Calibration Laboratory Cert: 5518.01

ISO/IEC 17025:2017 and ANSI/NCSL Z540.1-1994

Accredited Calibration Certificate

Customer Address:	Rental
Order / RMA:	
Certificate:	A24090501DR
Product:	RF Immunity System
Manufacturer:	The EMC Shop
Model:	NSG 4070-75
Serial:	26996
Notes:	
Date of Report:	9/6/2024
Date of Calibration:	9/5/2024
Next Calibration:	

The next calibration date is defined by the equipment user/owner.

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 and ANSI Z-540-1 at the address shown above, 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. Calibrations will be completed with the understanding that our Laboratories' estimate of uncertainty for the measurement is not included and not considered in the Pass/Fail/Tolerance decision. Results are accredited values unless annotated with an asterisk *. The Results presented below are only applicable to the Model/Serial number shown.

Ambient Conditions of Laboratory	
Temperature (°C):	22
Relative Humidity (%):	38

Technician: Dan Raines

Technician Signature: _____

The EMC Shop

Calibration Equipment				
Model	Description	Serial Number	Certificate	Due Date
ZNB 8	Network Analyzer	103153	5000-309120570	7/3/2025
ZV-Z21	Cal Kit	100800	584251 D-K-15195-01-00	7/26/2025
E9304A	Power Sensor	MY62480010	WO-00569563	9/5/2025
E4419B	Power Meter	GB40202731	1-17660891762-1	5/24/2025
ECO-2G	Oscilloscope	SDS62DDQ6R0169	551220085524529	12/8/2024
N9010A	Spectrum Analyzer	MY54510521	1-14095158622-1	3/1/2025

Calibration method used: IEC 61000-4-6

VSWR measurements made are not accredited

Condition as found:	IN tolerance
Condition as left:	IN tolerance

Measuring Uncertainties	
Insertion Loss	± 0.2 dB
RF Power Level	± 0.3 dB
Power Amplifer Gain Linearity	± 0.44 dB

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%

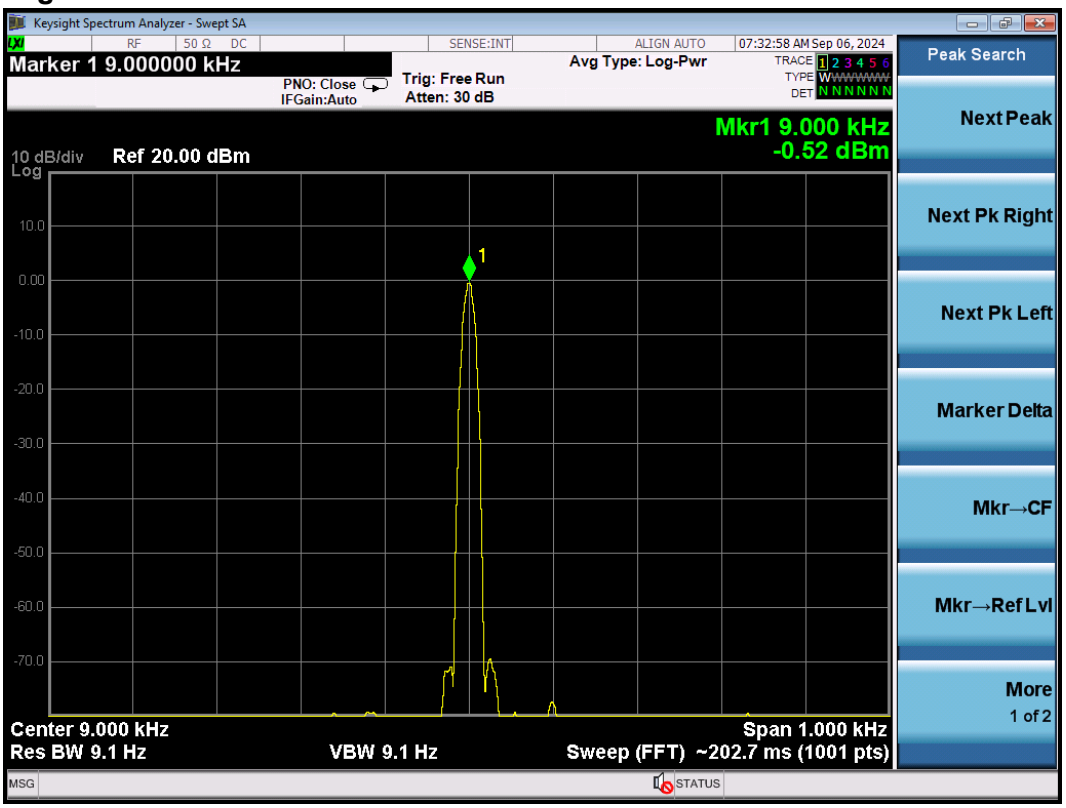
RF Out Main Generator Linearity - tested at 100 MHz

Nominal (dBm)	Actual (dBm)	Difference (dBm)
-40.00	-40.41	-0.41
-35.00	-35.35	-0.35
-30.00	-30.31	-0.31
-25.00	-25.30	-0.30
-20.00	-20.29	-0.29
-15.00	-15.16	-0.16
-10.00	-10.13	-0.13
-5.00	-5.01	-0.01
0.00	0.01	0.01
5.00	5.03	0.03
10.00	10.03	0.03

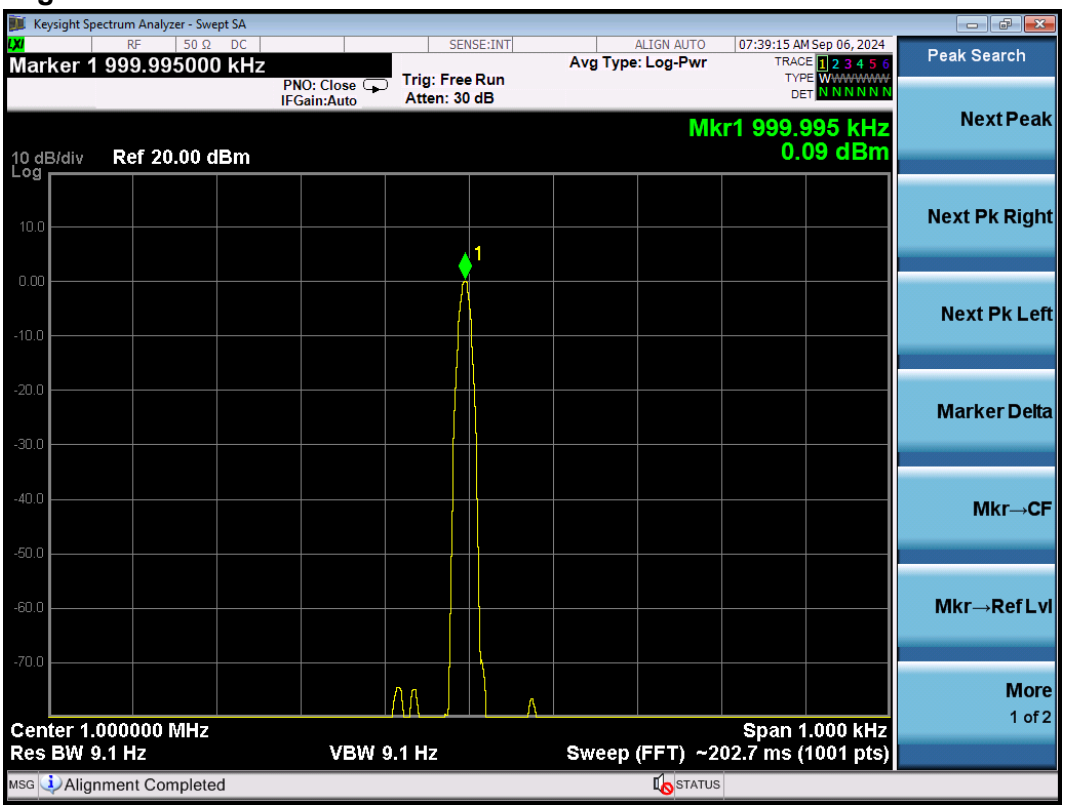
RF Out Main Generator Flatness - tested at -10 dBm

