LUGANO – SWITZERLAND
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6934 Bioggio

QUALIFICATION REPORT

Tested products:

PN: 619361 Probe for volume production usage
PN: 619384 Probe for repair center usage
PN: 619383 Adaptor 90°, SMPM – SMA Jack

Description: *Return Loss Performances and Mechanical Test – mating cycles, engagement and disengagement force compliant to product specification 108-71086.*

Date: 04-06-2009
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1 SPECIFICATIONS

Reference: product specification 108-71086.

Electrical

Test Description	Requirement	Procedure
Return loss **Volume production probe pn 619361-1**	-10 dB: Dc - 3GHz -8 dB: >3GHz – 6 GHz -5 dB: >6GHz – 11 GHz	IEC 61169-1-1 Clause 9.2.1
Return loss **Repair centre probe pn 619384-1**	-15 dB: Dc - 3GHz -13 dB: >3GHz – 6 GHz -8 dB: >6GHz – 11 GHz	IEC 61169-1-1 Clause 9.2.1
Return loss **Adaptor 90°, SMPM – SMA pn 619383-1**	-20 dB: Dc - 3GHz -15 dB: >3GHz – 11 GHz	IEC 61169-1-1 Clause 9.2.1

Mechanical

Test Description	Requirement	Procedure
Mating cycles **Volume production probe**	1’000’000	10-20mm/s ~ 2 cycles/min
Mating cycles **Repair centre probe**	500	
Mating cycles **Adaptor 90°, SMPM – SMA Jack**	100	
Engagement force **Repair centre probe**	Max 40N	
Disengagement force **Repair centre probe**	Min 10N	
Center contact force at locking position **Repair centre probe**	Min 1.8N	

2 MEASUREMENT SETUP

2.1 Return Loss Measurement – Instrument setup

The network analyzer used for this measurement is an **HP8720B:**

- ✓ Used frequency range : **130MHz – 20GHz**
- ✓ Number of points : **201**
- ✓ Averaging : none
- ✓ IF BW : **3 kHz**
- ✓ PWR : **-10dBm**
- ✓ Calibration : 2-port-calibration with calibration set HP85052D (3.5 mm cal. kit)

To identify the connectors from the setup the 'Time Domain Option' was used.

2.2 Working position and Radial Compensation Measurement – Fixture Setup – Volume production probe pn 619361-1

A customized fixture was realized to test the adaptor. The fixture is able to measure the working position (using a tuning screw) and the radial compensation (using comparator) of the test adaptor.

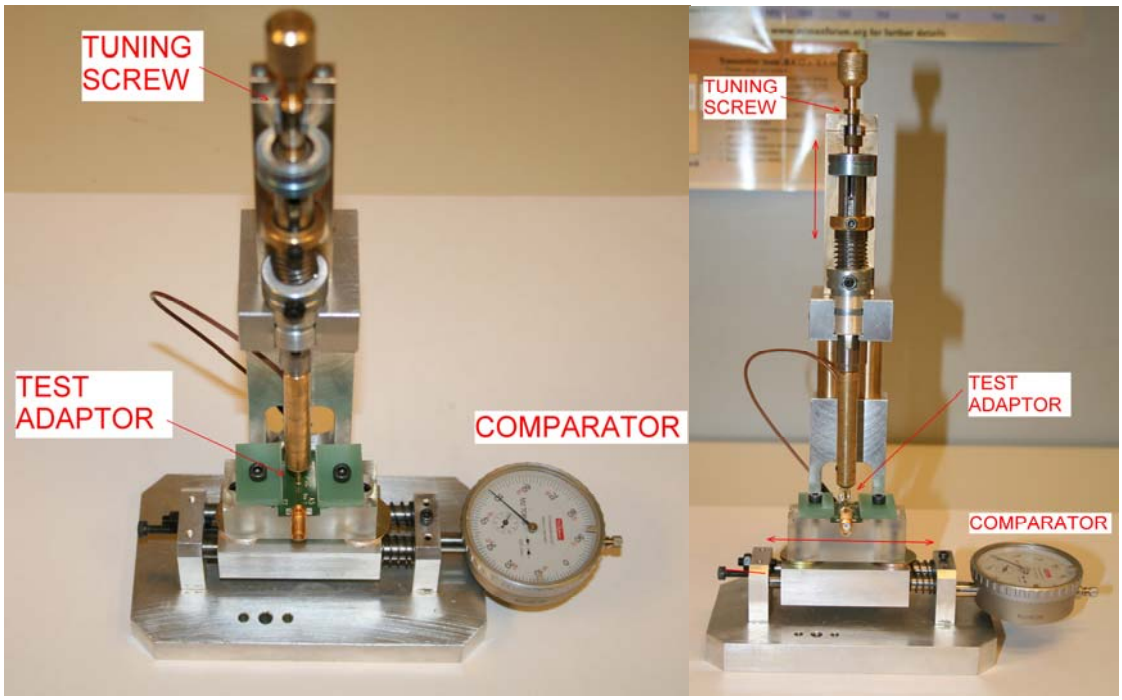


Fig. 1 and 2: Fixture of DUT.

2.2.1 Mating Cycles Test – Fixture Setup – Volume production probe pn 619361-1

A customized fixture was realized to test the adaptor. We used a pneumatic system controlled by a PLC.
This machine is able to test the probe at different strokes, with high repetitiveness and fine regulation.
The test probe was perfectly vertical and tested without misalignment.

