Measurement of Transmission line loss with the help of RFME Signal Source and Power Detector:

This application describes how to use the RFME Signal Source and Power Detector to test the transmission line loss. The transmission of energy from one point to another is done with the help of the transmission line. For the effective usage of power and equipment the study of transmission line theory is helpful. Thus a transmission line is a medium of transferring power from the generating station to the load centre.

The two most common types of transmission lines are coaxial line and microstrip line which are the examples of transverse electromagnetic (TEM) transmission lines.

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. As shown in the fig. 1 below a RFME Signal Source is set to a frequency of 2.45GHz and signal level of -1dBm is given to the RFME Power Detector with the help of the coaxial cable. The user easily measures the received signal at RFME Power Detector of -1.6dBm if there is a loss of -0.6dB in the coaxial cable connected in between both the units.
The below setup shows the 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 display "2.450" for 2.45GHz and on RFME Power Detector results will be displayed in dBm as "-01.6" for -1.6 dBm.

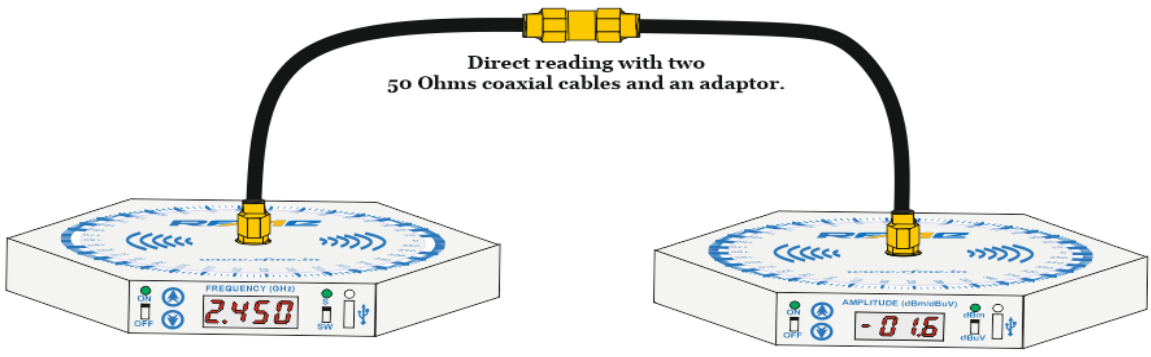

Figure: 1

In Figure: 2 A setup for testing the **50Ω transmission line (microstrip line)** as a device under test (DUT) working at 2.45 GHz can be observed. For 2.45 GHz you can observe the result on RFME Power Detector with the dBm selection as "-01.8" (-1.8dBm) for 0.2dB loss in the impedance matching circuit at 2.45GHz. *1

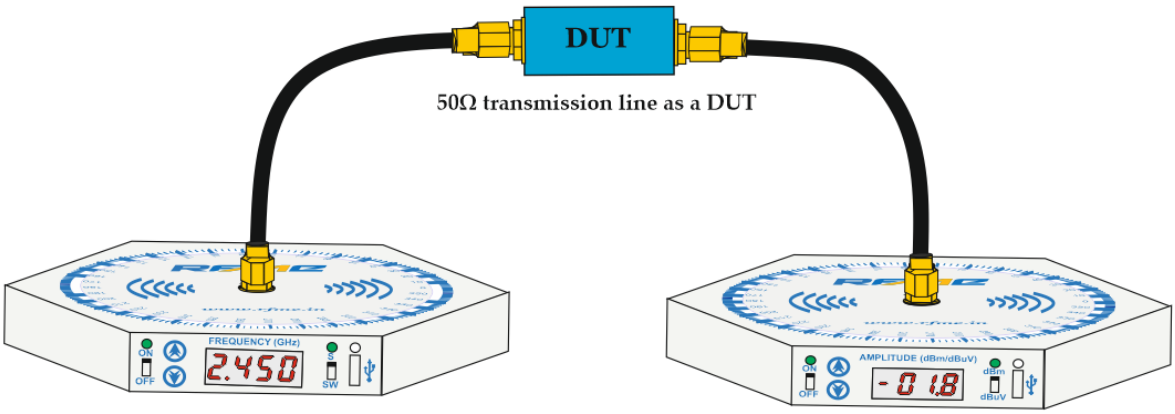

Figure: 2

Now if any other frequencies are to be tested which comes under the band of RFME Signal Source and matching circuit it can be easily checked by following the same procedures. *2

Note: *1) 1.1 dB loss in the direct reading is measured.
*2) Transmission line loss can be checked in single mode only.
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.

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