



Calibration Laboratory Cert: 5518.01

ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994  
**Accredited Calibration Certificate**

Customer Address: Rental

Order / RMA:

Certificate: A24101405DR

Product: Dual Directional Coupler  
 Manufacturer: The EMC Shop  
 Model: DC18G-400  
 Serial: 23-1083-04

Notes: Frequency Range: 500MHz to 18GHz

Date of Report: 10/14/2024  
 Date of Calibration: 10/14/2024  
 Next Calibration:

***The next calibration date is defined by the equipment user/owner. We recommend recalibration annually.***

The results of the tests performed are held on file at The EMC Shop. The calibration was carried out in accordance with the general requirements of ISO/IEC 17025-2017, ANSI Z-540-1, and IEC 61000-4-3 using laboratory standards which are traceable to the SI International System of Quantities through the National Institute of Standards and Technology (NIST), and or other Accredited bodies except where none exist. Tests are carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. This certificate shall not be reproduced except in full without the written approval of the laboratory. The uncertainty results meet the requirements of the ISO/IEC 17025-2017 standard and ILAC Doc.P14. Statements of conformity (e.g. Pass or Fail) are made in accordance with Simple Acceptance decision rules as defined in ILAC G8 with a TUR of 4:1 or greater. The customer is responsible for considering whether the inclusion of the uncertainties shown on the certificate would prevent their use of the equipment based on their risk evaluations. Results are accredited unless annotated with an asterisk "\*". The Results presented above are only applicable to the Model/Serial number shown. Template Rev1.

**Ambient Conditions of Laboratory**

Temperature (°C): **22**  
 Relative Humidity (%): **36**

Technician: **Dan Raines**

Technician Signature: \_\_\_\_\_



Calibration Equipment				
Model	Description	Serial Number	Certificate	Due Date
ZNB 8	Network Analyzer	102017	S220805-021	8/9/2025
ZV-Z21	Cal Kit	100800	584251 D-K-15195-01-00	7/26/2025

Calibration method used: IEC 61000-4-3

<b>Condition as found:</b>	<b>IN tolerance</b>
<b>Condition as left:</b>	<b>IN tolerance</b>

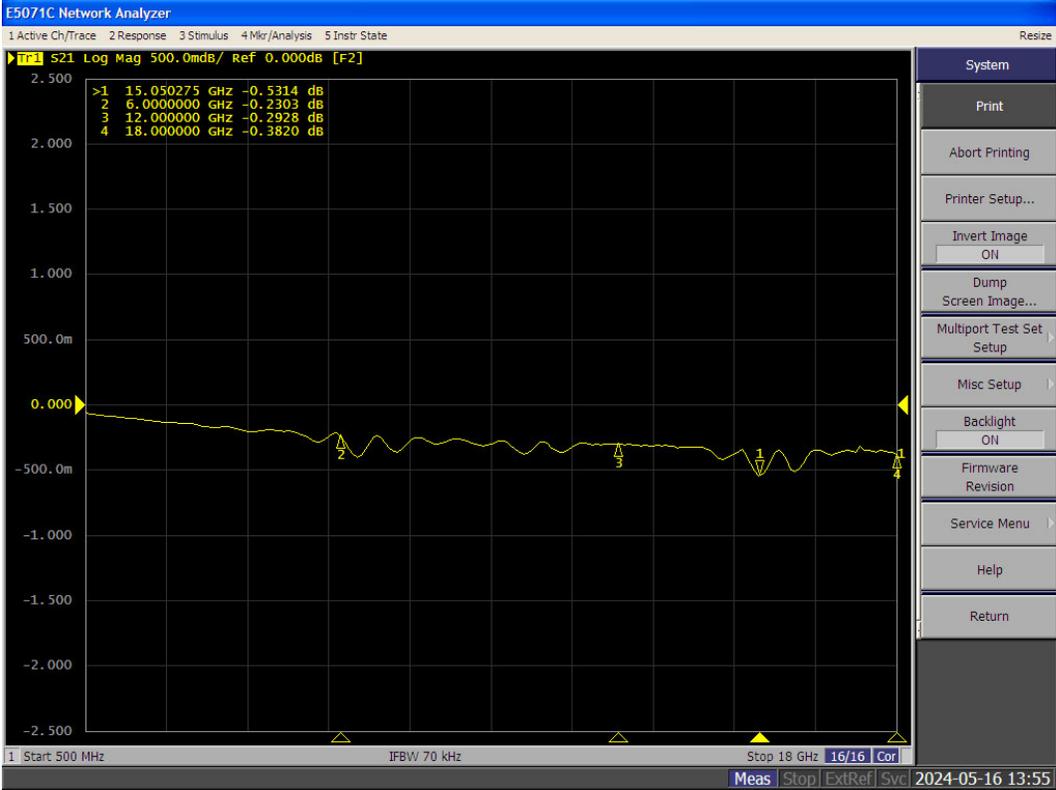
Measuring Uncertainties	
Insertion Loss	<b>0.2 dB</b>
VSWR	<b>0.2 U</b>