Average speed:	10-20 mm/s
Cycle time:	2 cycles/min

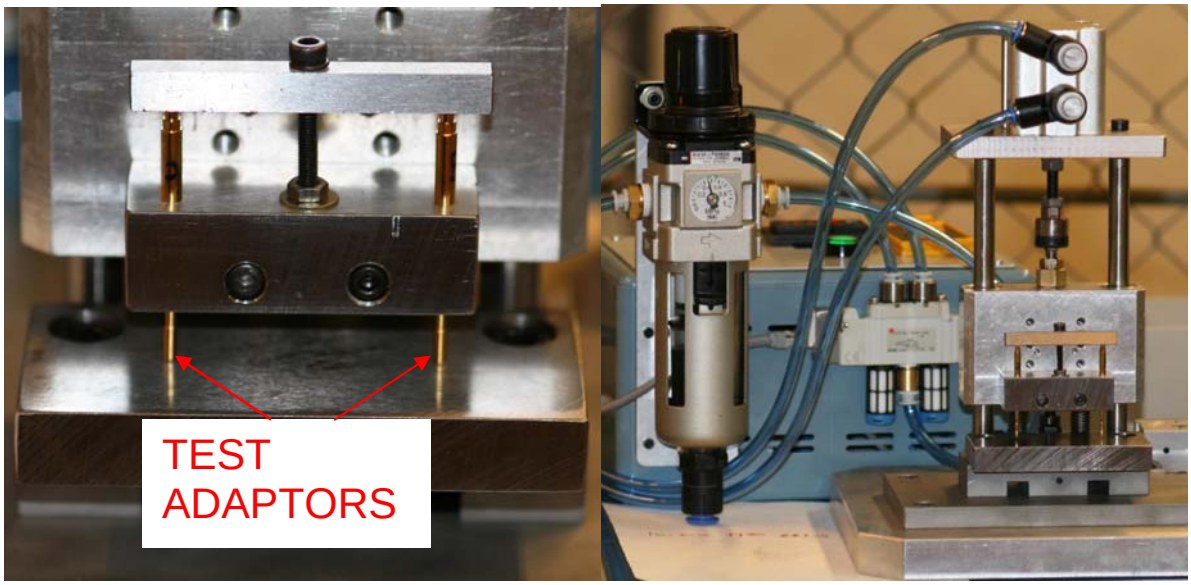


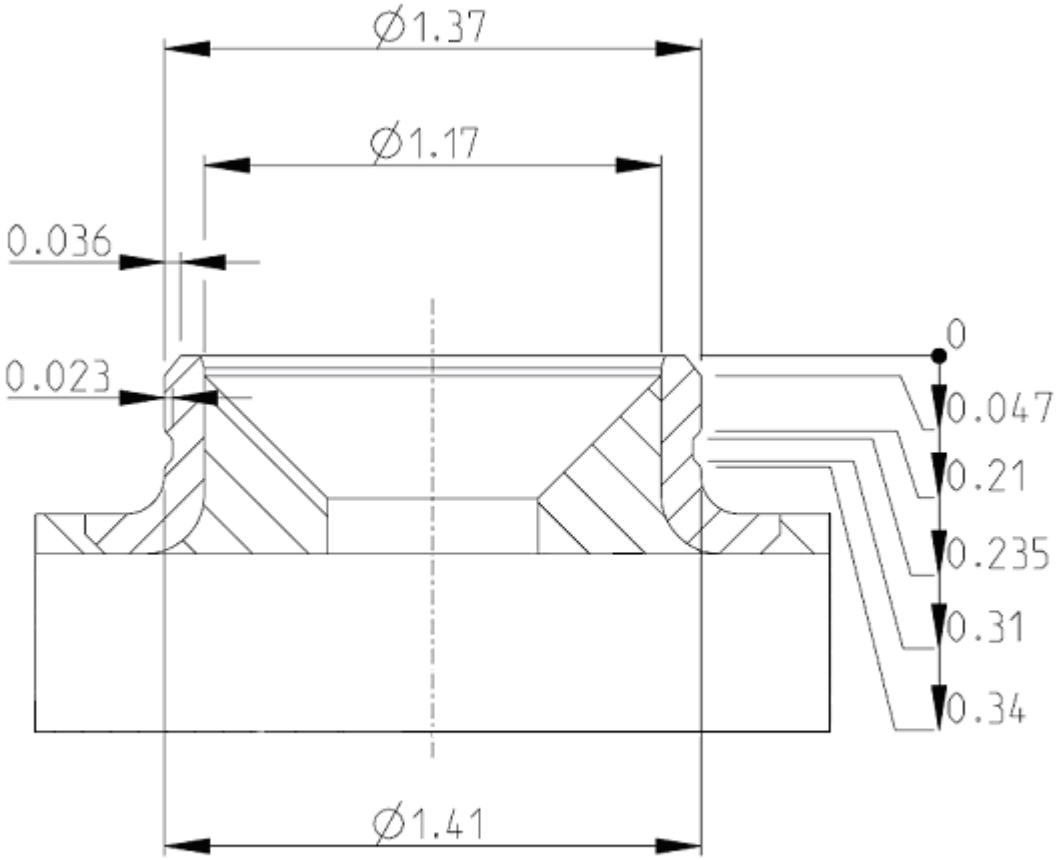
Fig. 3: Mating cycles test with samples fully aligned.

10 pieces were measured. The mechanical and electrical performances of the Test Adaptor **pn 619361-1** were verified before and after 1.000k mating cycles.

2.3 Mating Cycles Test – Repair centre probe pn 619384-1

Repair centre probes pn 619384-1 were connected and disconnected by hand for 500 cycles with switch counterparts, every 50 – 80 connections the counterpart was changed with a new one.

Average dimensions of counterparts were used:



2.4 Mating Cycles Test – Adaptor 90°, SMPM – SMA pn 619383-1

Adaptors 90°, SMPM – SMA pn 619383-1 were connected and disconnected by hand for 100 cycles with SMPM counterparts.

3 SAMPLE DESCRIPTION

3.1 Sample description – Volume production probe pn 619361-1

The samples were made according to the relevant drawings (TE pn 619361). 10 pieces were measured. The RL performance of the Test Adaptor was measured. Initially the test probe was perfectly aligned with the counterpart. 6 different stroke positions (1.5mm, 2.0mm, 3.0mm, 4.0mm and 4.5mm) were tested. Below there are some pictures that show some phases of this first test.