Frequency (MHz)	Actual (dBm)	Difference (dBm)
0.009	-10.58	-0.58
0.03	-10.02	-0.02
0.06	-10.02	-0.02
0.10	-10.02	-0.02
0.30	-9.98	0.02
0.60	-9.98	0.02
1.00	-9.94	0.06
3.00	-10.03	-0.03
6.00	-10.04	-0.04
10.00	-10.02	-0.02
30.00	-10.09	-0.09
60.00	-10.11	-0.11
100.00	-10.13	-0.13
300.00	-10.27	-0.27
600.00	-10.15	-0.15
1000.00	-9.73	0.27

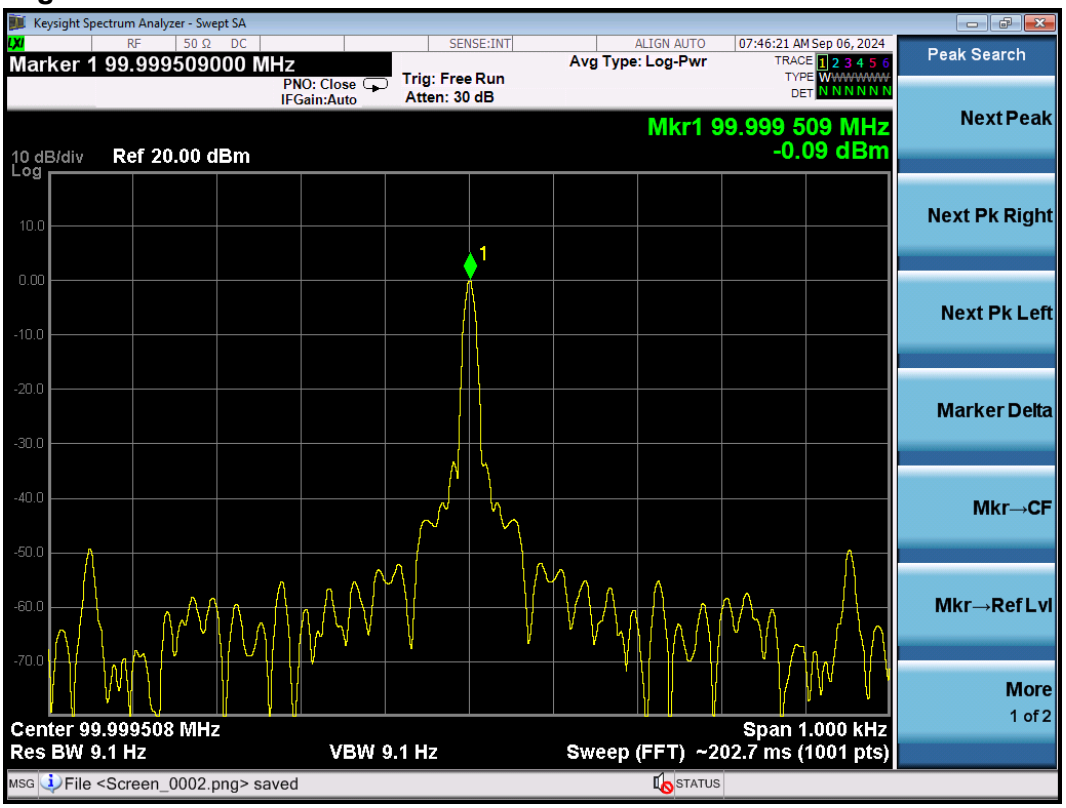
Signal Generator 0dBm out at 9kHz



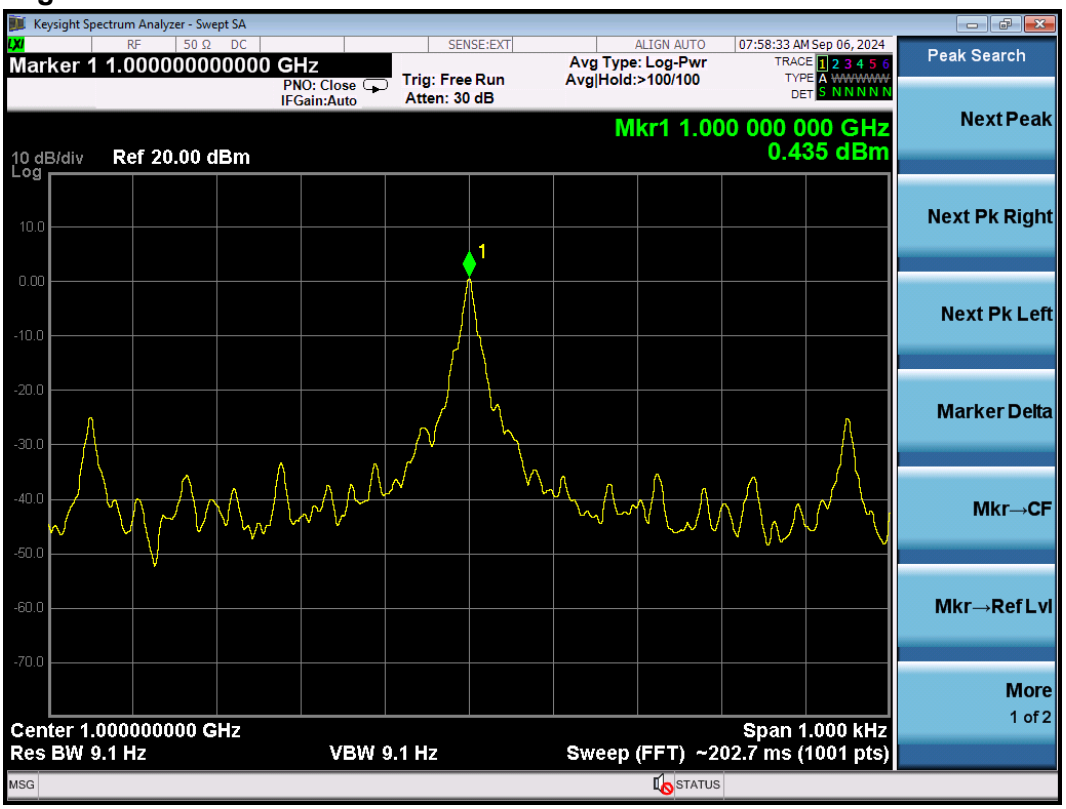
Signal Generator 0dBm out at 1MHz



Signal Generator 0dBm out at 100MHz



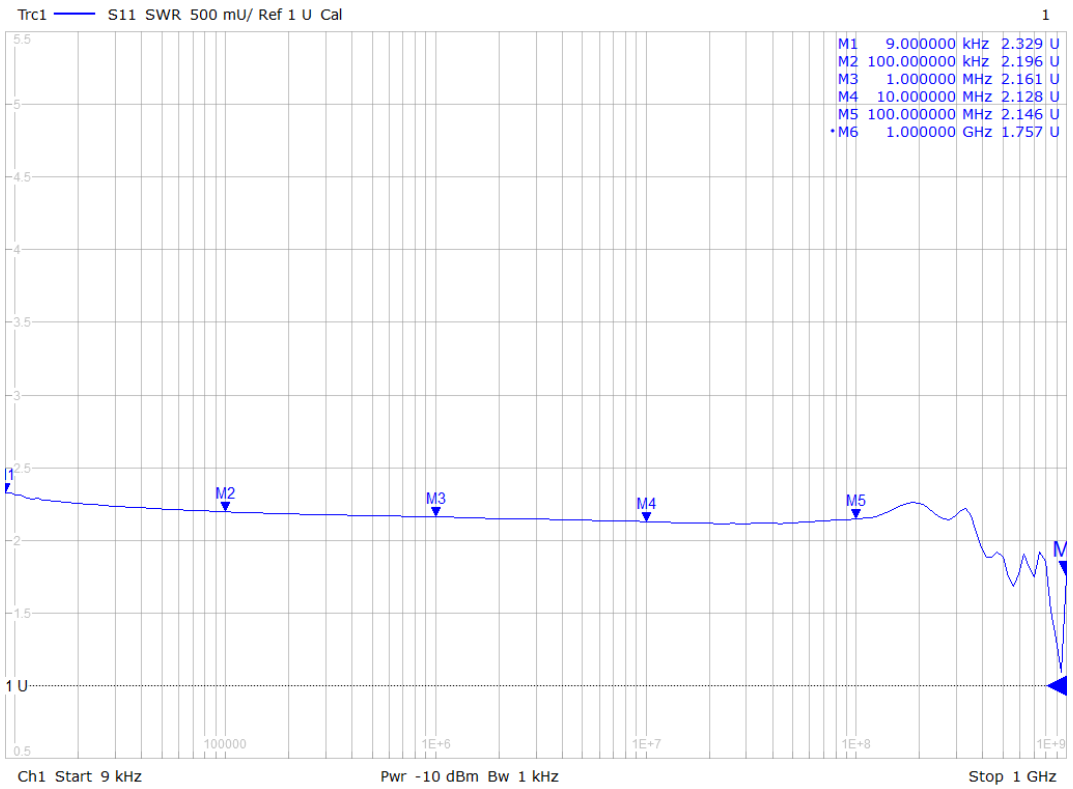
Signal Generator 0dBm out at 1GHz



RF Out Main Generator VSWR - tested at -10 dBm

Frequency (MHz)	VSWR (U)	Tol. Error (U)	Verdict
0.010	2.320	<2.4	PASS
0.03	2.241	<2.4	PASS
0.06	2.211	<2.4	PASS
0.10	2.202	<2.4	PASS
0.30	2.175	<2.4	PASS
0.60	2.171	<2.4	PASS
1	2.162	<2.4	PASS
3	2.150	<2.4	PASS
6	2.144	<2.4	PASS
10	2.133	<2.4	PASS
30	2.114	<2.4	PASS
60	2.133	<2.4	PASS
100	2.141	<2.4	PASS
300	2.182	<2.4	PASS
1,000	1.757	<2.4	PASS

RF Out Main Generator VSWR



Power Meter Ch1 Linearity - tested at 100 MHz

Nominal (dBm)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
