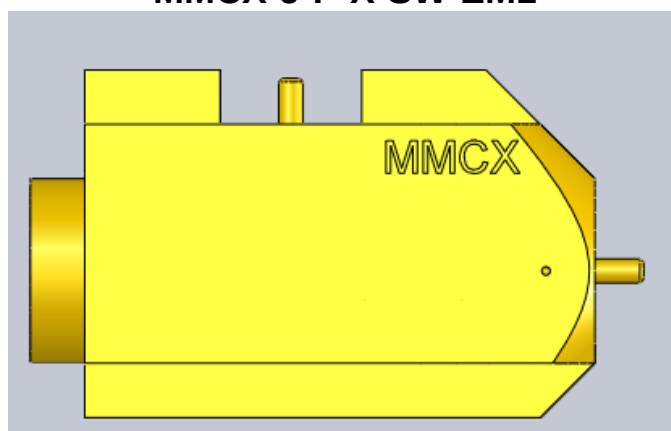




RF Characterization Report

MMCX Switch

MMCX-J-P-X-SW-EM1



Description:
MICRO-MINI RF JACK, SWITCHABLE



Series: MMCX-SW

Description: MICRO-MINI RF JACK, SWITCHABLE

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Series: MMCX-SW

Description: MICRO-MINI RF JACK, SWITCHABLE

Test Setup Information

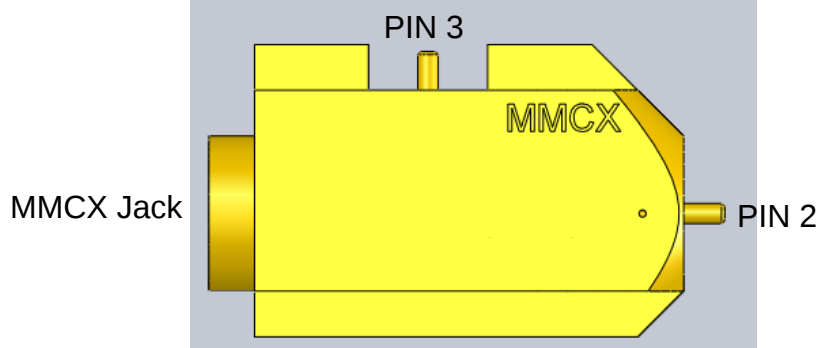
Scope:

To perform characterization tests, Insertion Loss, Return Loss and Voltage Standing Wave Ratio.

Product Description:

The table below presents a description of the MMCX Switch that was tested.

Part Number	Termination – End 1	Termination – End 2	Termination – End 3
MMCX-J-P-X-SW-EM1	MMCX, Straight, Jack	PIN 2	PIN 3



Test Calibration:

In this report, the system under test (SUT) includes the MMCX switch and footprint effects on a typical multi-layer PCB. PCB effects (trace loss) are de-embedded from test data. Board related effects, such as pad-to-ground capacitance, are included in the data presented in this report.

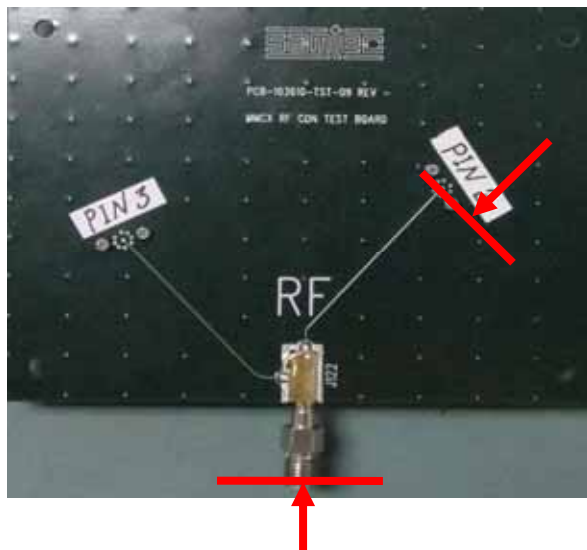
Additionally, intermediate test signal connections can mask the connector's true performance. Such connection effects are minimized by using high performance test cables and adapters. Where appropriate, calibration and de-embedding routines are also used to reduce residual effects.