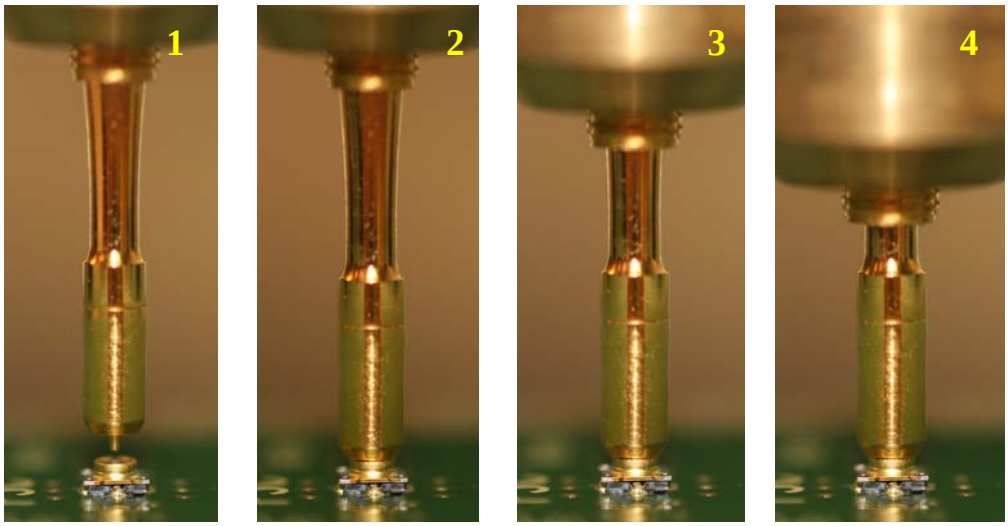


Fig. 4: Mating with Test Adaptor fully aligned.

Subsequently the test probe was misaligned in respect to the counterpart. 4 different radial misalignments (0.1mm, 0.2mm, 0.3mm and 0.4mm) were tested. Below there are some pictures that show some phases of this second test.

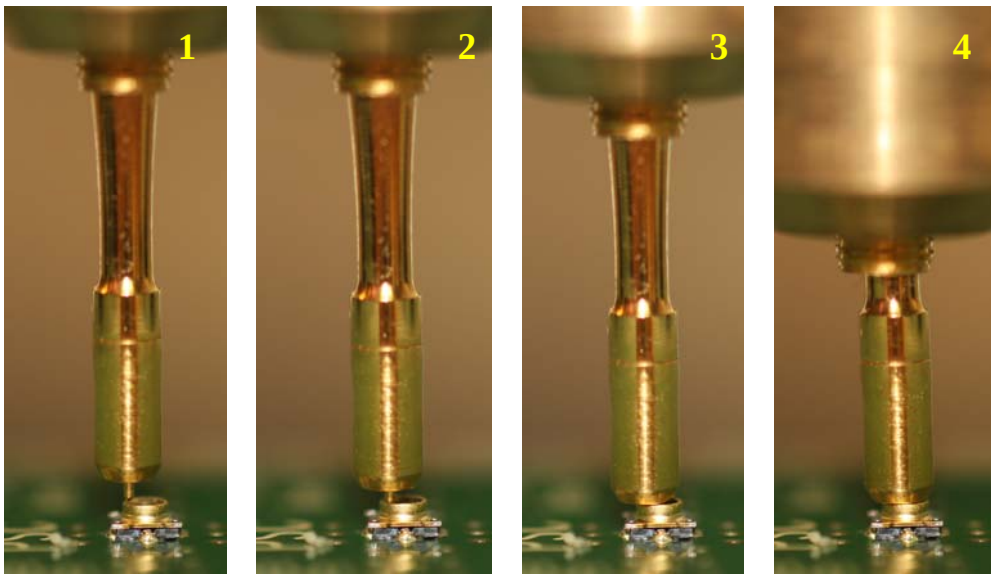


Fig. 5: Mating with Test Adaptor misaligned of 0.4mm.

3.2 Sample description – Repair centre probe pn 619384-1

The samples were made in according to the relevant drawings (TE pn 619384).
The RL performance of the Repair centre probe was measured.
The samples were mated with Switching-coax SMD connectors.

Fig.6: Measurement setup.

3.3 Sample description – Adaptor 90°, SMPM – SMA pn 619383-1

The samples were made in according to the relevant drawings (TE pn 619383). 4 pieces were measured. The RL performance of the Adaptor 90°, SMPM – SMA was measured.
The samples were mated with Switching-coax SMD connector.

