

Report No.: RF20000022 Report Date: 2020-10-12

1000W Fixed Attenuator Power Handling Test

1. Test Purpose

To evaluate and determine the power handling capability of 1000 Watts Fixed Attenuator from RF ONE.

2. DUT Product Information

Product Name	DC-4GHz, 50dB, 1000W Fan-cooled Attenuator
P/N	RFH0450DN1000-DF
Specification	Frequency Range: DC-4 GHz VSWR: 1.3 max Attenuation: 50dB, accuracy: +1.0/-1.2 dB Avg Power Handling: 1000 Watts
Qty	1 PC

3. Test Instrument and Tools

No.	Instrument	Model
1	AC Current Source	CHNT TDGC2-5KVA
2	Amp Meter	UT210E PRO
3	Infrared Thermometer	UTi260B
4	Vector Network Analyzer	Ceyear AV3672E(10MHz-67GHz)

4. Test Description

As the causes of avg power failure are heat related, DUT is tested at a given AC current level for 2 hours, providing sufficient time for the attenuator to warm up.

At $25 \pm 2^{\circ}$ C, input the DUT attenuator with 1000 Watts power for 120 minutes continuously, with the integrated cooling fan in operation simultaneously. During the entire test process, DUT case temperature is measured and recorded by infrared thermometer. Before and after the power test, the DUT attenuator accuracy and VSWR are measured and recorded by VNA.



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Diagram 1 Power test setup

5. Test Procedures

5.1 Before the power test, measure and record VSWR and attenuation accuracy by VNA.

5.2 Measure the resistance of DUT attenuator, which should be within $50\Omega \pm 2\Omega$.

5.3 Set up the test according to the Diagram 1.

5.4 Turn on the 220V, 50Hz AC power. Slowly tune/increase the voltage transformer clockwise from 0 until the Amp meter reads 4.5 A. The input power to DUT is now as $P=I \cdot U=4.5 \times 220=1000$ Watts.

5.5 Keeping inputting this AC power continuously to DUT attenuator for 2 hours.

5.6 During the two hours, an infrared thermometer is used so as to measure the DUT case temperature every 10 minutes till the attenuator reaches heat equilibrium around 66 $^{\circ}$ C on its case surface. Record the temperature changes.

5.7 After 2 hours, slowly tune the voltage transformer counter-clockwise till the voltage is zero V. Disconnect the DUT attenuator when there is no current in operation.

5.8 Re-measure and record VSWR and attenuation accuracy by VNA.

6. Test Result

6.1 Case Temperature Records



Input 1000 Watt CW power, recording case temperature of DUT Attenuator.

Test Duration (minutes)	0	10	20	30	40	50	60	90	120
Temperature (℃)	25	57.3	63.1	65.4	65.5	65.8	65.8	65.7	65.8

Notes:

1. The temperature was measured on the surface of heat sink located closely to the input by infrared thermometer.

2. The temperature reached a heat equilibrium after 60 minutes since power test began. Refer to below temperature curve.



6.2 S Parameter Measurement Before and After Power Test

Specification: DC-4 GHz, VSWR 1.3 max							
VSWR@ Frequency	10MHz	1GHz	2GHz	3GHz	4GHz	VSWR max	
Before Power Test	1.07	1.05	1.06	1.10	1.06	1.14	
After Power Test	1.08	1.07	1.06	1.13	1.12	1.14	



Specification: DC-4 GHz, Attenuation 50 +1.0/-1.2dB							
Attenuation@ Frequency, dB	10MHz	1GHz	2GHz	3GHz	4GHz		
Before Power Test	49.26	51.06	51.18	51.33	51.08		
After Power Test	49.69	50.89	51.09	51.27	51.17		

7. Conclusion

This attenuator can handle full power 1000W continuously at room temperature with the built-in cooling fan in full operation.

Fixed Attenuators from RF ONE

RF ONE offers a wide range of coax fixed attenuators from 2 W to 2000 W, available in 1GHz to 67GHz operating frequency ranges. Power handling tests are implemented across our low power, medium power and high power attenuator series to ensure the delivered attenuators will operate safely and reliably at specified power levels. To check more, please visit our website at <u>www.rfone.cn</u> or contact us at sales@rfone.cn.