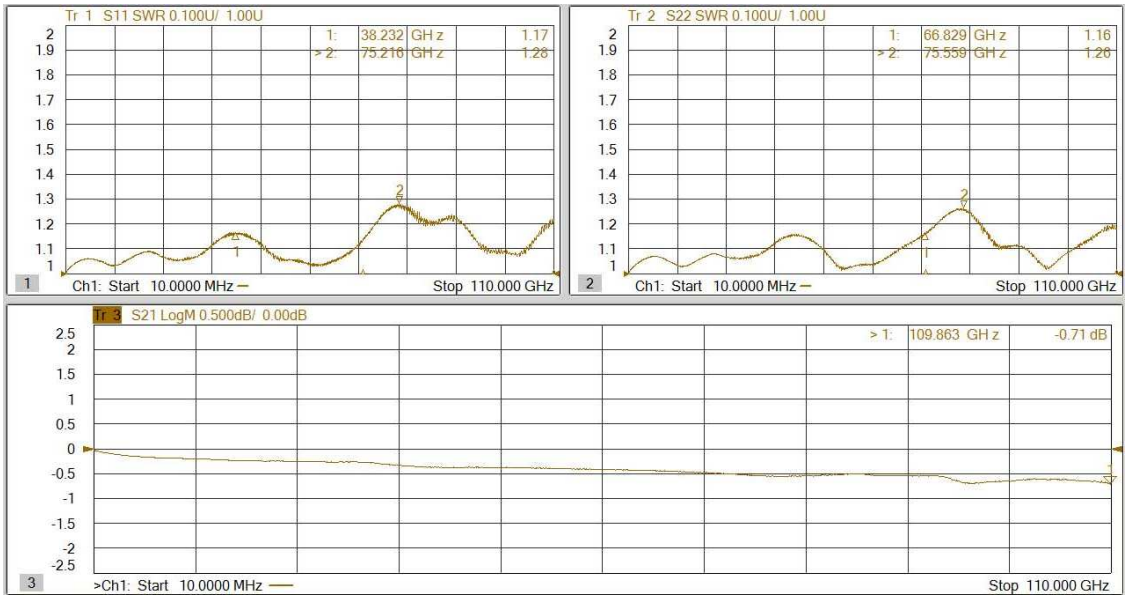


2385352-1:

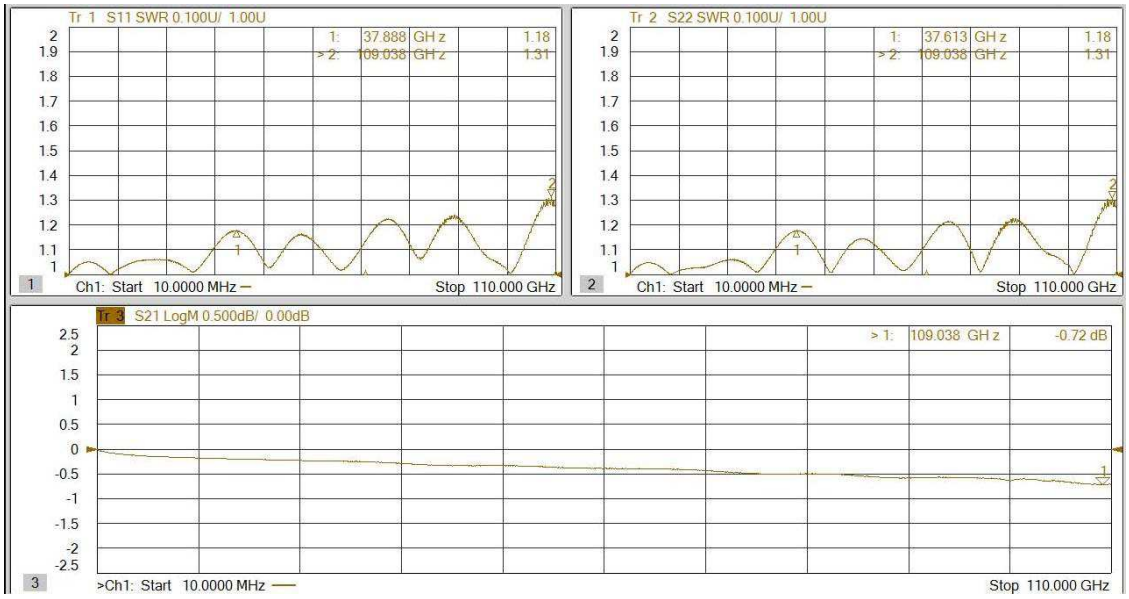


1.2 SI result of 110GHz adapters:

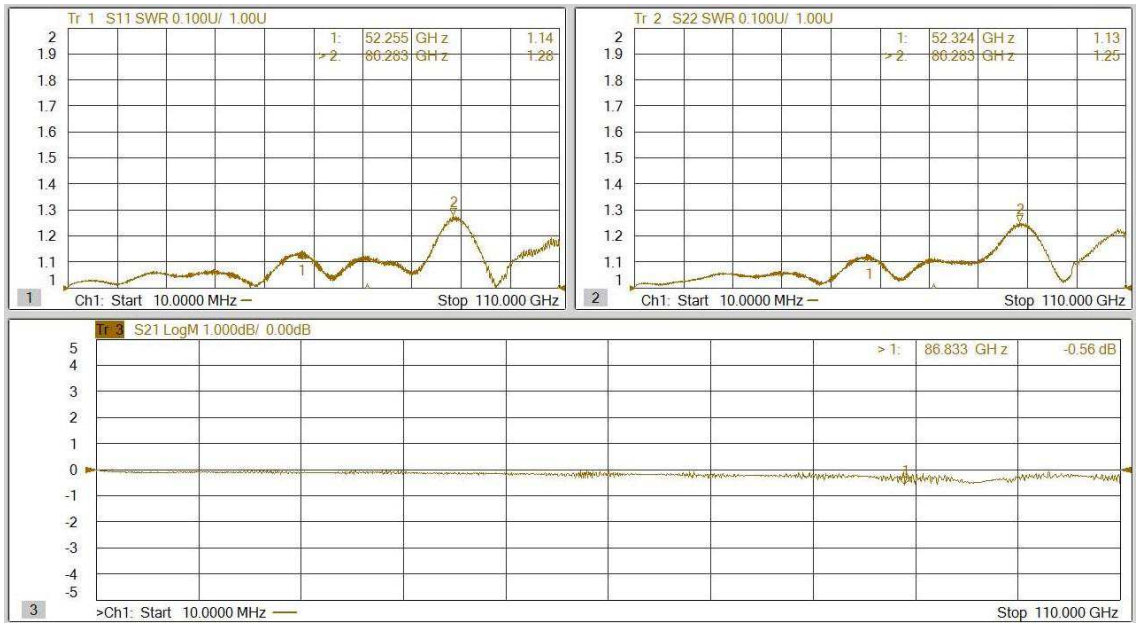
2388687-1:



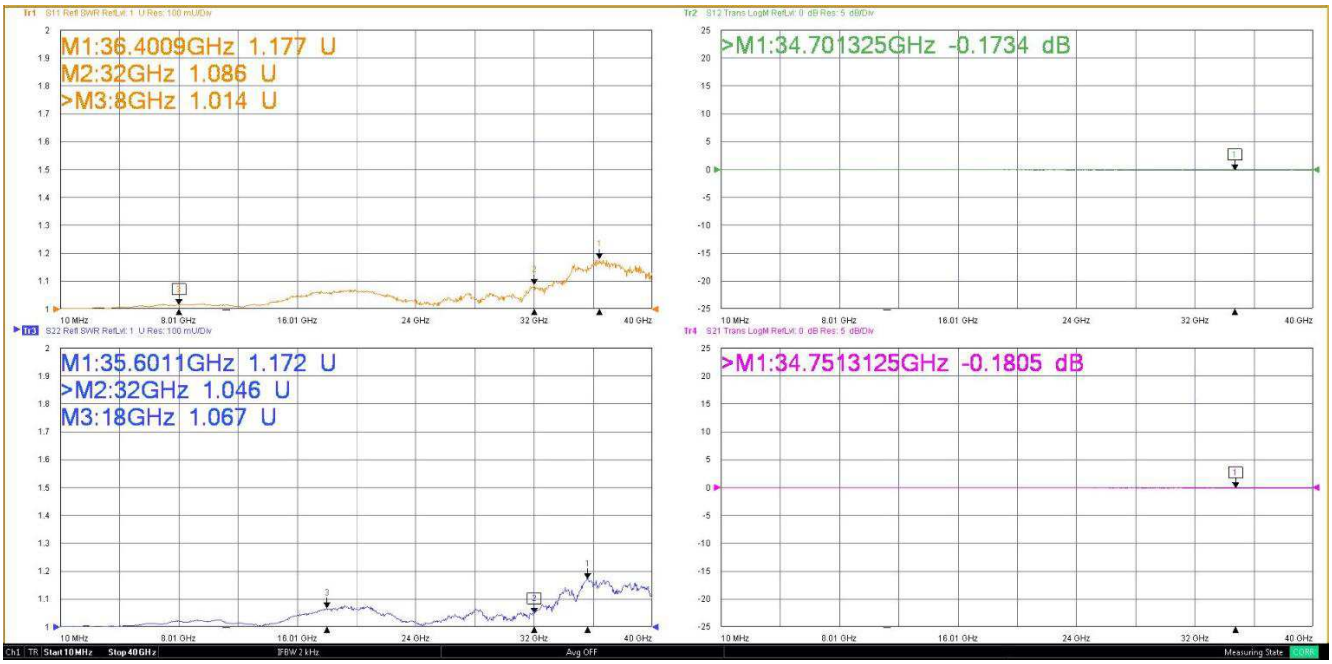
2081773-1:

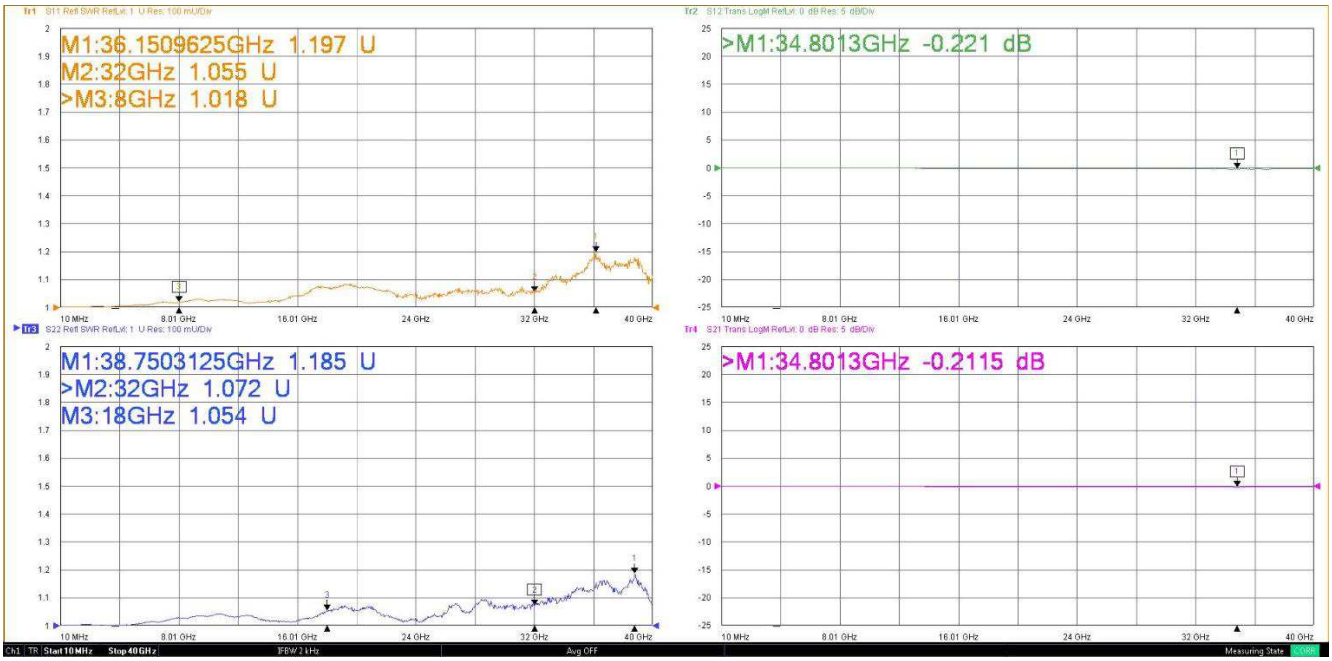


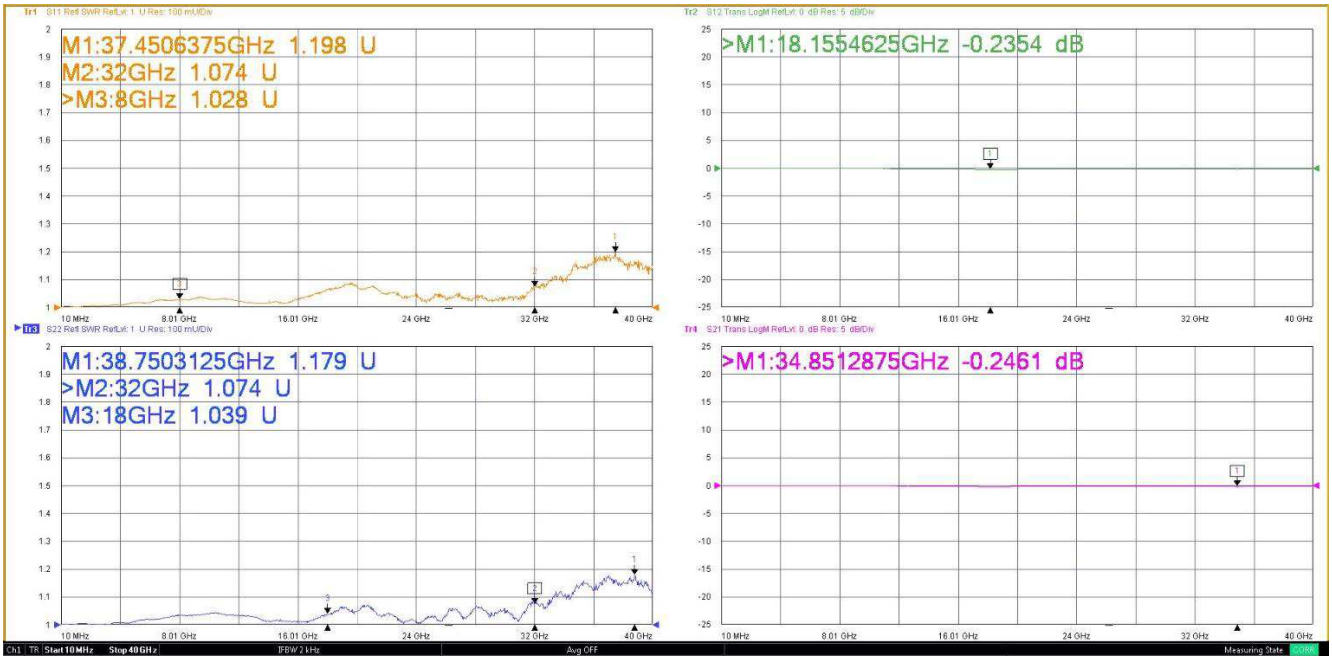
2081774-1:



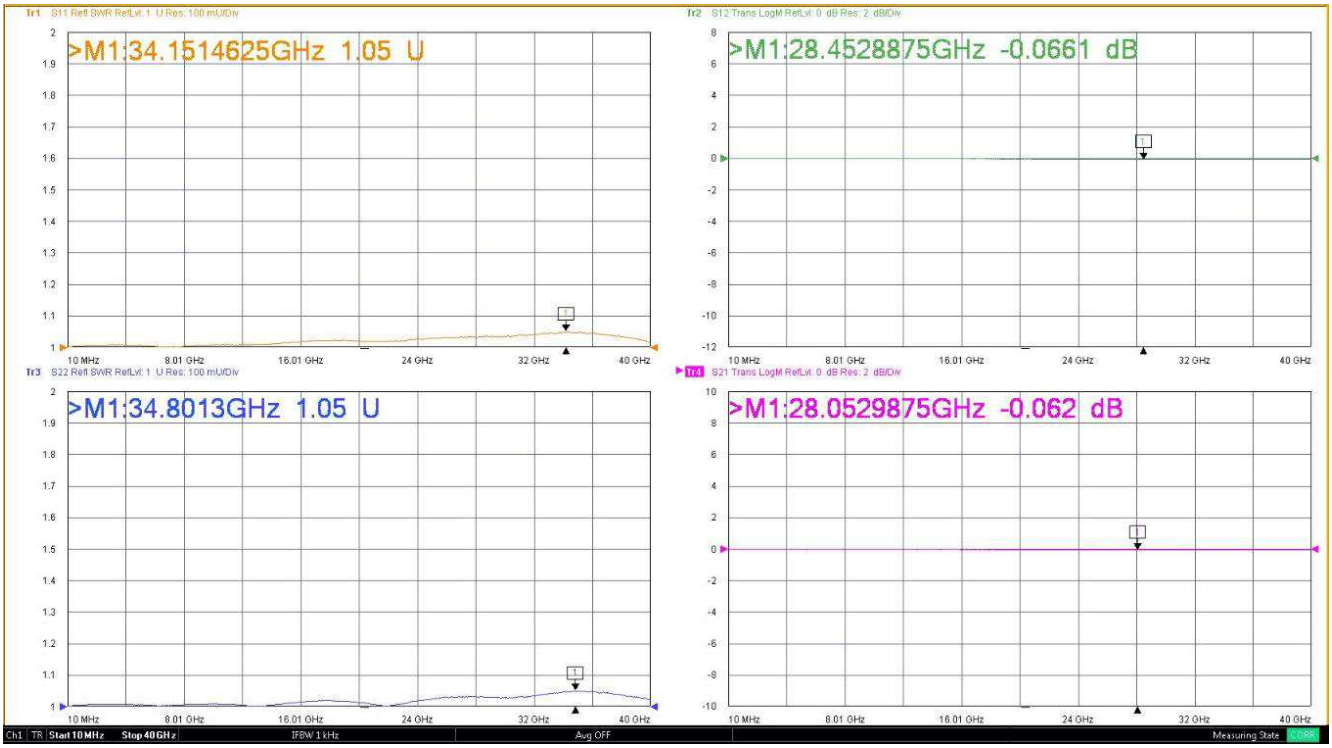
1.3 SI result of 3.5mm adapters 2081920-1:

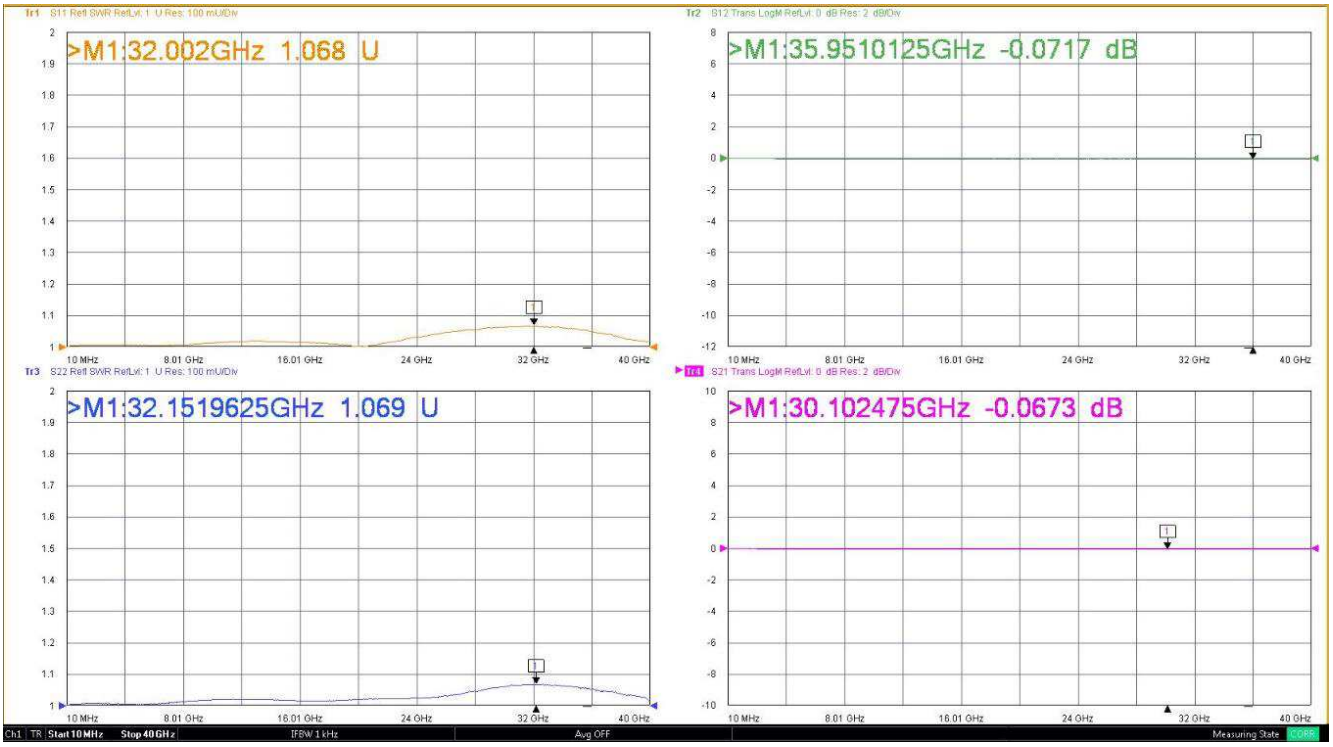


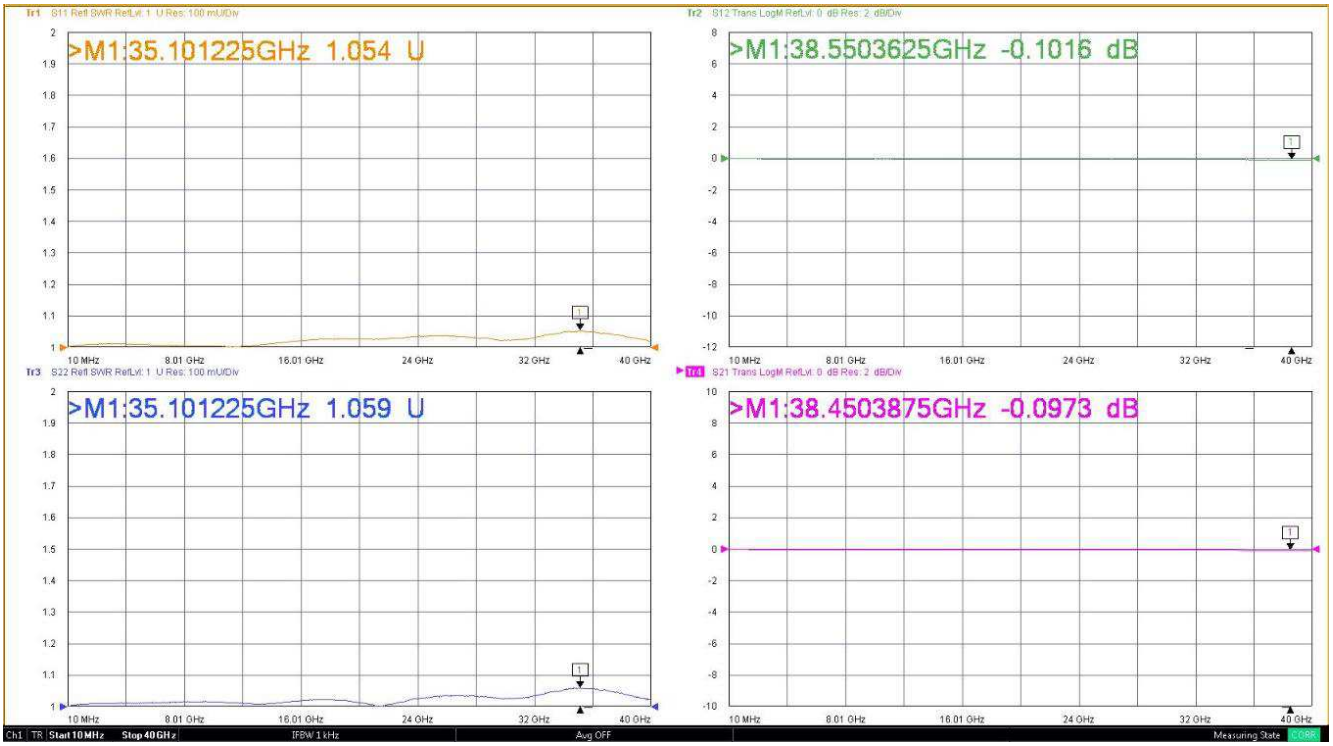