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k$  such that the coverage probability corresponds to approximately 95%



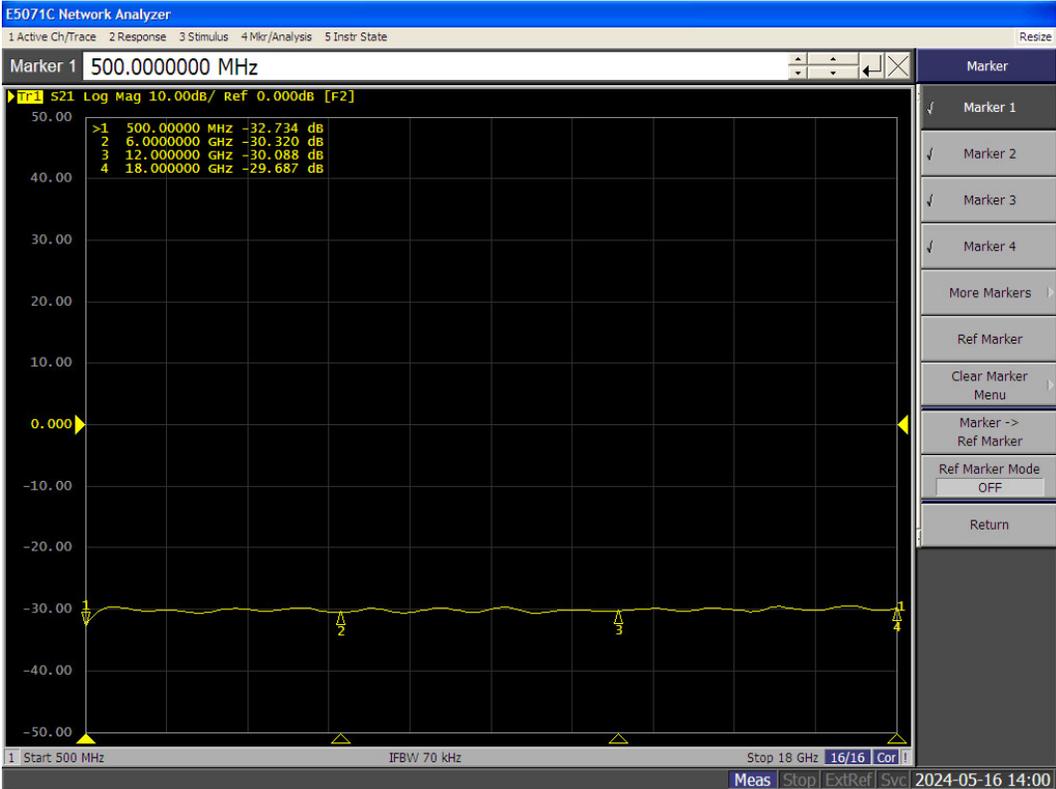
### Insertion Loss - J1 to J2

Tolerance: < 1 dB



### Forward Coupling - J1 to J3

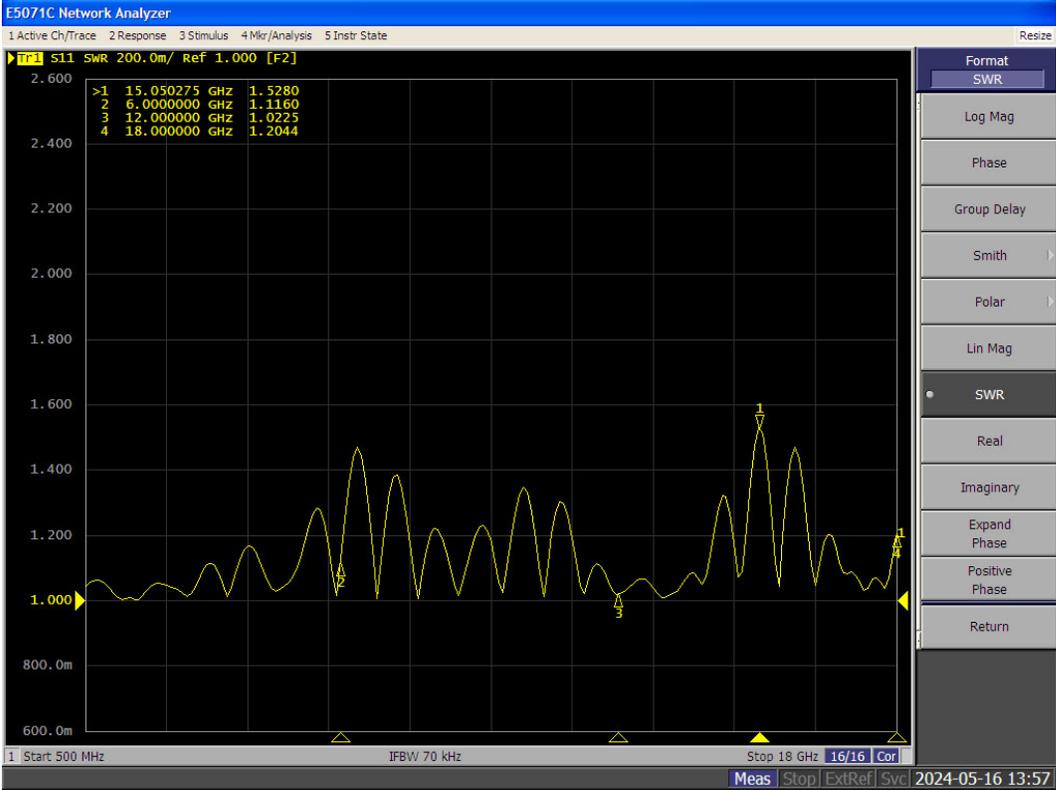
Tolerance: 30dB +/-3dB





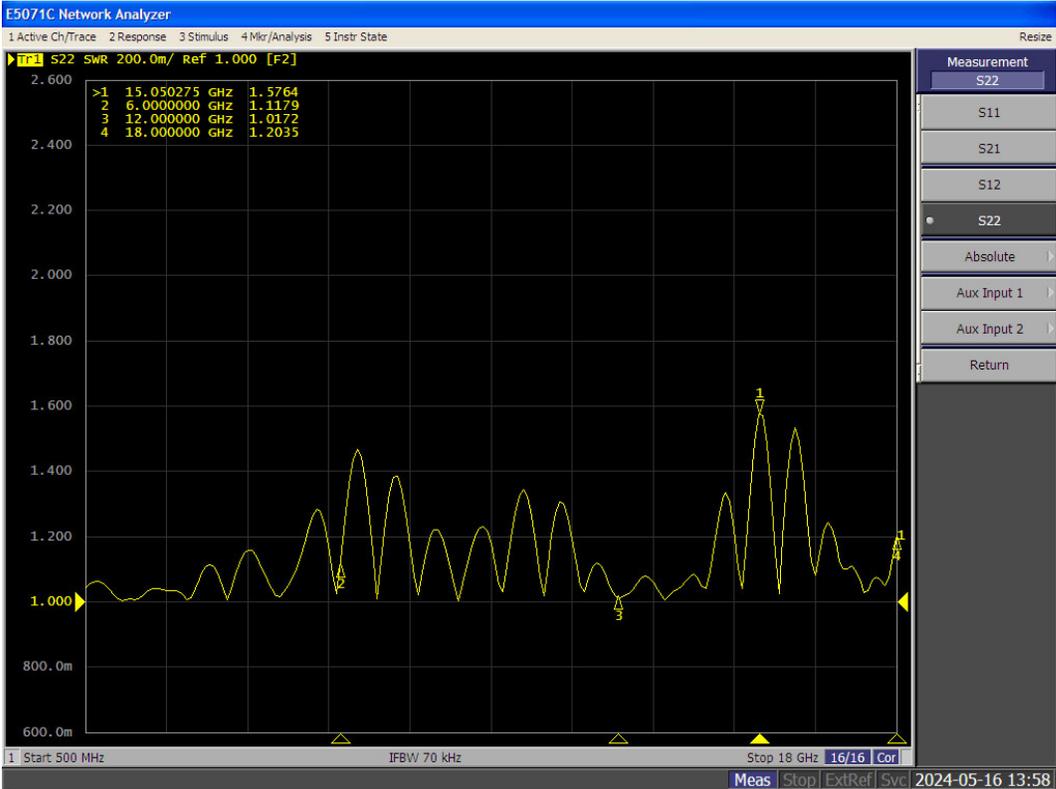
### VSWR - J1

Tolerance:  $\leq 1.80$  U



### VSWR - J2

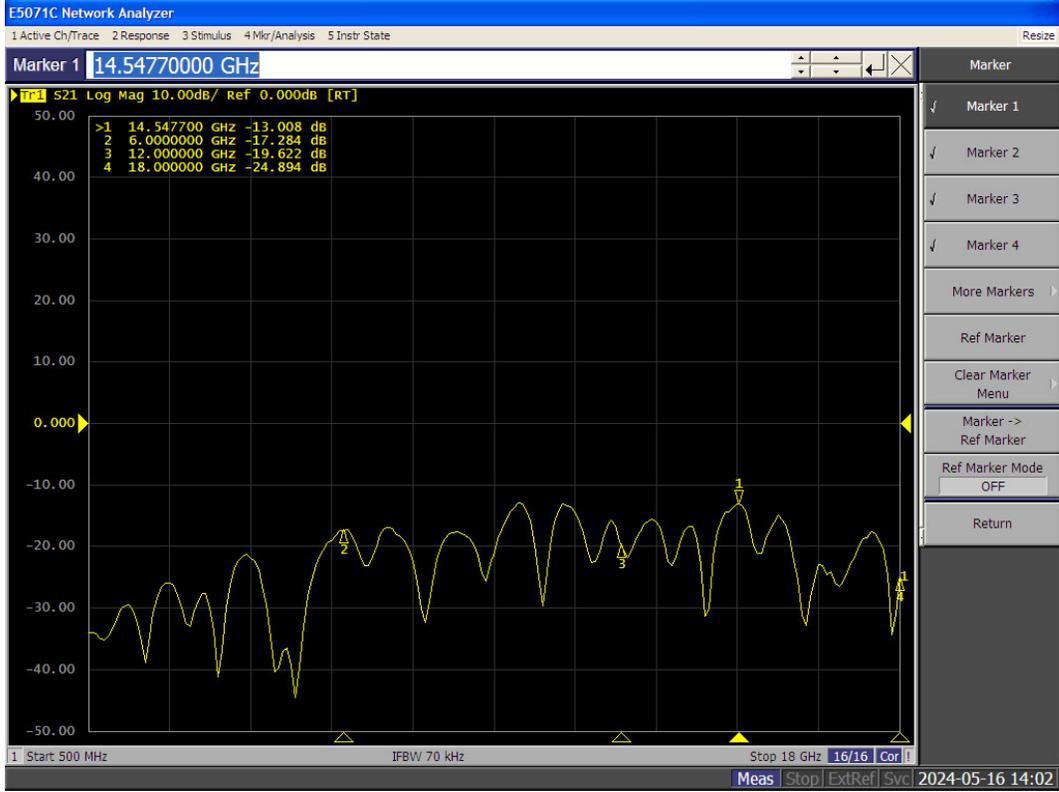
Tolerance:  $\leq 1.80$  U





