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TRU BMA Products Test Report

Objective

Verify the durability of TRU BMA connector products over extended cycling of mating and unmating. The process is meant to simulate the lifetime mating of the connectors and to measure the effects on the electrical and mechanical performance. Parameters measured were VSWR, insertion loss, RF leakage, insertion force, and extraction force.

Test Samples

A quantity of 5 assemblies were built with the following configuration.

- Conn. 1: SMA(m) Plug (TRU-7113G)
- Conn. 2: BMA(f) Feedthru Jack (TRU-9831-GGU)
- Cable: .086 semi-rigid (M17/133-00001)
- Length : 6 inches
- Adapter: BMA(m) to SMA(f) (TRU-7415-GPU)

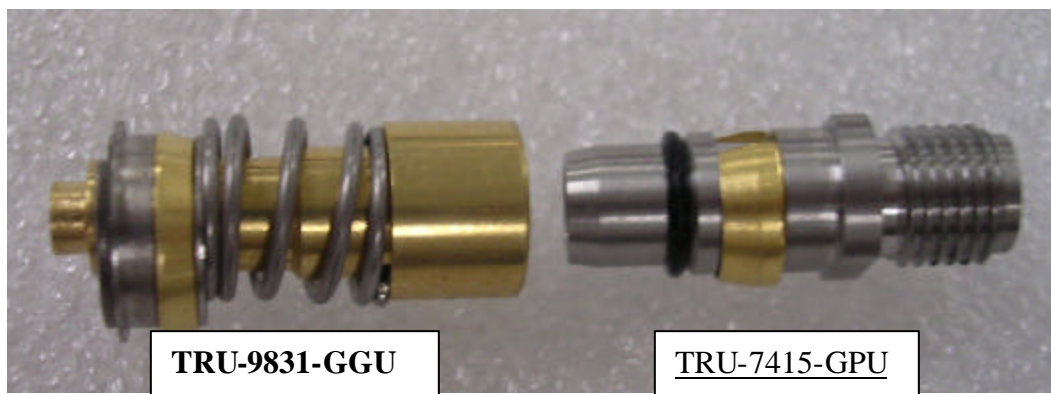
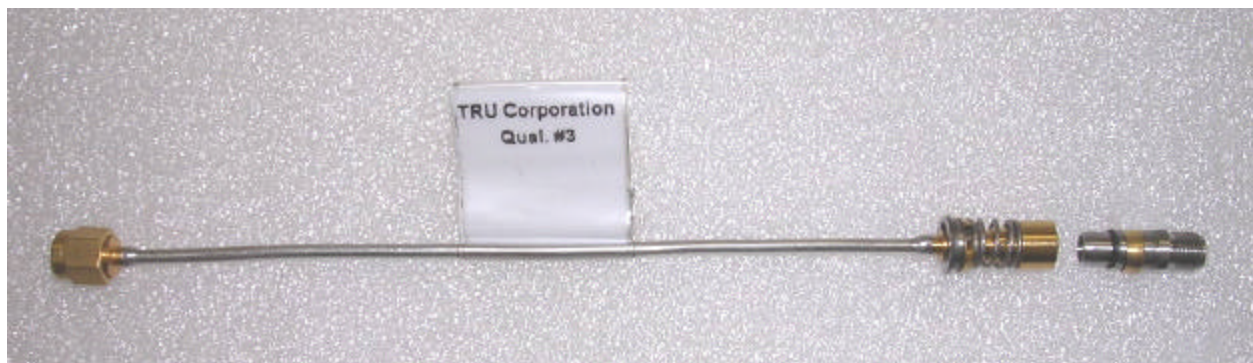


Figure 1

Baseline Testing

Mechanical and electrical tests were performed on the sample assemblies to establish the baseline values before commencing cycling. The electrical tests were performed in the configuration shown in figure 2. The BMA connector and BMA to SMA adapter (TRU-7415-GGU) were installed in test plates and mated to achieve .060 inch of compression on the feedthru spring. A full 2-port 3.5mm calibration was performed. Measurements were taken from .05 to 6.0 GHz with device under test consisting of the test assembly plus the BMA to SMA adapter. The assemblies were tested in the same configuration for RF leakage against a requirement of -90dB minimum.

