

## More than SWR:

**In the common usage of the MFJ-269 Analyzer, you would connect it to the antenna to be tested, preset the frequency desired, and power it on.**

- The first display is the MFJ Model and Version #.
- The next display is the "MFJ Enterprises" and date of manufacture.
- The next thing displayed is a battery check. If possible, use an external power supply to save the batteries for outside use.
- Finally, the display will indicate the discovered SWR as well as certain values that are related to the reading of the antenna at the frequency selected.
  - Frequency                      SWR
  - $R_s$  (in *Serial* Ohms)         $X_s$  (in *Serial* Ohms)

***Note: Parallel Values are available in one of the Advanced Menues***

***It is important to pay attention to the  $R_s$  and  $X_s$  values, as they indicate certain things about this SWR indication.***

1. Ideally, you would find not only a very low SWR (like 1:1),  $R_s = 50$  Ohms, and  $X_s = 0$ .
2. However, the lowest SWR would be with the lowest Impedance ( $Z_s$ ), which is actually a vectoral combination of the  $R_s$  &  $X_s$  at this frequency. I.e. At resonance,  $Z_s = R_s$ , with  $X_s = 0$ , indicating resonance (with  $X_L$  &  $X_C$  equal to each other and therefore cancelling each other out)
3. If at the lowest SWR,  $X_s \neq 0$ , then try tuning for the lowest  $X_s$  ( $X_s = 0$  is normally very difficult by manual tuning). See Special Note below.
4. At this point, this is the actual resonance of the antenna, and the  $R_s$  may or may not be the ideal 50 Ohms. If the  $R_s$  was 25 Ohms for instance, the SWR would be 2:1 because of the miss-match between the 2:1 ratio.
5. If this was a Gamma-Match you are working with, this is where you would move the feed-point to as close to 50 Ohms as possible.
6. If resonance is below the desired frequency the antenna is too long and needs to be shortened, and if the resonance is above the desired frequency, and is too short and needs to be lengthened.
7. As a general rule, this is the common method for knowing how to adjust the length of antenna, but if adjusting a Gamma-Match there is another article on more adjustments.

**A Special Note:        { *Advanced Modes are available by pressing Gate & Mode together* }**

***There are "Advanced Modes" available, and one of those will accomplish the method of item #5 automatically, called the "Resonance Mode" (5.4.1.5 in the manual).***

***Advanced Mode #1    Normal SWR Functions described above***  
***Advanced Mode #2    Magnitude and Phase of Load Impedance***  
***Advanced Mode #3    Series Equivalent Impedance***  
***Advanced Mode #4    Parallel Equivalent Impedance***  
***Advanced Mode #5    Return Loss and Reflection Coefficient***  
***Advanced Mode #6    Resonance Mode***  
***Advanced Mode #7    Match Efficiency***