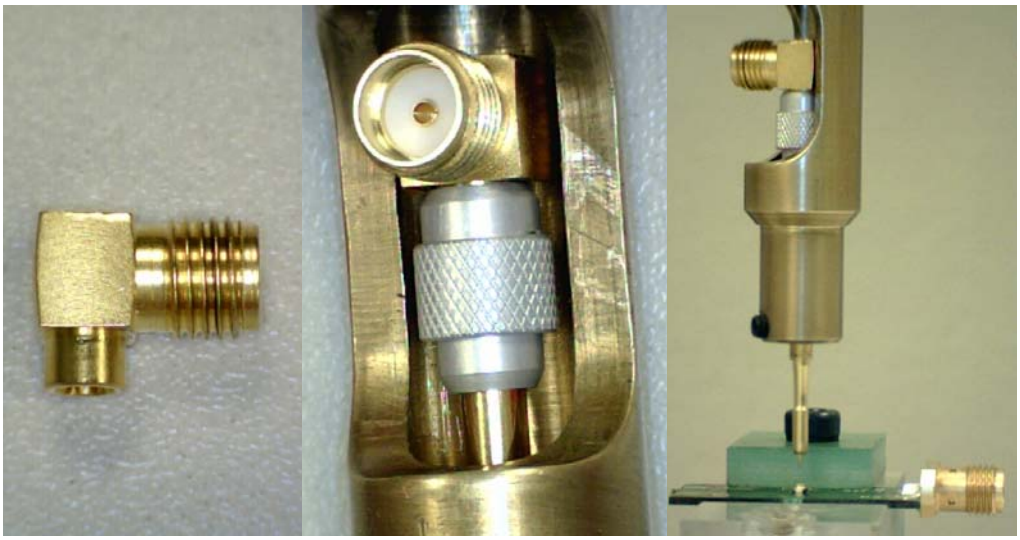


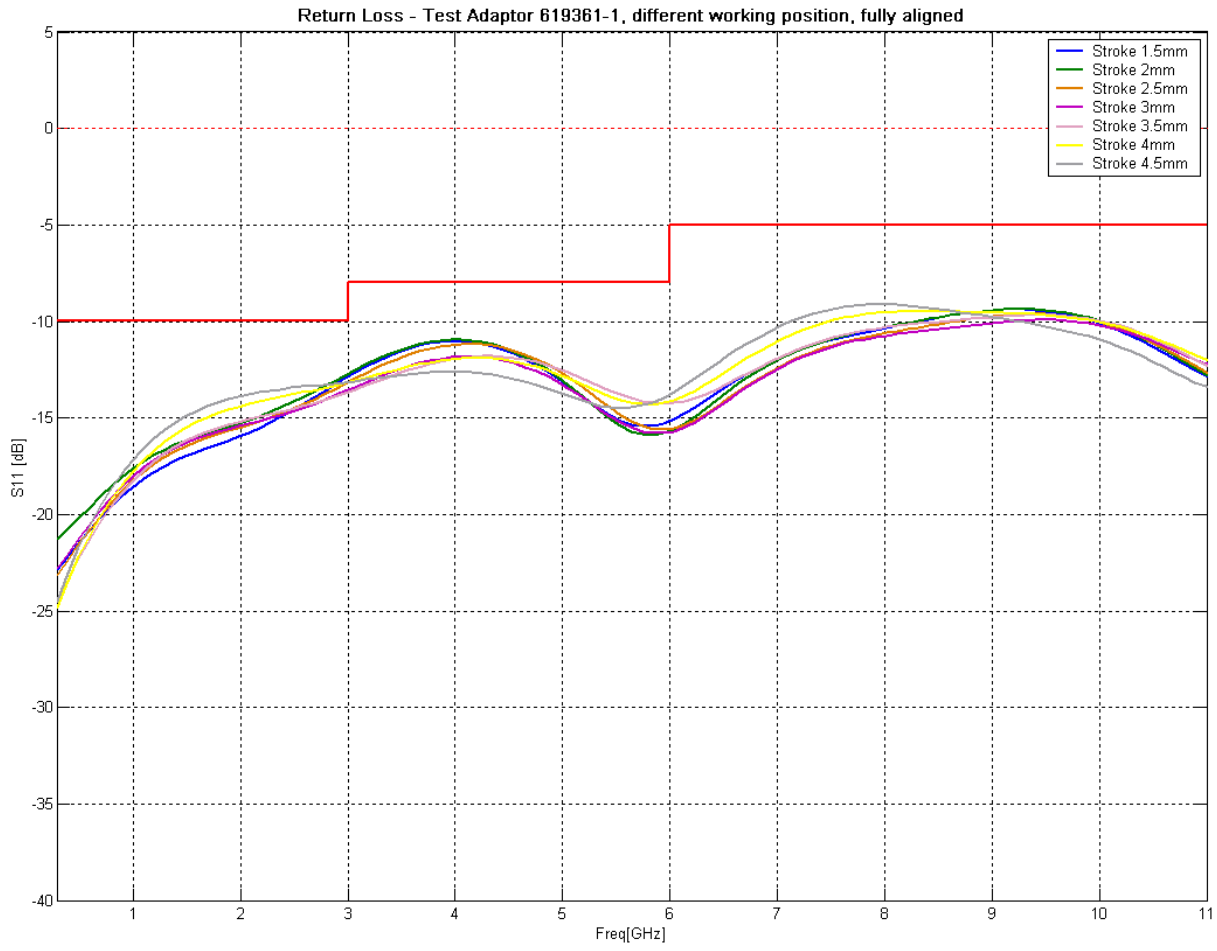
Fig.7: Measurement setup.