Insertion force and extraction force measurements were taken using the configuration shown in figure 3. Refer to Table 1 for the results of the baseline testing.

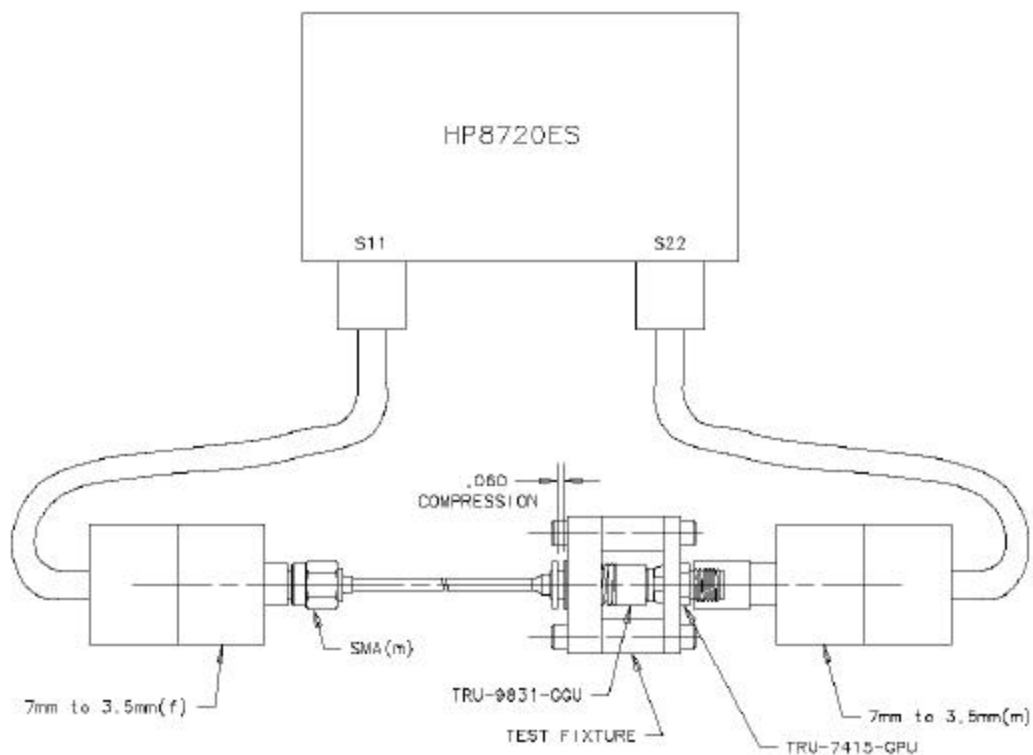


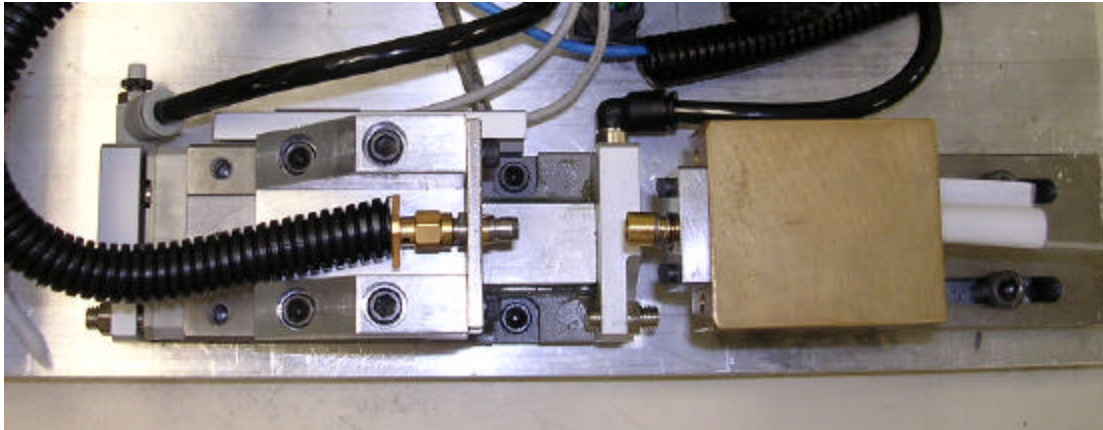
Figure 2, Electrical Test Setup



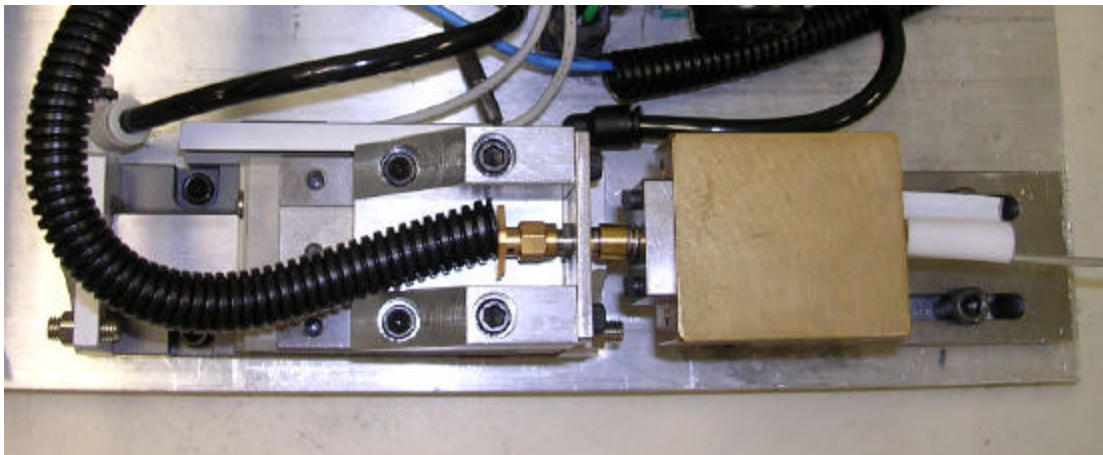
Figure 3, Mechanical Test Setup

Mating/Unmating Cycling

The cycling of the connector mating was performed using the fixture shown in figure 4. The cable assembly was mounted in a fixed position and the adapter was moved forward to engage the connector interface. The rate of cycling was approximately 12 mating cycles per minute. During the test sequence, the assemblies were monitored for continuity to ensure that mating had occurred. Every 500 cycles, measurements were taken for VSWR, insertion loss, insertion force, and extraction force. The assemblies were tested for RF leakage after 5,000 and 10,000 cycles.



Unmated



Mated

Figure 4, Cycling Setup

Results

