

Test Report

Products: Solid State Power Amplifier

Acuramw P/N: AMT-180400-10(18.0-40.0GHz)

S/N: 200020232

Date: 12th,Mar., 2024

1. Description

This report is applicable only to the power amplifier equipment developed by Acura Microwave Tech.

2. Inspection Basis

- a) Power Amplifier Acceptance Outline;
- b) "Finished Power Amplifier Calibration Standard", Number: AMTASC011-2018.

3. Test Instruments List

No.	Equipment Name	Instrument Model	QTY	Remarks
1	VNA	N5245A	1 Set	
2	Coxial Cable Assembly	/	4 pcs	
3	Signal Generator	AT E8257D	1 Set	
4	Power Meter	NRP-Z85	1 Set	
5	Spectrum Analyzer	AT 8565EC	1 Set	
6	Dummy Load Assembly	/	1 Set	

4. Photos (Product Visual Inspection)



Power Amplifier Top View



Power Amplifier Right Side View



5. Functional and Technique Specifications Test Table

5-1 Inspection Record Table

No.	Technique Spec.s	Technique Spec.s			Test Result	Remarks
		Min.	Typ.	Max.		
1	Frequency Range(GHz)	18	/	40	18-40	
2	Gain(dB)	42	44	49	≥48.71	
3	Gain Flatness(±dB)	/	3	5.5	±5.35	Full Band
4	Saturated Output Power(dBm)	40	42	/	≥40.01	
5	Input/Output VSWR		1.8	2.8	2.15	
6	Harmonics (dBc)	18G-19G < -15dBc 19G-20G < -10dBc 20G-22G < -15dBc 22G-25G < -20dBc			Compliance	
7	Spurious (dBc)	/	/	-55	< -62.17	
8	Supply Voltage (V)	+20	+28	+36	+28V	Apply built-in EMI RFI filter on DC input power
9	Supply Current (A)	/	6	/	3.3-5.4	No fan included
10	Enable Switch	TTL:3.3V-5V turn on , 0V turn off			Compliance	
11	Output Power Test	30mV/dB (Max : 1.2V)			28mV/dB	RMS Test
12	Reflection Power Test	30mV/dB (Max : 1.2V)			28mV/dB	RMS Test
13	Input Power Test	30mV/dB (Max : 1.2V)			28mV/dB	RMS Test
14	Maximum Input Power (dBm)	/	/	8	Design Guarantee	
15	VVA Control Voltage(dB)	30			Compliance	
16	VVA Control Voltage	0-+5V			0-+2V	
17	Temperature Test	Vt : 3.3V, 18mV/°C			18mV/°C	
18	Current Detection	50mV/A			51mV/A	
19	Over-Input Protection (dBm)	0	/	5	Design Guarantee	
20	Fan Power Supply	+28V			1.3A	
Inspector :						
Inspection Time :						

6. Interface
6-1 Interface Inspection Record

Item	Specification	Inspection Result	Remark
Interface	RF Input : 2.92-F	Compliance	
	RF Output : 24JS18000 (WRD180C24)	Compliance	
	Communication : RS485	Compliance	
	Power Supply and Control Connector : Y50P5-1419Z30J	Compliance	
Inspector :			
Inspection Time :			

7. Other Inspections

7-1 Other Inspection Record

No.	Item	Specification	Inspection Result	Remark
1	Weight	≤5Kg(excluding heat sink)	3.01Kg	
		≤6Kg(including heat sink)	4.58Kg	
2	Size	250mm×180mm×83mm (including heat sink)	250mm×180mm×83mm (including heat sink)	
		250mm×180mm×39mm (excluding heat sink)	250mm×180mm×39mm (excluding heat sink)	
3	Surface Treatment	Nickel Plating, Epoxy Powder Coating (Color Code: RAL7032)	Compliance	
4	Operating temperature	-40°C-+55°C	Compliance	
5	Storage temperature	-45°C-+85°C	Compliance	
6	Humidity	< 95%	Compliance	
Inspector :				
Inspection Time :				

8. Conclusion

Through the inspection of the power amplifier, the product performance specification meet the technical specifications required by the 'Power Amplifier'."

Test Data
Table 1 Ambient Temperature Input Test Data

Small Signal							
Frequency (GHz)	Input (dBm)	Output (dBm)	Gain (dB)	Frequency (GHz)	Input (dBm)	Output (dBm)	Gain (dB)
18	-30	30.83	65.91	21.2	-30	23.83	59.14
18.1	-30	31.48	66.37	21.3	-30	23.85	59.23
18.2	-30	30.48	65.31	21.4	-30	24.21	59.61
18.3	-30	29.13	64.21	21.5	-30	23.88	59.25
18.4	-30	29.46	64.71	21.6	-30	24	59.46
18.5	-30	28.92	64.15	21.7	-30	25.08	60.65
18.6	-30	29.67	64.82	21.8	-30	25.22	60.62
18.7	-30	30.09	65.13	21.9	-30	26.15	61.4
18.8	-30	30.66	65.67	22	-30	26.16	61.5
18.9	-30	30.43	65.66	22.1	-30	26.02	61.58
19	-30	29.13	64.63	22.2	-30	26.05	61.97
19.1	-30	29.74	65.16	22.3	-30	26.3	62.44
19.2	-30	27.92	63.05	22.4	-30	27.23	63.06
19.3	-30	27.53	62.49	22.5	-30	28.14	63.68
19.4	-30	27.54	62.58	22.6	-30	29.05	64.59
19.5	-30	27.17	62.64	22.7	-30	30.02	65.75
19.6	-30	27.17	63.01	22.8	-30	30.75	66.76
19.7	-30	26.69	62.4	22.9	-30	31.47	67.45
19.8	-30	25.55	60.79	23	-30	31.76	67.42
19.9	-30	24.97	60.05	23.1	-30	32.34	67.78
20	-30	23.98	59.14	23.2	-30	34.11	69.57
20.1	-30	23.24	58.69	23.3	-30	33.52	69.13
20.2	-30	23.21	58.88	23.4	-30	33.9	69.67
20.3	-30	23.14	58.62	23.5	-30	33.27	68.93
20.4	-30	23.28	58.62	23.6	-30	31.66	67.13
20.5	-30	23.17	58.59	23.7	-30	29.85	65.43
20.6	-30	22.85	58.33	23.8	-30	29.14	65.1
20.7	-30	22.77	58.33	23.9	-30	28.89	65.14
20.8	-30	22.73	58.27	24	-30	28.91	65.18
20.9	-30	22.9	58.25	24.1	-30	28.94	65.04
21	-30	23.01	58.27	24.2	-30	28.93	64.81
21.1	-30	23.48	58.74	24.3	-30	28.93	64.81
24.4	-30	28.11	63.86	28.4	-30	28.51	65.28