-25.00	-25.41	-0.41	±0.50	PASS
-20.00	-20.37	-0.37	±0.50	PASS
-15.00	-15.22	-0.22	±0.50	PASS
-10.00	-10.02	-0.02	±0.50	PASS
-5.00	-5.09	-0.09	±0.50	PASS
0.00	0.01	0.01	±0.50	PASS
5.00	4.93	-0.07	±0.50	PASS
10.00	9.99	-0.01	±0.50	PASS
15.00	15.08	0.08	±0.50	PASS

Power Meter Ch1 Flatness - tested at -10 dBm

Frequency (MHz)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
0.009	-10.27	-0.27	±0.50	PASS
0.03	-9.81	0.19	±0.50	PASS
0.06	-9.82	0.18	±0.50	PASS
0.10	-9.80	0.20	±0.50	PASS
0.30	-9.85	0.15	±0.50	PASS
0.60	-9.89	0.11	±0.50	PASS
1	-9.90	0.10	±0.50	PASS
3	-9.97	0.03	±0.50	PASS
6	-9.97	0.03	±0.50	PASS
10	-9.91	0.09	±0.50	PASS
30	-10.00	0.00	±0.50	PASS
60	-10.05	-0.05	±0.50	PASS
100	-10.02	-0.02	±0.50	PASS
300	-10.15	-0.15	±0.50	PASS
600	-10.08	-0.08	±0.50	PASS
1000	-10.44	-0.44	±0.50	PASS

Power Meter Ch2 Linearity - tested at 100 MHz

Nominal (dBm)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
-25.00	-25.48	-0.48	±0.50	PASS
-20.00	-20.09	-0.09	±0.50	PASS
-15.00	-15.03	-0.03	±0.50	PASS
-10.00	-10.06	-0.06	±0.50	PASS
-5.00	-5.19	-0.19	±0.50	PASS
0.00	0.00	0.00	±0.50	PASS
5.00	5.17	0.17	±0.50	PASS
10.00	10.16	0.16	±0.50	PASS
15.00	15.29	0.29	±0.50	PASS