The results from each test sample are shown in Table 1. Averages were taken of the data points for the five samples and plotted versus the number of mates, see figures 5-8. The test results indicate that the electrical performance of the assemblies did not significantly degrade after 10,000 cycles.

		Insertion Force (lbs)	Extraction Force (lbs)	VSWR Max.	Insertion Loss Max (dB)	RF Leakage (-90dB min)
Sample 1	Baseline	2.9	1.5	1.0851	-.328	Pass
	After 5,000 cycles	0.3	0.2	1.0865	-.373	Pass
	After 10,000 cycles	0.2	0.1	1.0795	-.375	Pass
Sample 2	Baseline	2.8	1.4	1.0911	-.327	Pass
	After 5,000 cycles	0.5	0.4	1.0915	-.331	Pass
	After 10,000 cycles	0.3	0.2	1.0964	-.389	Pass
Sample 3	Baseline	3.0	1.5	1.0737	-.320	Pass
	After 5,000 cycles	0.6	0.5	1.0546	-.334	Pass
	After 10,000 cycles	0.4	0.3	1.0531	-.327	Pass
Sample 4	Baseline	2.8	1.5	1.0968	-.320	Pass
	After 5,000 cycles	0.4	0.3	1.1476	-.344	Pass
	After 10,000 cycles	0.2	0.1	1.0982	-.358	Pass
Sample 5	Baseline	2.9	1.4	1.1446	-.322	Pass
	After 5,000 cycles	0.8	0.5	1.1594	-.365	Pass
	After 10,000 cycles	0.6	0.4	1.1366	-.353	Pass

