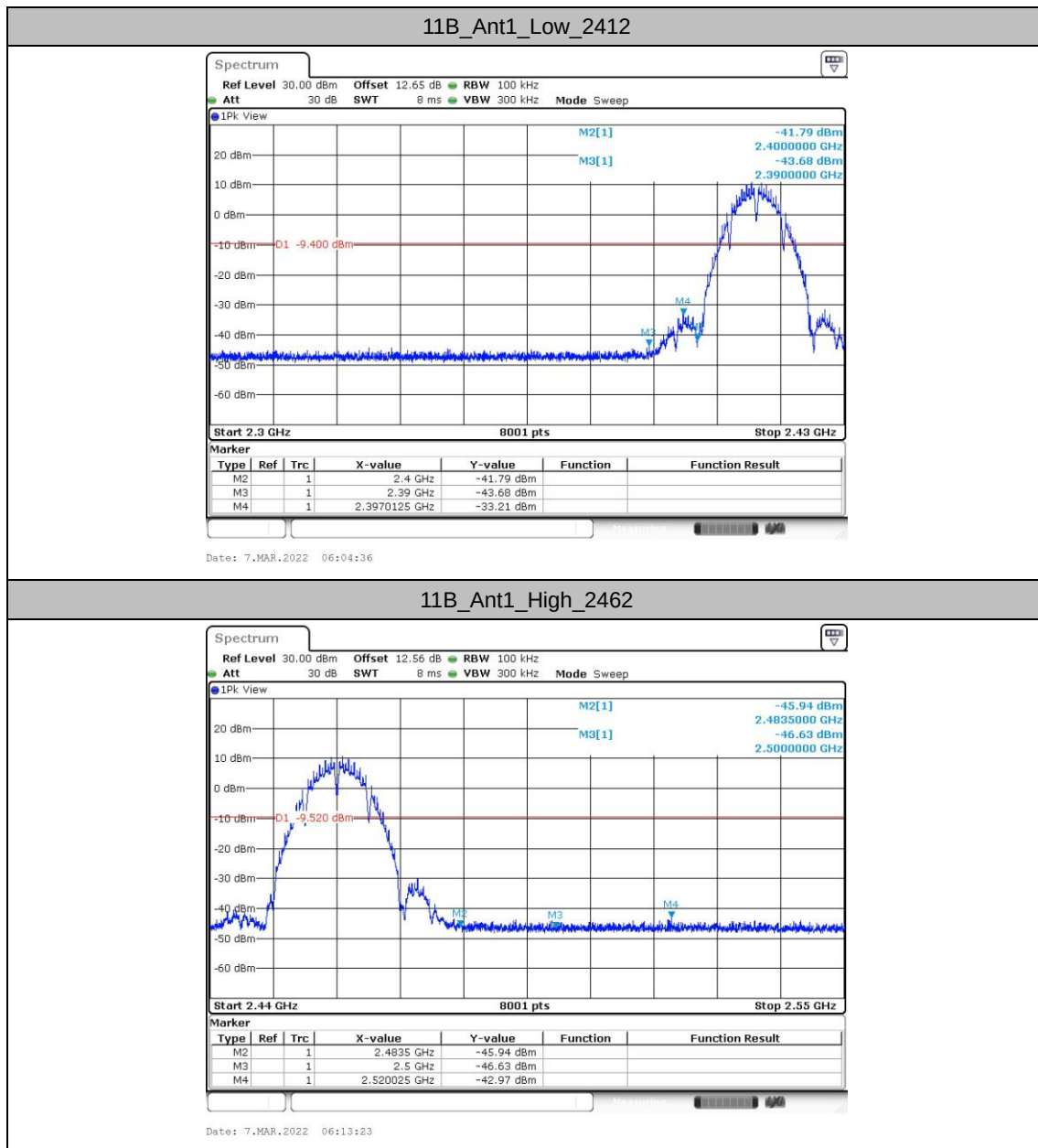


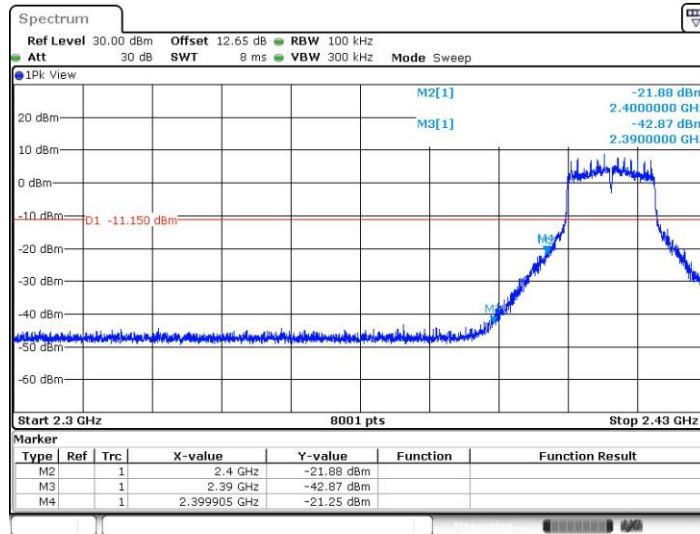


Test Graphs

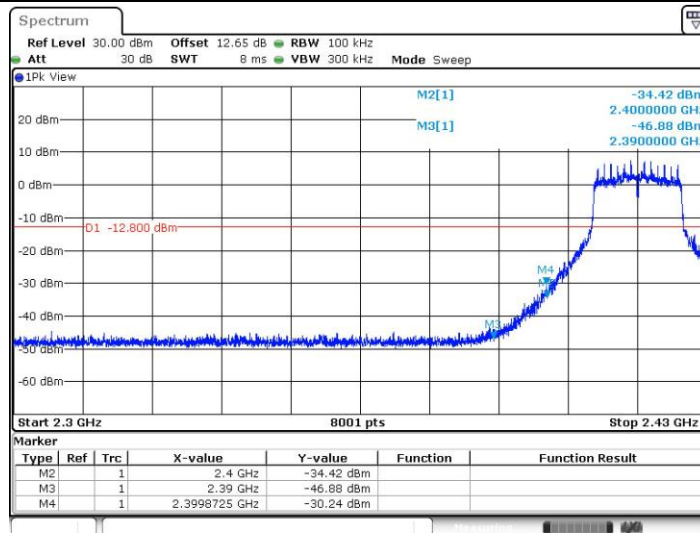




11G_Ant1_Low_2412

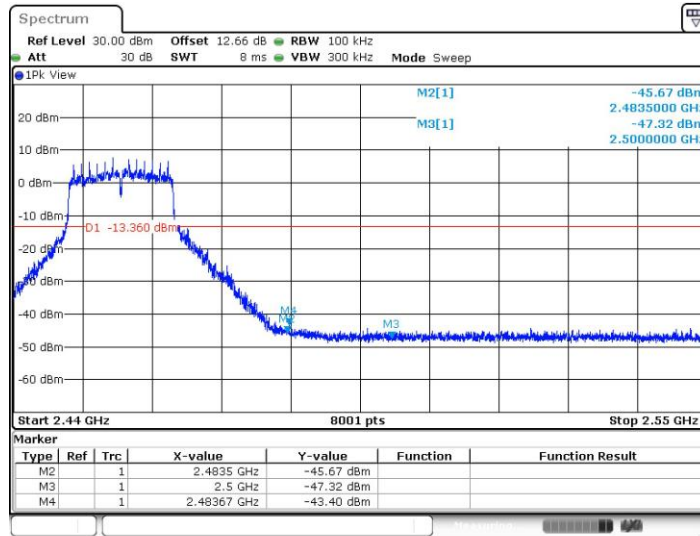


11G_Ant1_Low_2417

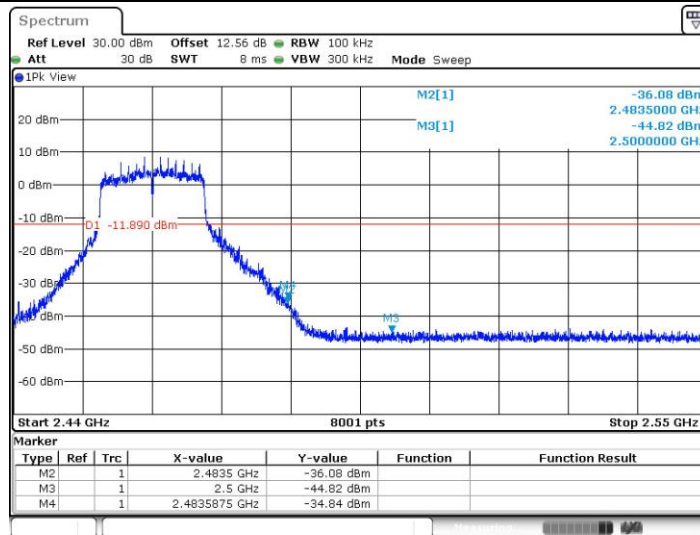




11G_Ant1_High_2457

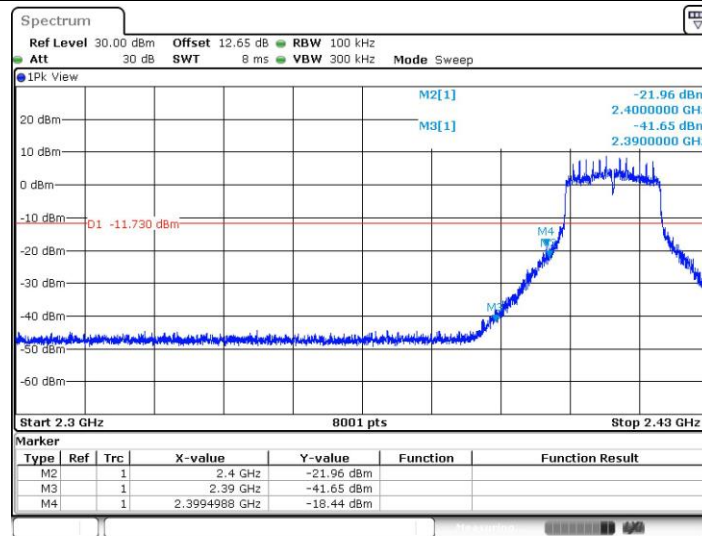


11G_Ant1_High_2462

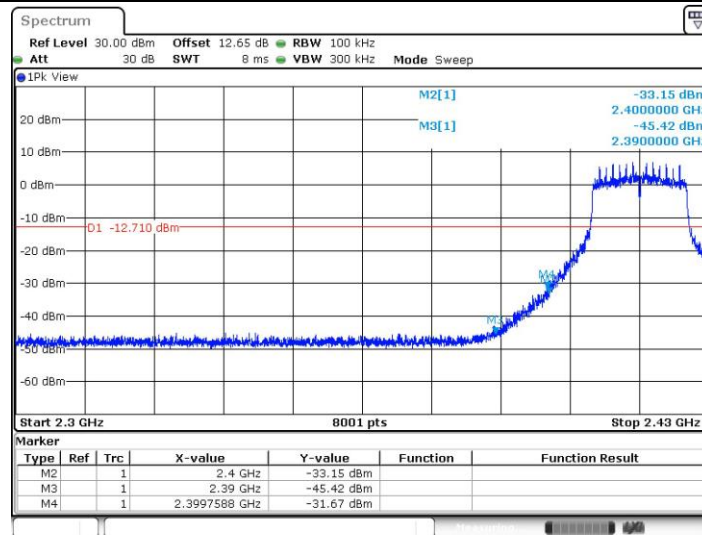




11N20SISO_Ant1_Low_2412

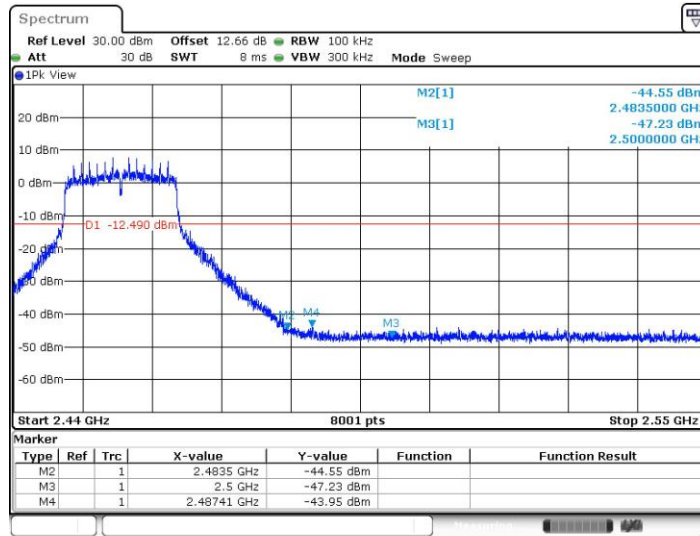


11N20SISO_Ant1_Low_2417

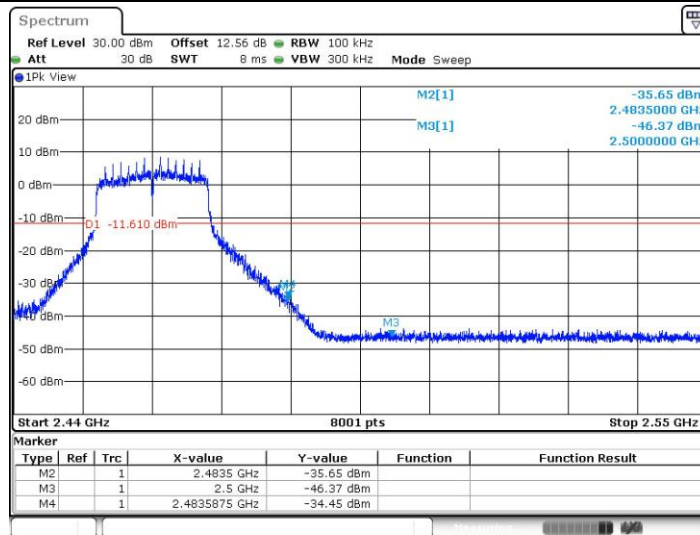




11N20SISO_Ant1_High_2457

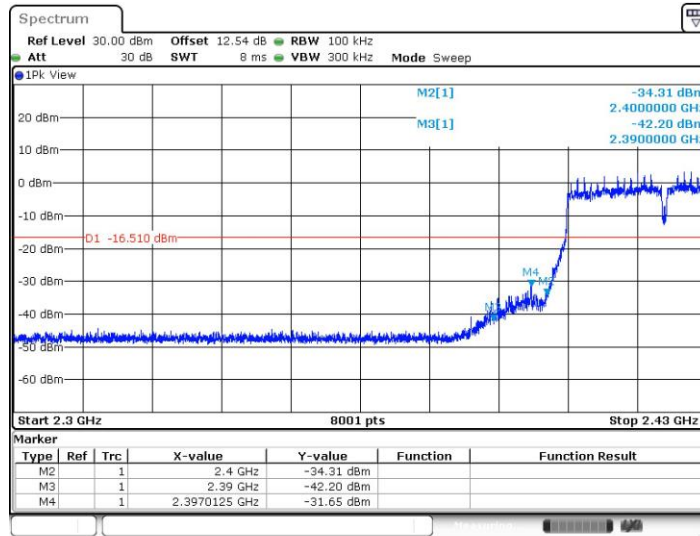


11N20SISO_Ant1_High_2462

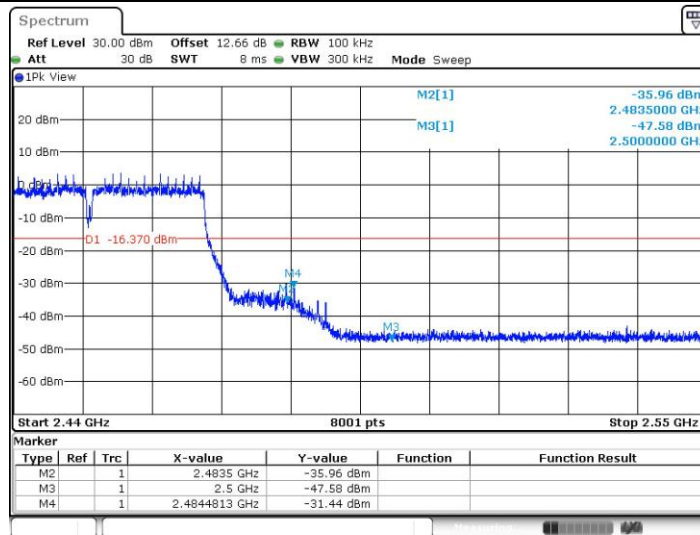




11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452





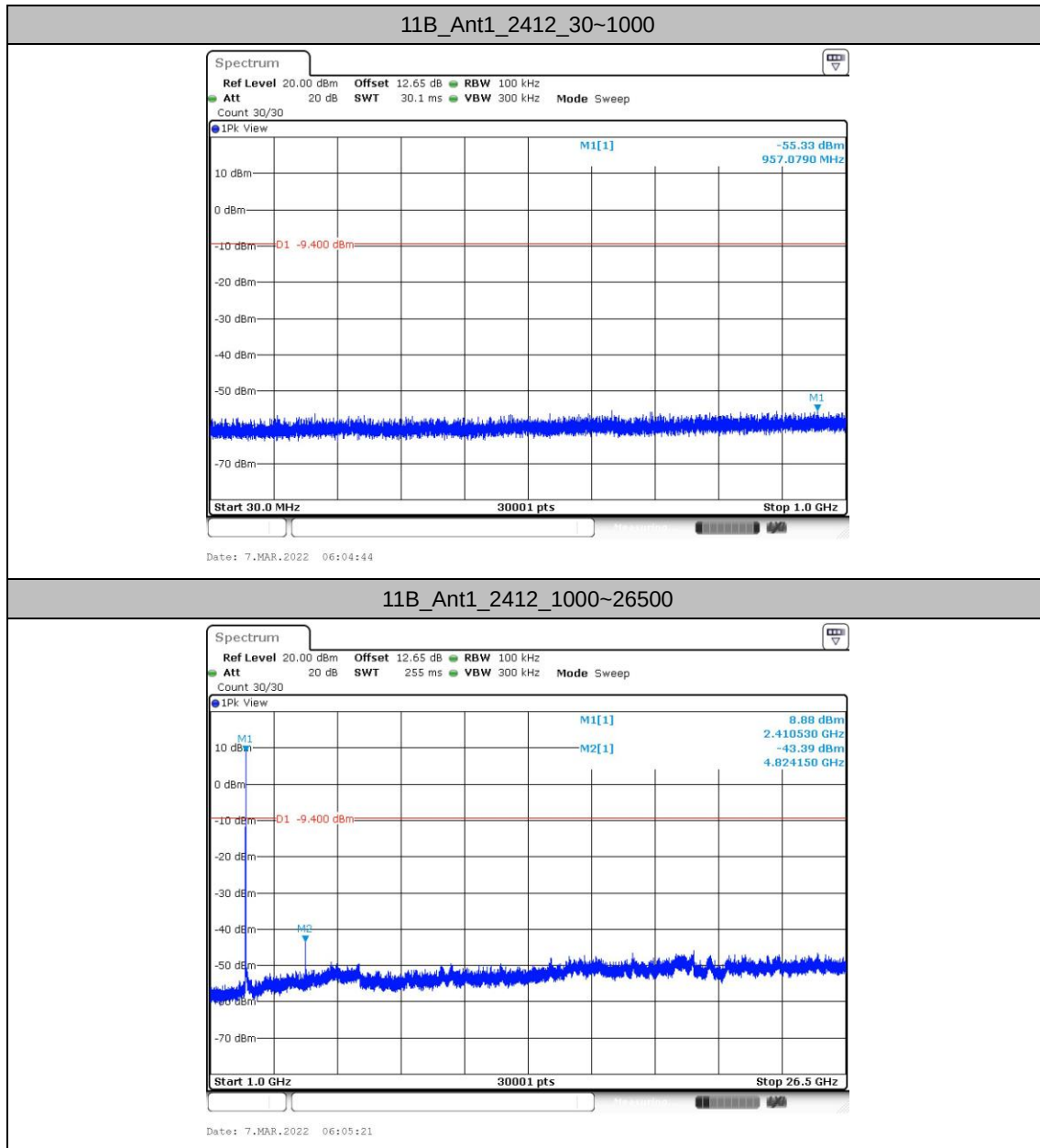
Conducted Spurious Emission

Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	10.60	-55.33	≤-9.4	PASS
			1000~26500	10.60	-43.39	≤-9.4	PASS
		2437	30~1000	10.45	-54.74	≤-9.55	PASS
			1000~26500	10.45	-45.68	≤-9.55	PASS
		2462	30~1000	10.48	-55.34	≤-9.52	PASS
			1000~26500	10.48	-44.46	≤-9.52	PASS
11G	Ant1	2412	30~1000	8.85	-54.63	≤-11.15	PASS
			1000~26500	8.85	-45.9	≤-11.15	PASS
		2417	30~1000	7.20	-55.46	≤-12.8	PASS
			1000~26500	7.20	-46.67	≤-12.8	PASS
		2437	30~1000	8.42	-55.42	≤-11.58	PASS
			1000~26500	8.42	-46.02	≤-11.58	PASS
		2457	30~1000	6.64	-55.73	≤-13.36	PASS
			1000~26500	6.64	-46.8	≤-13.36	PASS
		2462	30~1000	8.11	-54.79	≤-11.89	PASS
			1000~26500	8.11	-46.01	≤-11.89	PASS
11N20SISO	Ant1	2412	30~1000	8.27	-55.27	≤-11.73	PASS
			1000~26500	8.27	-46.24	≤-11.73	PASS
		2417	30~1000	7.29	-55.4	≤-12.71	PASS
			1000~26500	7.29	-46.73	≤-12.71	PASS
		2437	30~1000	8.59	-54.71	≤-11.41	PASS
			1000~26500	8.59	-46.07	≤-11.41	PASS
		2457	30~1000	7.51	-54.64	≤-12.49	PASS
			1000~26500	7.51	-46.53	≤-12.49	PASS
11N40SISO	Ant1	2422	30~1000	3.49	-54.46	≤-16.51	PASS
			1000~26500	3.49	-46.19	≤-16.51	PASS
		2437	30~1000	4.00	-55.21	≤-16	PASS
			1000~26500	4.00	-45.27	≤-16	PASS
		2452	30~1000	3.63	-54.48	≤-16.37	PASS
			1000~26500	3.63	-45.82	≤-16.37	PASS

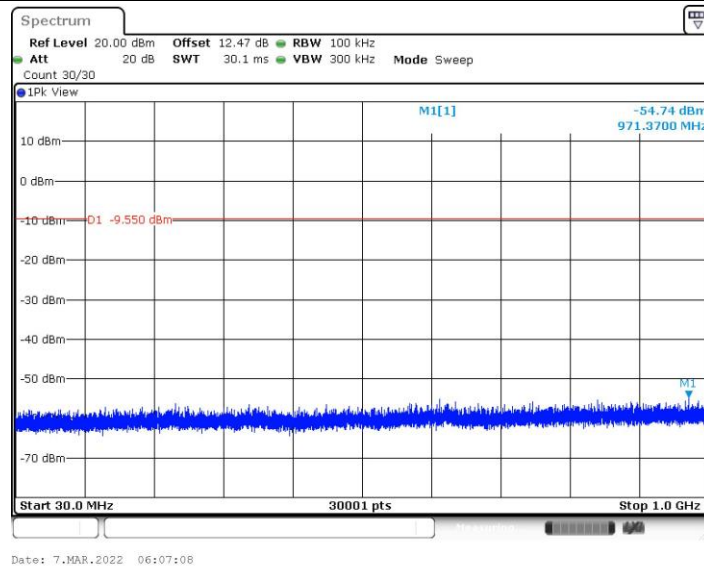


Test Graphs

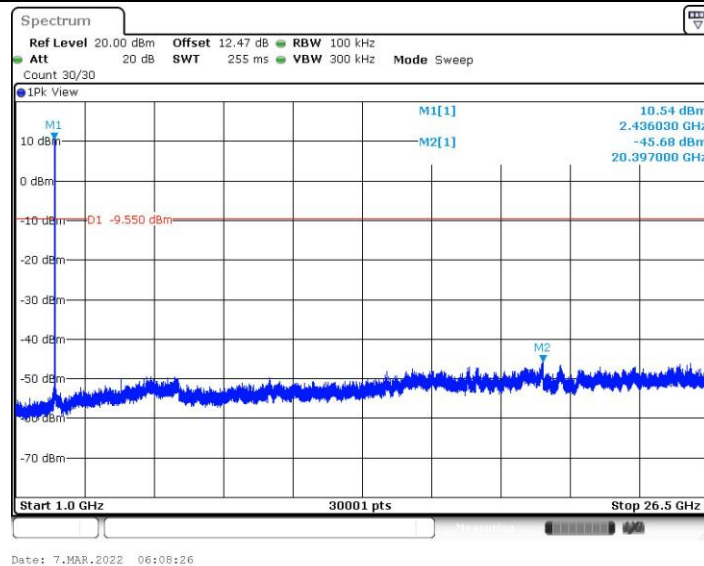




11B_Ant1_2437_30~1000

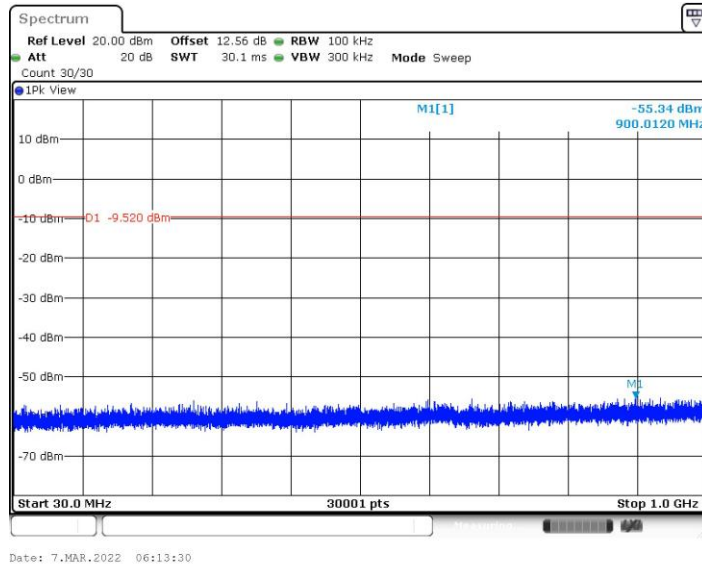


11B_Ant1_2437_1000~26500

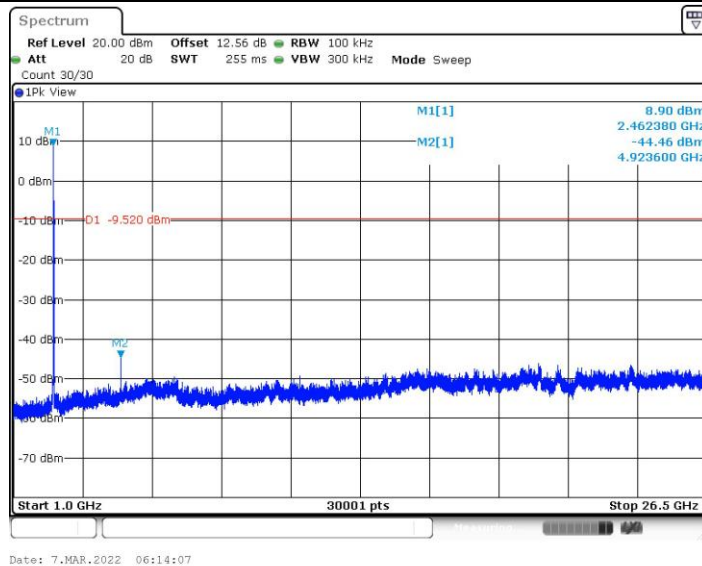




11B_Ant1_2462_30~1000

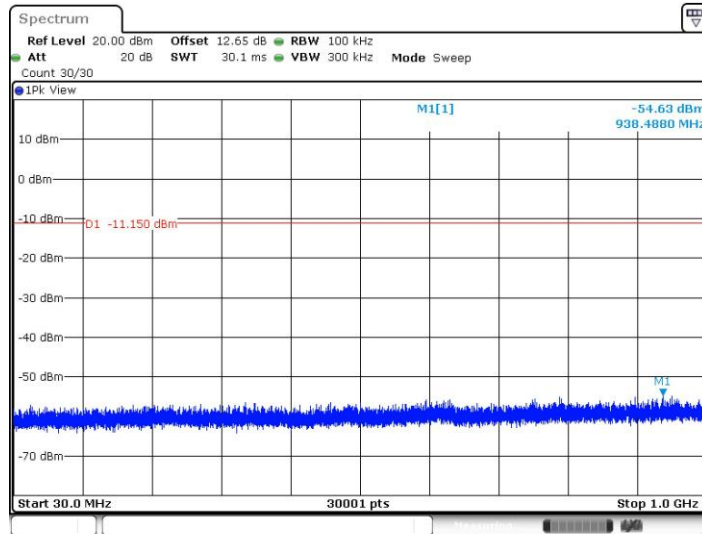


11B_Ant1_2462_1000~26500



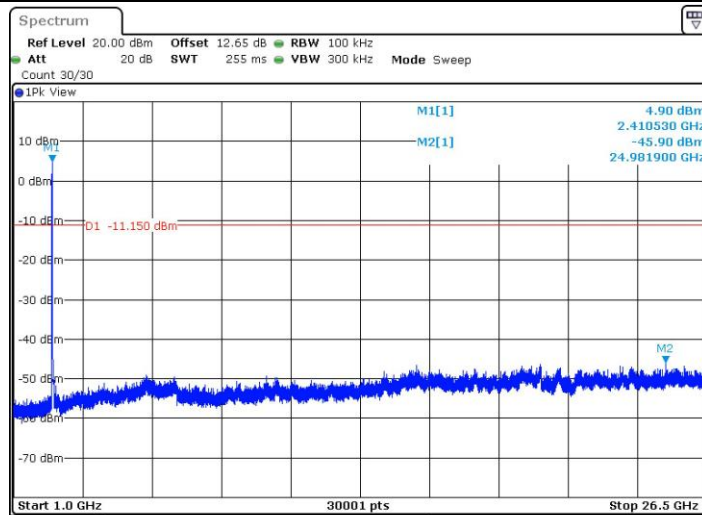


11G_Ant1_2412_30~1000



Date: 7.MAR.2022 06:15:48

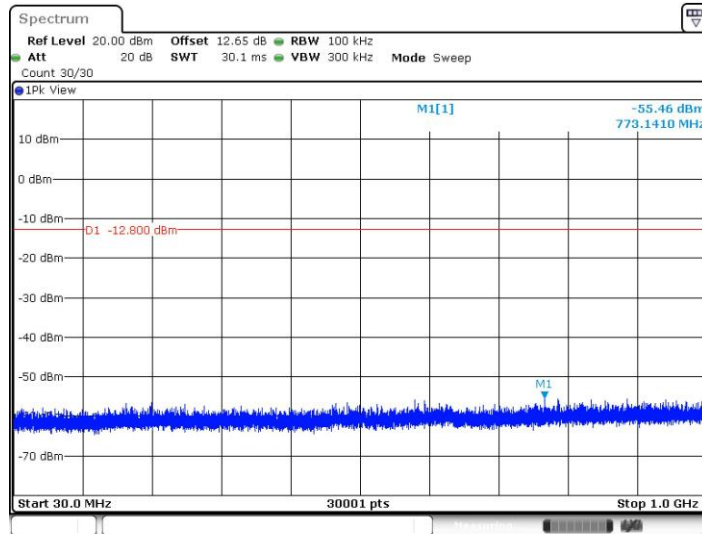
11G_Ant1_2412_1000~26500



Date: 7.MAR.2022 06:16:25

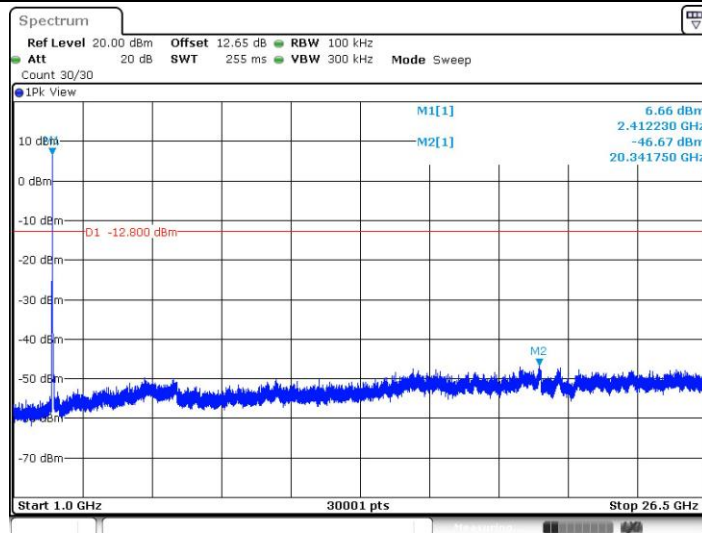


11G_Ant1_2417_30~1000



Date: 2.APR.2022 04:34:14

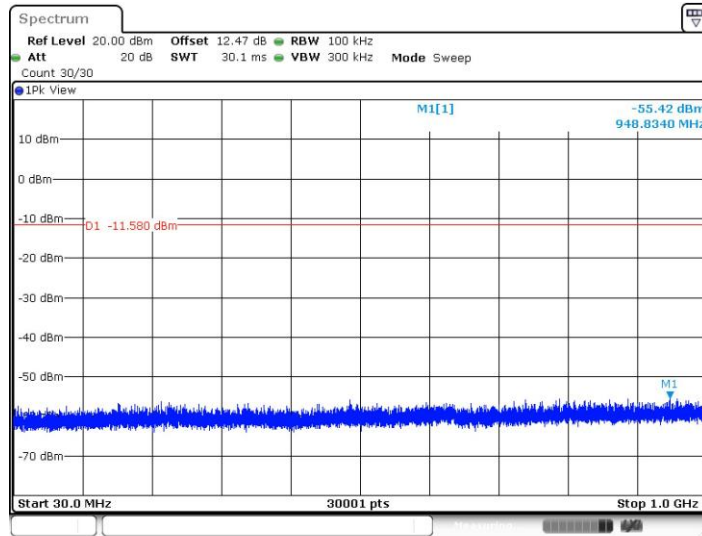
11G_Ant1_2417_1000~26500



Date: 2.APR.2022 04:34:51

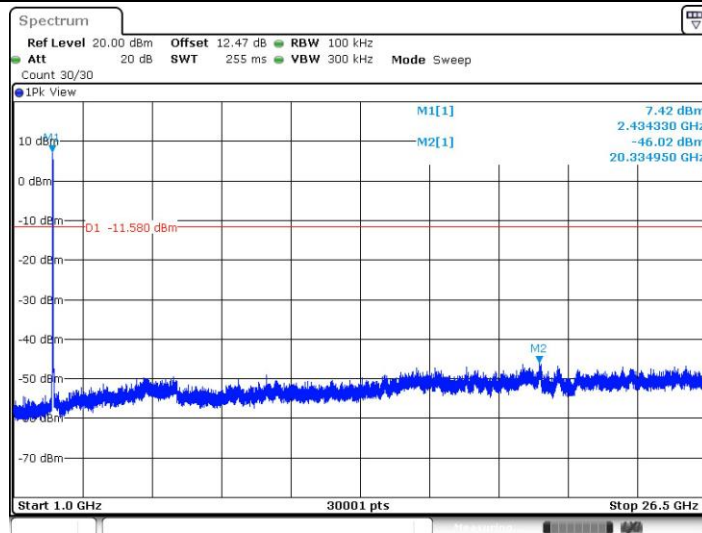


11G_Ant1_2437_30~1000



Date: 7.MAR.2022 06:17:53

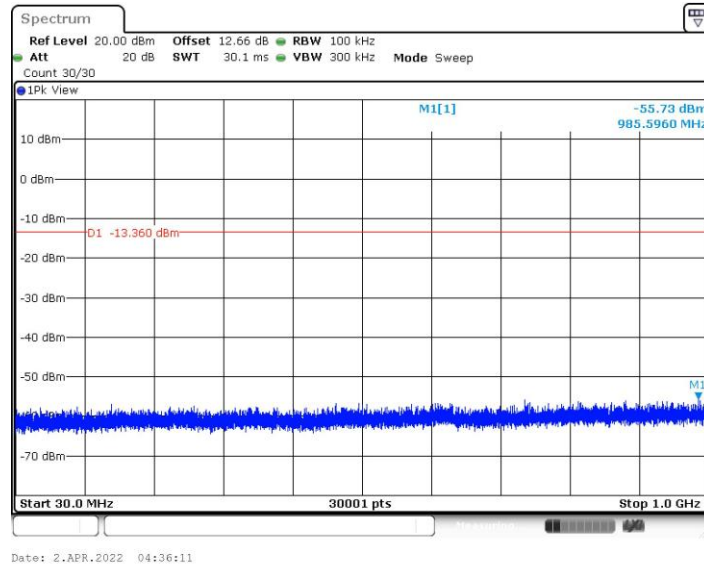
11G_Ant1_2437_1000~26500



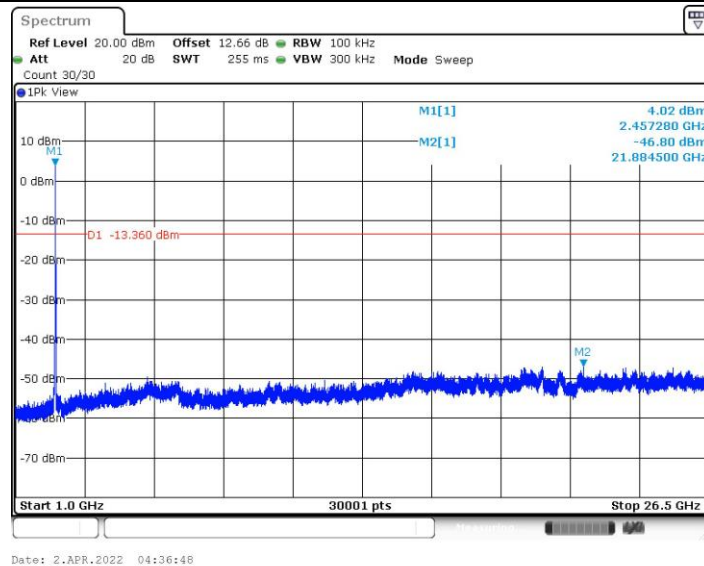
Date: 7.MAR.2022 06:18:30



11G_Ant1_2457_30~1000

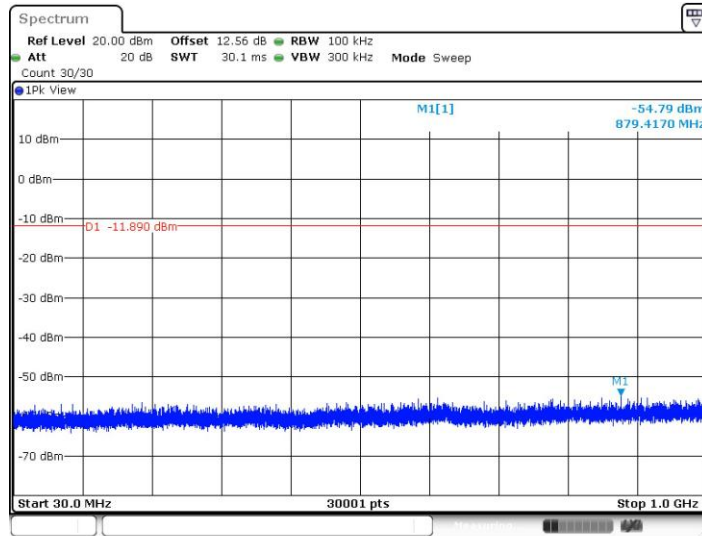


11G_Ant1_2457_1000~26500



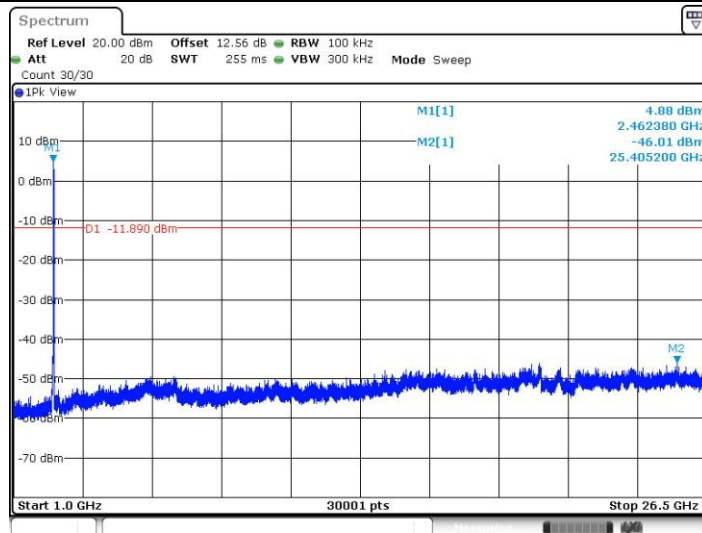


11G_Ant1_2462_30~1000



Date: 7.MAR.2022 06:19:39

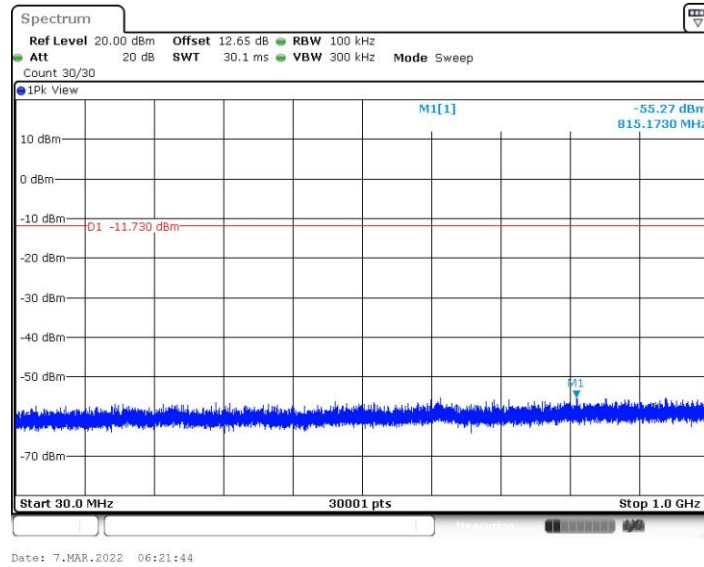
11G_Ant1_2462_1000~26500



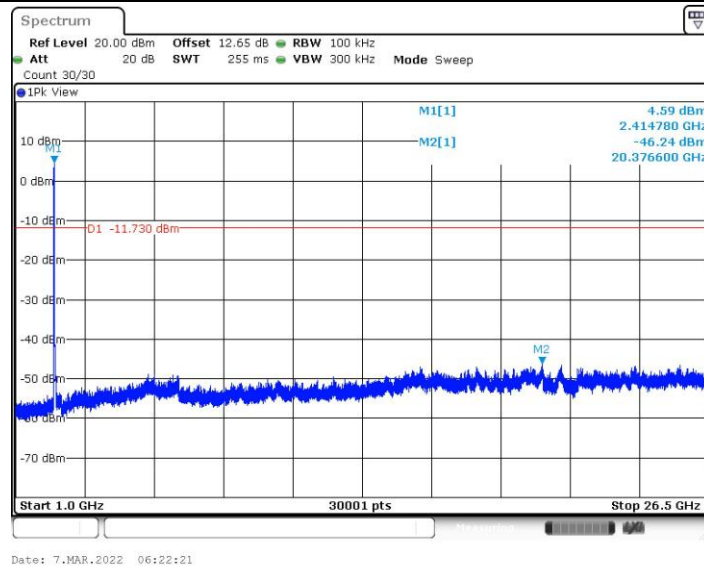
Date: 7.MAR.2022 06:20:16



11N20SISO_Ant1_2412_30~1000

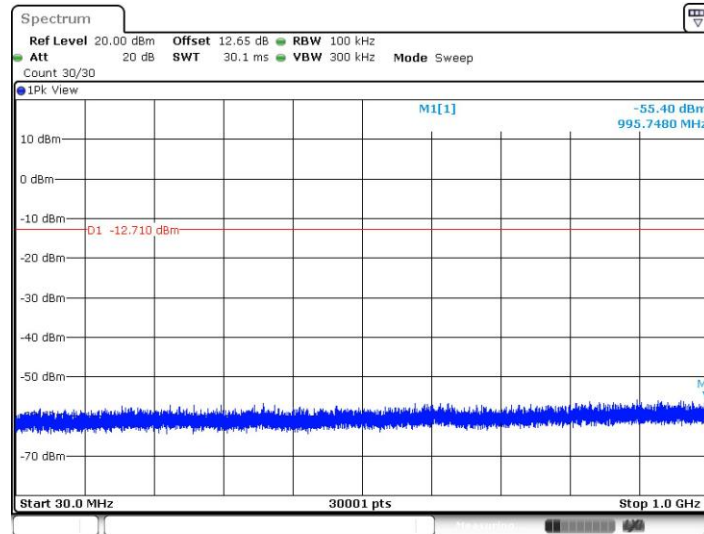


11N20SISO_Ant1_2412_1000~26500



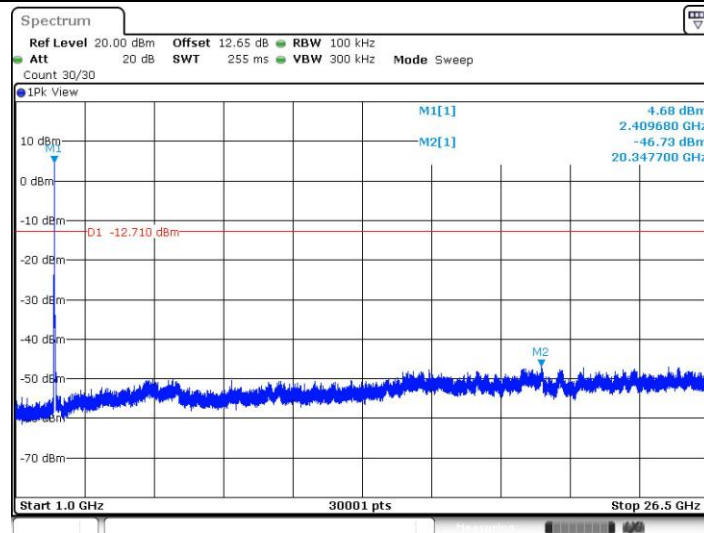


11N20SISO_Ant1_2417_30~1000



Date: 2.APR.2022 04:40:20

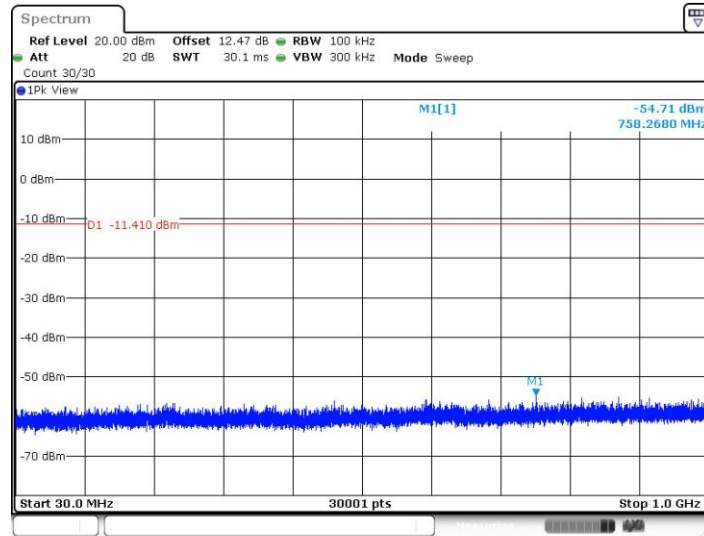
11N20SISO_Ant1_2417_1000~26500



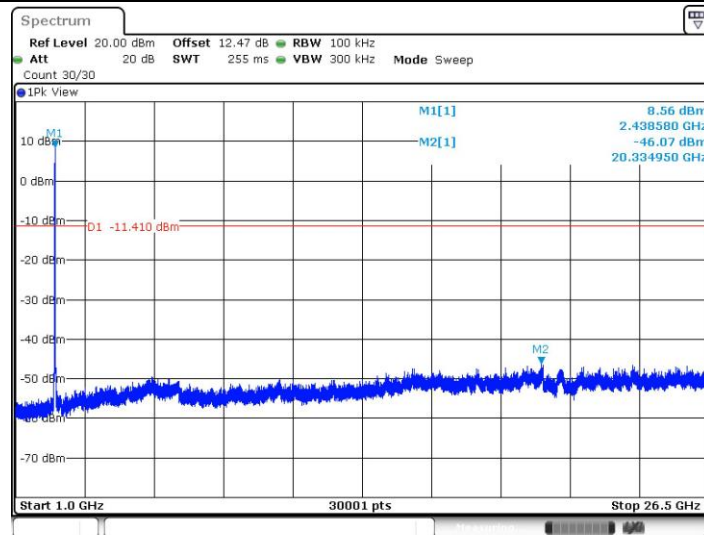
Date: 2.APR.2022 04:40:56



11N20SISO_Ant1_2437_30~1000

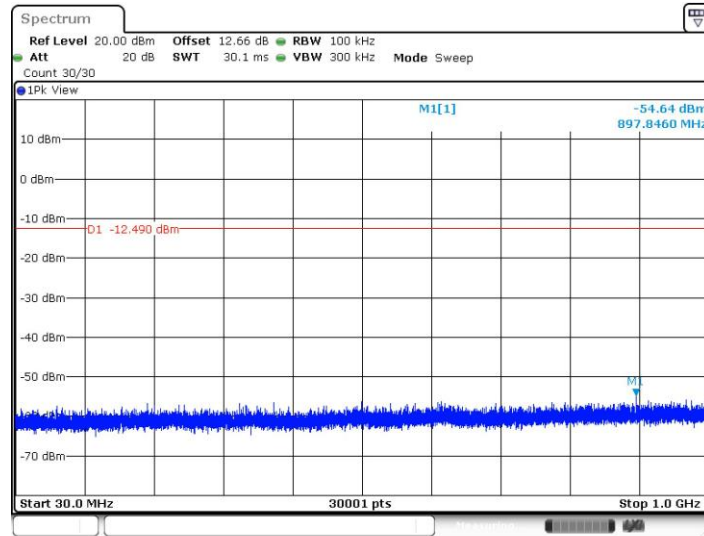


11N20SISO_Ant1_2437_1000~26500



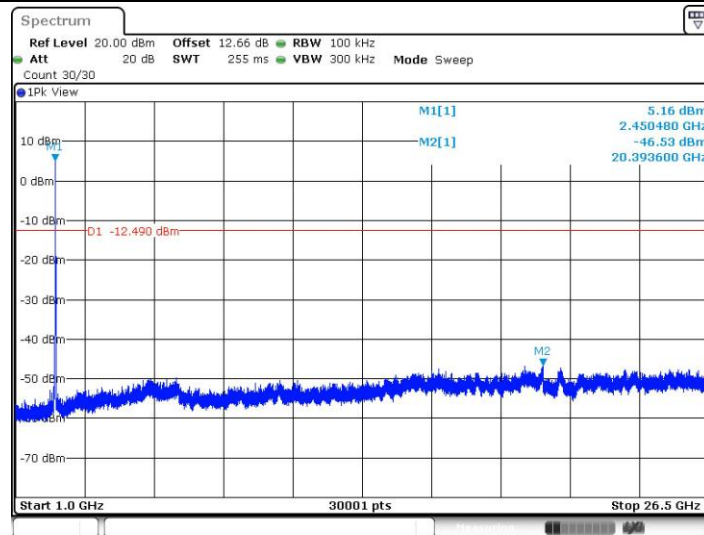


11N20SISO_Ant1_2457_30~1000



Date: 2.APR.2022 04:42:14

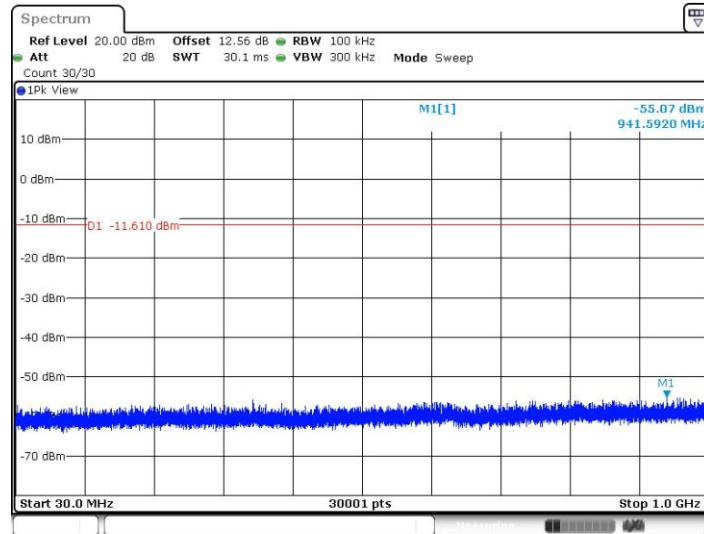
11N20SISO_Ant1_2457_1000~26500



Date: 2.APR.2022 04:42:51

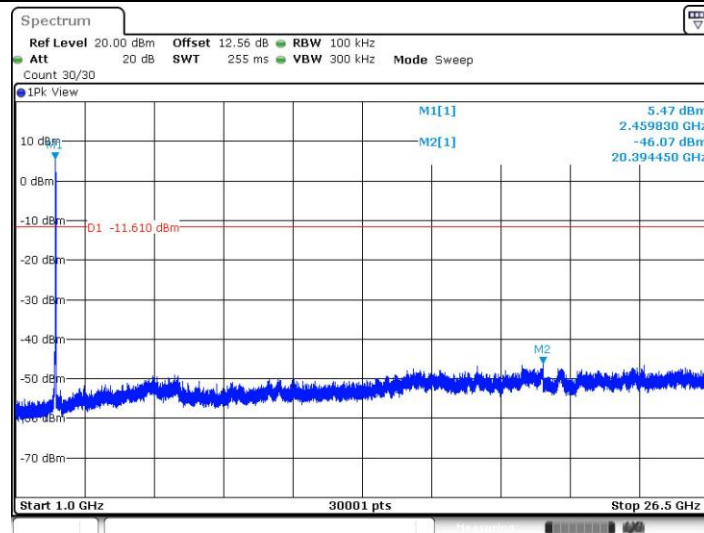


11N20SISO_Ant1_2462_30~1000



Date: 7.MAR.2022 06:25:22

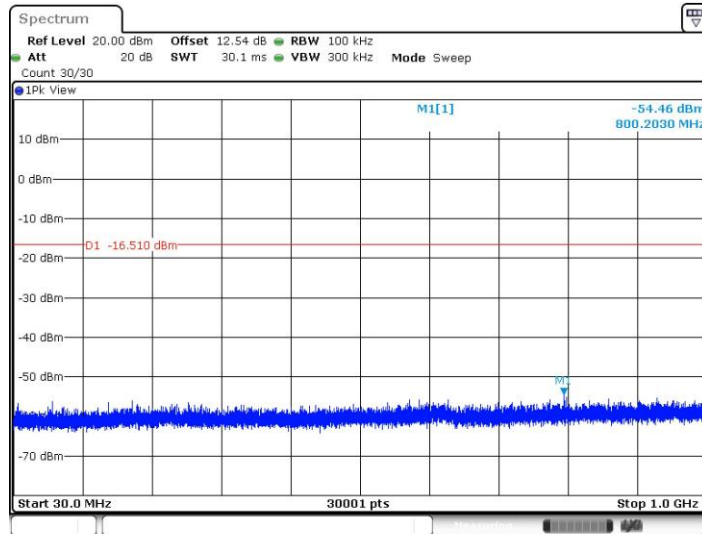
11N20SISO_Ant1_2462_1000~26500



Date: 7.MAR.2022 06:25:58

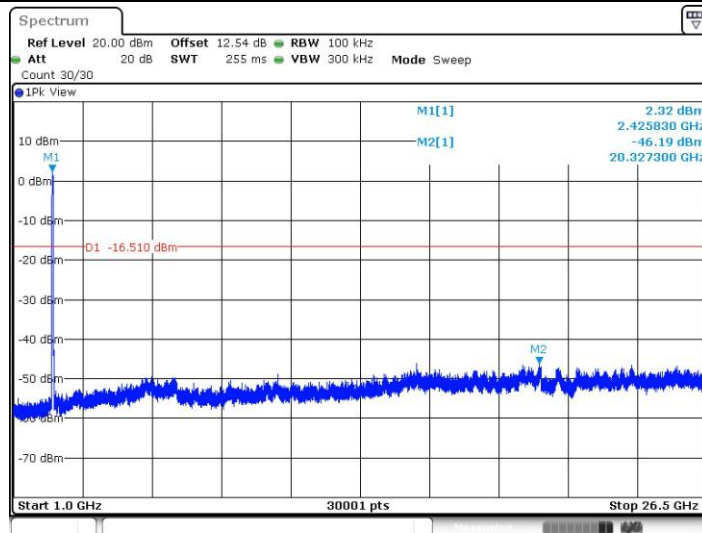


11N40SISO_Ant1_2422_30~1000



Date: 7.MAR.2022 06:27:47

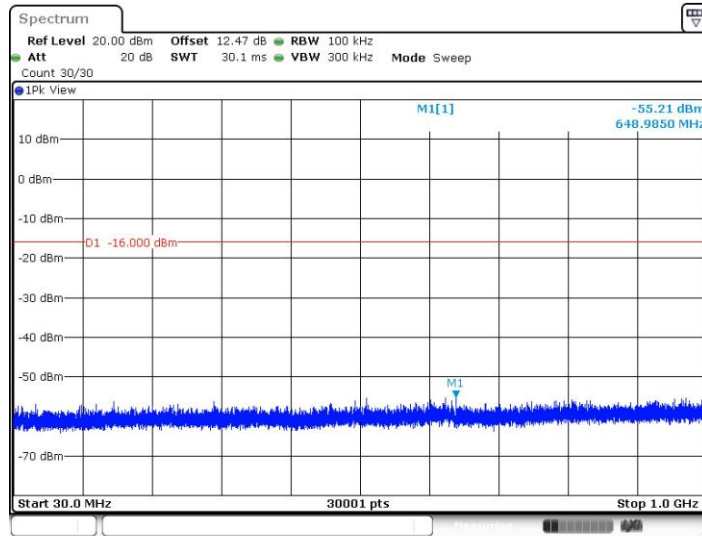
11N40SISO_Ant1_2422_1000~26500



Date: 7.MAR.2022 06:28:23

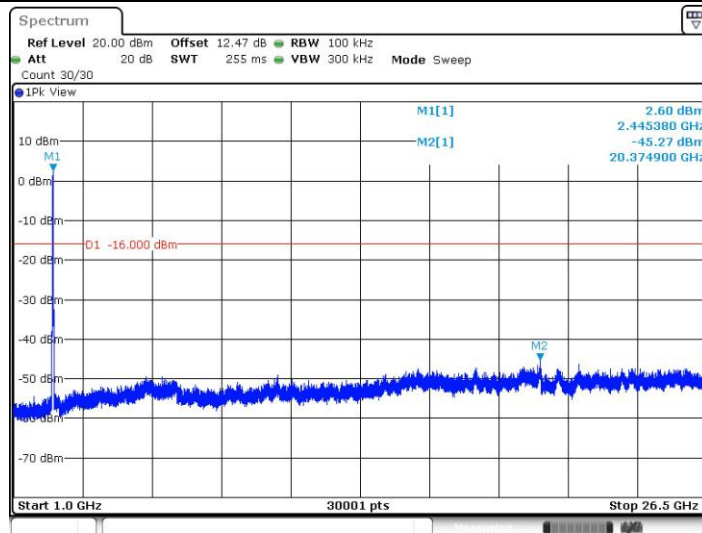


11N40SISO_Ant1_2437_30~1000



Date: 7.MAR.2022 06:29:26

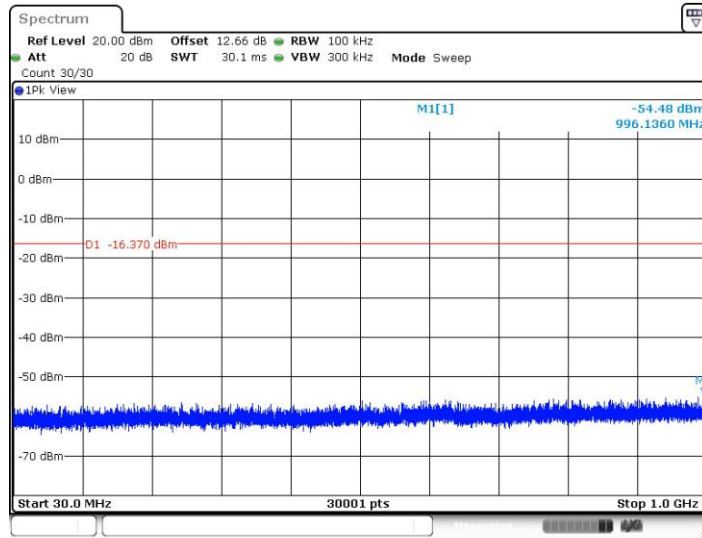
11N40SISO_Ant1_2437_1000~26500



Date: 7.MAR.2022 06:30:03

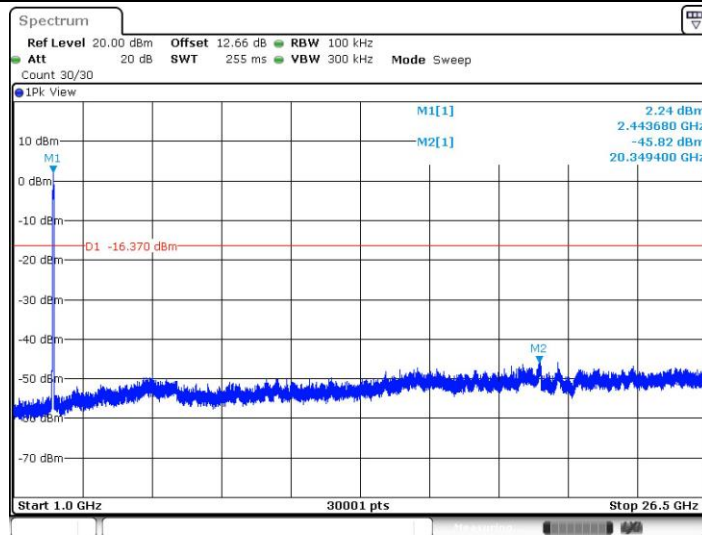


11N40SISO_Ant1_2452_30~1000



Date: 7.MAR.2022 06:31:26

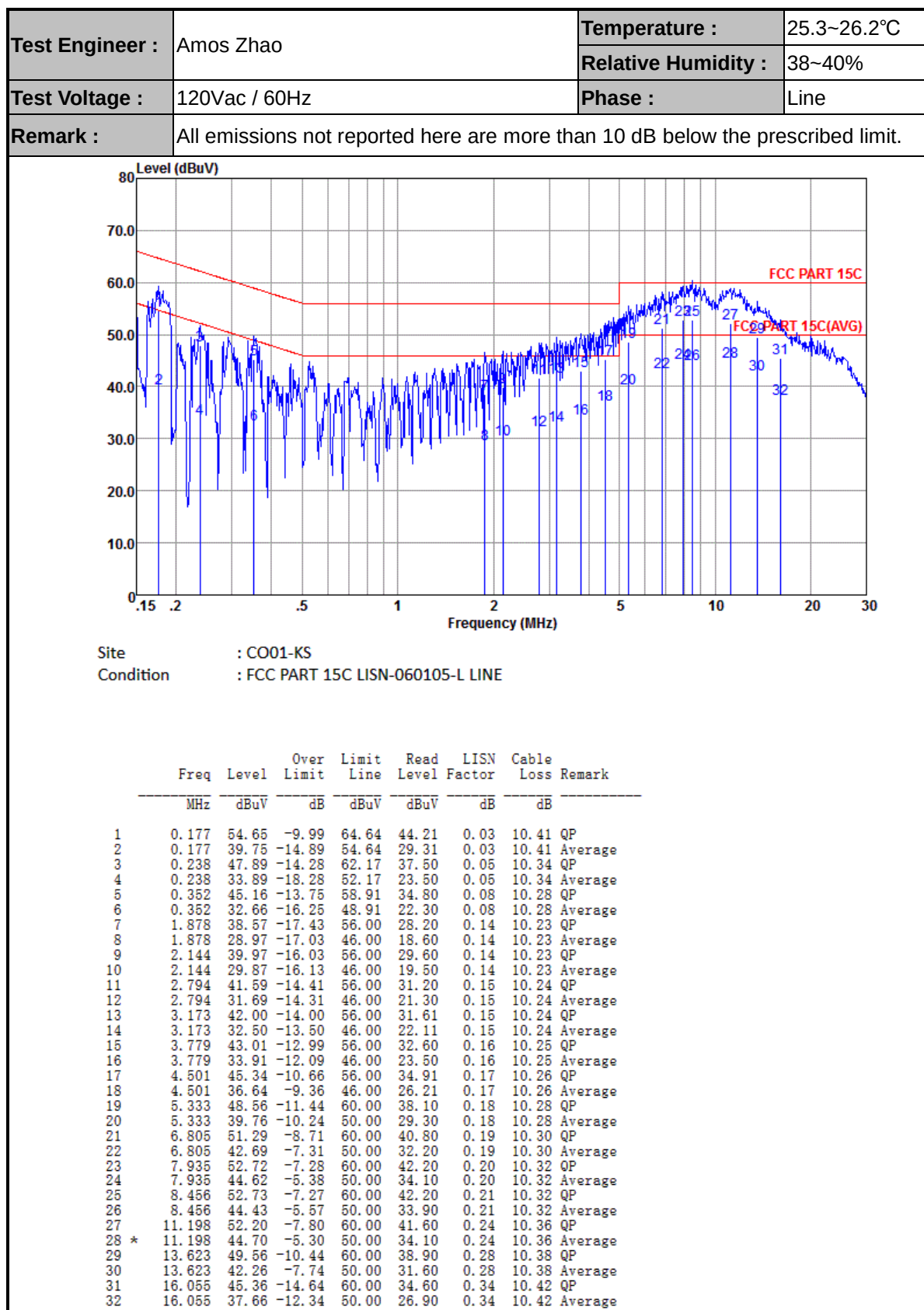
11N40SISO_Ant1_2452_1000~26500



Date: 7.MAR.2022 06:32:03

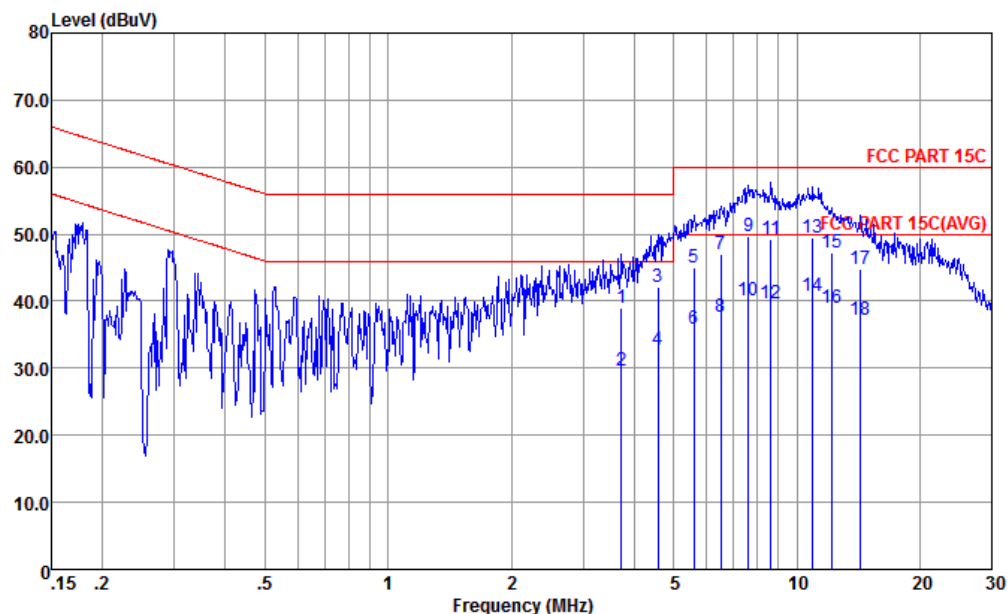


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Amos Zhao	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15C LISN-060105-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBμV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBμV	dBμV	dB	dB	
1	3.720	38.91	-17.09	56.00	28.50	0.16	10.25	QP
2	3.720	29.71	-16.29	46.00	19.30	0.16	10.25	Average
3	4.574	42.04	-13.96	56.00	31.61	0.17	10.26	QP
4	4.574	32.74	-13.26	46.00	22.31	0.17	10.26	Average
5	5.594	45.07	-14.93	60.00	34.60	0.19	10.28	QP
6	5.594	35.97	-14.03	50.00	25.50	0.19	10.28	Average
7	6.523	47.09	-12.91	60.00	36.60	0.20	10.29	QP
8	6.523	37.59	-12.41	50.00	27.10	0.20	10.29	Average
9	7.606	49.72	-10.28	60.00	39.20	0.21	10.31	QP
10	7.606	40.12	-9.88	50.00	29.60	0.21	10.31	Average
11	8.637	49.14	-10.86	60.00	38.59	0.22	10.33	QP
12	8.637	39.74	-10.26	50.00	29.19	0.22	10.33	Average
13	10.963	49.50	-10.50	60.00	38.90	0.25	10.35	QP
14 *	10.963	40.80	-9.20	50.00	30.20	0.25	10.35	Average
15	12.188	47.24	-12.76	60.00	36.60	0.27	10.37	QP
16	12.188	38.94	-11.06	50.00	28.30	0.27	10.37	Average
17	14.288	44.89	-15.11	60.00	34.20	0.30	10.39	QP
18	14.288	37.19	-12.81	50.00	26.50	0.30	10.39	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)



Appendix C. Radiated Spurious Emission

Test Engineer :	Carry Xu	Temperature :	22~23°C
		Relative Humidity :	41~42%



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 11 2462MHz		2485.12	56.57	-17.43	74	53.16	32.98	7.25	36.82	299	66	P	H
		2483.5	46.01	-7.99	54	42.6	32.98	7.25	36.82	299	66	A	H
		2464	108.18	-	-	104.83	32.96	7.22	36.83	299	66	P	H
		2464	105.42	-	-	102.07	32.96	7.22	36.83	299	66	A	H
		2485.3	59.52	-14.48	74	56.11	32.98	7.25	36.82	100	113	P	V
		2483.5	48.81	-5.19	54	45.4	32.98	7.25	36.82	100	113	A	V
		2464	112.05	-	-	108.7	32.96	7.22	36.83	100	113	P	V
		2464	108.32	-	-	104.97	32.96	7.22	36.83	100	113	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 11 2462MHz		4920	46.96	-27.04	74	67.81	34.26	10.34	65.45	300	0	P	H
		7380	43	-31	74	60.5	35.88	12.73	66.11	300	0	P	H
		4920	52.55	-21.45	74	73.4	34.26	10.34	65.45	100	298	P	V
		4920	50.66	-3.34	54	71.51	34.26	10.34	65.45	100	298	A	V
		7380	42.56	-31.44	74	60.06	35.88	12.73	66.11	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 11 2462MHz		2483.86	60.53	-13.47	74	57.12	32.98	7.25	36.82	304	44	P	H
		2483.5	49.69	-4.31	54	46.28	32.98	7.25	36.82	304	44	A	H
	*	2468	107.11	-	-	103.76	32.96	7.22	36.83	304	44	P	H
	*	2466	98.71	-	-	95.36	32.96	7.22	36.83	304	44	A	H
		2483.62	60.88	-13.12	74	57.47	32.98	7.25	36.82	100	115	P	V
		2483.5	50.61	-3.39	54	47.2	32.98	7.25	36.82	100	115	A	V
	*	2466	107.86	-	-	104.51	32.96	7.22	36.83	100	115	P	V
	*	2466	99.71	-	-	96.36	32.96	7.22	36.83	100	115	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4920	40.28	-33.72	74	61.13	34.26	10.34	65.45	300	0	P	H
HT20		7380	42.52	-31.48	74	60.02	35.88	12.73	66.11	300	0	P	H
CH 11		4920	41.63	-32.37	74	62.48	34.26	10.34	65.45	100	0	P	V
2462MHz		7380	42.67	-31.33	74	60.17	35.88	12.73	66.11	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 06 2437MHz		2388.91	56.33	-17.67	74	53.21	32.88	7.1	36.86	100	143	P	H
		2389.95	44.84	-9.16	54	41.72	32.88	7.1	36.86	100	143	A	H
		2483.74	57.06	-16.94	74	53.65	32.98	7.25	36.82	100	143	P	H
		2483.68	47.36	-6.64	54	43.95	32.98	7.25	36.82	100	143	A	H
	*	2440	105.94	-	-	102.65	32.94	7.19	36.84	100	143	P	H
	*	2440	96.34	-	-	93.05	32.94	7.19	36.84	100	143	A	H
		2389.82	59.07	-14.93	74	55.95	32.88	7.1	36.86	100	65	P	V
		2389.95	47.73	-6.27	54	44.61	32.88	7.1	36.86	100	65	A	V
		2483.5	61.08	-12.92	74	57.67	32.98	7.25	36.82	100	65	P	V
		2483.5	50.67	-3.33	54	47.26	32.98	7.25	36.82	100	65	A	V
	*	2440	108.17	-	-	104.88	32.94	7.19	36.84	100	65	P	V
	*	2440	100.7	-	-	97.41	32.94	7.19	36.84	100	65	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4875	40.97	-33.03	74	61.87	34.23	10.29	65.42	300	0	P	H
HT40		7311	43.33	-30.67	74	60.66	35.86	12.72	65.91	300	0	P	H
CH 06		4875	42	-32	74	62.9	34.23	10.29	65.42	100	0	P	V
2437MHz		7311	43.77	-30.23	74	61.1	35.86	12.72	65.91	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Co-location

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40& LTE_B13_BW_5M (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 06 2437MHz		2389.04	54.05	-19.95	74	50.93	32.88	7.1	36.86	267	61	P	H
		2389.95	44.11	-9.89	54	40.99	32.88	7.1	36.86	267	61	A	H
		2483.86	57.69	-16.31	74	54.28	32.98	7.25	36.82	267	61	P	H
		2483.5	47.09	-6.91	54	43.68	32.98	7.25	36.82	267	61	A	H
	*	2440	106.91	-	-	103.62	32.94	7.19	36.84	267	61	P	H
	*	2440	98.3	-	-	95.01	32.94	7.19	36.84	267	61	A	H
		2388.78	58.35	-15.65	74	55.23	32.88	7.1	36.86	111	106	P	V
		2389.82	46.69	-7.31	54	43.57	32.88	7.1	36.86	111	106	A	V
		2483.74	60.21	-13.79	74	56.8	32.98	7.25	36.82	111	106	P	V
		2483.56	49.93	-4.07	54	46.52	32.98	7.25	36.82	111	106	A	V
	*	2440	108.46	-	-	105.17	32.94	7.19	36.84	111	106	P	V
	*	2440	99.87	-	-	96.58	32.94	7.19	36.84	111	106	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40& LTE_B13_BW_5M (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4875	40.31	-33.69	74	61.21	34.23	10.29	65.42	300	0	P	H
HT40		7311	42.87	-31.13	74	60.2	35.86	12.72	65.91	300	0	P	H
CH 06		4875	41.48	-32.52	74	62.38	34.23	10.29	65.42	100	0	P	V
2437MHz		7311	43.26	-30.74	74	60.59	35.86	12.72	65.91	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT40 LF		100.81	20.26	-23.24	43.5	34.53	16.19	1.74	32.2	-	-	P	H
		124.09	27.21	-16.29	43.5	39.82	17.6	1.94	32.15	-	-	P	H
		159.98	25.11	-18.39	43.5	38.51	16.5	2.2	32.1	-	-	P	H
		213.33	29.67	-13.83	43.5	44.02	15.23	2.55	32.13	-	-	P	H
		239.52	27.38	-18.62	46	39.36	17.5	2.7	32.18	-	-	P	H
		828.31	30.29	-15.71	46	28.82	28.83	5	32.36	-	-	P	H
		35.82	33.85	-6.15	40	43.33	21.92	0.78	32.18	-	-	P	V
		127	27.47	-16.03	43.5	40.35	17.6	1.67	32.15	-	-	P	V
		213.33	25.29	-18.21	43.5	40.1	15.23	2.09	32.13	-	-	P	V
		363.68	22.71	-23.29	46	31.24	20.88	2.82	32.23	-	-	P	V
		440.31	23.7	-22.3	46	29.94	22.87	3.11	32.22	-	-	P	V
		832.19	29.8	-16.2	46	29	28.91	4.25	32.36	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	P eak or A verage
H/V	H orizontal or V ertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

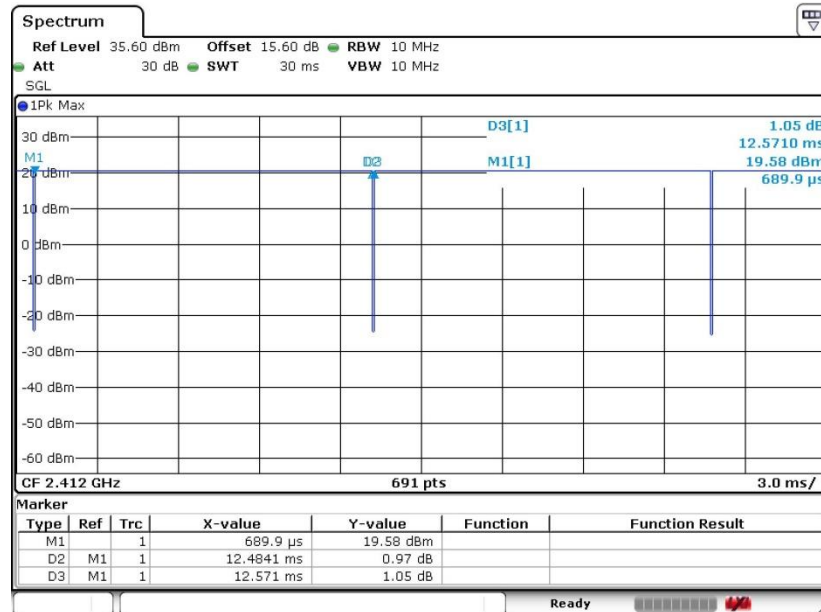
Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

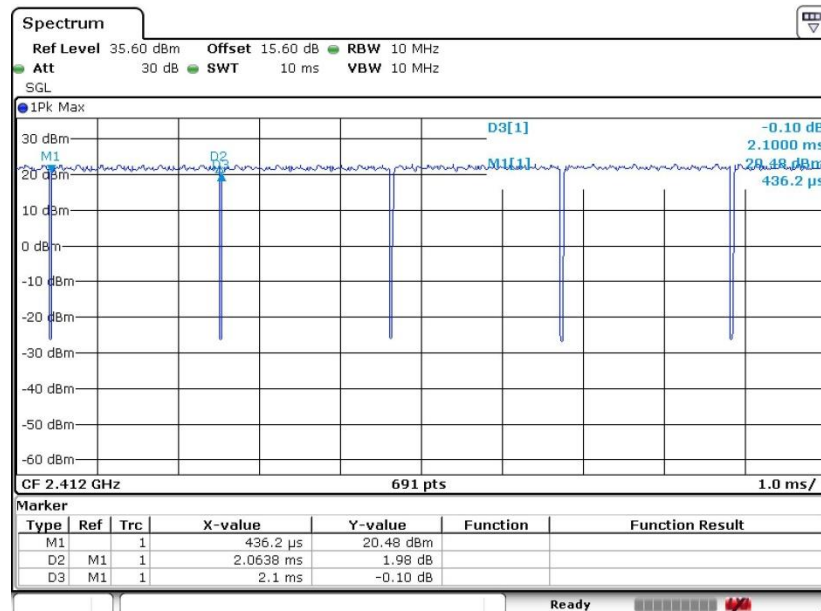
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.31	-	-	10Hz
802.11g	98.28	-	-	10Hz
802.11n HT20	97.42	1.919	0.521	0.56KHz
802.11n HT40	94.92	0.948	1.055	1.1KHz



802.11b

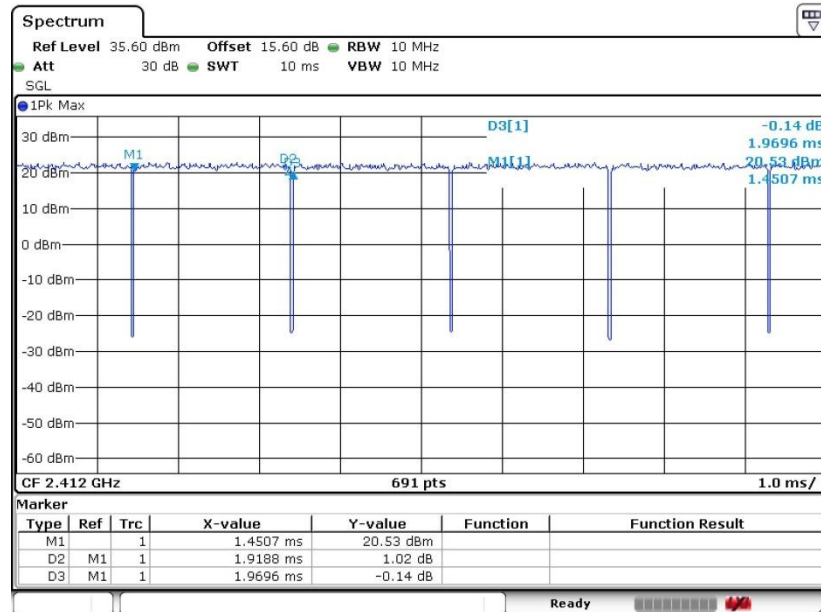


802.11g





802.11n HT20



802.11n HT40

