

Matching Circuit testing with the help of RFME Tx and Rx:

In this application note we will learn how to use the RFME Tx and Rx to test various passive components. By these testing setups the designers and manufacturers will be able to measure performance of the components and circuits used in various systems. The discussion includes transmission of known signal with the help of the RFME Tx (Signal Source) and measuring of amplitude level with the help of RFME Rx (Receiver).

Input - output impedance is need to be matched for proper transmission of any signal from or into RF modules, if not then signal can reflected back to the RF module or can be attenuate within the transmission line. To measure and test the matching circuit or Transmission line RFME designed signal source and receiver can be used.

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

For eg. At RFTx, frequency is set to 2.45GHz and signal level of -1dBm is given to the RFRx with the help of the coaxial cable as shown in the Figure: 1. you can easily measure the received signal at RFRx 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 selection of Single mode with the switch position at 'S' on RFTx and in the RFRx the switch is selected for dBm. Thus on RFTx it will display "2.450" for 2.45GHz and on RFRx results will be displayed in dBm as "-01.6" for -1.6 dBm.

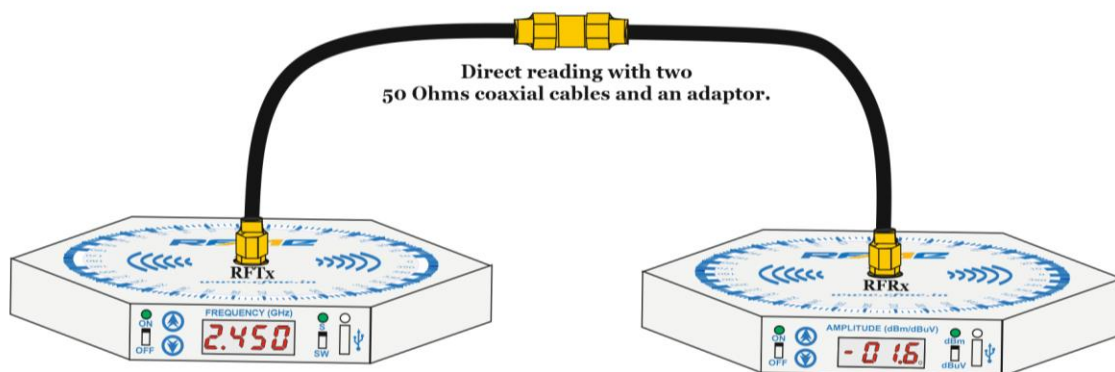
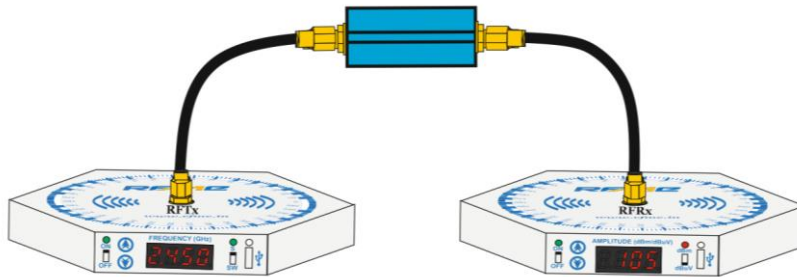


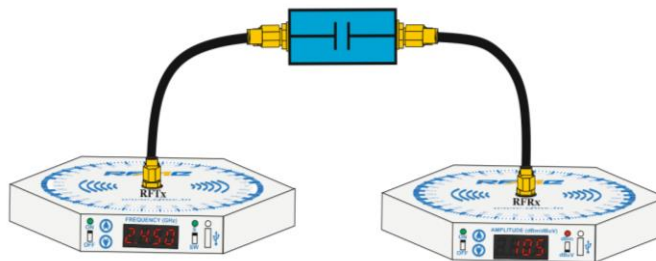
Figure: 1

1) Tuning of Matching circuit:

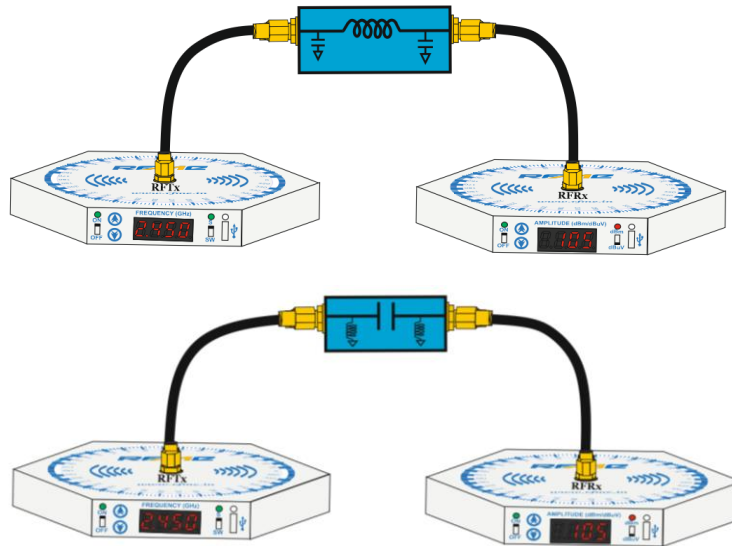
- In first step Connect direct transmission line without any component, to check impedance matching from input to output ends. If transmission line is proper designed, then input power will be equal to output power, it means no loss in transmission line. If output power is less that received power, then transmission line itself having loss. In this case Need to check transmission line design. Be aware that a big reflected wave can puzzle your radio modules or will generate emissions on your PCB.



- Test with just one capacitor in Series.



- You also could end with a Pi circuit (Figure 4 and 5).



- Take care on enough place for components close to the antenna and select capacitors and inductors with small footprint, because smaller footprints will help with less parasitic effects.
- Each capacitor contains an inductive part and each inductor has a capacitive part as well. Never change the manufacturer of the components you selected during the antenna matching circuit.
- Take care that the Epsilon R of your FR4 is always the same in each production lot. Best is not the change the supplier of the manufacturer of the PCBs as well.

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