For MMCX Jack to PIN 2 path, calibration is performed using Agilent mechanical calibration kit, PN 85052D to the shift the reference plane as showed below. The SMA Jack to MMCX Plug adapter beyond this point is included in the measurement. The trace loss

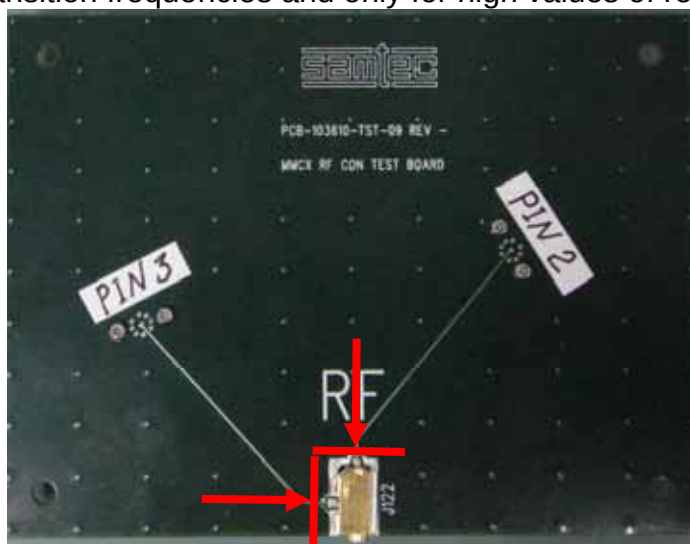
Series: MMCX-SW

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from SMA to MMCX is de-embedded from test data by using Matlab to post-process the measured data.



For PIN 2 to PIN 3 path, TRL calibration is performed by using TRL calibration kit directly, PN PCB-103610-TST-08 to shift the reference plane as showed below. TRL calibration is effective at removing the effects of the PCB test fixture and providing a more accurate depiction of the MMCX switch. This approach relies on the use of on-board calibration standards that are imperfect. Mainstream PCB manufacturing can only maintain a trace impedance of $\pm 5\%$ and this variation has a slight effect on the MMCX switch results. At 800 MHz, there is a step in the return loss profile, which is due to the impedance variation of the TRL calibration standards. This effect only shows up at the calibration standard transition frequencies and only for high values of return loss (>20 dB)



Series: MMCX-SW

Description: MICRO-MINI RF JACK, SWITCHABLE

Adapter Use:

Any supplementary adapter will contribute additional electrical characteristics to the measured data. Any use of additional adapters is noted.

Product Part Number	Used Adapter Part Number	Adapter End 1	Adapter End 2	Vender	Used Quantity
MMCX-J-P-X-SW-EM1	PE9475	SMA Jack	MMCX Plug	Pasternack	1

Definition of Assembly under Test:

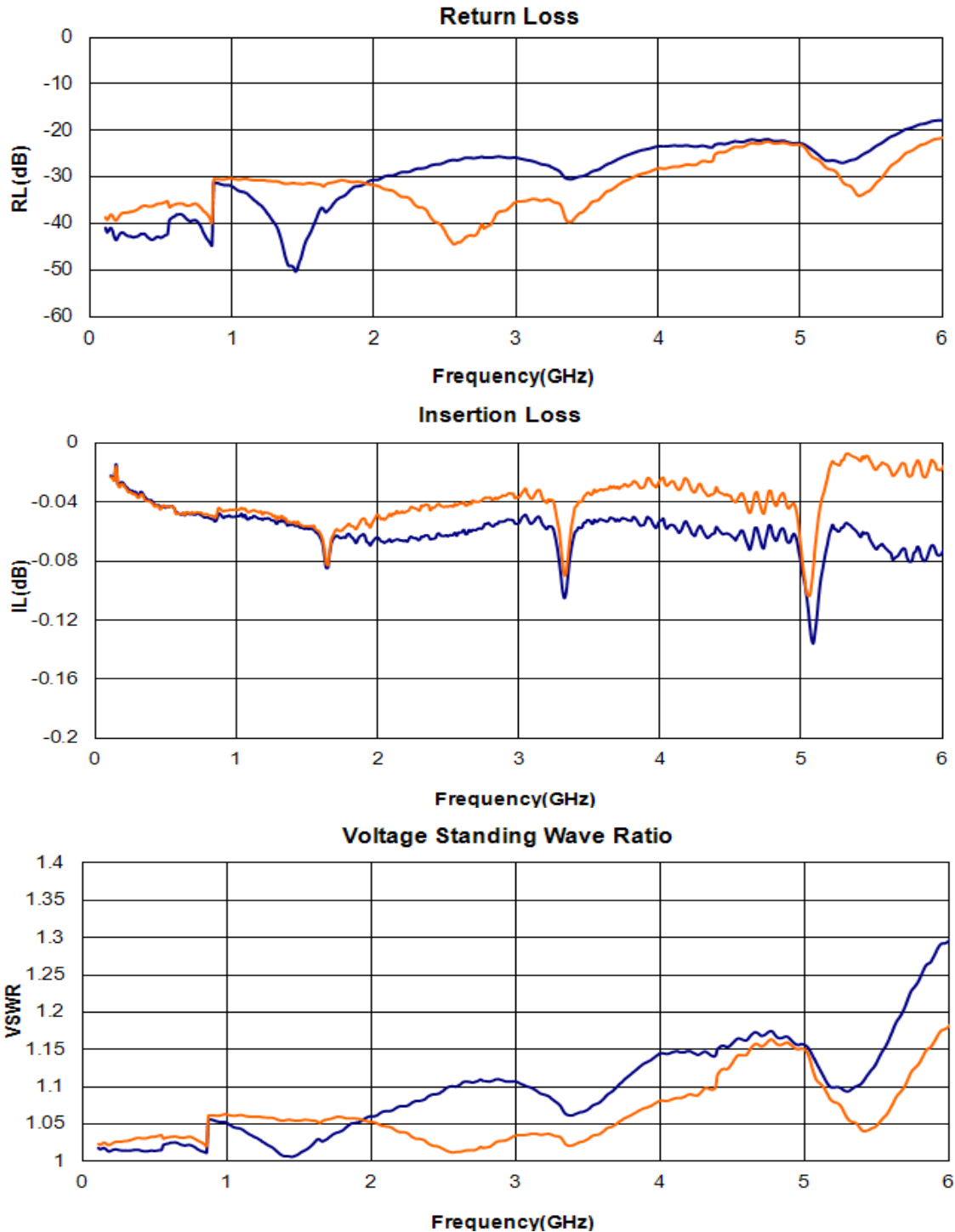
The performance characteristics include the interface with adapters.