24.5	-30	27.23	62.72	28.5	-30	27.97	64.66
24.6	-30	26.65	62.24	28.6	-30	27.76	64.11
24.7	-30	25.99	61.74	28.7	-30	28.42	64.68
24.8	-30	26.22	61.92	28.8	-30	28.4	65
24.9	-30	26.35	62.32	28.9	-30	28.94	65.63
25	-30	26.45	62.53	29	-30	28.5	64.98
25.1	-30	26.55	62.38	29.1	-30	28.14	64.56
25.2	-30	25.49	61.33	29.2	-30	28.34	64.64
25.3	-30	24.84	60.76	29.3	-30	27.25	63.55
25.4	-30	24.45	60.57	29.4	-30	27.04	63.66
25.5	-30	24.32	60.97	29.5	-30	28.54	65.01
25.6	-30	24.55	61.37	29.6	-30	29.88	66.04
25.7	-30	25	61.64	29.7	-30	29.43	65.75
25.8	-30	25.11	61.41	29.8	-30	29.25	65.89
25.9	-30	25.11	61.18	29.9	-30	29.68	66.79
26	-30	24.43	60.58	30	-30	29.04	66.5
26.1	-30	24.06	60.33	30.1	-30	28.57	65.72
26.2	-30	24.03	60.24	30.2	-30	29.3	66
26.3	-30	25.17	61.24	30.3	-30	31.63	68.12
26.4	-30	25.09	61.16	30.4	-30	30.71	67.34
26.5	-30	26.95	63.1	30.5	-30	31.58	68.71
26.6	-30	27.19	63.48	30.6	-30	31.75	69.02
26.7	-30	26.9	63.59	30.7	-30	30.54	67.46
26.8	-30	26.29	63	30.8	-30	29.31	65.89
26.9	-30	25.81	62.05	30.9	-30	30.13	66.7
27	-30	26.01	62.09	31	-30	28.95	65.72
27.1	-30	26.47	62.51	31.1	-30	29.83	66.79
27.2	-30	27.26	63.47	31.2	-30	30.78	67.77
27.3	-30	28.19	64.94	31.3	-30	28.96	65.78
27.4	-30	30.1	66.78	31.4	-30	29.15	65.83
27.5	-30	29.05	65.25	31.5	-30	28.5	65.3
27.6	-30	29.39	65.32	31.6	-30	26.72	63.66
27.7	-30	29	64.78	31.7	-30	26.77	63.85
27.8	-30	28.04	63.95	31.8	-30	26.05	63.24
27.9	-30	27.12	63.34	31.9	-30	26.36	63.3
28	-30	25.8	62.07	32	-30	27.25	63.97
28.1	-30	26	62.24	32.1	-30	27.47	64.29
28.2	-30	27.42	63.7	32.2	-30	27.17	63.93
28.3	-30	28.13	64.6	32.3	-30	27.1	63.75
32.4	-30	26.83	63.55	36.3	-30	22.43	59.47



32.5	-30	25.15	61.85	36.4	-30	22.62	59.79
32.6	-30	24.49	61.35	36.5	-30	23	60.24
32.7	-30	24.65	61.64	36.6	-30	23.14	60.08
32.8	-30	25.93	62.84	36.7	-30	23.02	59.84
32.9	-30	26.19	63.04	36.8	-30	22.35	59.4
33	-30	25.75	62.56	36.9	-30	22.15	59.42
33.1	-30	25.6	62.38	37	-30	21.47	58.96
33.2	-30	26.22	63.05	37.1	-30	21.31	58.86
33.3	-30	26.67	63.59	37.2	-30	21.45	58.74
33.4	-30	25.02	62.05	37.3	-30	21.9	59.12
33.5	-30	24.96	61.93	37.4	-30	21.87	59.25
33.6	-30	25.94	62.74	37.5	-30	21.48	59.04
33.7	-30	25.8	62.48	37.6	-30	21.1	58.82
33.8	-30	24.69	61.43	37.7	-30	21.05	58.64
33.9	-30	24.77	61.68	37.8	-30	21.21	58.58
34	-30	24.62	61.48	37.9	-30	21.09	58.43
34.1	-30	24.65	61.41	38	-30	21.39	58.81
34.2	-30	24.38	61.17	38.1	-30	22.24	59.83
34.3	-30	24.17	60.95	38.2	-30	22.67	60.27
34.4	-30	24.83	61.86	38.3	-30	22.27	59.74
34.5	-30	24.51	61.7	38.4	-30	22.42	59.82
34.6	-30	23.38	60.41	38.5	-30	22.86	60.38
34.7	-30	22.99	59.89	38.6	-30	22.55	60.32
34.8	-30	22.88	59.73	38.7	-30	23.27	61.07
34.9	-30	23.02	59.86	38.8	-30	23.81	61.54
35	-30	23.27	60.35	38.9	-30	23.9	61.66
35.1	-30	23.69	60.9	39	-30	24.02	61.66
35.2	-30	23.73	60.84	39.1	-30	24.51	62.09
35.3	-30	23.53	60.52	39.2	-30	23.95	61.54
35.4	-30	22.81	59.88	39.3	-30	23.53	61.06
35.5	-30	22.96	60.24	39.4	-30	23.52	61.25
35.6	-30	22.57	59.9	39.5	-30	23.37	61.16
35.7	-30	22.6	59.74	39.6	-30	23.9	61.61
35.8	-30	22.96	59.97	39.7	-30	24.11	61.94
35.9	-30	23.06	60.11	39.8	-30	24.16	62.05
36	-30	22.92	60.07	39.9	-30	24.21	62.16
36.1	-30	22.63	59.8	40	-30	22.43	59.47
36.2	-30	22.58	59.63				
36.3	-30	22.2	59.23				

Table 2: Ambient Temperature Saturation, Spurious and Harmonic Test Data

Frequency (GHz)	Unsaturated Input Power		Gain	Spurious (dBc)	Harmonic @Pout=40dBm (dBc)
	Input (dBm)	Output (dBm)			
18	-16	43.05	64.13	-67.83	- 24.83
18.1	-17	43.31	65.2		
18.2	-17	43.56	65.39		
18.3	-17	43.39	65.47		
18.4	-17	43.41	65.66		
18.5	-17	43.25	65.48		-24.17
18.6	-17	43.14	65.29		
18.7	-16	43.23	64.27		
18.8	-15	42.84	62.85		
18.9	-15	42.53	62.76		
19	-14	41.96	61.46	-65.17	-26
19.1	-15	41.72	62.14		
19.2	-14	41.28	60.41		
19.3	-13	41.1	59.06		
19.4	-12	41.22	58.26		
19.5	-11	41.31	57.78		-25.34
19.6	-10	41.79	57.63		
19.7	-9	41.9	56.61		
19.8	-8	41.98	55.22		
19.9	-8	42.02	55.1		
20	-7	41.84	54	-67	-24.1
20.1	-6	42.17	53.62		
20.2	-6	42	53.67		
20.3	-6	42.4	53.88		
20.4	-6	42.57	53.91		
20.5	-6	42.78	54.2		-22.33
20.6	-6	42.84	54.32		
20.7	-5	42.77	53.33		
20.8	-6	42.87	54.41		
20.9	-6	43.01	54.36		
21	-6	42.87	54.13	-70.33	-21.84
21.1	-6	42.65	53.91		
21.2	-7	42.55	54.86		
21.3	-7	42.22	54.6		
21.4	-8	41.92	55.32		
21.5	-9	41.64	56.01		-26.33



21.6	-9	41.55	56.01		
21.7	-10	41.59	57.16		
21.8	-10	41.61	57.01		
21.9	-10	41.42	56.67		
22	-11	41.28	57.62	-69.33	-24.16
22.1	-11	41.29	57.85		
22.2	-12	41.11	59.03		
22.3	-13	40.92	60.06		
22.4	-14	40.81	60.64		
22.5	-14	40.77	60.31		-28.17
22.6	-15	40.76	61.3		
22.7	-15	40.82	61.55		
22.8	-16	40.86	62.87		
22.9	-16	41.04	63.02		
23	-16	40.81	62.47	-64.17	-32.83
23.1	-17	41.18	63.62		
23.2	-19	41.17	65.63		
23.3	-19	40.99	65.6		
23.4	-19	41.14	65.91		
23.5	-18	40.95	64.61		-32.83
23.6	-17	40.93	63.4		
23.7	-16	40.57	62.15		
23.8	-15	40.33	61.29		
23.9	-15	40.49	61.74		
24	-15	40.47	61.74	-67.34	-41
24.1	-15	40.78	61.88		
24.2	-14	41.11	60.99		
24.3	-14	41.25	61.13		
24.4	-13	41.27	60.02		
24.5	-12	41.53	59.02		-25.33
24.6	-11	41.34	57.93		
24.7	-10	41.09	56.84		
24.8	-10	40.9	56.6		
24.9	-10	41.13	57.1		
25	-10	40.74	56.82	-66.83	
25.1	-10	40.56	56.39		
25.2	-10	40.61	56.45		
25.3	-10	40.69	56.61		
25.4	-9	40.66	55.78		
25.5	-8	40.87	55.52		



25.6	-8	40.95	55.77		
25.7	-7	40.92	54.56		
25.8	-7	40.76	54.06		
25.9	-7	40.55	53.62		
26	-7	40.32	53.47	-71.33	
26.1	-7	40.38	53.65		
26.2	-8	40.66	54.87		
26.3	-9	40.71	55.78		
26.4	-8	40.64	54.71		
26.5	-8	40.8	54.95		
26.6	-8	40.67	54.96		
26.7	-8	40.62	55.31		
26.8	-8	40.76	55.47		
26.9	-9	40.72	55.96		
27	-9	40.62	55.7	-71.33	
27.1	-10	40.5	56.54		
27.2	-10	40.77	56.98		
27.3	-10	40.85	57.6		
27.4	-12	40.65	59.33		
27.5	-11	40.85	58.05		
27.6	-12	40.65	58.58		
27.7	-12	40.75	58.53		
27.8	-11	40.72	57.63		
27.9	-10	40.51	56.73		
28	-9	40.01	55.28	-67.33	
28.1	-8	40.3	54.54		
28.2	-8	40.47	54.75		
28.3	-9	40.48	55.95		
28.4	-10	40.54	57.31		
28.5	-11	40.55	58.24		
28.6	-11	40.53	57.88		
28.7	-12	40.33	58.59		
28.8	-11	40.39	57.99		
28.9	-11	40.27	57.96		
29	-10	40.43	56.91	-69.67	
29.1	-10	40.55	56.97		
29.2	-10	40.57	56.87		
29.3	-10	40.32	56.62		
29.4	-10	40.24	56.86		
29.5	-10	40.57	57.04		



29.6	-13	40.28	59.44		
29.7	-13	40.41	59.73		
29.8	-12	40.84	59.48		
29.9	-13	40.76	60.87		
30	-14	40.6	62.06	-69.67	
30.1	-14	40.67	61.82		
30.2	-14	40.76	61.46		
30.3	-16	40.65	63.14		
30.4	-14	40.93	61.56		
30.5	-14	41.07	62.2		
30.6	-17	40.15	64.42		
30.7	-14	40.93	61.85		
30.8	-14	40.94	61.52		
30.9	-15	41.01	62.58		
31	-14	41.17	61.94	-64.83	
31.1	-15	41.23	63.19		
31.2	-15	41.16	63.15		
31.3	-13	41.02	60.84		
31.4	-14	40.72	61.4		
31.5	-14	40.45	61.25		
31.6	-12	40.49	59.43		
31.7	-12	40.52	59.6		
31.8	-11	40.49	58.68		
31.9	-11	40.61	58.55		
32	-11	40.73	58.45	-67.33	
32.1	-11	40.6	58.42		
32.2	-10	40.58	57.34		
32.3	-10	40.64	57.29		
32.4	-10	40.67	57.39		
32.5	-10	40.61	57.31		
32.6	-9	40.51	56.37		
32.7	-9	40.28	56.27		
32.8	-9	40.16	56.07		
32.9	-9	40.23	56.08		
33	-8	40.54	55.35	-67.83	
33.1	-7	41.05	54.83		
33.2	-7	41.26	55.09		
33.3	-8	41.26	56.18		
33.4	-6	41.33	54.36		
33.5	-6	41.05	54.02		



33.6	-8	40.62	55.42		
33.7	-8	40.43	55.11		
33.8	-7	40.42	54.16		
33.9	-7	40.42	54.33		
34	-7	40.55	54.41	-67.16	
34.1	-7	40.91	54.67		
34.2	-6	40.95	53.74		
34.3	-5	40.98	52.76		
34.4	-5	40.94	52.97		
34.5	-5	40.79	52.98		
34.6	-5	40.57	52.6		
34.7	-5	40.48	52.38		
34.8	-6	40.13	52.98		
34.9	-5	40.17	52.01		
35	-5	40.24	52.32	-67.5	
35.1	-6	40.44	53.65		
35.2	-6	40.42	53.53		
35.3	-6	40.38	53.37		
35.4	-5	40.56	52.63		
35.5	-5	40.53	52.81		
35.6	-4	40.56	51.89		
35.7	-4	40.57	51.71		
35.8	-4	40.5	51.51		
35.9	-4	40.44	51.49		
36	-4	40.52	51.67	-67.5	
36.1	-4	40.37	51.54		
36.2	-4	40.36	51.41		
36.3	-4	40.38	51.41		
36.4	-5	40.44	52.48		
36.5	-5	40.69	52.86		
36.6	-4	40.95	52.19		
36.7	-5	41.09	53.03		
36.8	-5	41.14	52.96		
36.9	-4	41.07	52.12		
37	-3	40.97	51.24	-62.17	
37.1	-2	40.96	50.45		
37.2	-1	40.99	49.54		
37.3	-1	41.07	49.36		
37.4	-1	41.26	49.48		
37.5	-1	41.31	49.69		

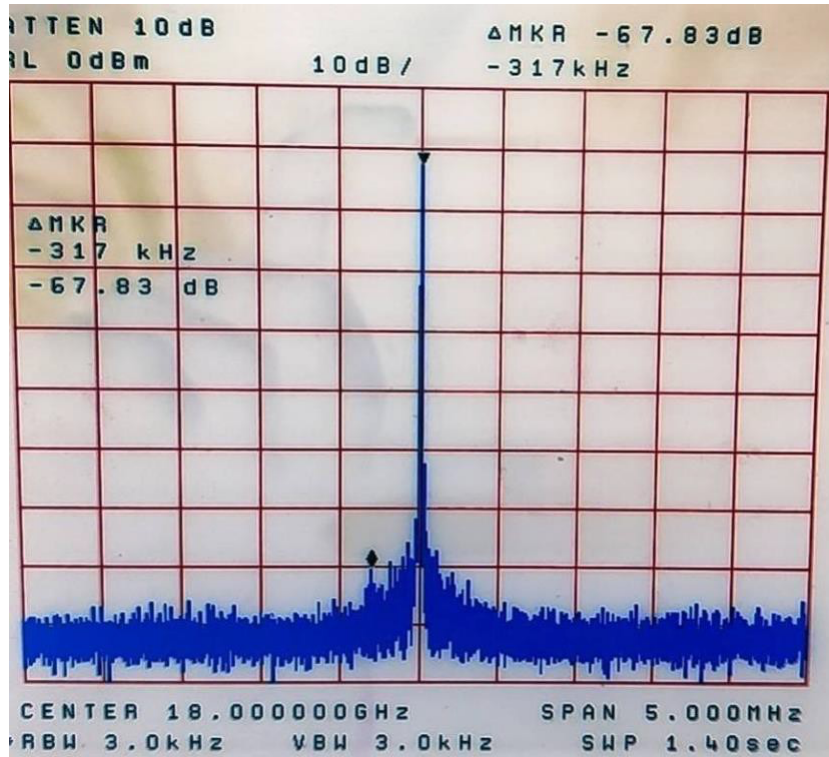


37.6	-1	41.26	49.82		
37.7	-1	41.22	49.94		
37.8	-1	41.08	49.67		
37.9	-1	41.04	49.41		
38	-1	41.21	49.55	-64.66	
38.1	0	41.29	48.71		
38.2	-1	41.24	49.83		
38.3	-1	41.27	49.87		
38.4	-2	41.29	50.76		
38.5	-3	41.22	51.62		
38.6	-4	41.23	52.75		
38.7	-4	41.28	53.05		
38.8	-5	41.29	54.09		
38.9	-6	41.28	55.01		
39	-6	41.09	54.85	-66.66	
39.1	-5	41.05	53.69		
39.2	-6	41.03	54.61		
39.3	-5	41.1	53.69		
39.4	-6	41.19	54.72		
39.5	-7	41.21	55.94		
39.6	-7	41.32	56.11		
39.7	-6	41.45	55.16		
39.8	-6	41.1	54.93		
39.9	-6	41	54.89		
40	-6	40.88	54.83	-66	

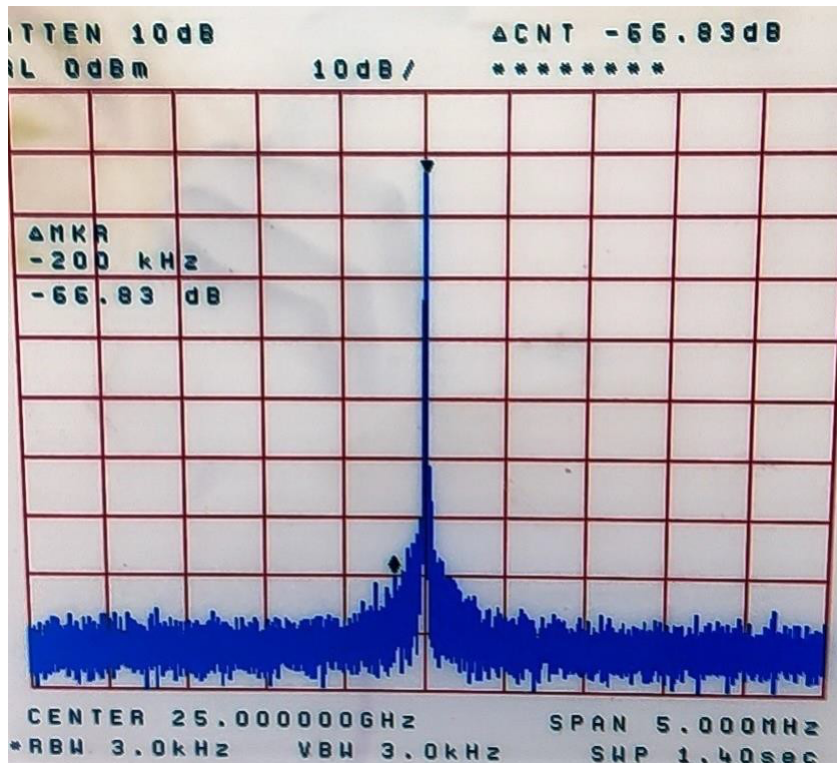


Spurious

18GHz

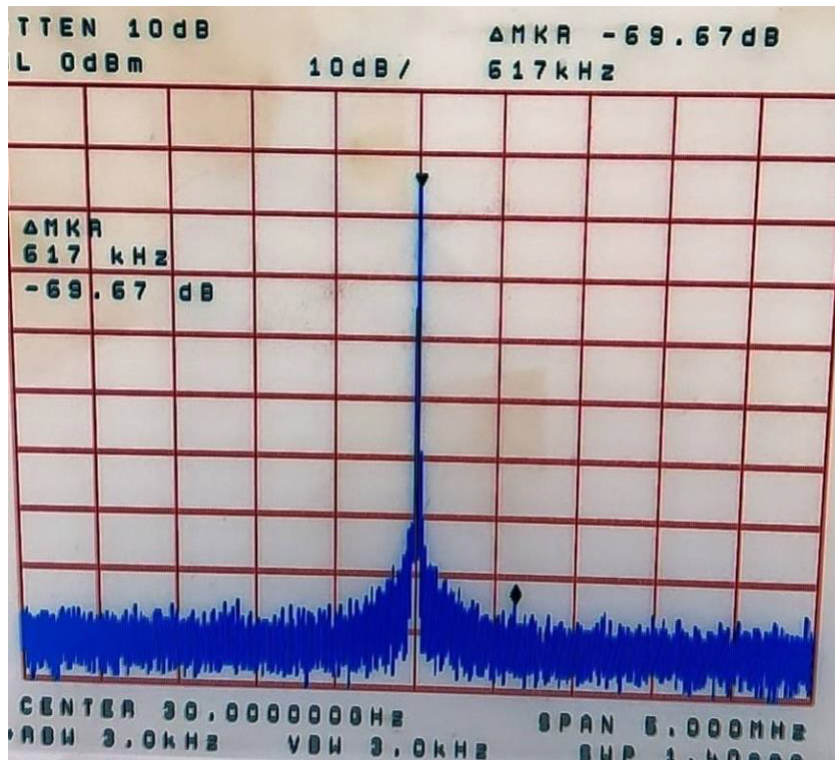


25GHz

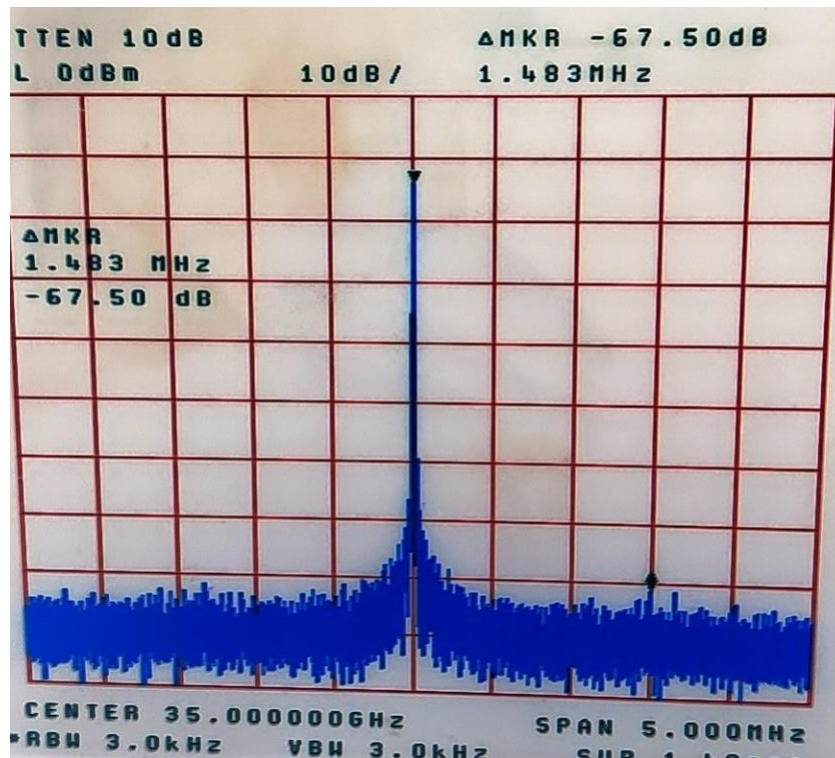




30GHz

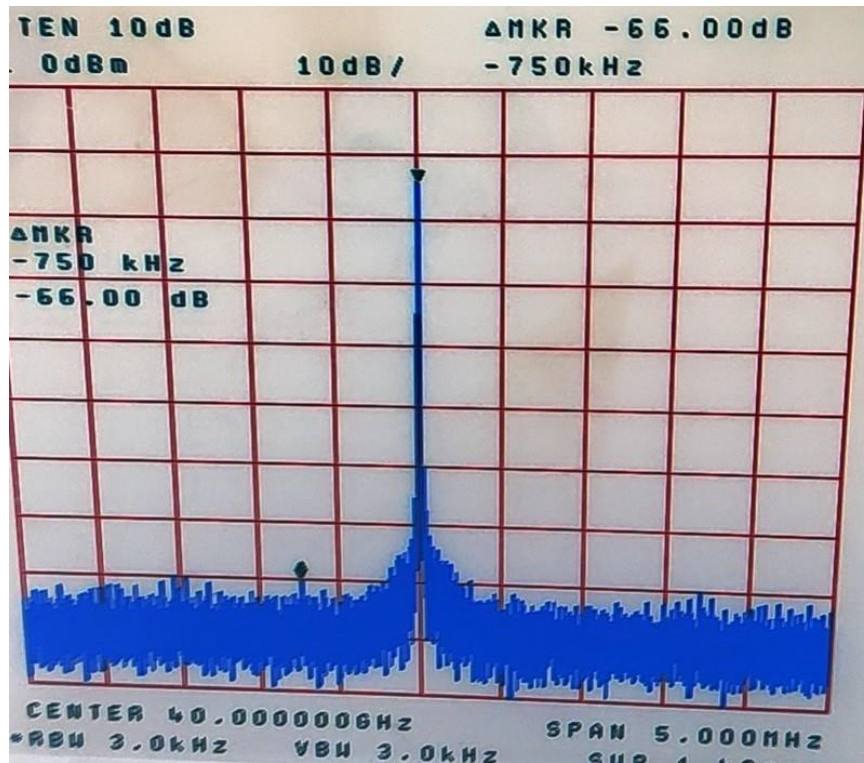


35GHz



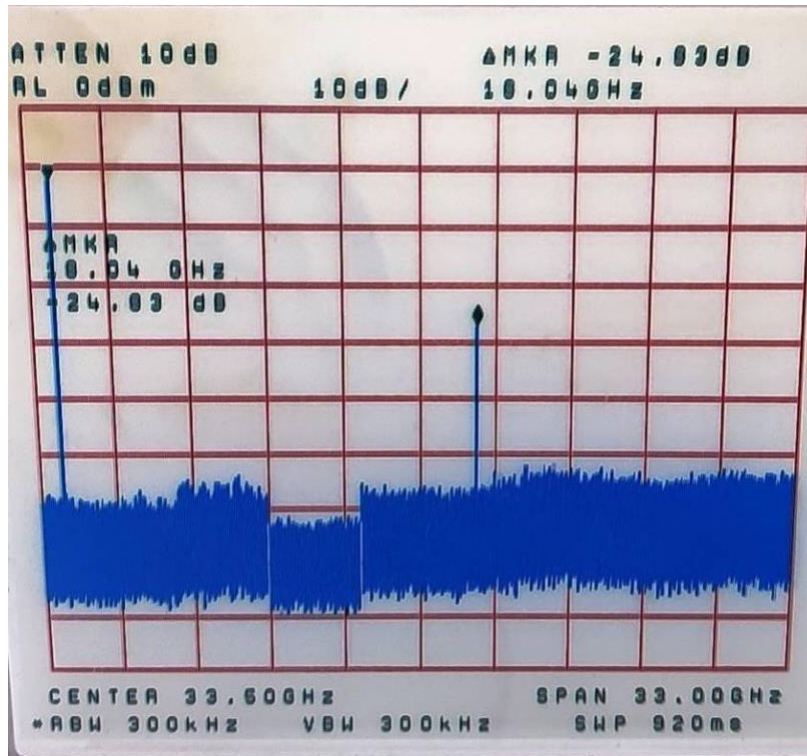


40GHz

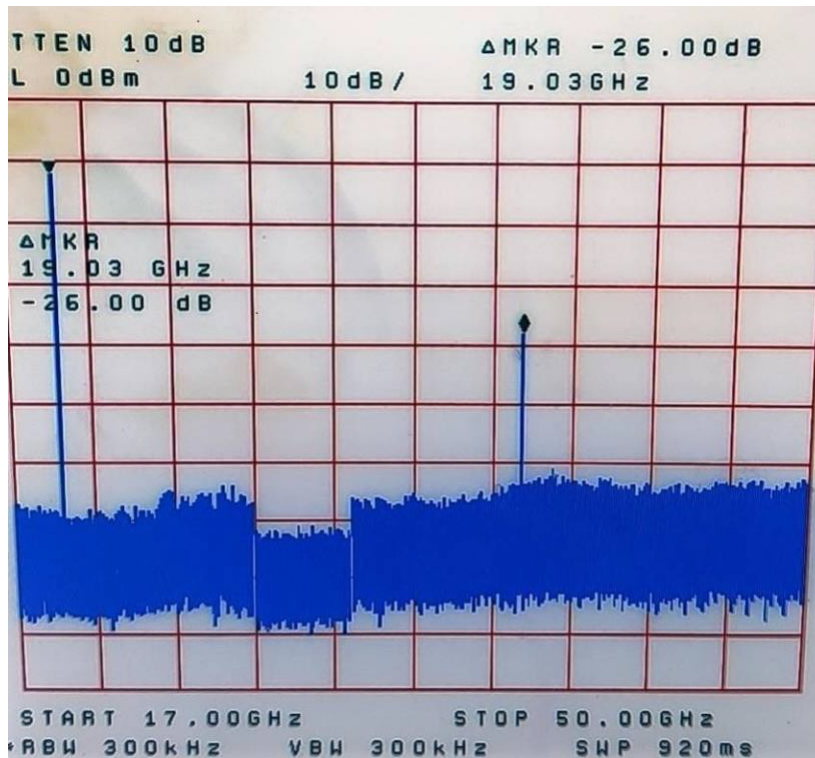




Harmonics 18GHz

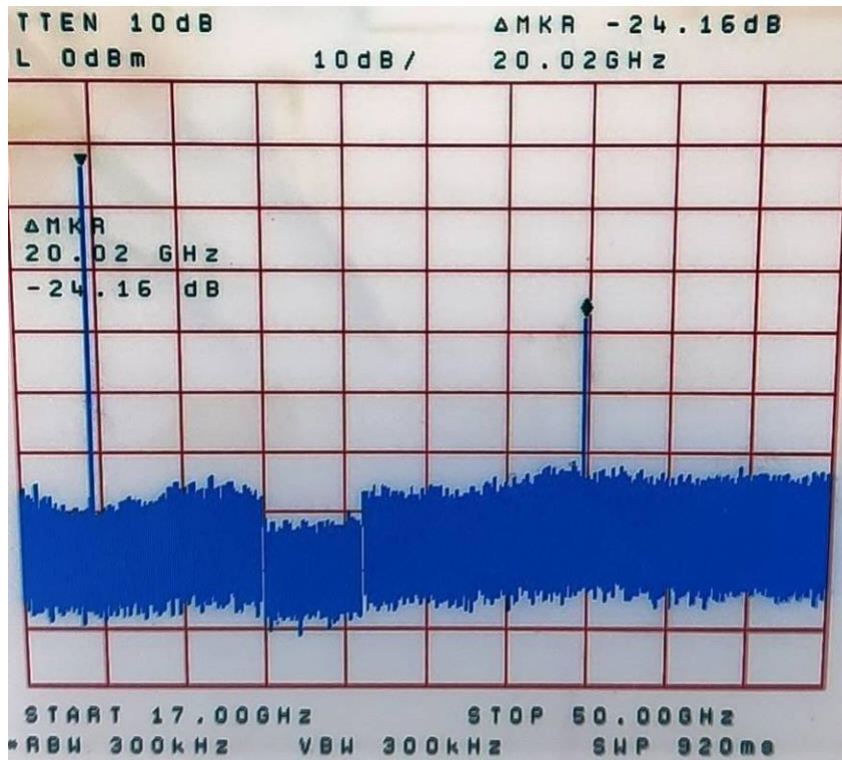


19GHz

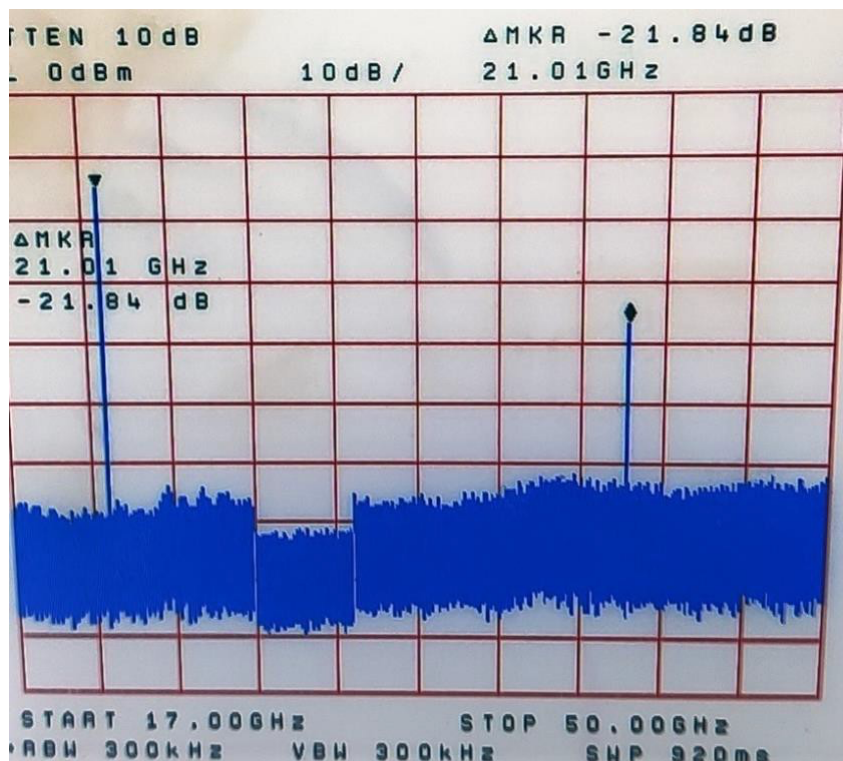




20GHz

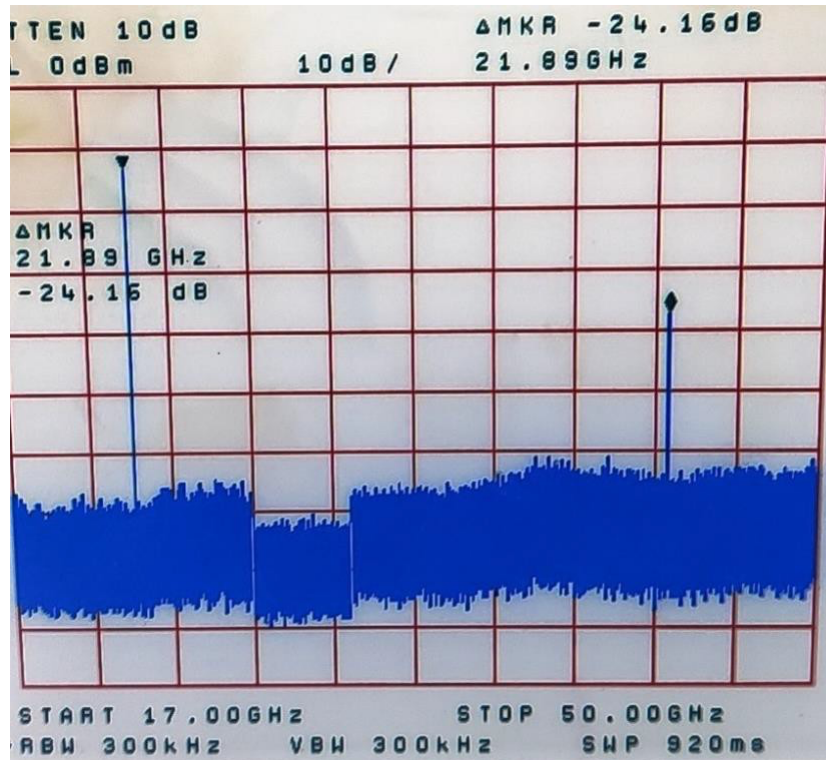


21GHz

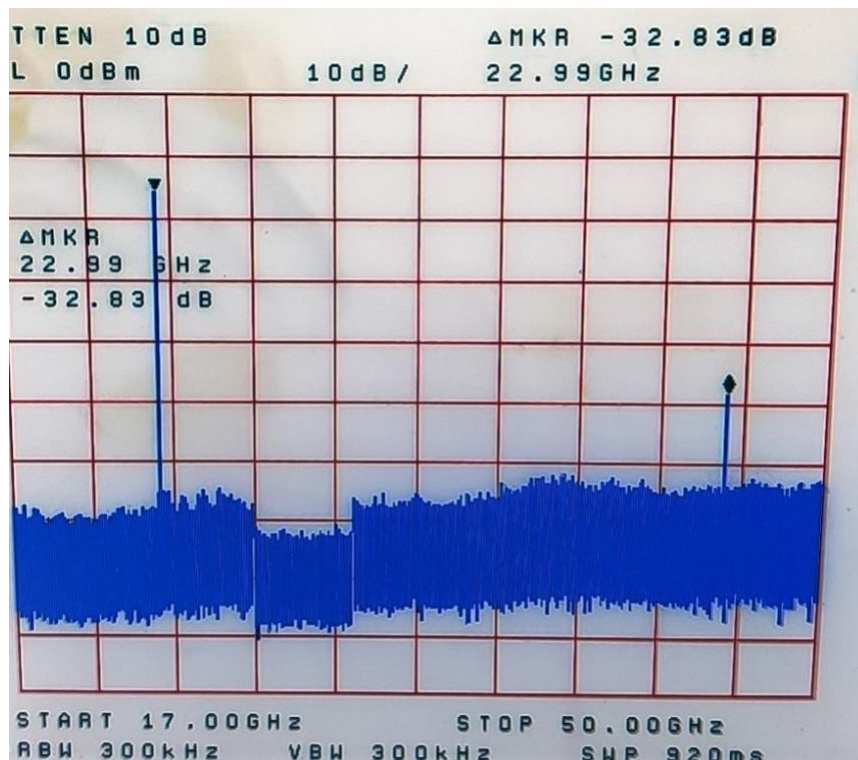




22GHz



23GHz





24GHz

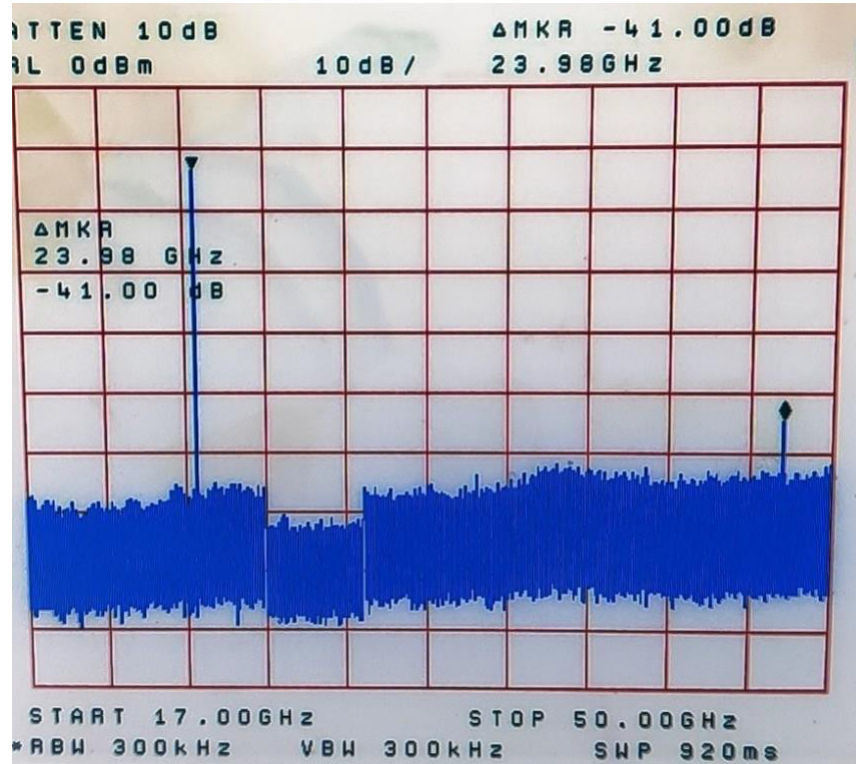




Table 3 Low Temperature, High Temperature Saturation Power Test Data

Frequency(GHz)	Low Temperature	High Temperature
	Saturated Output Power (dBm)	Saturated Output Power (dBm)
18	43.02	42.97
19	41.94	41.81
20	41.81	41.55
21	42.89	41.58
22	41.31	40.99
23	40.84	40.12
24	40.45	40.03
25	40.64	40.6
26	40.35	40.02
27	40.67	40.08
28	40.78	40.05
29	40.42	40.23
30	40.61	40.14
31	41.12	40.99
32	40.75	40.25
33	40.55	40.05
34	40.54	40.47
35	40.24	40.18
36	40.54	40.44
37	40.98	40.75
38	41.19	40.91
39	41.09	41.02
40	40.87	40.75

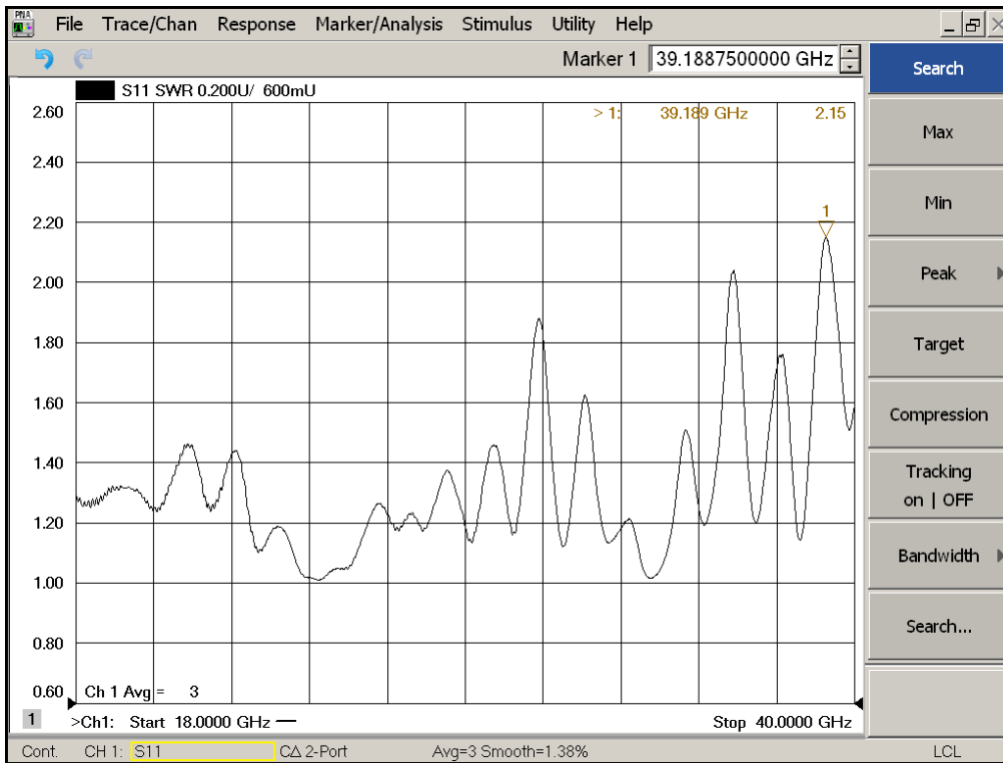
Table 4 Low Temperature, High Temperature Spurious, and Harmonic Test Data

Frequency (GHz)	Low Temperature		High Temperature	
	Spurious (dBc)	Harmonic (dBc)	Spurious (dBc)	Harmonic (dBc)
18	-67	-23	-65.34	-27.33
19	-63	-22	-65.33	-23
20	-68	-22	-68.33	-23.17
21	-68	-23	-66.5	-23.83
22	-66	-27	-66.66	-29.17
23	-64	-30	-65.84	-32.16
24	-66	-31	-64.83	-30.84
25	-66		-63.67	
26	-65		-64.16	/
27	-68		-67.17	/
28	-68		-64.83	/
29	-68		-67.34	/
30	-68		-65.67	/
31	-65		-68.34	/
32	-66		-64.83	/
33	-65		-64	/
34	-66		-62.66	/
35	-66		-64.83	/
36	-63		-63.33	/
37	-64		-62.83	/
38	-62		-59.83	/
39	-63		-62.17	/
40	-62		-61.33	/



5. VSWR

Input VSWR



Output VSWR



6. Gain Flatness