Directivity - J2 to J3

Tolerance:  $\geq 10$





Frequency (Hz)	Insertion Loss J1 to J2 (dB)	Forward Coupling J1 to J3 (dB)	Directivity J2 to J3 (dB)	VSWR J1 (U)	VSWR J2 (U)
500000000	-0.05	-32.8	-34.0	1.04	1.04
587500000	-0.06	-31.7	-34.3	1.06	1.06
675000000	-0.07	-30.9	-34.2	1.06	1.06
762500000	-0.07	-30.4	-35.0	1.07	1.07
850000000	-0.07	-30.0	-34.9	1.06	1.06
937500000	-0.08	-29.7	-34.7	1.05	1.05
1025000000	-0.08	-29.6	-33.3	1.04	1.04
1112500000	-0.08	-29.5	-31.4	1.03	1.03
1200000000	-0.09	-29.5	-30.0	1.01	1.01
1287500000	-0.09	-29.6	-29.6	1.00	1.01
1375000000	-0.09	-29.7	-29.3	1.01	1.01
1462500000	-0.09	-29.8	-30.2	1.01	1.01
1550000000	-0.10	-29.9	-32.0	1.01	1.01
1637500000	-0.10	-30.0	-35.5	1.01	1.01
1725000000	-0.10	-30.1	-39.0	1.02	1.02
1812500000	-0.11	-30.1	-35.4	1.03	1.03
1900000000	-0.11	-30.1	-30.9	1.04	1.04
1987500000	-0.12	-30.1	-28.2	1.05	1.04
2075000000	-0.12	-30.0	-26.6	1.06	1.04
2162500000	-0.12	-30.0	-25.8	1.05	1.04
2250000000	-0.12	-30.0	-25.7	1.05	1.04
2337500000	-0.13	-30.0	-26.0	1.05	1.04
2425000000	-0.13	-30.1	-27.9	1.04	1.04
2512500000	-0.13	-30.1	-29.7	1.03	1.03
2600000000	-0.13	-30.2	-32.4	1.03	1.02
2687500000	-0.14	-30.3	-32.7	1.02	1.01
2775000000	-0.14	-30.4	-30.5	1.02	1.02
2862500000	-0.14	-30.4	-28.6	1.04	1.04
2950000000	-0.15	-30.4	-27.5	1.07	1.07
3037500000	-0.15	-30.4	-27.7	1.09	1.10
3125000000	-0.16	-30.4	-29.4	1.11	1.11
3212500000	-0.16	-30.3	-33.7	1.12	1.12
3300000000	-0.17	-30.1	-40.9	1.11	1.11
3387500000	-0.16	-30.0	-36.4	1.09	1.08
3475000000	-0.16	-29.9	-29.6	1.05	1.04