Power Meter Ch2 Flatness - tested at -10 dBm

Frequency (MHz)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
0.009	-10.17	-0.17	±0.50	PASS
0.03	-9.81	0.19	±0.50	PASS
0.06	-9.82	0.18	±0.50	PASS
0.10	-9.80	0.20	±0.50	PASS
0.30	-9.85	0.15	±0.50	PASS
0.60	-9.89	0.11	±0.50	PASS
1	-9.90	0.10	±0.50	PASS
3	-9.95	0.05	±0.50	PASS
6	-9.99	0.01	±0.50	PASS
10	-10.06	-0.06	±0.50	PASS
30	-10.00	0.00	±0.50	PASS
60	-10.05	-0.05	±0.50	PASS
100	-10.06	-0.06	±0.50	PASS
300	-10.15	-0.15	±0.50	PASS
600	-10.08	-0.08	±0.50	PASS
1,000	-10.44	-0.44	±0.50	PASS

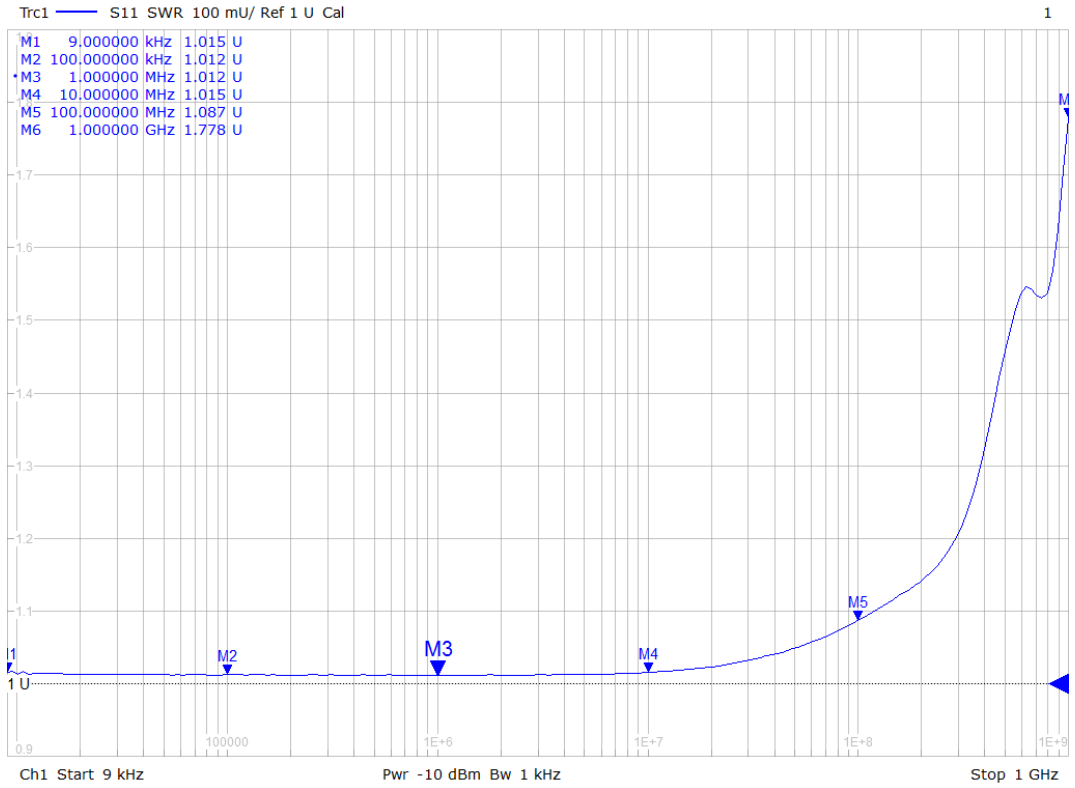
Power Meter Ch3 Linearity - tested at 100 MHz

Nominal (dBm)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
-25.00	-25.46	-0.46	±0.50	PASS
-20.00	-20.11	-0.11	±0.50	PASS
-15.00	-15.04	-0.04	±0.50	PASS
-10.00	-9.94	0.06	±0.50	PASS
-5.00	-5.18	-0.18	±0.50	PASS
0.00	-0.01	-0.01	±0.50	PASS
5.00	5.18	0.18	±0.50	PASS
10.00	10.26	0.26	±0.50	PASS
15.00	15.32	0.32	±0.50	PASS

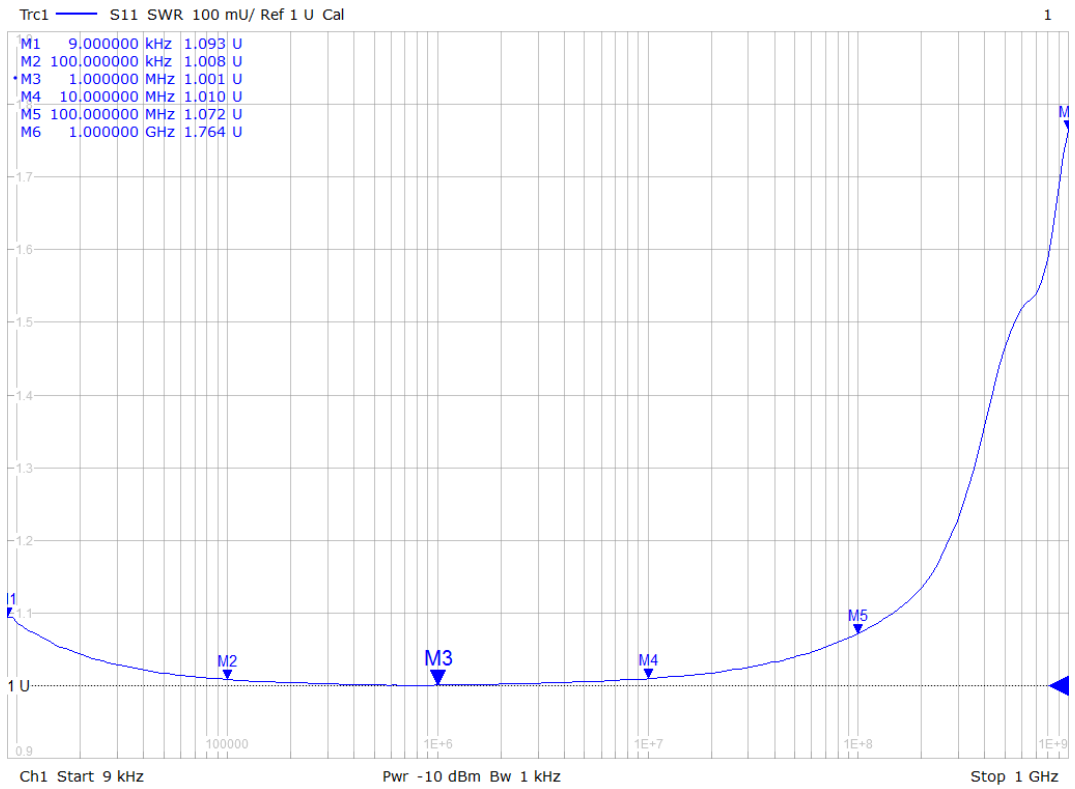
Power Meter Ch3 Flatness - tested at -10 dBm

