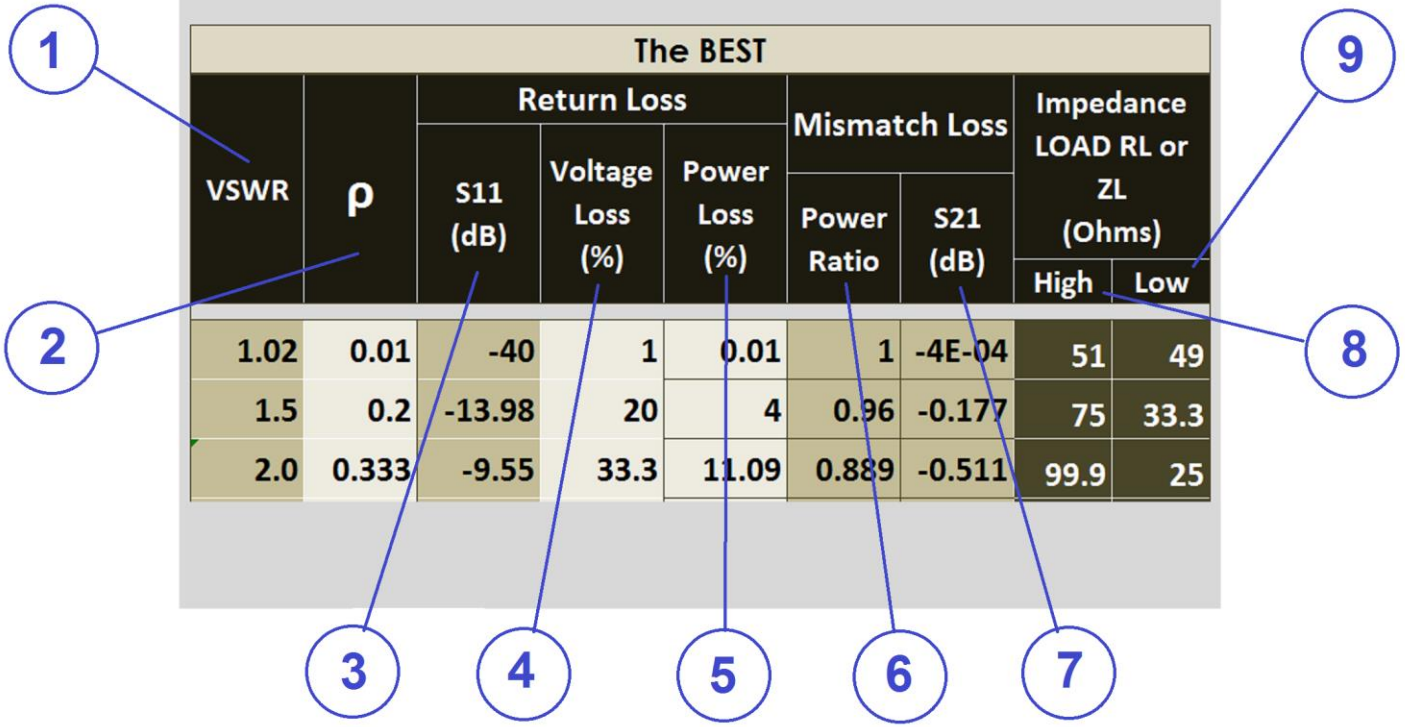
## The Return Loss Tables. Comments.

# Notes:

### 50 Ohms matching - Return Loss whole table

*Produced by Alex Lapayev*

| The BEST | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| VSWR | ρ | Return Loss | | | Mismatch Loss | | Impedance LOAD RL or ZL (Ohms) | |
| | | S11 (dB) | Voltage Loss (%) | Power Loss (%) | Power Ratio | S21 (dB) | High | Low |
| 1.02 | 0.01 | -40 | 1 | 0.01 | 1 | -4E-04 | 51 | 49 |
| 1.5 | 0.2 | -13.98 | 20 | 4 | 0.96 | -0.177 | 75 | 33.3 |
| 2.0 | 0.333 | -9.55 | 33.3 | 11.09 | 0.889 | -0.511 | 99.9 | 25 |



1. Voltage Standing Wave Ratio - VSWR and "ρ" (**Notes 1st and 2nd** See please the picture above):

$$VSWR = \frac{(1+\rho)}{(1-\rho)};$$

Where:

$$\rho = |\Gamma|;$$

$$\Gamma = \frac{(RL-RS)}{(RL+RS)} = \frac{V\ return}{V\ forward};$$

- Γ is a complex number that describes both the magnitude and the phase shift of the reflection;
- RL is an R load;
- RS is an R Source;

2. Return Loss (**Notes 3rd ,4th and 5th** ):

S11 Return Loss = -20Lg **ρ** (dB);

Voltage Loss (%);

Power Loss (%);

The **Voltage Percent Losses** and the **Power Percent Losses** is the percentage of Voltage or Power from the forward part of energy only, not from the whole energy. For an example: 50% Losses means two parts of forward energy and one part of return energy: Return = Forward / 2 ~ 0.66 forward and 0.33 losses.

3. Mismatch Loss (**Notes 6th and 7th**):

**Mismatch Loss Power Ratio** is the ratio of incident power to the difference between incident and reflected power:

**Power Loss + Mismatch Loss Power Ratio = 1:**

Power Loss (%) + 100 [Mismatch Loss Ratio] = 1;

S21= Mismatch Loss (dB) = 10Lg (1 - ρ^2);

4. Impedance LOAD RL or ZL (**Notes 8th and 9th** )

**High and Low Load RL or ZL** shows the value of the load impedance in Ohms at which the observed current value of VSWR:

$$\text{RL (high)} = \frac{(RS*\Gamma)+RS)}{(1-\Gamma)};$$

$$\text{RL (low)} = \frac{RS-(RS*\Gamma)}{(1+\Gamma)};$$

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