3562500000	-0.16	-29.8	-26.1	1.02	1.01
3650000000	-0.16	-29.7	-23.4	1.04	1.04
3737500000	-0.17	-29.7	-22.0	1.09	1.09
3825000000	-0.18	-29.8	-21.4	1.13	1.12
3912500000	-0.19	-29.8	-21.2	1.16	1.15
4000000000	-0.20	-29.9	-21.8	1.17	1.16
4087500000	-0.20	-30.0	-22.3	1.17	1.16
4175000000	-0.20	-30.1	-23.7	1.15	1.14
4262500000	-0.19	-30.1	-26.2	1.13	1.12
4350000000	-0.19	-30.2	-29.1	1.09	1.10
4437500000	-0.18	-30.2	-34.7	1.06	1.07
4525000000	-0.18	-30.1	-40.0	1.04	1.04
4612500000	-0.19	-30.1	-38.8	1.03	1.02
4700000000	-0.19	-30.0	-36.4	1.04	1.02
4787500000	-0.19	-29.9	-36.3	1.05	1.04
4875000000	-0.19	-29.8	-38.7	1.06	1.05
4962500000	-0.20	-29.7	-44.8	1.07	1.07
5050000000	-0.20	-29.6	-40.1	1.10	1.10
5137500000	-0.22	-29.6	-32.8	1.14	1.14
5225000000	-0.23	-29.6	-28.0	1.18	1.18
5312500000	-0.25	-29.7	-25.4	1.23	1.23
5400000000	-0.27	-29.8	-22.9	1.27	1.27
5487500000	-0.28	-30.0	-21.4	1.29	1.29
5575000000	-0.28	-30.1	-20.4	1.28	1.28
5662500000	-0.26	-30.2	-19.3	1.24	1.24
5750000000	-0.24	-30.3	-18.8	1.17	1.18
5837500000	-0.22	-30.3	-18.1	1.08	1.09
5925000000	-0.21	-30.3	-17.3	1.02	1.03
6012500000	-0.23	-30.3	-17.3	1.13	1.13
6100000000	-0.27	-30.3	-17.2	1.25	1.25
6187500000	-0.33	-30.3	-18.1	1.36	1.36
6275000000	-0.37	-30.2	-19.7	1.44	1.44
6362500000	-0.39	-30.1	-21.5	1.47	1.47
6450000000	-0.38	-29.9	-23.1	1.45	1.45
6537500000	-0.33	-29.8	-23.0	1.37	1.37
6625000000	-0.28	-29.7	-21.5	1.26	1.26
6712500000	-0.24	-29.7	-19.7	1.13	1.12
6800000000	-0.23	-29.7	-17.8	1.01	1.01
6887500000	-0.24	-29.8	-17.0	1.13	1.13
6975000000	-0.28	-30.0	-16.7	1.24	1.25
7062500000	-0.32	-30.1	-17.0	1.33	1.34
7150000000	-0.34	-30.3	-17.9	1.38	1.39
7237500000	-0.35	-30.4	-18.2	1.39	1.39
7325000000	-0.33	-30.4	-19.0	1.35	1.35