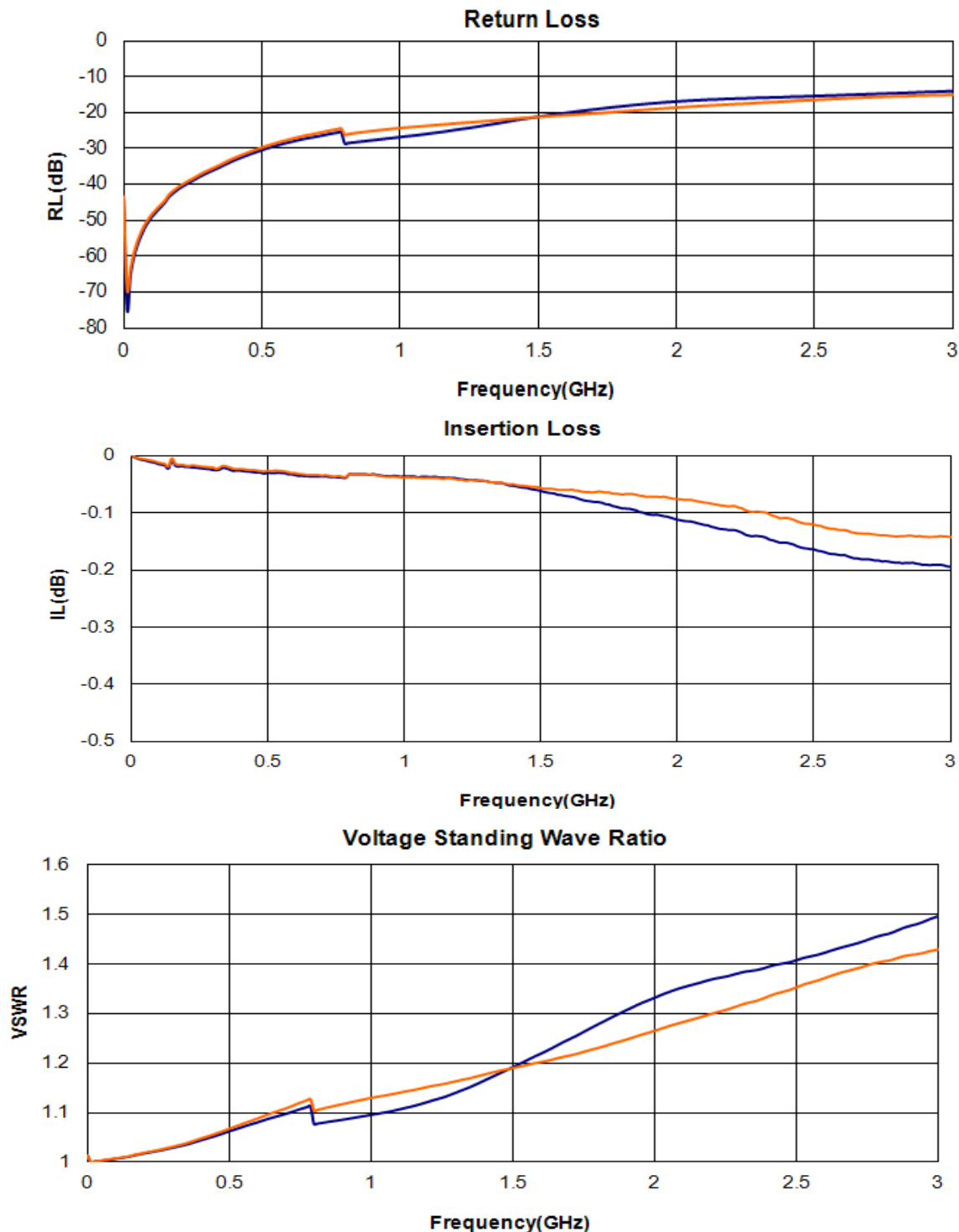
Port Designations:

The connector attached to port 1 of the VNA is "End 1" from the part number callout. Insertion Loss is measured using S21 and Return Loss / VSWR is measured using S11.

Legend for Plots:

Five samples were tested. Base on the insertion loss, the min/max plots are shown for clarity in this report.

Series: MMCX-SW**Description:** MICRO-MINI RF JACK, SWITCHABLE**Results Summary****MMCX-J-P-X-SW-EM1, MMCX Jack to PIN 2**

Series: MMCX-SW**Description:** MICRO-MINI RF JACK, SWITCHABLE**MMCX-J-P-X-SW-EM1, PIN 2 to PIN 3**

Series: MMCX-SW

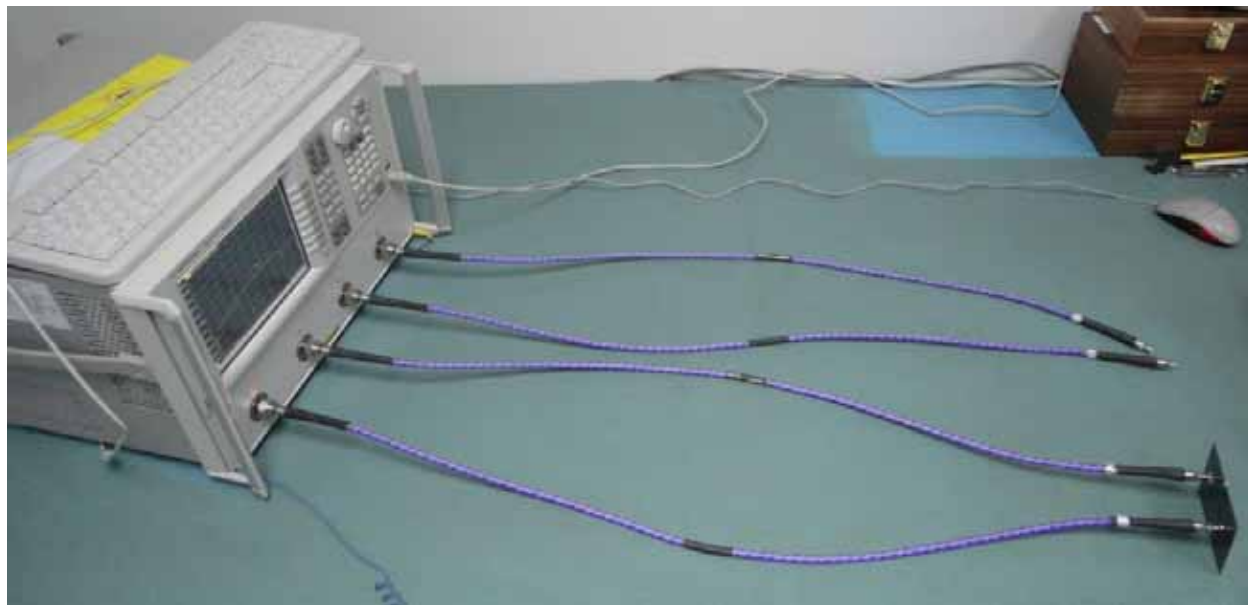
Description: MICRO-MINI RF JACK, SWITCHABLE

Instrument Setup:

Network analyzer (Agilent N5230C) was used for the measurements and setup as below:

Network Analyzer	Agilent N5230C PNA-L Series (300 KHz - 20 GHz)
Mechanical Calibration Kit	85052D
TRL Calibration Kit	PCB-103610-TST-08
Averaging Factor	0
Smoothing	Off
IF Bandwidth	1 KHz
Sweep Start	300 KHz
Sweep End	20 GHz
Points	1601

Test Fixtures:



N5230C (Typical set-up)