

## Appendix B Return Loss, VSWR and Reflection Coefficient

Return loss (dB)	Voltage Standing Wave Ratio (VSWR)	Reflection coefficient G
4	4.41943	0.63096
5	3.56977	0.56234
6	3.00952	0.50119
7	2.61457	0.44668
8	2.32285	0.39811
9	2.09988	0.35481
10	1.92495	0.31623
11	1.78489	0.28184
12	1.6709	0.25119
13	1.57689	0.22387
14	1.49852	0.19953
15	1.43258	0.17783
16	1.37668	0.15849
17	1.32898	0.14125
18	1.28805	0.12589
19	1.25276	0.1122
20	1.22222	0.1
21	1.19569	0.08913
22	1.17257	0.07943
23	1.15238	0.07079
24	1.13469	0.0631
25	1.11917	0.05623
26	1.10553	0.05012
27	1.09351	0.04467
28	1.08292	0.03981
29	1.07357	0.03548
30	1.06531	0.03162
31	1.058	0.02818
32	1.05153	0.02512
33	1.0458	0.02239
34	1.04072	0.01995
35	1.03621	0.01778
36	1.03221	0.01585
37	1.02866	0.01413
38	1.0255	0.01259
39	1.0227	0.01122
40	1.0202	0.01
41	1.01799	0.00891
42	1.01601	0.00794
43	1.01426	0.00708
44	1.0127	0.00631
45	1.01131	0.00562
46	1.01007	0.00501
47	1.00897	0.00447
48	1.00799	0.00398
49	1.00712	0.00355
50	1.00634	0.00316

The calculation formulas for reflection coefficient  $\Gamma$ , return Loss (RL), and VSWR are displayed in the following table:

Reflection coefficient $\Gamma$	VSWR	Return loss (dB)
$\Gamma = \frac{U_{reflected}}{U_{forward}}$	$VSWR = \frac{U_{forward} + U_{reflected}}{U_{forward} - U_{reflected}}$	$RL = 20 \lg \frac{U_{forward}}{U_{reflected}}$
$\Gamma = \frac{1}{\text{alg}\left(\frac{RL}{20}\right)}$	$VSWR = \frac{1 + \Gamma}{1 - \Gamma}$	$RL = 20 \lg \frac{1}{\Gamma}$
$\Gamma = \frac{VSWR - 1}{VSWR + 1}$	$VSWR = \frac{\text{alg}\left(\frac{RL}{20}\right) + 1}{\text{alg}\left(\frac{RL}{20}\right) - 1}$	$RL = 20 \lg \frac{VSWR + 1}{VSWR - 1}$

In the above formulas, *Uforward* stands for forward voltage and *Ureflected* for reverse voltage.