Frequency (MHz)	Actual (dBm)	Difference (dBm)	Tol. Error (dBm)	Verdict
0.009	-10.12	-0.12	±0.50	PASS
0.03	-9.91	0.09	±0.50	PASS
0.06	-9.82	0.18	±0.50	PASS
0.10	-9.80	0.20	±0.50	PASS
0.30	-9.85	0.15	±0.50	PASS
0.60	-9.89	0.11	±0.50	PASS
1	-9.91	0.09	±0.50	PASS
3	-9.96	0.04	±0.50	PASS
6	-9.97	0.03	±0.50	PASS
10	-9.94	0.06	±0.50	PASS
30	-10.01	-0.01	±0.50	PASS
60	-10.03	-0.03	±0.50	PASS
100	-9.94	0.06	±0.50	PASS
300	-10.15	-0.15	±0.50	PASS
600	-10.08	-0.08	±0.50	PASS
1,000	-10.44	-0.44	±0.50	PASS

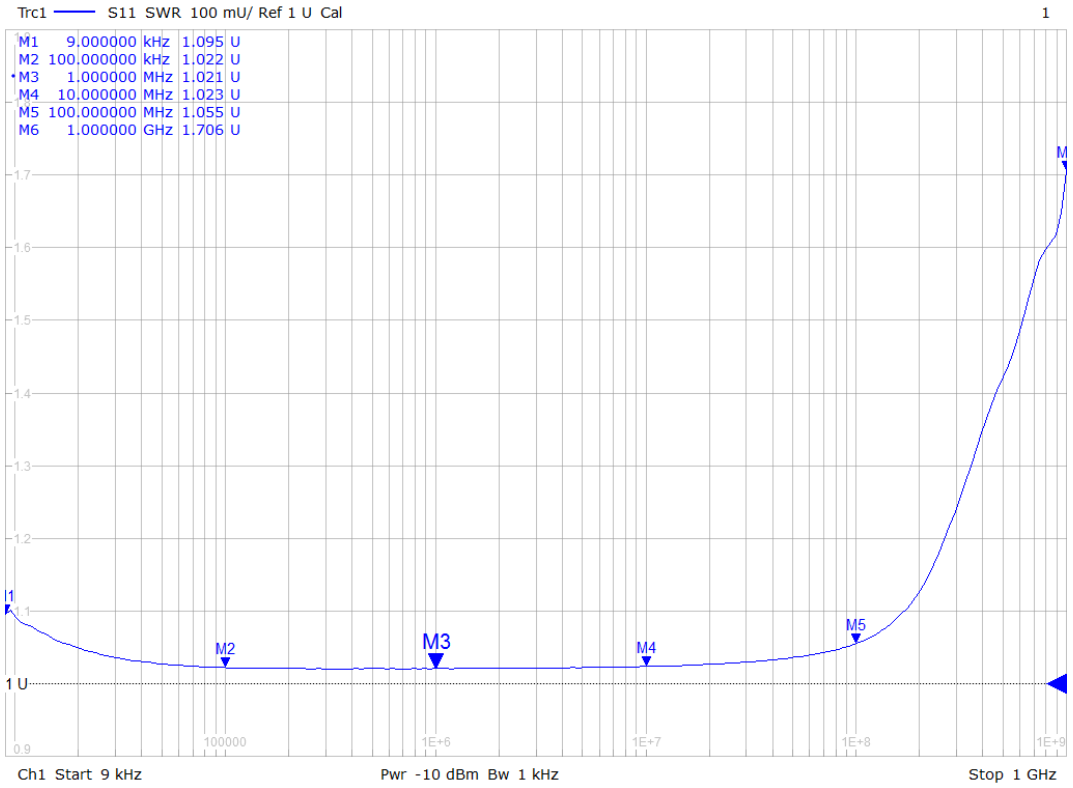
VSWR on Power Meter Ch. 1 Input



VSWR on Power Meter Ch. 2 Input



VSWR on Power Meter Ch. 3 Input



Harmonics on Amplifier RF Out _ tested at -10dBm Input

Frequency (MHz)	2nd Harmonic (dBc)	Tol. Error (dBc)	Verdict
0.15	-42.76	<-15	PASS
0.30	-42.74	<-15	PASS
0.60	-44.19	<-15	PASS
1	-44.65	<-15	PASS
3	-42.38	<-15	PASS
6	-40.62	<-15	PASS
10	-40.97	<-15	PASS
30	-47.33	<-15	PASS
60	-45.13	<-15	PASS
100	-42.21	<-15	PASS
230	-66.07	<-15	PASS

Amplitude Modulation (AM) Depth

Tested at 0dB 150kHz Output, 1kHz AM Frequency 80% AM Depth

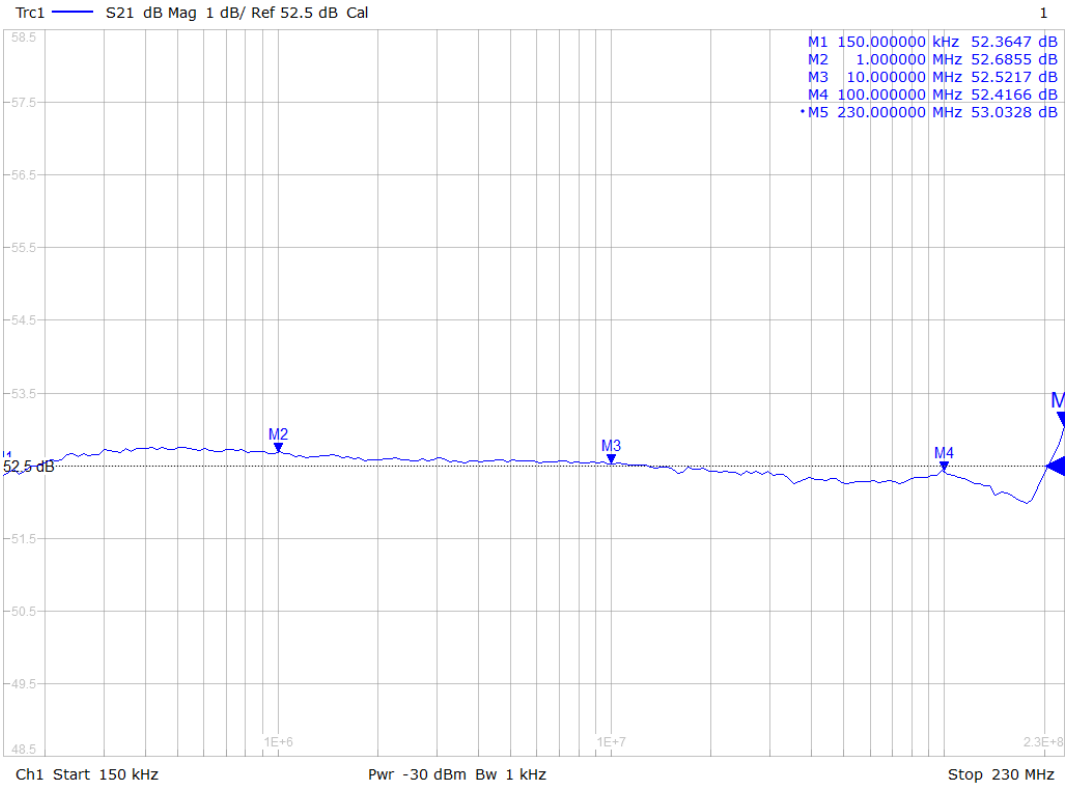
Maximum Envelope (mV)	Minimum Envelope (mV)	AM Depth (%)	Difference (%)	Tol. Error (%)	Verdict
576.124	80.014	75.61%	5.49%	64 to 84	PASS