4 RESULTS

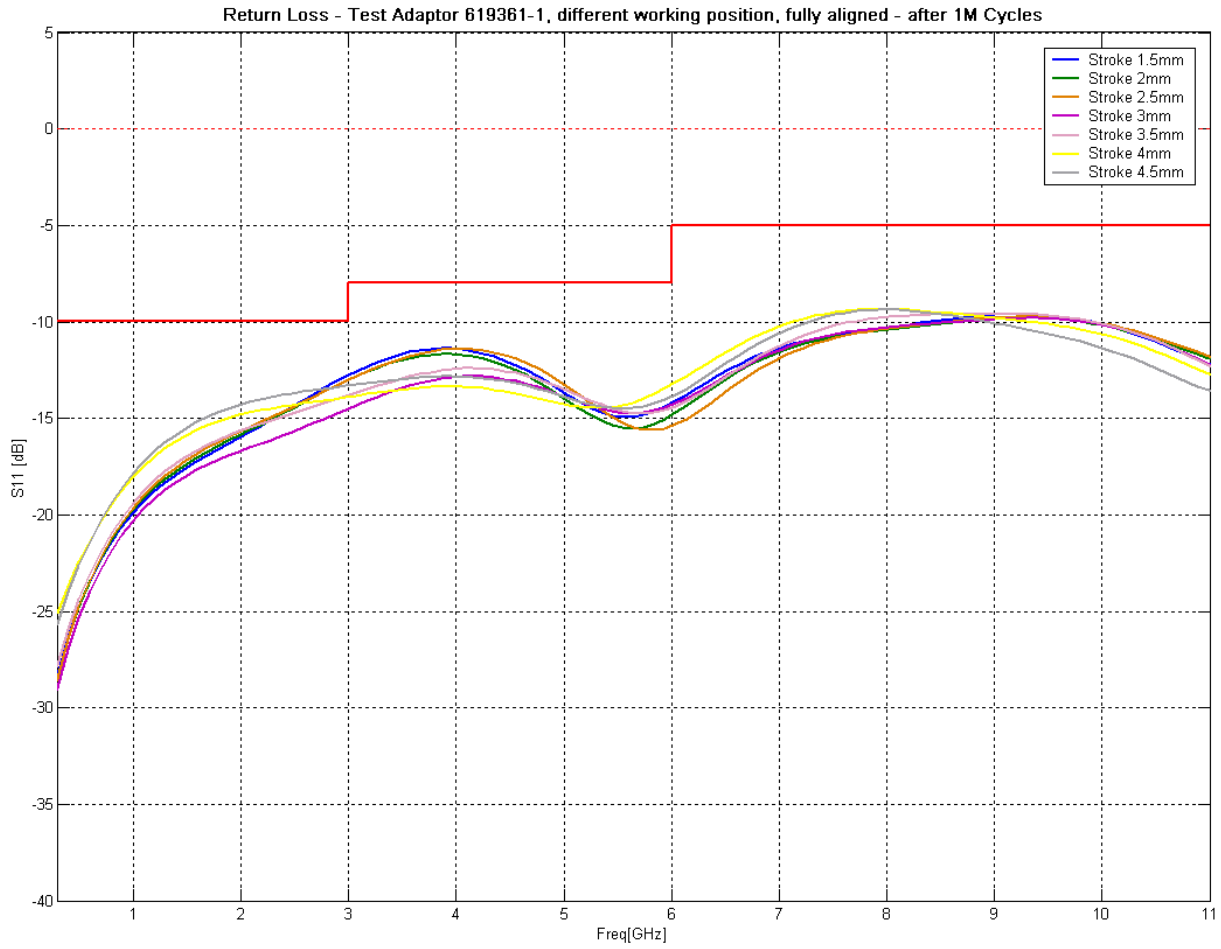
4.1 Result – Volume production probe pn 619361-1

The following results can be considered valid for all 10 samples tested.

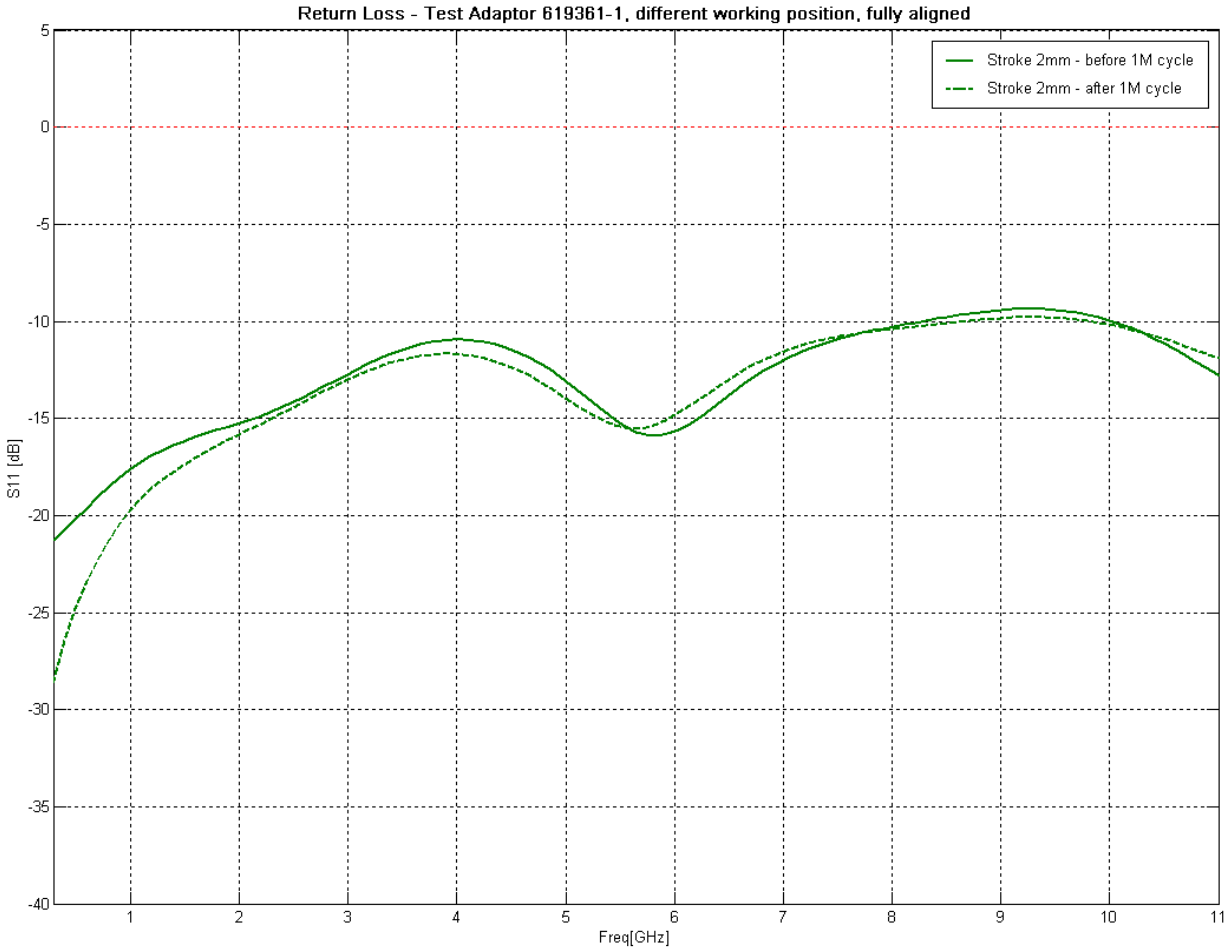
4.1.1 RL Measurement – (Different working position, fully aligned, initial condition)