7412500000	-0.30	-30.4	-20.2	1.27	1.27
7500000000	-0.26	-30.4	-22.3	1.18	1.18
7587500000	-0.25	-30.3	-25.6	1.08	1.08
7675000000	-0.24	-30.2	-30.0	1.01	1.03
7762500000	-0.25	-30.0	-32.3	1.09	1.09
7850000000	-0.27	-29.9	-29.0	1.16	1.16
7937500000	-0.28	-29.8	-24.8	1.20	1.20
8025000000	-0.29	-29.7	-22.0	1.22	1.22
8112500000	-0.29	-29.6	-19.9	1.22	1.22
8200000000	-0.28	-29.6	-18.6	1.19	1.20
8287500000	-0.28	-29.7	-17.8	1.15	1.16
8375000000	-0.26	-29.8	-17.5	1.11	1.11
8462500000	-0.26	-29.9	-17.4	1.05	1.05
8550000000	-0.25	-30.1	-17.8	1.02	1.01
8637500000	-0.26	-30.2	-18.0	1.06	1.06
8725000000	-0.27	-30.3	-18.6	1.11	1.11
8812500000	-0.28	-30.4	-19.4	1.16	1.16
8900000000	-0.30	-30.4	-21.2	1.20	1.20
8987500000	-0.30	-30.3	-24.3	1.23	1.23
9075000000	-0.31	-30.2	-25.4	1.23	1.23
9162500000	-0.30	-30.1	-22.6	1.22	1.22
9250000000	-0.29	-29.9	-20.7	1.18	1.18
9337500000	-0.28	-29.7	-18.7	1.13	1.13
9425000000	-0.27	-29.6	-17.1	1.06	1.06
9512500000	-0.27	-29.5	-15.9	1.03	1.03
9600000000	-0.28	-29.6	-14.3	1.11	1.11
9687500000	-0.31	-29.7	-13.6	1.19	1.20
9775000000	-0.33	-29.8	-12.7	1.27	1.28
9862500000	-0.36	-30.0	-12.9	1.33	1.33
9950000000	-0.37	-30.2	-14.1	1.35	1.35
10037500000	-0.36	-30.3	-15.8	1.33	1.33
10125000000	-0.33	-30.4	-19.5	1.28	1.27
10212500000	-0.31	-30.4	-25.2	1.19	1.18
10300000000	-0.28	-30.4	-30.2	1.09	1.08
10387500000	-0.28	-30.4	-23.4	1.01	1.02
10475000000	-0.29	-30.3	-18.6	1.11	1.12
10562500000	-0.32	-30.2	-15.9	1.21	1.21
10650000000	-0.34	-30.1	-14.0	1.27	1.28
10737500000	-0.36	-30.1	-12.9	1.31	1.31
10825000000	-0.36	-30.0	-13.0	1.30	1.30
10912500000	-0.34	-29.9	-13.3	1.26	1.26
11000000000	-0.32	-29.9	-14.2	1.20	1.20
11087500000	-0.30	-29.9	-15.7	1.12	1.12
11175000000	-0.29	-29.9	-17.6	1.05	1.05

11262500000	-0.29	-30.0	-20.3	1.03	1.03
11350000000	-0.29	-30.0	-22.7	1.07	1.08
11437500000	-0.30	-30.1	-22.4	1.10	1.11
11525000000	-0.29	-30.1	-21.0	1.12	1.12
11612500000	-0.30	-30.1	-18.1	1.11	1.11
11700000000	-0.30	-30.1	-16.4	1.09	1.09
11787500000	-0.29	-30.1	-15.6	1.06	1.06
11875000000	-0.29	-30.1	-16.5	1.03	1.04
11962500000	-0.29	-30.1	-18.8	1.02	1.02
12050000000	-0.29	-30.1	-20.6	1.02	1.02
12137500000	-0.30	-30.0	-21.5	1.03	1.02
12225000000	-0.29	-30.0	-20.5	1.04	1.03
12312500000	-0.30	-29.9	-18.7	1.05	1.04
12400000000	-0.30	-29.9	-17.3	1.07	1.06
12487500000	-0.31	-29.8	-16.5	1.07	1.07
12575000000	-0.30	-29.8	-15.7	1.07	1.08
12662500000	-0.30	-29.7	-15.6	1.06	1.08
12750000000	-0.31	-29.7	-16.0	1.04	1.06
12837500000	-0.30	-29.7	-17.1	1.02	1.04
12925000000	-0.31	-29.8	-19.5	1.01	1.02
13012500000	-0.30	-29.8	-22.6	1.01	1.01
13100000000	-0.31	-30.0	-23.2	1.02	1.02
13187500000	-0.30	-30.0	-21.4	1.02	1.03
13275000000	-0.32	-30.1	-19.2	1.03	1.04
13362500000	-0.32	-30.2	-17.4	1.05	1.05
13450000000	-0.31	-30.2	-16.6	1.07	1.06
13537500000	-0.32	-30.2	-16.5	1.08	1.08
13625000000	-0.32	-30.1	-18.4	1.09	1.09
13712500000	-0.32	-30.0	-22.9	1.07	1.08
13800000000	-0.31	-29.9	-32.4	1.05	1.05
13887500000	-0.33	-29.8	-30.2	1.08	1.04
13975000000	-0.34	-29.7	-21.5	1.14	1.10
14062500000	-0.38	-29.7	-17.5	1.22	1.18
14150000000	-0.40	-29.7	-15.5	1.29	1.26
14237500000	-0.41	-29.8	-14.3	1.33	1.32
14325000000	-0.40	-29.8	-14.2	1.32	1.34
14412500000	-0.38	-29.9	-13.5	1.27	1.31
14500000000	-0.37	-29.9	-12.9	1.18	1.22
14587500000	-0.35	-29.9	-13.1	1.08	1.11
14675000000	-0.33	-30.0	-13.9	1.09	1.04
14762500000	-0.38	-30.1	-16.5	1.22	1.19
14850000000	-0.44	-30.2	-19.5	1.37	1.35
14937500000	-0.50	-30.2	-21.1	1.48	1.49
15025000000	-0.53	-30.2	-21.0	1.53	1.58