Amplitude Modulation (AM) Frequency

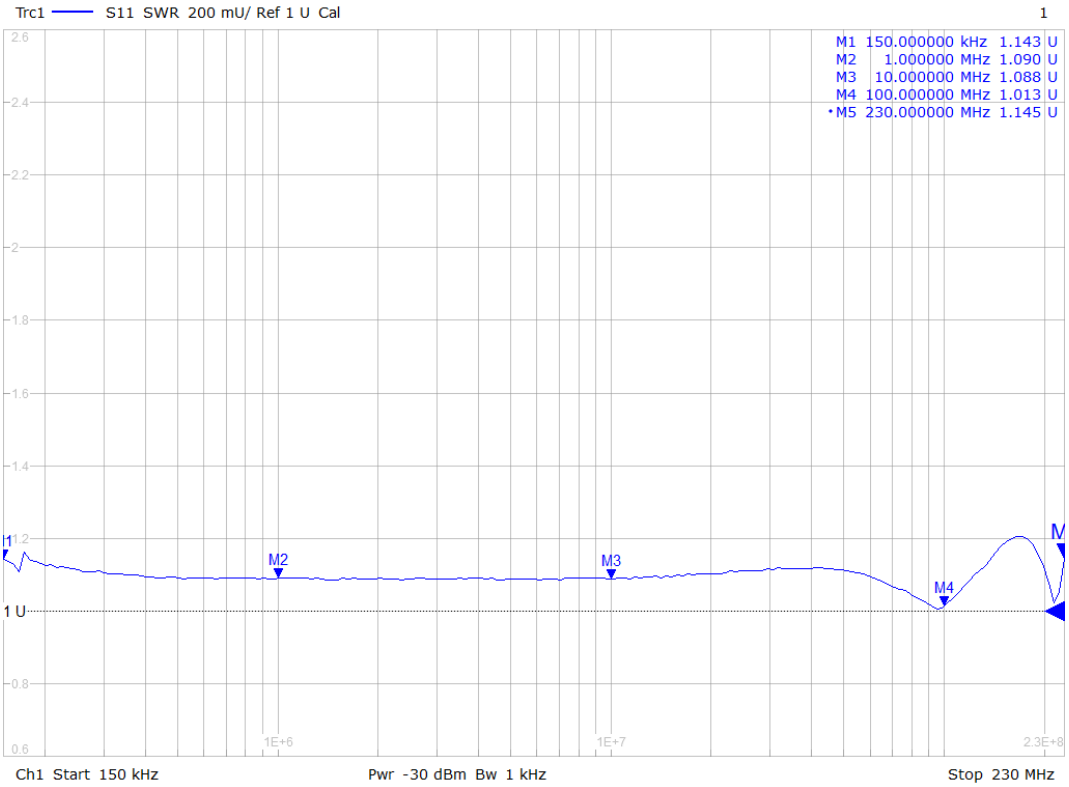
Tested at 0dB 150kHz Output, 1kHz AM Frequency 80% AM Depth

Sideband	Expected Sideband Frequency (kHz)	Actual Sideband Frequency (kHz)	Difference (%)	Tol. Error (%)	Verdict
Upper	149.000	149.004	0.003%	±0.1	PASS
Lower	151.000	151.002	0.001%	±0.1	PASS