4.1.2 RL Measurement – (Different working position, fully aligned, after 1M Cycles)

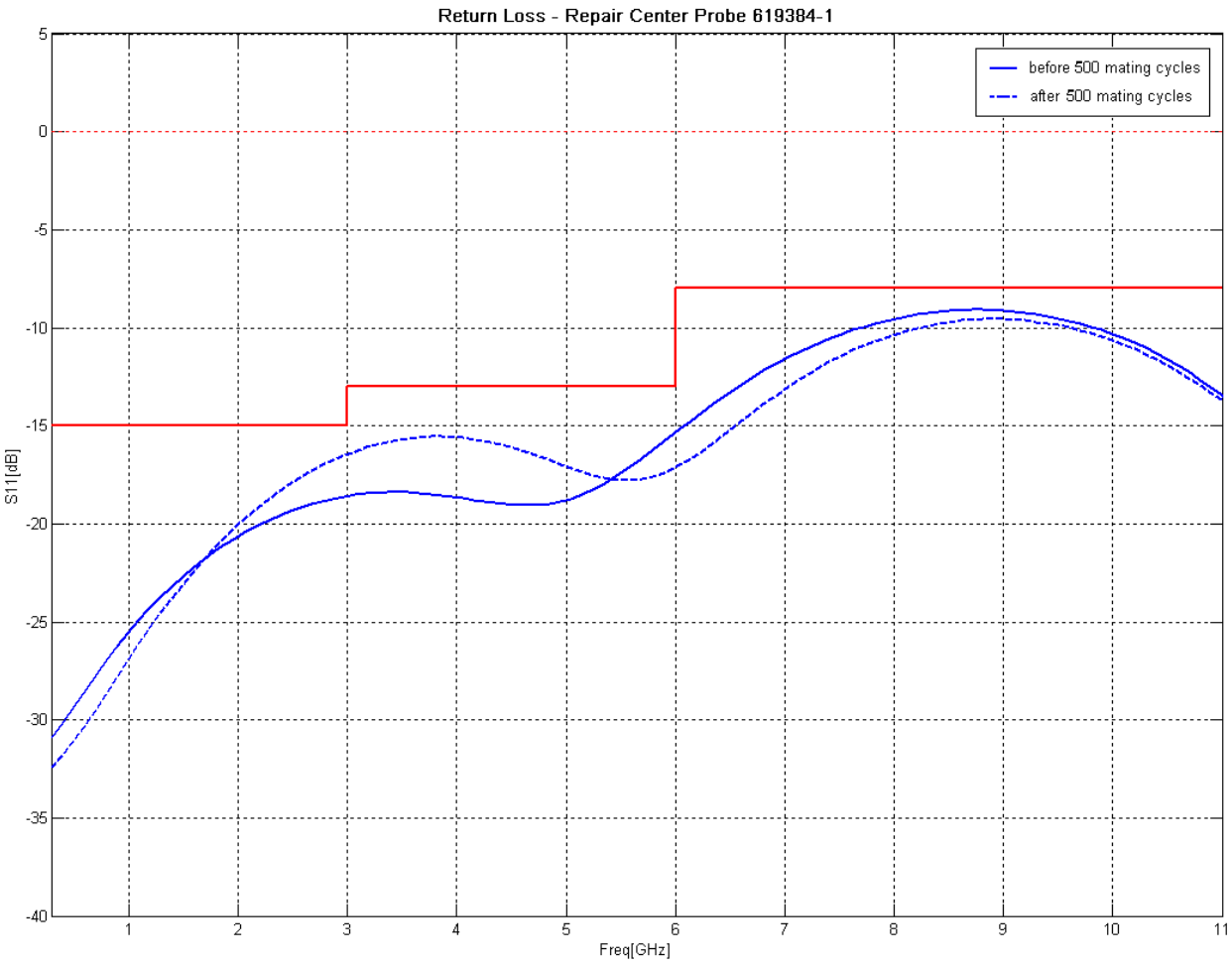


4.1.3 RL Measurement – (Comparison before and after Cycles - Stroke 2mm, fully aligned)



4.2 Result – Repair centre probe pn 619384-1