15112500000	-0.52	-30.0	-18.6	1.51	1.57
15200000000	-0.48	-29.7	-17.3	1.42	1.49
15287500000	-0.41	-29.6	-16.0	1.28	1.33
15375000000	-0.35	-29.4	-14.7	1.12	1.15
15462500000	-0.33	-29.4	-15.3	1.05	1.03
15550000000	-0.37	-29.5	-16.3	1.20	1.20
15637500000	-0.42	-29.6	-18.1	1.34	1.37
15725000000	-0.48	-29.7	-21.7	1.44	1.48
15812500000	-0.51	-29.8	-25.8	1.47	1.54
15900000000	-0.48	-29.8	-31.7	1.44	1.50
15987500000	-0.44	-29.9	-33.4	1.35	1.39
16075000000	-0.38	-30.0	-27.7	1.23	1.25
16162500000	-0.35	-30.0	-24.9	1.11	1.12
16250000000	-0.34	-30.0	-23.2	1.05	1.08
16337500000	-0.34	-30.0	-23.1	1.12	1.15
16425000000	-0.35	-29.9	-24.2	1.18	1.22
16512500000	-0.37	-29.8	-24.5	1.21	1.25
16600000000	-0.38	-29.7	-26.0	1.20	1.23
16687500000	-0.36	-29.6	-27.0	1.16	1.18
16775000000	-0.36	-29.5	-25.8	1.12	1.13
16862500000	-0.34	-29.4	-24.8	1.09	1.10
16950000000	-0.33	-29.3	-22.2	1.08	1.10
17037500000	-0.35	-29.4	-21.6	1.09	1.11
17125000000	-0.35	-29.4	-20.3	1.08	1.10
17212500000	-0.31	-29.4	-18.6	1.06	1.07
17300000000	-0.34	-29.6	-18.3	1.03	1.03
17387500000	-0.34	-29.7	-17.2	1.04	1.04
17475000000	-0.35	-29.9	-17.6	1.07	1.07
17562500000	-0.35	-30.0	-18.9	1.07	1.08
17650000000	-0.34	-30.0	-20.1	1.06	1.07
17737500000	-0.35	-30.0	-23.9	1.04	1.05
17825000000	-0.35	-30.0	-34.1	1.07	1.08
17912500000	-0.35	-29.9	-32.6	1.14	1.14
18000000000	-0.38	-29.7	-25.1	1.20	1.20

***End of Calibration Report: Directional Coupler cert. rev. 1***