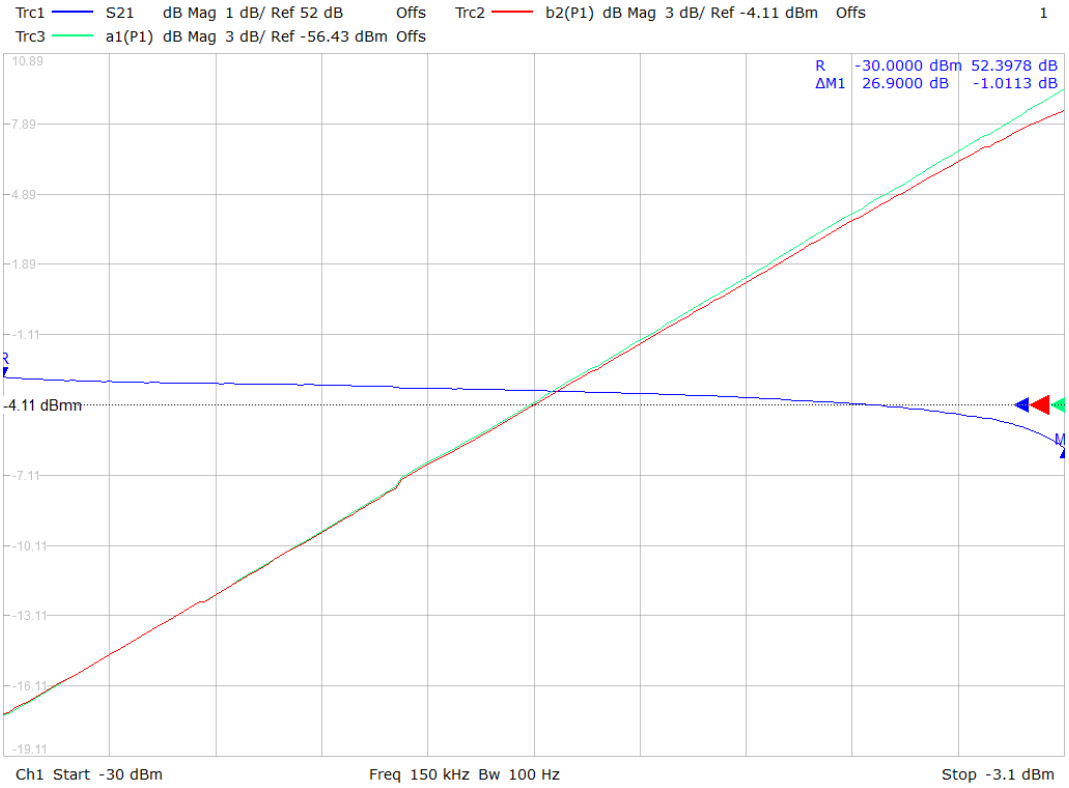
Gain Through Band



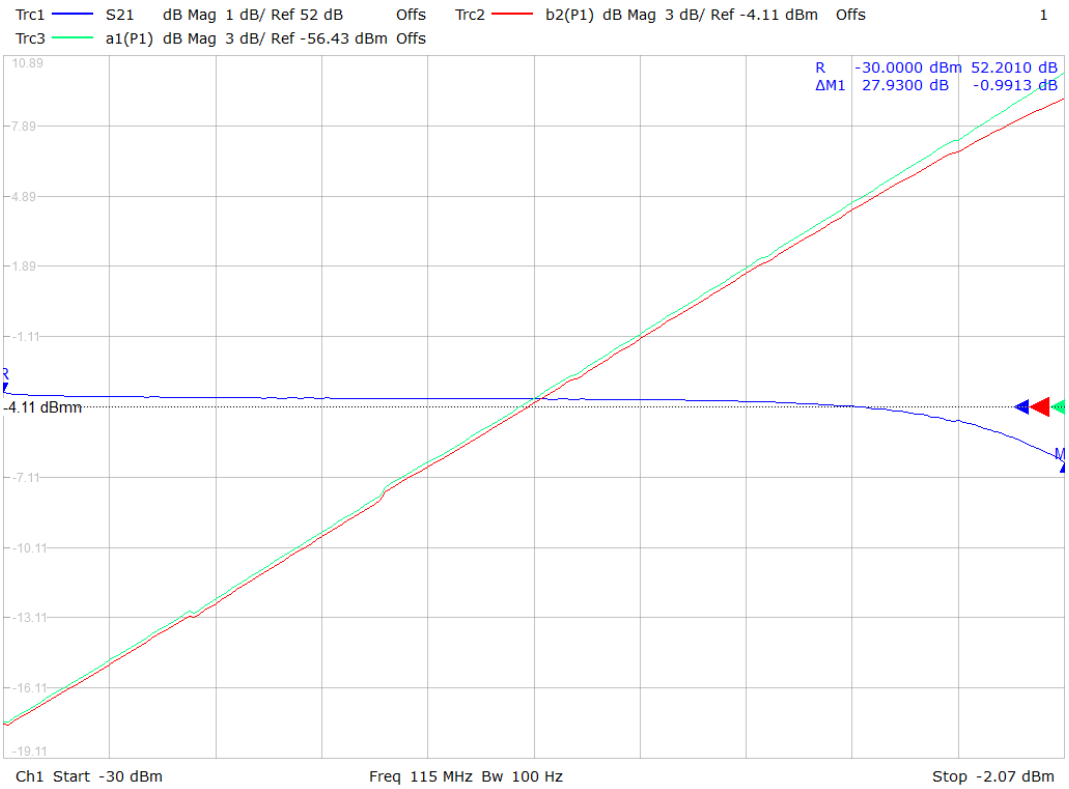
VSWR on Amplifier Input Tolerance: ≤1.50 U



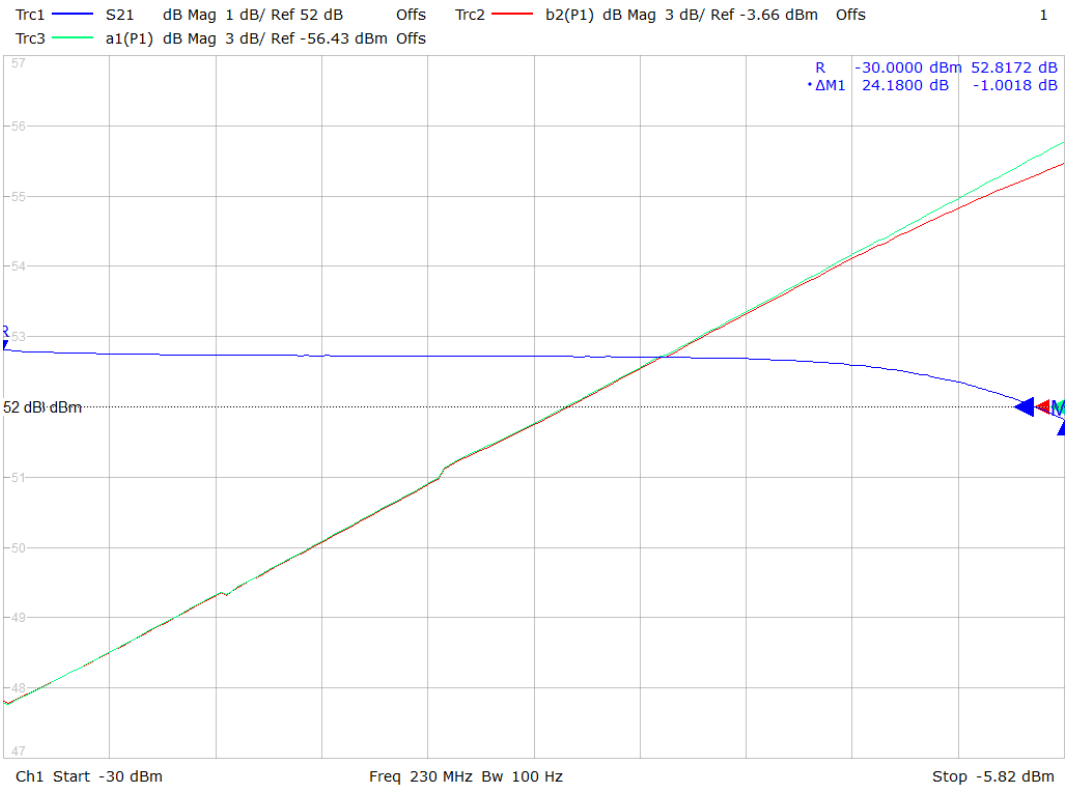
P1dB Lower Frequency Band - 150kHz



P1dB Mid Frequency Band - 115 MHz



P1dB Upper Frequency Band - 230 MHz



Frequency (Hz)	Gain (dBm)	VSWR (U)
150,000.0	52.36	1.14
155,603.5	52.41	1.14
161,416.4	52.45	1.13
167,446.4	52.37	1.11
173,701.7	52.43	1.16
180,190.6	52.49	1.14
186,922.0	52.50	1.14
193,904.8	52.50	1.13
201,148.5	52.55	1.12
208,662.7	52.58	1.13
216,457.7	52.56	1.12
224,543.9	52.58	1.12
232,932.2	52.65	1.12
241,633.8	52.66	1.12
250,660.5	52.62	1.11
260,024.3	52.67	1.11
269,738.0	52.64	1.11
279,814.6	52.65	1.11
290,267.6	52.64	1.11
301,111.1	52.72	1.11
312,359.6	52.70	1.10
324,028.4	52.70	1.10
336,133.1	52.68	1.10
348,690.0	52.73	1.10
361,715.9	52.69	1.10
375,228.5	52.73	1.10
389,245.9	52.74	1.10
403,786.9	52.73	1.09
418,871.1	52.75	1.09
434,518.8	52.72	1.09
450,751.1	52.75	1.09
467,589.7	52.72	1.09
485,057.4	52.72	1.09
503,177.6	52.76	1.09
521,974.7	52.75	1.09
541,474.1	52.73	1.09
561,701.8	52.73	1.09
582,685.3	52.71	1.09
604,452.5	52.73	1.09
627,033.0	52.71	1.09

