## Measurement of RF Amplifier with the help of RFME Signal Source and Power Detector:

This application note gives a brief overview about the measurement of an RF amplifier with the help of the RFME signal source and power detector.

An RF amplifier is an electronic device that transforms a low power radio frequency signal and converts it into a higher power signal. They are used to drive the antenna of various transmitters and many other equipments where higher power is required.
Their design parameters include gain, power output, bandwidth, power efficiency, linearity, input and output impedance matching and heat dissipation. The amplification in an amplifier is measured by its gain (ratio of the output voltage, current, or power to its input). The power gain is greater than one in an amplifier.

RF amplifiers operates in different classes. They are class A, class AB, class B, class C which are considered as linear amplifier classes. Controlled current source is used as an active device in these classes. The class of the amplifier is determined by the bias at the input.

RF amplifiers can be used in various applications like driving a transmitting antenna, driving to another high power source, exciting microwave cavity resonators, RF amplification using LDMOS is widely used as power semiconductor devices in wireless telecommunication networks and digital mobile networks such as 2G, 3G and 4G.
The transmitters and receivers are also used for voice and data communication but also for weather sensing in the form of a radar.

RF amplifier input and output power is measured in dBm and its gain is measured in dB.
Following is the method for the measurement of an amplifier with the help of RFME Signal Source and Power Detector.

To do the measurement of any component the user first needs to take the direct reading with the help of two 50 Ohms coaxial cable and an adaptor in between.

For eg. Take the RFME signal source and set its frequency to 2.45GHz and signal level to -1dBm which is given as an input to the RFME power detector with the help of two coaxial cables and one adaptor in between as shown in the Figure: 1. -1.6dBm is observed on the power detector.

The below setup shows selection of Single mode with the switch position at 'S" on RFME signal source and in the RFME power detector the switch is selected for dBm. Thus on RFME signal source it will be displayed as "2.450" for 2.45GHz and on RFME power detector results will be displayed in dBm as "-01.6" for -1.6 dBm.

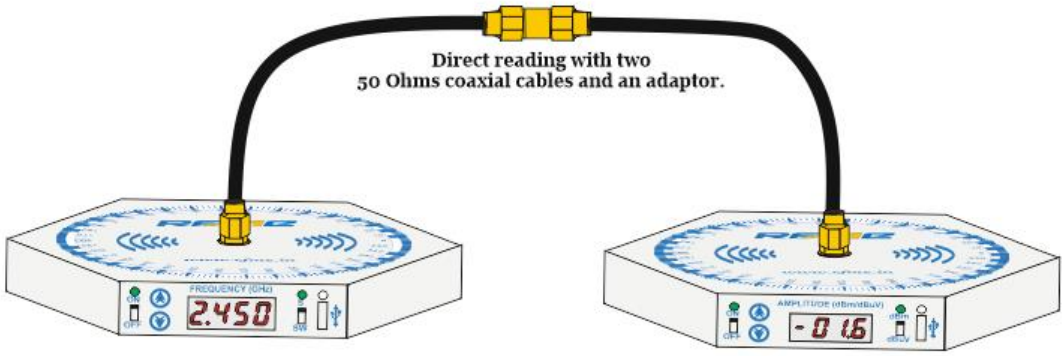


**Figure: 1**

In Figure: 2 below the setup for testing RF amplifier which has a gain of 8dB, will be replaced in between the two coaxial cables instead of the adaptor. The direct reading at 2.45 GHz is "-01.6" dBm which is considered as an input to the RF amplifier. *1

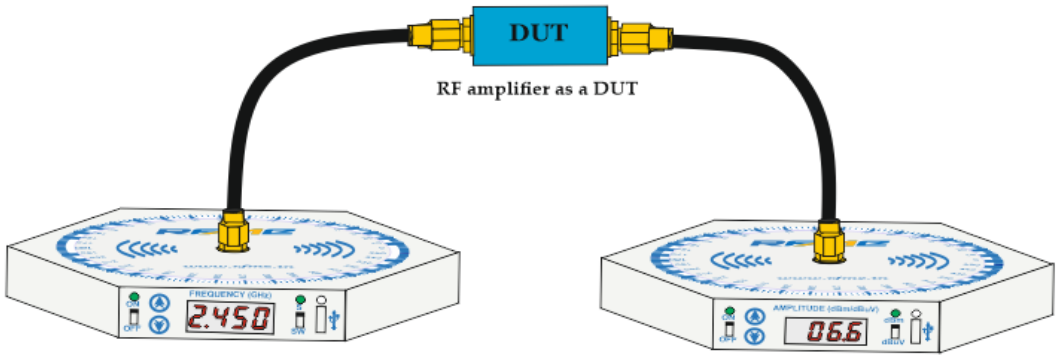


**Figure: 2**

Thus in order to measure the output of the RF amplifier, connect it to the RFME power detector. The displayed output is "+06.6" dBm. This result shows that the RF amplifier

under test has a gain of 8dB at 2.45 GHz. Here the RFME power detector is on the dBm selection. The measured data can also be displayed in the dBuV when selected for dBuV.

Now if you want to check any other frequency which comes under the band of RFME signal source and RF amplifier you can easily check by following the above procedure. *2

Note: *1) 1.6dB loss in the direct reading as measured.
*2) RF amplifier can be checked in single mode as well as on the scan mode according to the frequency band of the chosen Tx and Rx models.
3) The measured data on the RFME power detector can also be displayed in the dBuV when selected for dBuV with the help of the switch on the front panel.

**Following is the table showing the RF amplifier measurement on Tx and Rx:**

| Sr.# | Frequency on Tx | Direct Reading on Rx | Reading on Rx with cable | RF amplifier measurement |
|---|---|---|---|---|
| 1 | 2.45 GHz | -01.6dBm | +06.6dBm | +08.2dBm |

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