4.2.1 RL Measurement



4.2.2 Mechanical Measurement

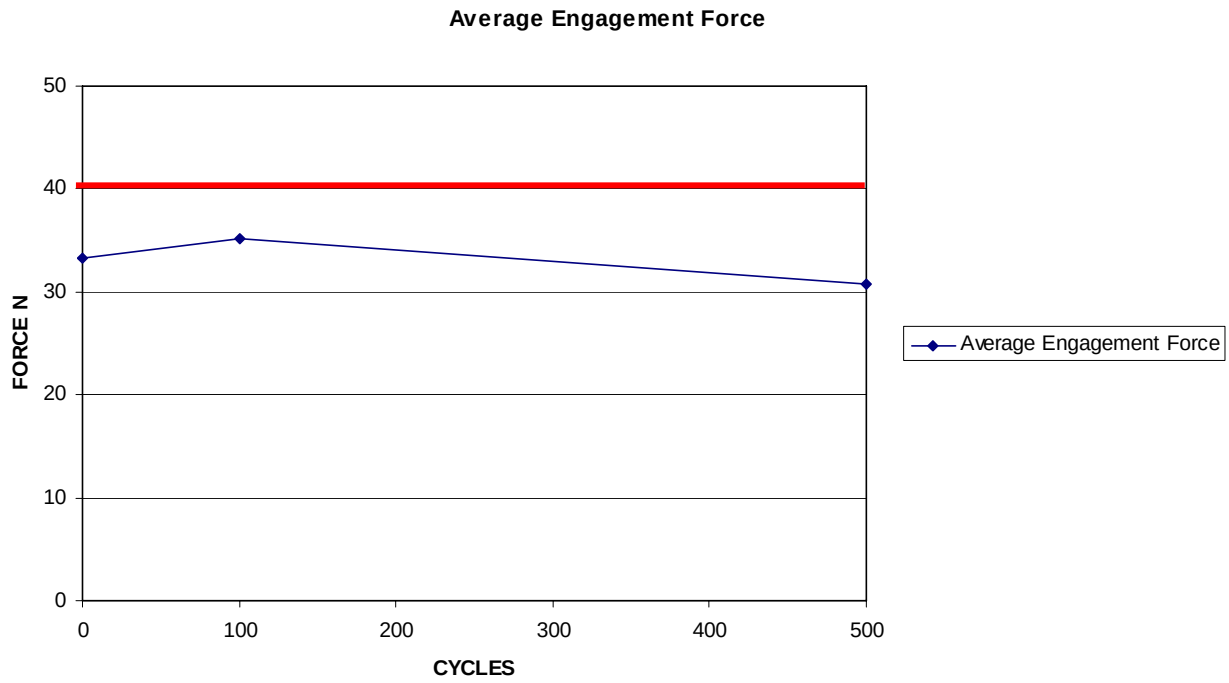


Fig.8: Engagement force.

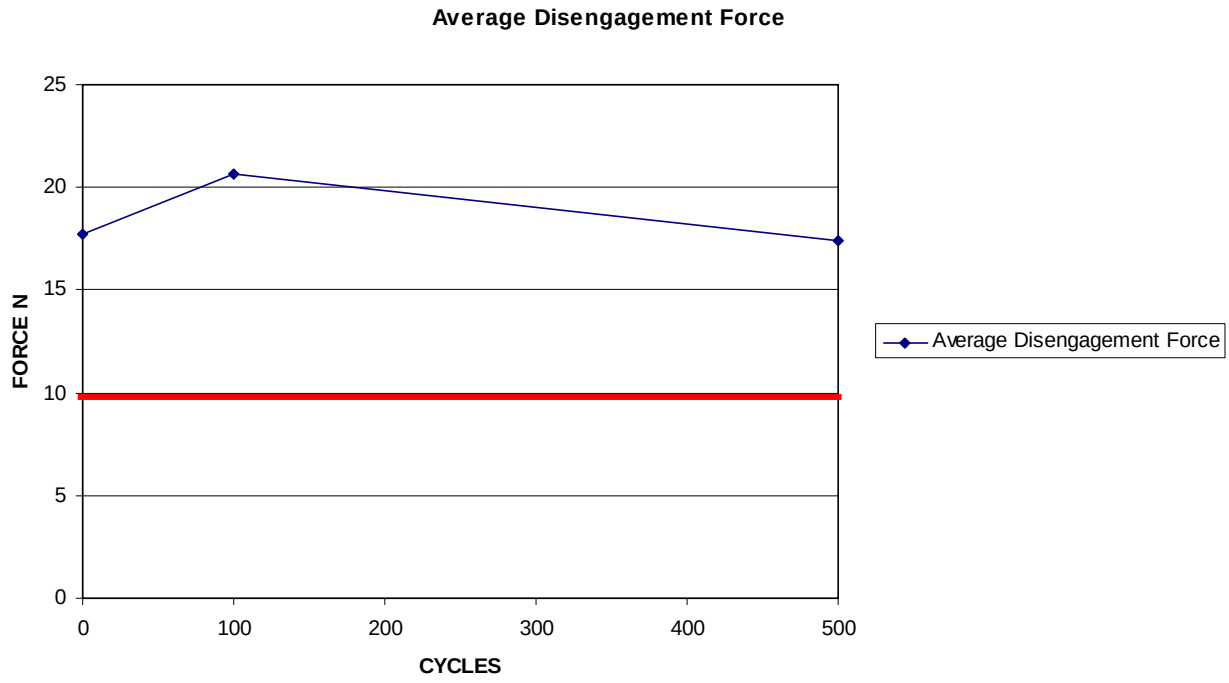


Fig.9: Disengagement force.

Samples had shown stable engagement force and disengagement force.

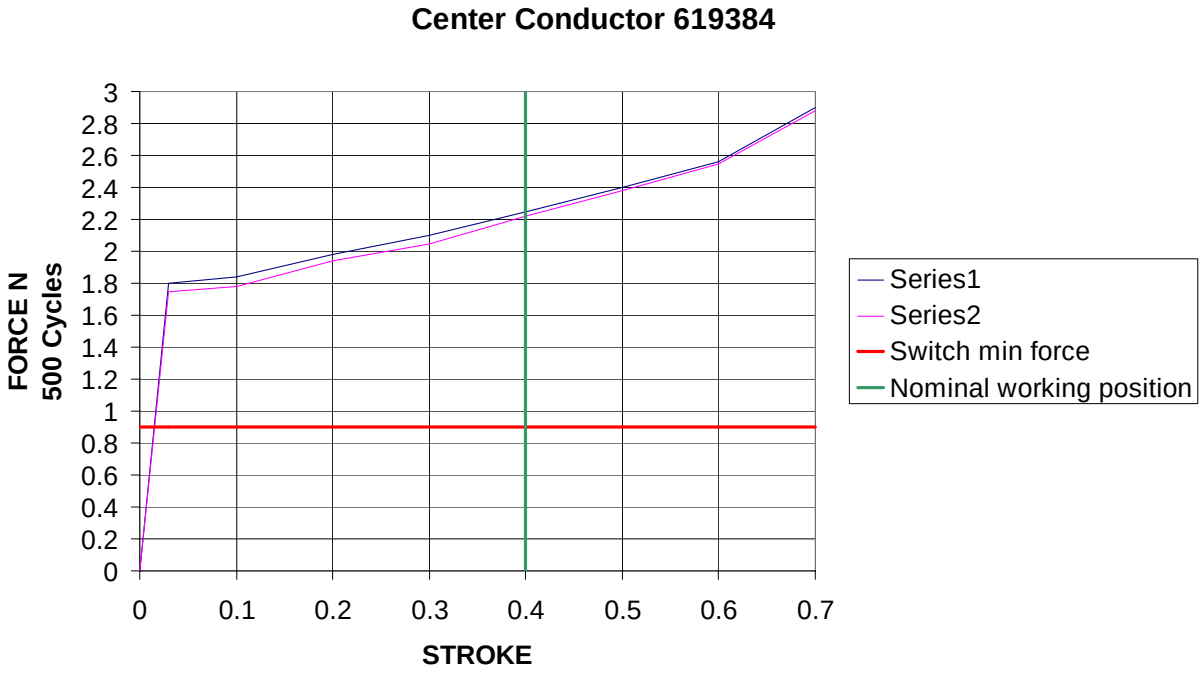


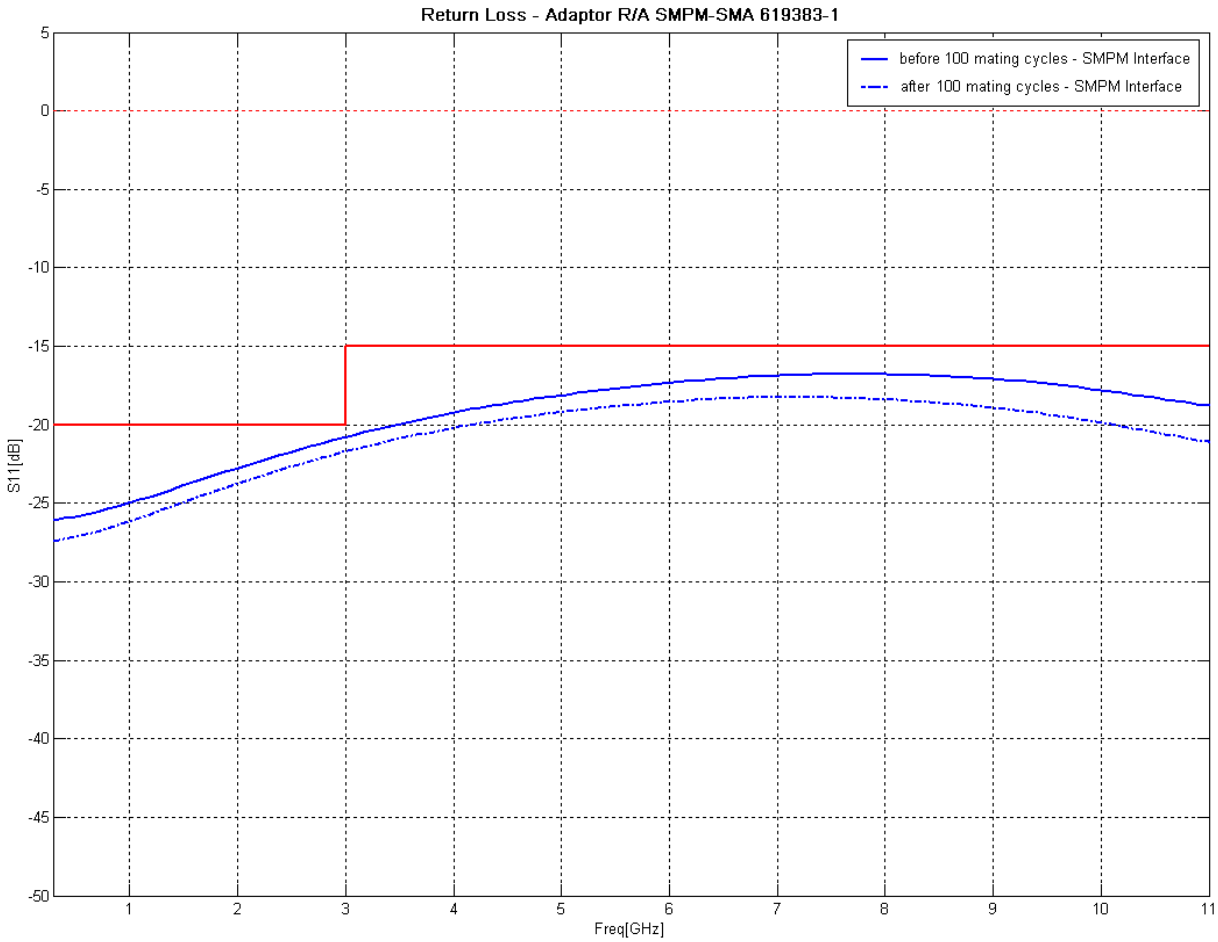
Fig.10: Center contact force at locking position.

The probe has enough contact force to activate the switch.

4.3 Result – Adaptor 90°, SMPM – SMA pn 619383-1

The following results can be considered valid for all 4 samples tested.

4.3.1 RL Measurement



5 CONCLUSION.

5.1 Conclusion – Volume production probe pn 619361-1

All samples show good reliable, repeatable performances and fully comply with product spec. 118-71086. Under conditions of maximum radial misalignment (0.4mm) the connection and the switching function to the switch is guaranteed with a minimum stroke of 1.5mm.
After 1.000K mating cycles the mechanical and electrical performances are still guaranteed.

5.2 Conclusion – Repair centre probe pn 619384-1

All samples show good reliable, repeatable performances and fully comply with product spec. 118-71086.
After 500 mating cycles the mechanical and electrical performances are still guaranteed.

5.3 Conclusion – Adaptor 90°, SMPM – SMA pn 619383-1

All samples show good reliable, repeatable performances and fully comply with product spec. 118-71086.
After 100 mating cycles the mechanical and electrical performances are still guaranteed.