650,457.0	52.69	1.09
674,756.0	52.69	1.09
699,962.8	52.72	1.09
726,111.2	52.72	1.09
753,236.4	52.71	1.09
781,375.0	52.72	1.09
810,564.7	52.68	1.09
840,844.8	52.70	1.09
872,256.1	52.70	1.09
904,840.9	52.70	1.09
938,642.9	52.67	1.09
973,707.7	52.66	1.09
1,010,082.3	52.69	1.09
1,047,815.8	52.67	1.09
1,086,958.9	52.66	1.09
1,127,564.3	52.63	1.09
1,169,686.6	52.64	1.09
1,213,382.4	52.61	1.09
1,258,710.5	52.63	1.09
1,305,732.0	52.62	1.09
1,354,510.1	52.63	1.09
1,405,110.3	52.63	1.09
1,457,600.8	52.65	1.09
1,512,052.2	52.63	1.09
1,568,537.7	52.61	1.09
1,627,133.4	52.63	1.09
1,687,917.9	52.59	1.09
1,750,973.3	52.61	1.09
1,816,384.1	52.57	1.09
1,884,238.5	52.58	1.09
1,954,627.8	52.57	1.09
2,027,646.5	52.58	1.09
2,103,393.0	52.60	1.09
2,181,969.2	52.59	1.09
2,263,480.7	52.60	1.09
2,348,037.2	52.57	1.09
2,435,752.5	52.58	1.09
2,526,744.6	52.57	1.09
2,621,135.8	52.56	1.09
2,719,053.2	52.60	1.09
2,820,628.5	52.57	1.09
2,925,998.3	52.59	1.09
3,035,304.4	52.61	1.09
3,148,693.9	52.59	1.09

3,266,319.2	52.55	1.09
3,388,338.6	52.57	1.09
3,514,916.3	52.55	1.09
3,646,222.5	52.54	1.09
3,782,434.0	52.56	1.09
3,923,733.8	52.57	1.09
4,070,312.2	52.55	1.09
4,222,366.3	52.57	1.09
4,380,100.6	52.56	1.09
4,543,727.4	52.58	1.09
4,713,466.8	52.58	1.09
4,889,547.1	52.55	1.09
5,072,205.2	52.57	1.09
5,261,686.9	52.56	1.09
5,458,247.0	52.57	1.09
5,662,149.9	52.56	1.09
5,873,670.1	52.56	1.09
6,093,091.9	52.53	1.09
6,320,710.7	52.55	1.09
6,556,832.6	52.55	1.09
6,801,775.3	52.55	1.09
7,055,868.2	52.56	1.09
7,319,453.3	52.56	1.09
7,592,885.1	52.54	1.09
7,876,531.4	52.56	1.09
8,170,773.9	52.54	1.09
8,476,008.4	52.54	1.09
8,792,645.4	52.55	1.09
9,121,111.0	52.53	1.09
9,461,847.1	52.54	1.09
9,815,312.0	52.52	1.09
10,181,981.2	52.52	1.09
10,562,348.0	52.54	1.09
10,956,924.2	52.52	1.09
11,366,240.5	52.51	1.09
11,790,847.5	52.51	1.09
12,231,316.5	52.51	1.09
12,688,240.1	52.51	1.09
13,162,232.9	52.48	1.09
13,653,932.6	52.47	1.10
14,164,000.6	52.49	1.09
14,693,123.2	52.49	1.10
15,242,012.1	52.46	1.09
15,811,405.8	52.39	1.10

16,402,070.3	52.41	1.10
17,014,800.1	52.48	1.10
17,650,419.6	52.45	1.10
18,309,783.8	52.45	1.10
18,993,779.9	52.47	1.10
19,703,327.8	52.43	1.10
20,439,382.2	52.43	1.10
21,202,933.4	52.41	1.10
21,995,008.4	52.42	1.10
22,816,672.8	52.40	1.11
23,669,032.0	52.41	1.11
24,553,232.7	52.37	1.11
25,470,464.4	52.43	1.11
26,421,960.9	52.39	1.11
27,409,002.4	52.42	1.11
28,432,916.6	52.38	1.11
29,495,081.1	52.42	1.12
30,596,924.7	52.37	1.11
31,739,929.7	52.38	1.12
32,925,633.8	52.37	1.12
34,155,632.0	52.33	1.12
35,431,579.2	52.24	1.12
36,755,191.7	52.27	1.12
38,128,250.2	52.31	1.12
39,552,601.9	52.34	1.12
41,030,162.8	52.31	1.12
42,562,920.8	52.30	1.12
44,152,937.9	52.30	1.12
45,802,353.0	52.32	1.12
47,513,385.0	52.32	1.11
49,288,335.8	52.27	1.11
51,129,593.2	52.25	1.11
53,039,634.3	52.26	1.11
55,021,028.4	52.28	1.11
57,076,441.2	52.27	1.10
59,208,637.8	52.27	1.10
61,420,486.5	52.29	1.09
63,714,963.0	52.27	1.09
66,095,153.9	52.28	1.08
68,564,261.2	52.30	1.07
71,125,606.7	52.28	1.07
73,782,635.9	52.26	1.06
76,538,923.5	52.28	1.06
79,398,177.2	52.32	1.05

82,364,243.8	52.33	1.04
85,441,113.2	52.34	1.03
88,632,924.8	52.34	1.02
91,943,972.5	52.37	1.01
95,378,710.6	52.36	1.01
98,941,759.6	52.43	1.01
102,637,913.0	52.38	1.02
106,472,143.0	52.36	1.04
110,449,607.9	52.33	1.05
114,575,658.3	52.32	1.07
118,855,845.0	52.30	1.08
123,295,926.1	52.25	1.10
127,901,874.6	52.25	1.11
132,679,886.9	52.22	1.12
137,636,390.8	52.23	1.14
142,778,054.0	52.09	1.16
148,111,793.7	52.14	1.18
153,644,785.1	52.12	1.19
159,384,471.7	52.10	1.20
165,338,574.9	52.04	1.21
171,515,104.8	52.01	1.21
177,922,370.4	51.98	1.20
184,568,991.3	52.03	1.18
191,463,909.1	52.19	1.16
198,616,399.4	52.38	1.12
206,036,084.2	52.52	1.08
213,732,945.2	52.64	1.02
221,717,336.7	52.81	1.05
230,000,000.0	53.03	1.14

End of Calibration Report: NSG 4070 cert. rev. 3