

Thermal Shock Test for Fixed Attenuators and Terminations

1. Test Purpose

To evaluate the Coax Fixed Attenuators and Terminations are able to operate properly within specifications after thermal shock 6 cycles (-55°C to +125 °C) in accordance with method 107 of MIL-STD-202.

2. DUT Product Information



No.	RF ONE P/N	Product Description	Qty pcs
1	RFHB6730185C2	1.85mm Attenuator, DC-67 GHz, 2W, 30dB	2
2	RFHB500324C2	2.4mm Attenuator, DC-50 GHz, 2W, 3dB	2
3	RFHB4003KC2A	2.92mm Attenuator, DC-40 GHz, 2W, 3dB	2
4	RFHB4010292C10	2.92mm Attenuator, DC-40 GHz, 10W, 10dB	2
5	RFHB2705SC2	SMA Attenuator, DC-27 GHz, 2W, 5dB	2
6	RFHB1830SC2	SMA Attenuator, DC-18 GHz, 2W, 30dB	2

7	RFHB0603SC10	SMA Attenuator, DC-6 GHz, 10W, 3dB	2
8	RFHB0810NC5	N Type Attenuator, DC-8.5 GHz, 5W, 10dB	2
9	RFH0640ND50	N Type Attenuator, DC-6 GHz, 50W, 40dB	1
10	RFH0420ND100-D	N Type Attenuator, DC-4 GHz, 100W, 20dB	1
11	RFT40022922	2.92mm Termination, DC-40 GHz, 2W	2
12	RFT0825S2	N Type Termination, DC-8.5 GHz, 25W	2

3. Test Instruments

No.	Instrument	Model
1	Hot And Cold Test Chamber	Shanghai Zhichou ZH/GDJS-50L
2	VNA	Ceyear VNA 3672E

4. Test Description

4.1 Before the thermal shock test, the DUT shall be measured by VNA in VSWR & Attenuation.

4.2 The DUT Attenuators and Terminations shall be tested in accordance with method 107 of MIL-STD-202 in below procedures.

Two thermal conditioning chambers were used, one set to -55°C and the other set to 125°C. The DUT was placed into the 125°C chamber first and conditioned for a minimum of 30 minutes. DUT was then transferred to the -55°C chamber within 120 seconds. The DUT was transferred between two (2) thermal conditioning chambers for 6 cycles.



4.3 After thermal shock test, repeat the step of 4.1.

4.4 After thermal shock test, perform visual and mechanical inspection to verify the dimensions and workmanship are in accordance with specification requirements.

5. Test Results

Before and after thermal shock, VSWR and attenuation measurement of the coax fixed attenuator and terminations showed minimum change. Test results are recorded below.

No.	P/N	Specification	Before	After
1	RFHB6730185 C2	VSWR 1.3 max Attenuation 30 -0.9/+1.0 dB	VSWR: 01#: 1.16 02#: 1.18 Attenuation: 01#: 30.06~30.36 dB 02#: 29.82~30.27 dB	VSWR: 01#: 1.17 02#: 1.16 Attenuation: 01#: 29.79~30.55 dB 02#: 29.86~30.22 dB
2	RFHB500324C 2	VSWR 1.3 max Attenuation 3 -0.6/+0.9 dB	VSWR: 01#: 1.17 02#: 1.19 Attenuation: 01#: 2.49~3.34 dB 02#: 2.50~3.35 dB	VSWR: 01#: 1.20 02#: 1.19 Attenuation: 01#: 2.51~3.38 dB 02#: 2.51~3.39 dB
3	RFHB4003KC2 A	VSWR 1.25 max Attenuation 3±0.5 dB	VSWR: 01#: 1.15 02#: 1.16 Attenuation: 01#: 2.68~3.44 dB 02#: 2.63~3.39 dB	VSWR: 01#: 1.14 02#: 1.17 Attenuation: 01#: 2.62~3.42 dB 02#: 2.67~3.36 dB
4	RFHB4010292 C10	VSWR 1.26 max Attenuation 10±0.8 dB	VSWR: 01#: 1.10 02#: 1.10 Attenuation:	VSWR: 01#: 1.10 02#: 1.12 Attenuation:

			01#: 9.71~10.52 dB 02#: 9.69~10.45 dB	01#: 9.76~10.57 dB 02#: 9.77~10.55 dB
5	RFHB2705SC2	VSWR 1.3 max Attenuation 5±0.65 dB	VSWR: 01#: 1.12 02#: 1.14 Attenuation: 01#: 4.50~5.08 dB 02#: 4.58~5.31 dB	VSWR: 01#: 1.12 02#: 1.13 Attenuation: 01#: 4.52~5.03 dB 02#: 4.67~5.22 dB
6	RFHB1830SC2	VSWR 1.3 max Attenuation 30±1.0 dB	VSWR: 01#: 1.15 02#: 1.16 Attenuation: 01#: 29.63~30.44 dB 02#: 29.79~30.31 dB	VSWR: 01#: 1.16 02#: 1.18 Attenuation: 01#: 29.53~30.46 dB 02#: 29.78~30.34 dB
7	RFHB0603SC1 0	VSWR 1.2 max Attenuation 3±0.5 dB	VSWR: 01#: 1.09 02#: 1.08 Attenuation: 01#: 2.88~3.19 dB 02#: 2.75~3.02 dB	VSWR: 01#: 1.10 02#: 1.08 Attenuation: 01#: 2.89~3.17 dB 02#: 2.74~2.95 dB
8	RFHB0810NC5	VSWR 1.25 max Attenuation 10±0.5 dB	VSWR: 01#: 1.19 02#: 1.17 Attenuation: 01#: 9.85~10.18 dB 02#: 9.79~10.26 dB	VSWR: 01#: 1.19 02#: 1.17 Attenuation: 01#: 9.85~10.18 dB 02#: 9.79~10.26 dB
9	RFH0640ND50	VSWR 1.25 max Attenuation 40±0.8 dB	VSWR: 01#: 1.09 Attenuation:	VSWR: 01#: 1.10 Attenuation:

			01#: 39.39~39.93 dB	01#: 39.23~39.95 dB
10	RFH0420ND10 0-D	VSWR 1.2 max Attenuation 20±0.7 dB	VSWR: 01#: 1.06 Attenuation: 01#: 19.65~20.07 dB	VSWR: 01#: 1.05 Attenuation: 01#: 19.84~20.18 dB
11	RFT40022922	VSWR 1.15 max	VSWR: 01#: 1.07 02#: 1.07	VSWR: 01#: 1.07 02#: 1.09
12	RFT0825S2	VSWR 1.2 max	VSWR: 01#: 1.17 02#: 1.15	VSWR: 01#: 1.16 02#: 1.15

6. Conclusion

As shown in the above table, after thermal shock, VSWR and attenuation accuracy measurement of the tested attenuators and terminations showed minimum changes and no permanent physical changes and damages were observed.