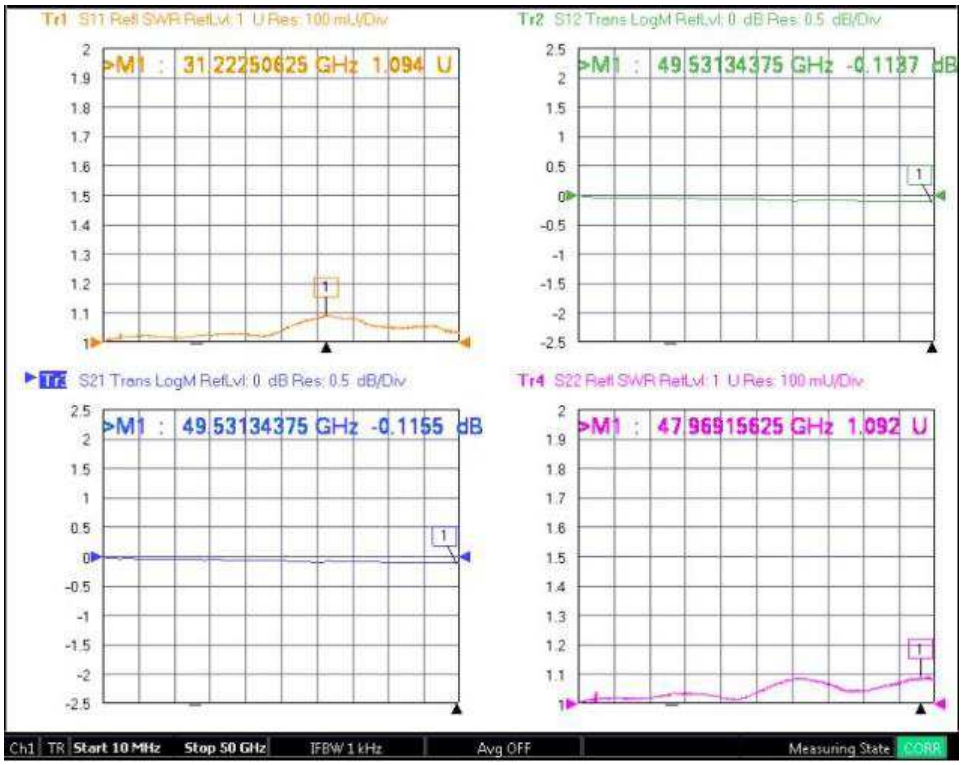
1.4 SI result of 2.92mm adapters 2081944-1:

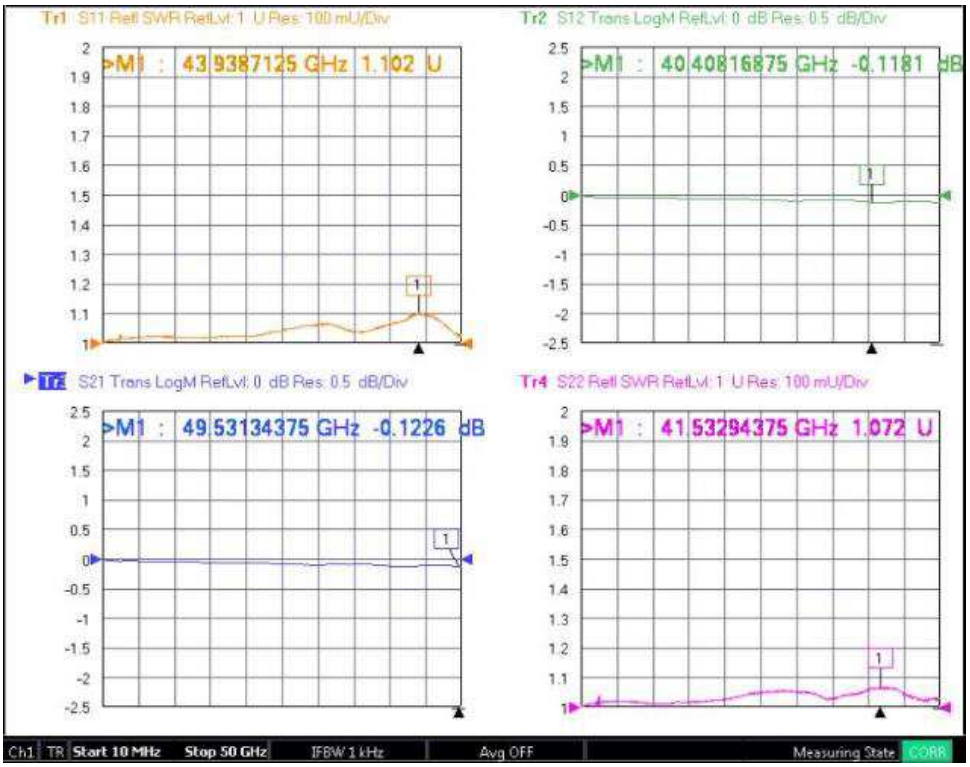


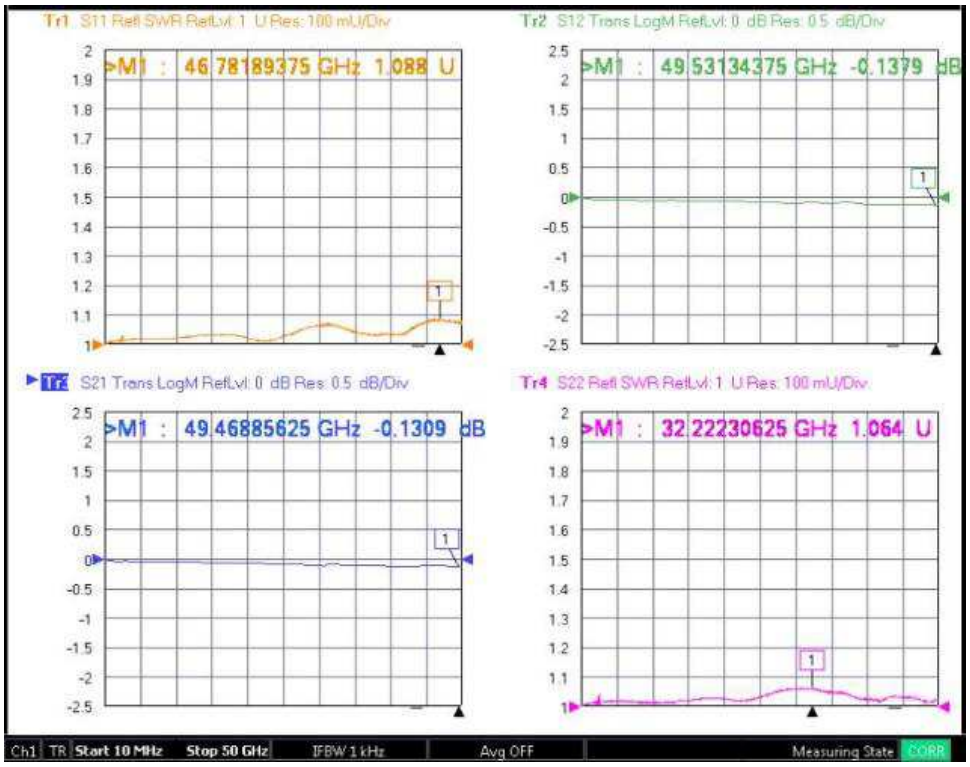




1.5 SI result of 2.4mm adapters 2081584-1:

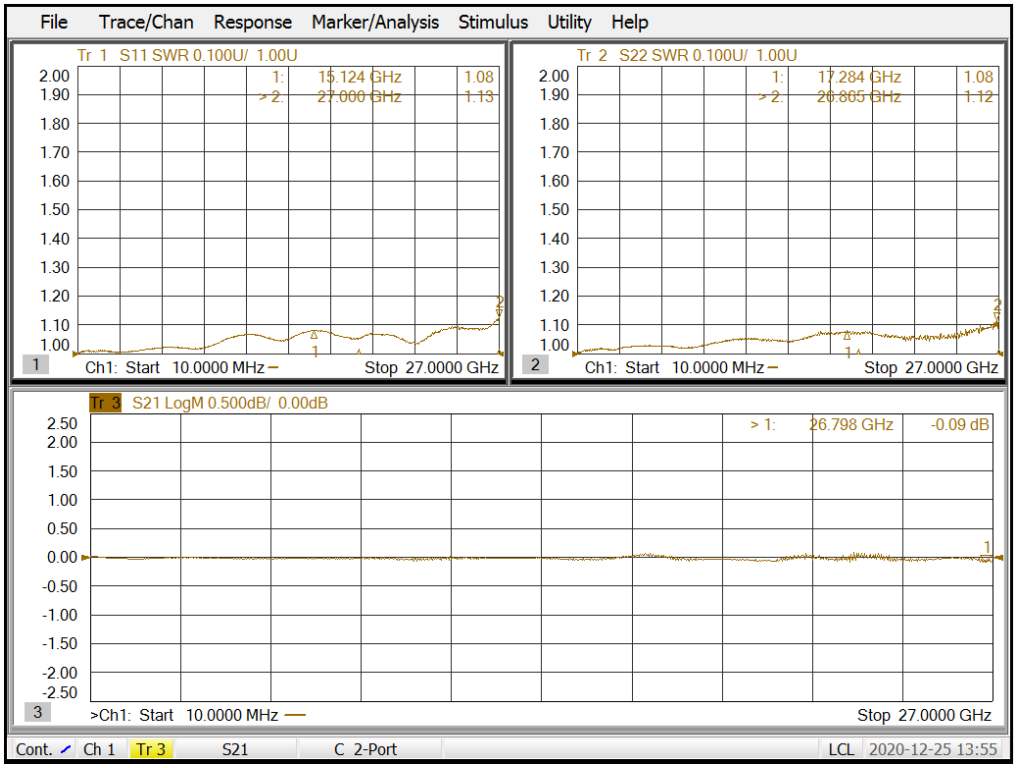




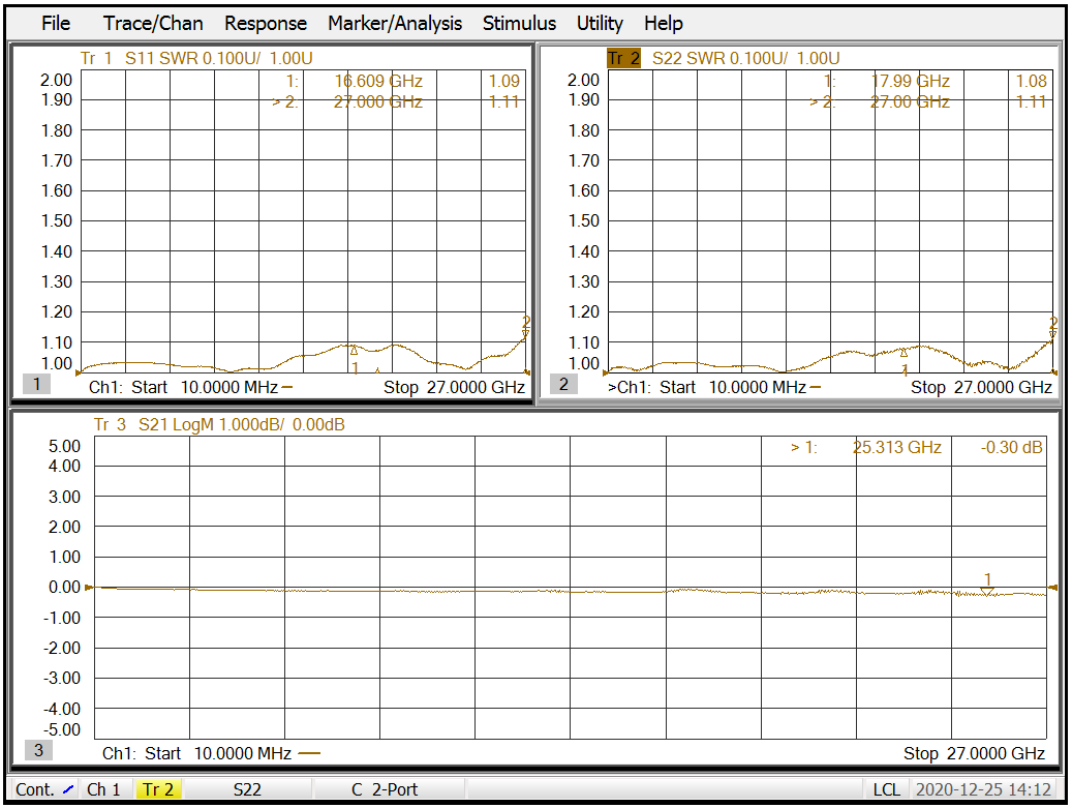


1.6 SI result of 1.85mm adapters 2081923-1:

1.7 SI result of SMA 27GHz adapters 2081888-1:



1.8 SI result of SMA 27GHz adapters 2081889-1:



1.9 SI result of SMA 27GHz adapters 2081890-1: