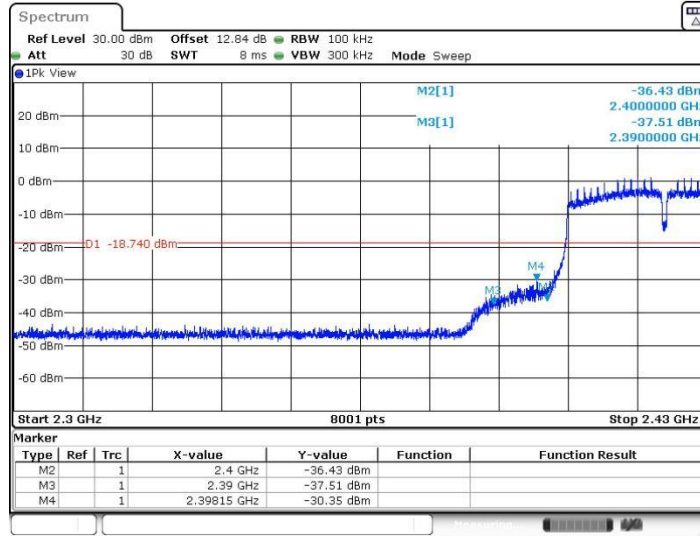
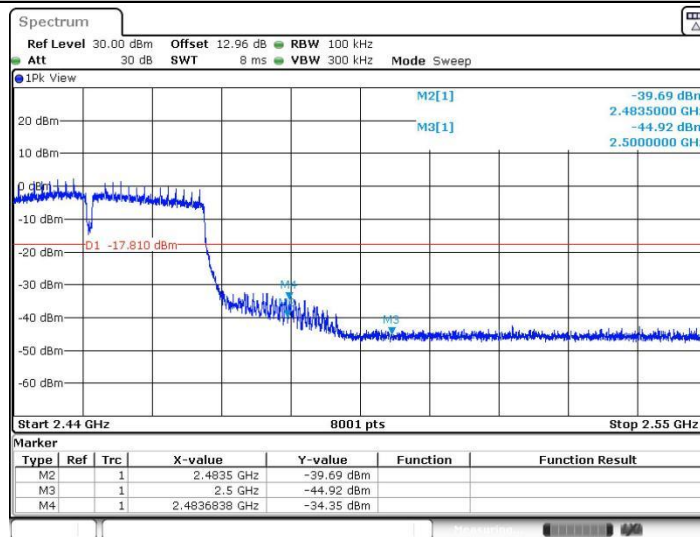




11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452





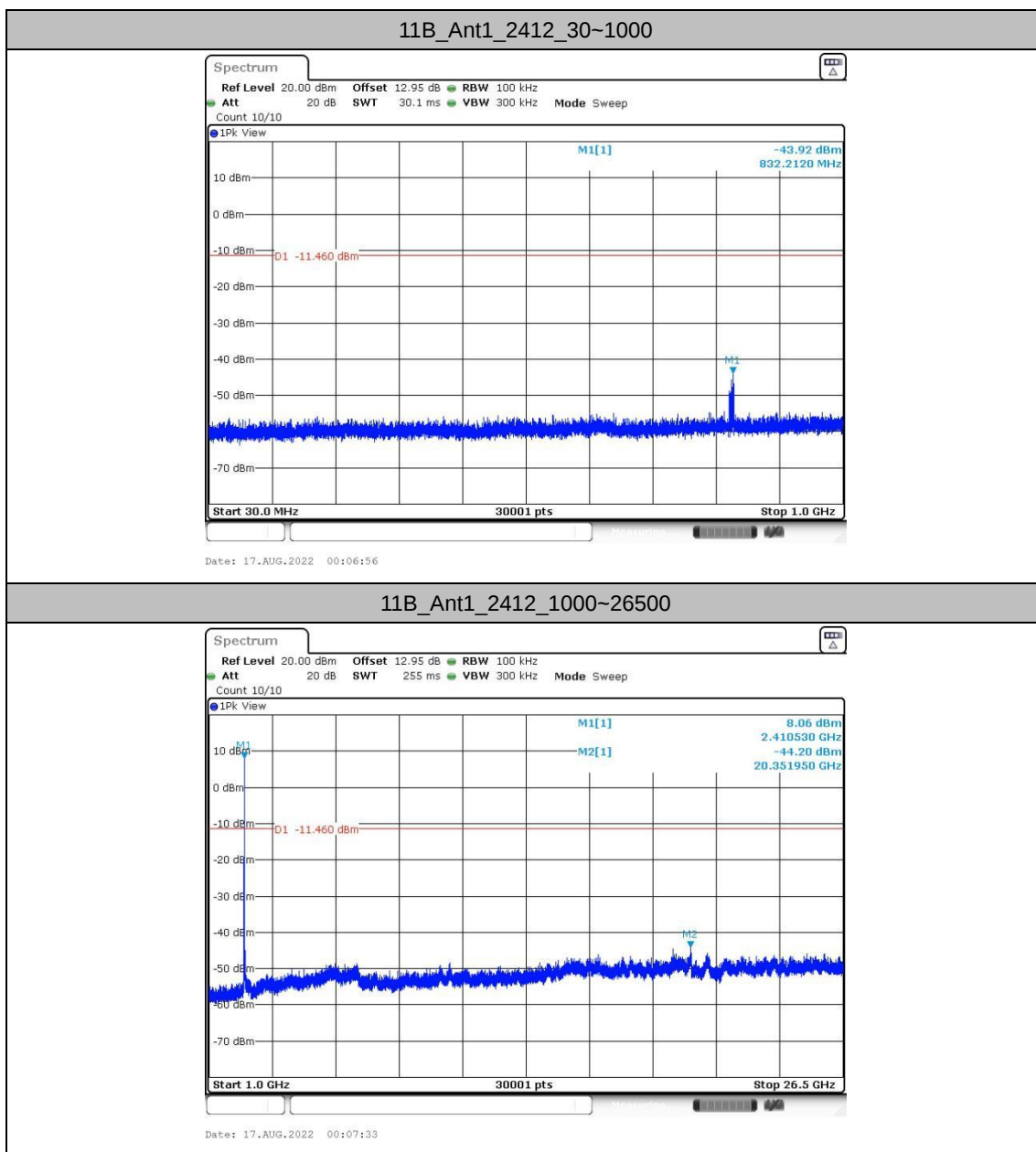
Conducted Spurious Emission

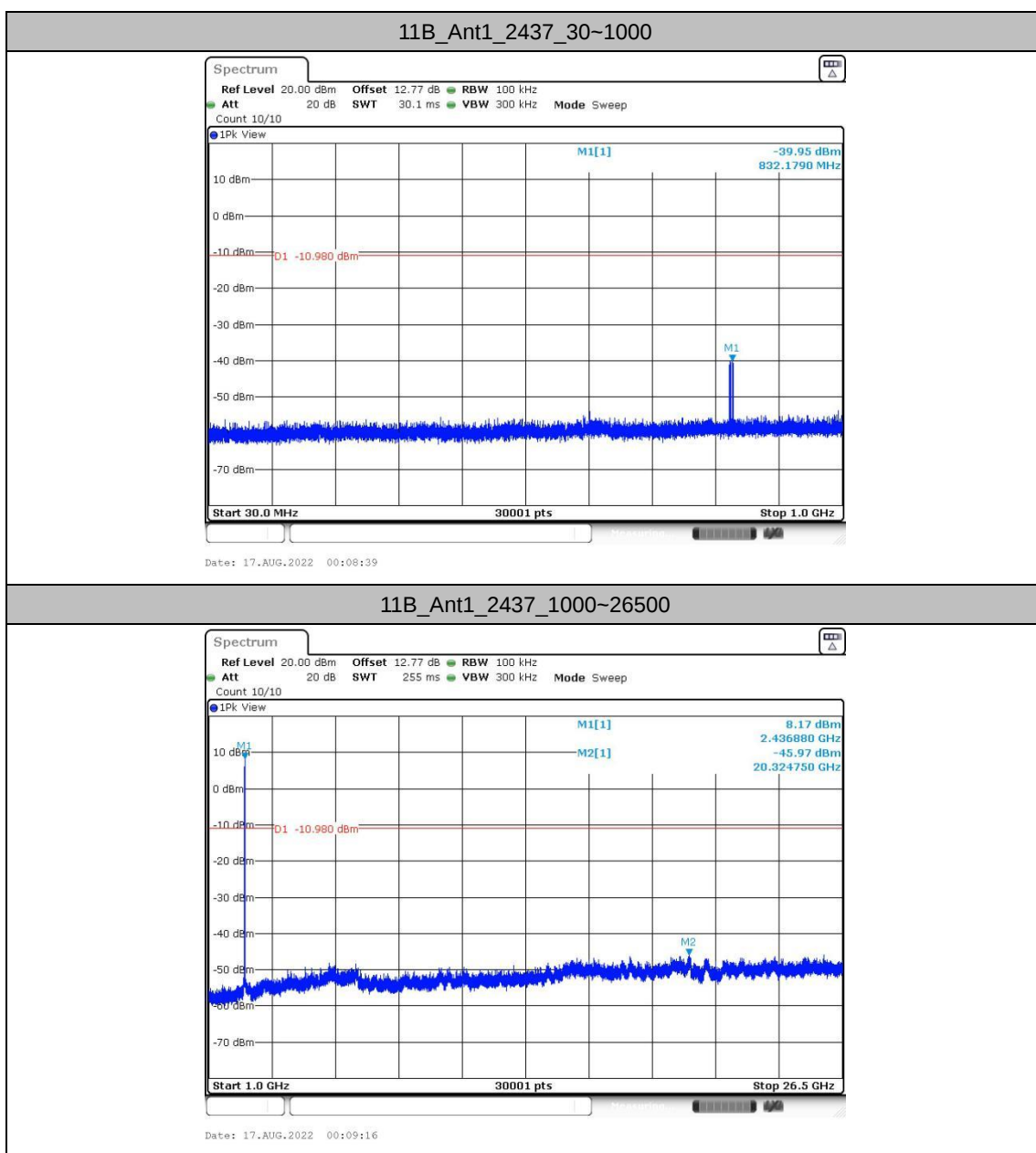
Test Result

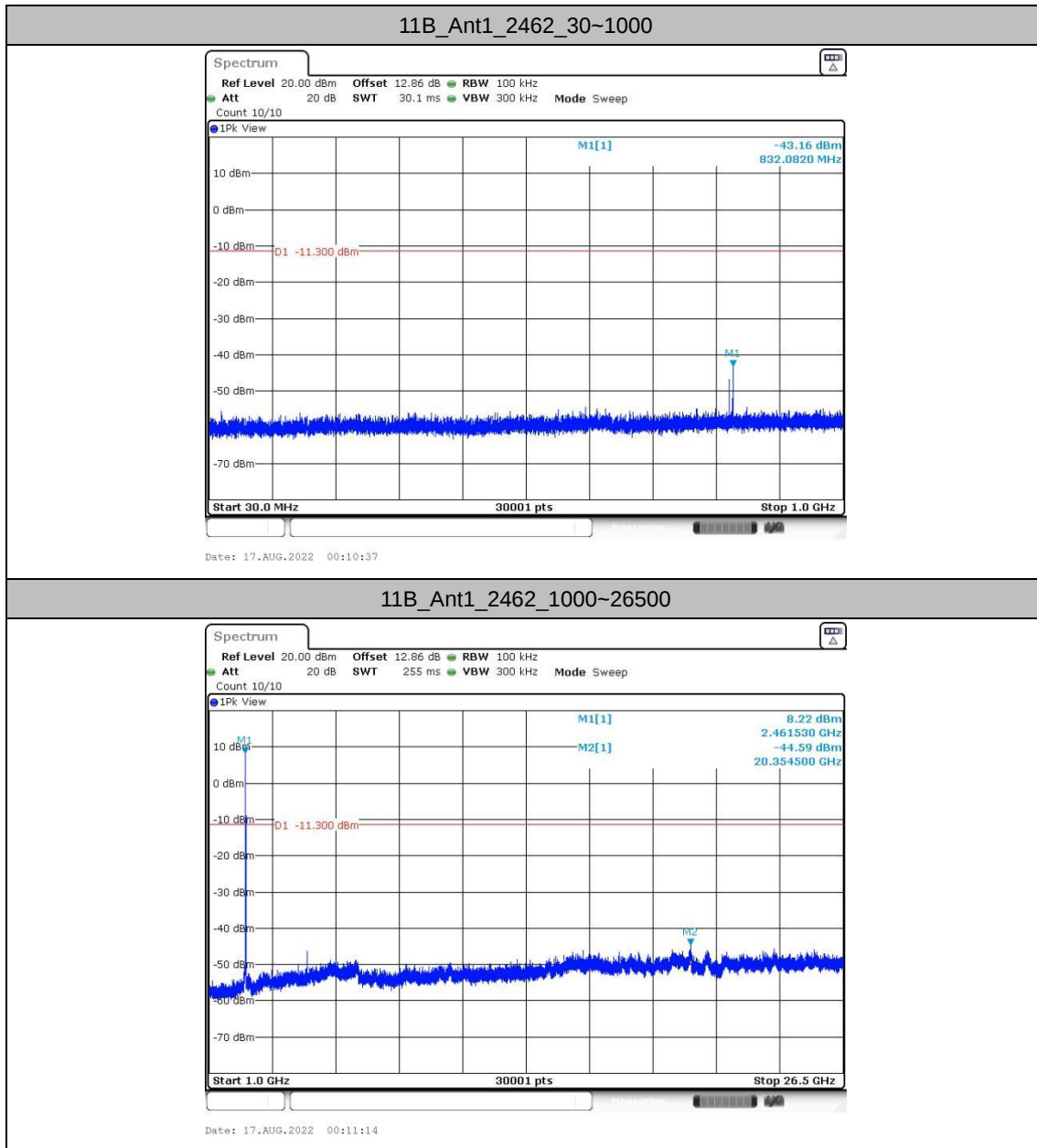
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	30~1000	8.54	-43.92	≤-11.46	PASS
			1000~26500	8.54	-44.2	≤-11.46	PASS
		2437	30~1000	9.02	-39.95	≤-10.98	PASS
			1000~26500	9.02	-45.97	≤-10.98	PASS
		2462	30~1000	8.70	-43.16	≤-11.3	PASS
			1000~26500	8.70	-44.59	≤-11.3	PASS
11G	Ant1	2412	30~1000	4.84	-50.49	≤-15.16	PASS
			1000~26500	4.84	-45.37	≤-15.16	PASS
		2437	30~1000	4.63	-54.52	≤-15.37	PASS
			1000~26500	4.63	-45.53	≤-15.37	PASS
		2462	30~1000	4.77	-37.44	≤-15.23	PASS
			1000~26500	4.77	-45.53	≤-15.23	PASS
11N20SISO	Ant1	2412	30~1000	4.07	-50.68	≤-15.93	PASS
			1000~26500	4.07	-45.39	≤-15.93	PASS
		2437	30~1000	4.20	-50.36	≤-15.8	PASS
			1000~26500	4.20	-44.04	≤-15.8	PASS
		2462	30~1000	4.37	-52.98	≤-15.63	PASS
			1000~26500	4.37	-44.92	≤-15.63	PASS
11N40SISO	Ant1	2422	30~1000	1.26	-44.55	≤-18.74	PASS
			1000~26500	1.26	-44.13	≤-18.74	PASS
		2437	30~1000	1.36	-45.5	≤-18.64	PASS
			1000~26500	1.36	-45.32	≤-18.64	PASS
		2452	30~1000	2.19	-46.78	≤-17.81	PASS
			1000~26500	2.19	-44.72	≤-17.81	PASS



Test Graphs

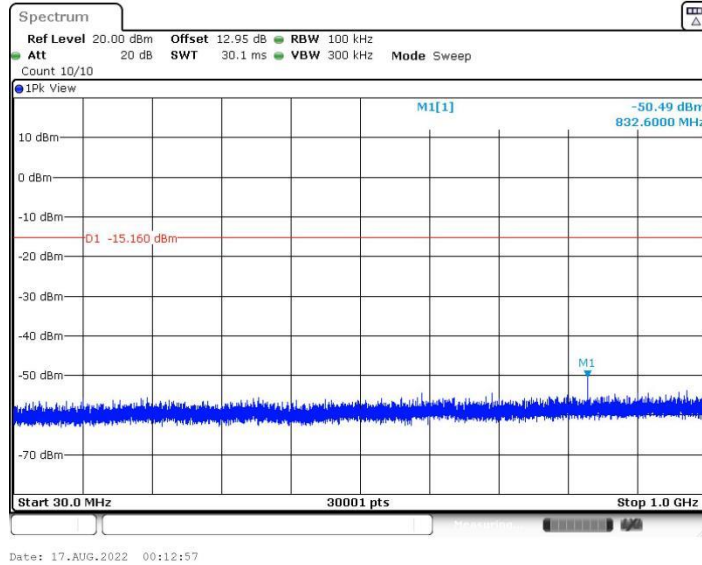




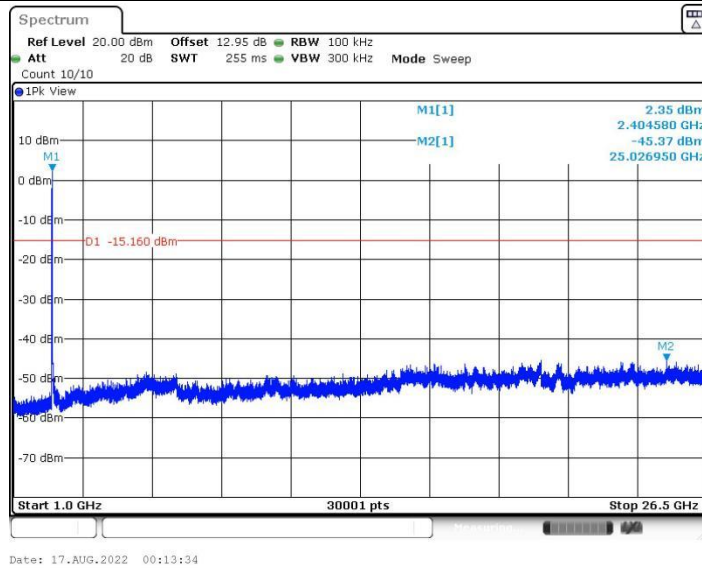


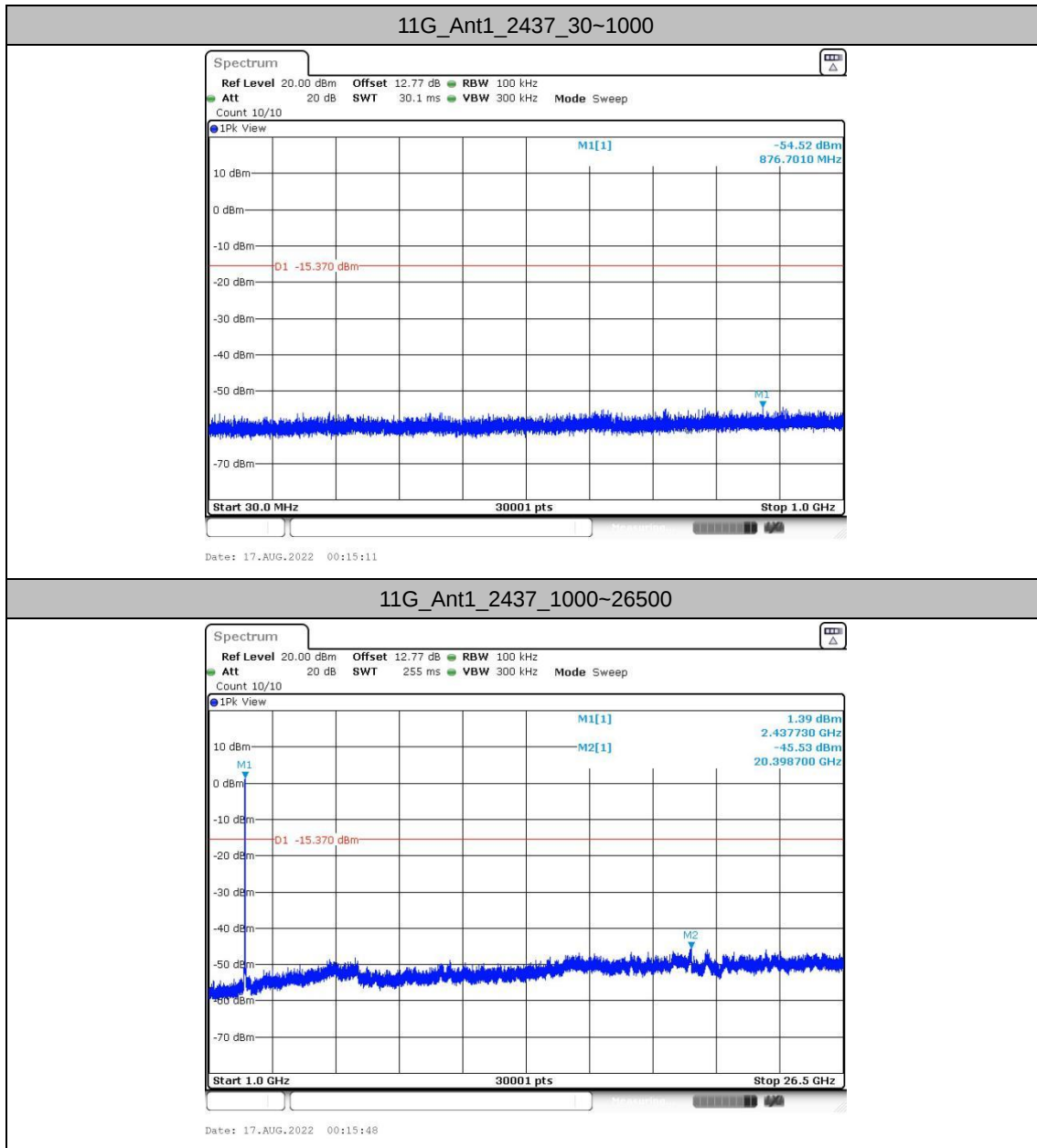


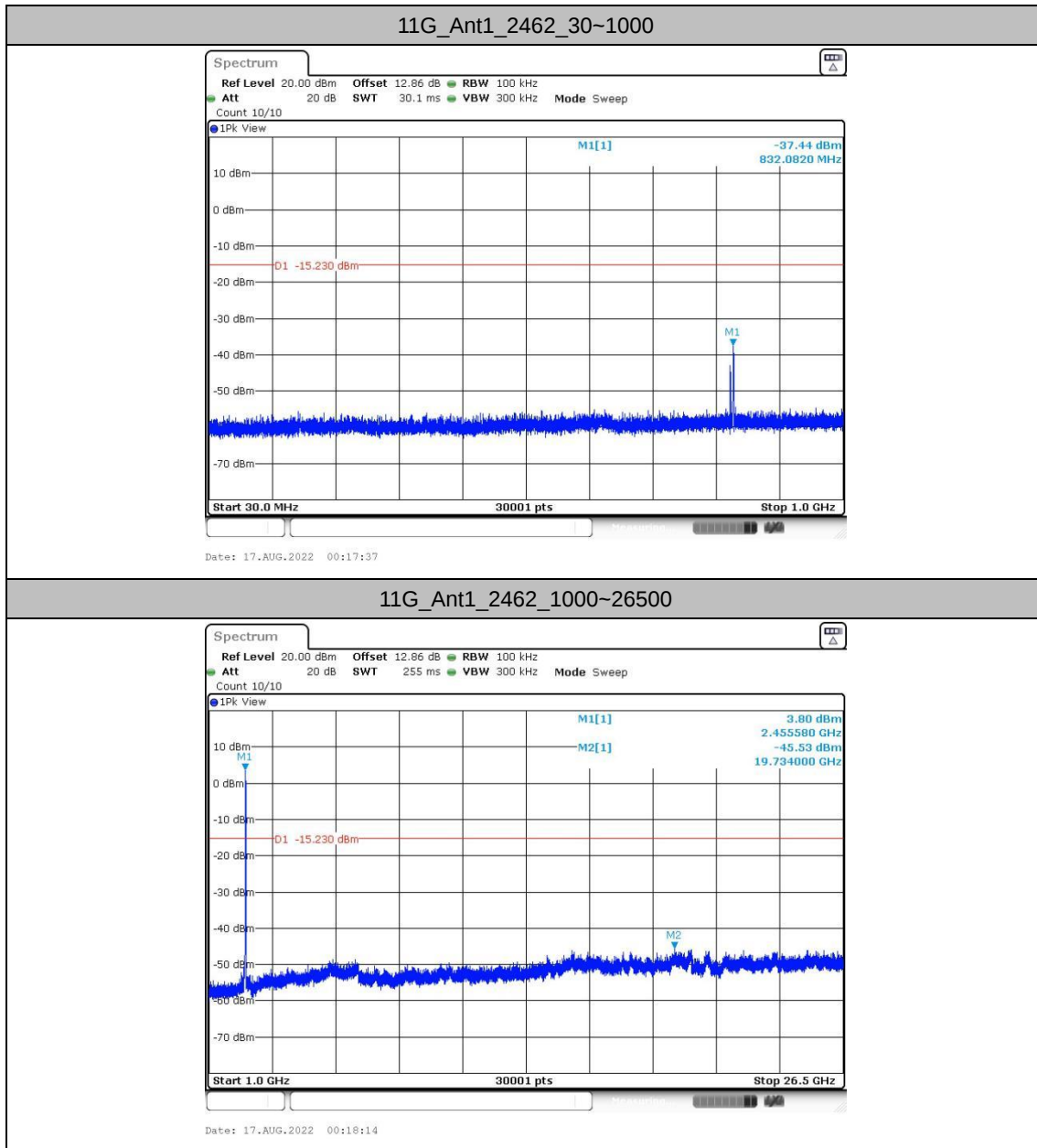
11G_Ant1_2412_30~1000



11G_Ant1_2412_1000~26500

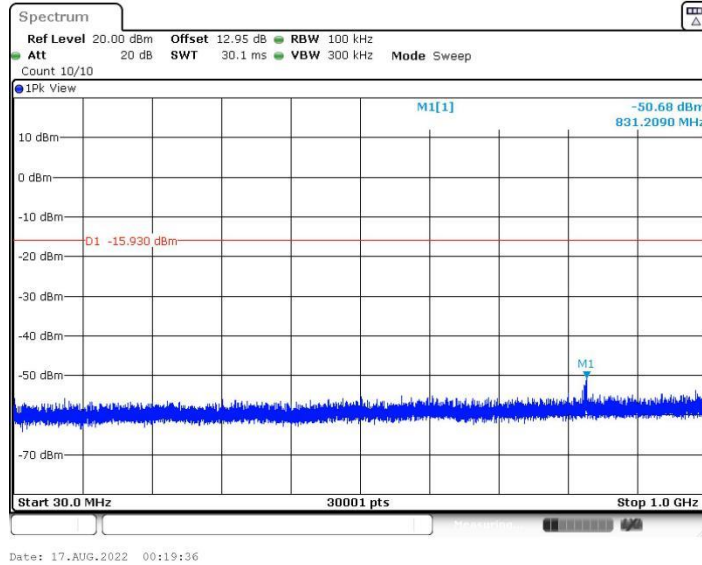




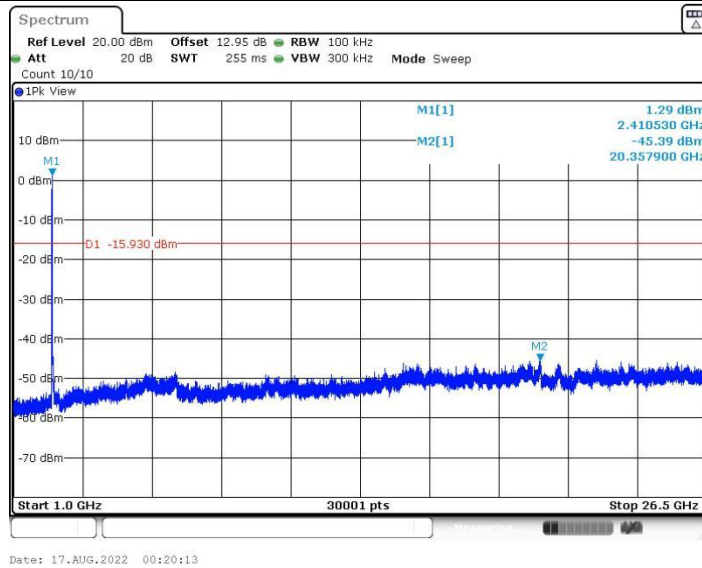


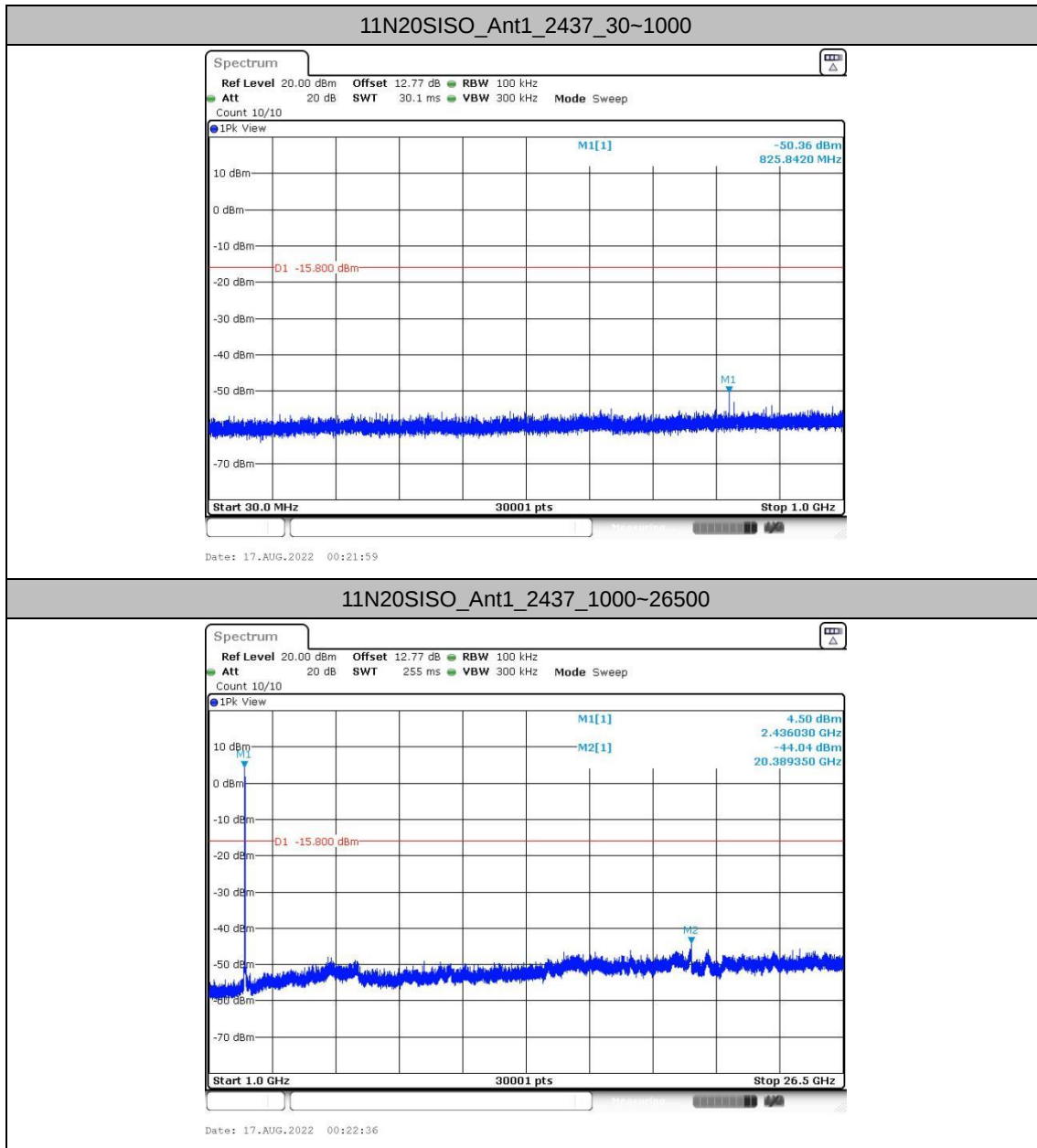


11N20SISO_Ant1_2412_30~1000