Table 1, Data Sheets

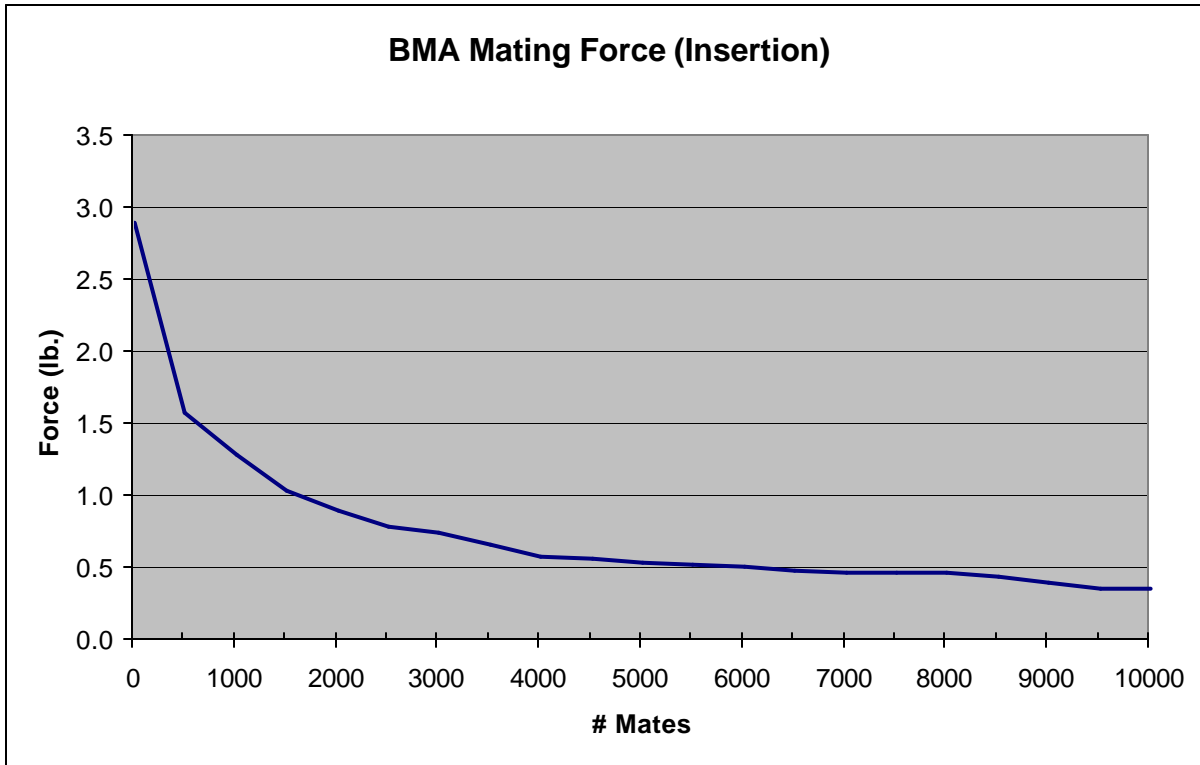


Figure 5

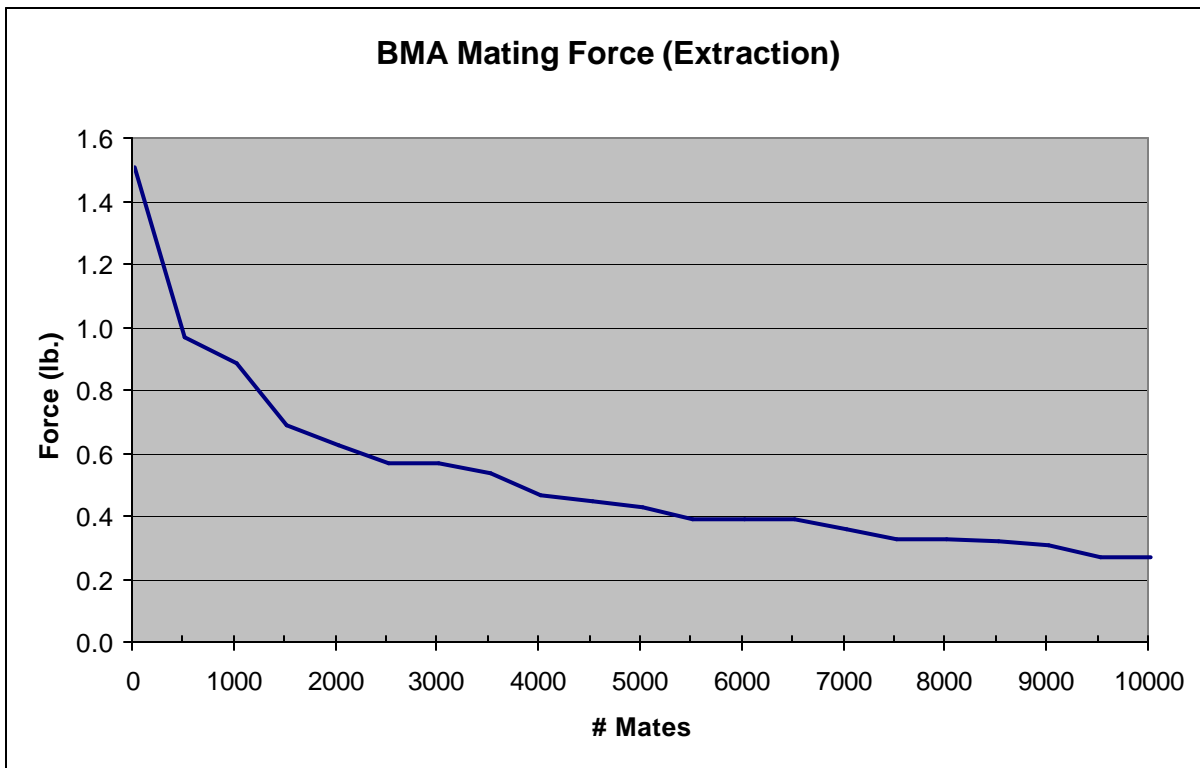


Figure 6

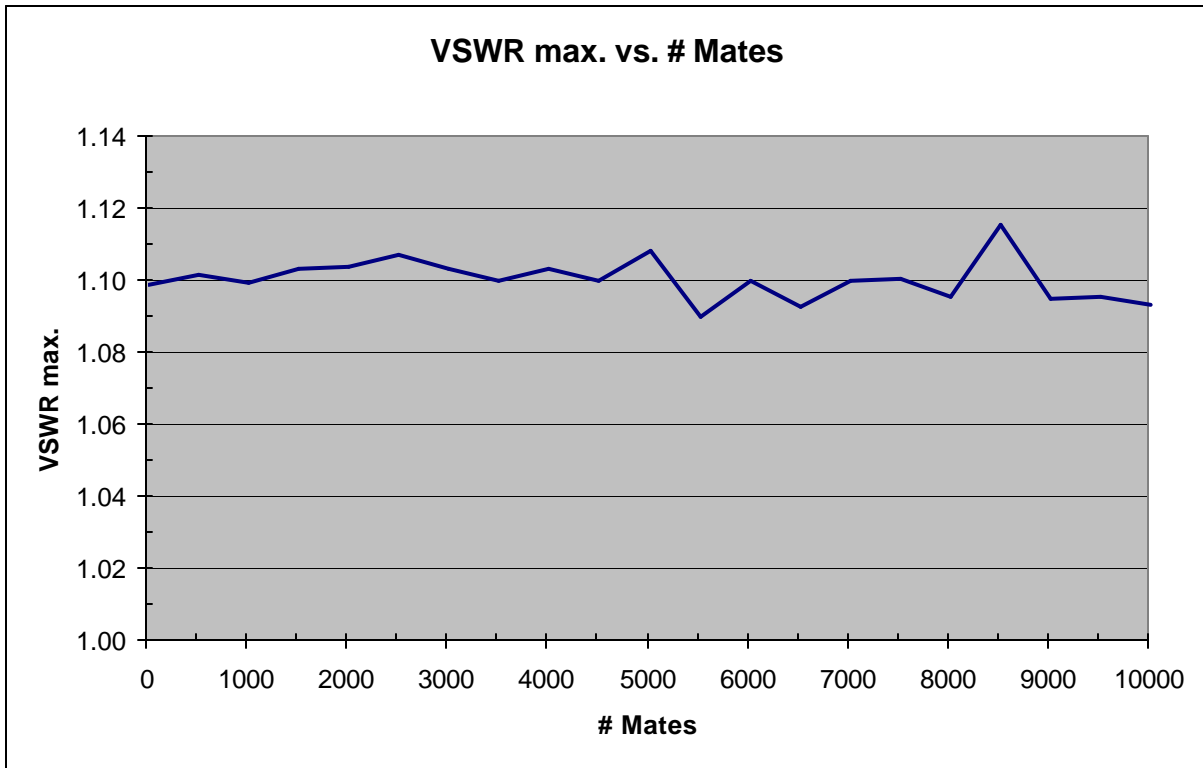


Figure 7

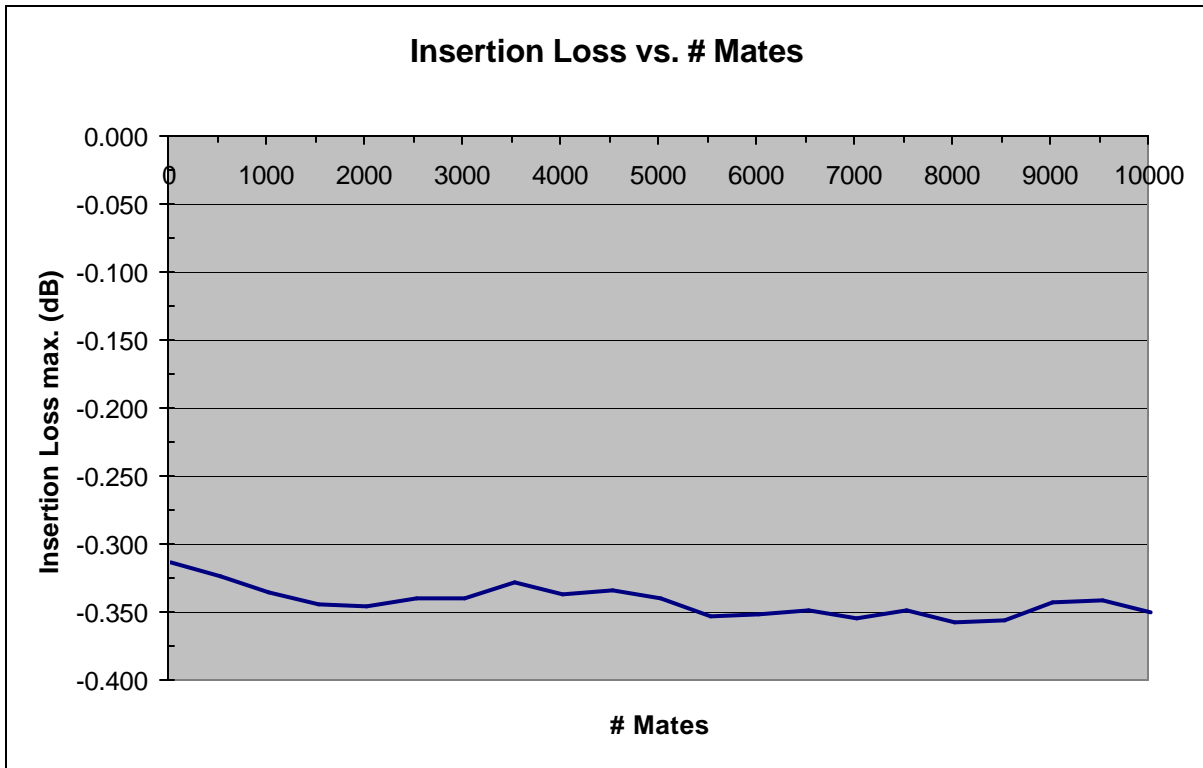


Figure 8