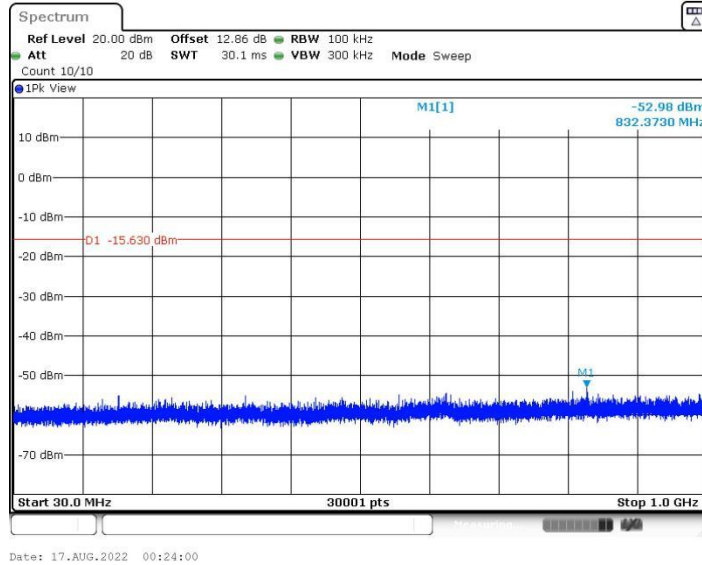
11N20SISO_Ant1_2412_1000~26500



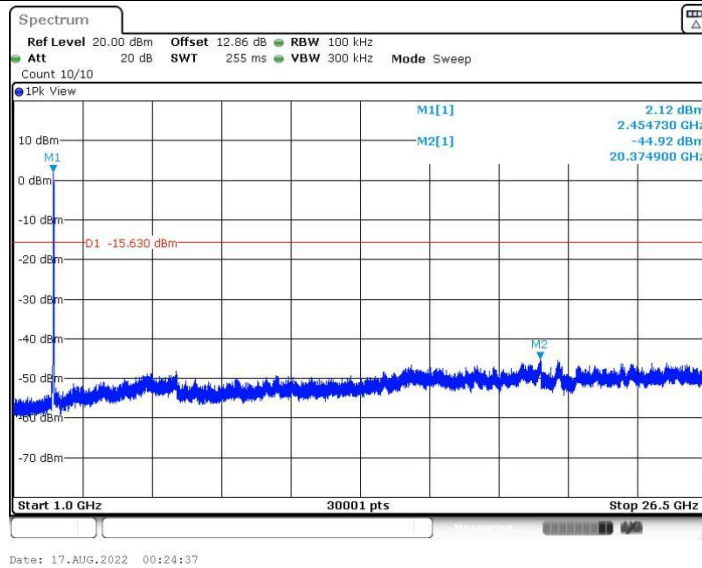


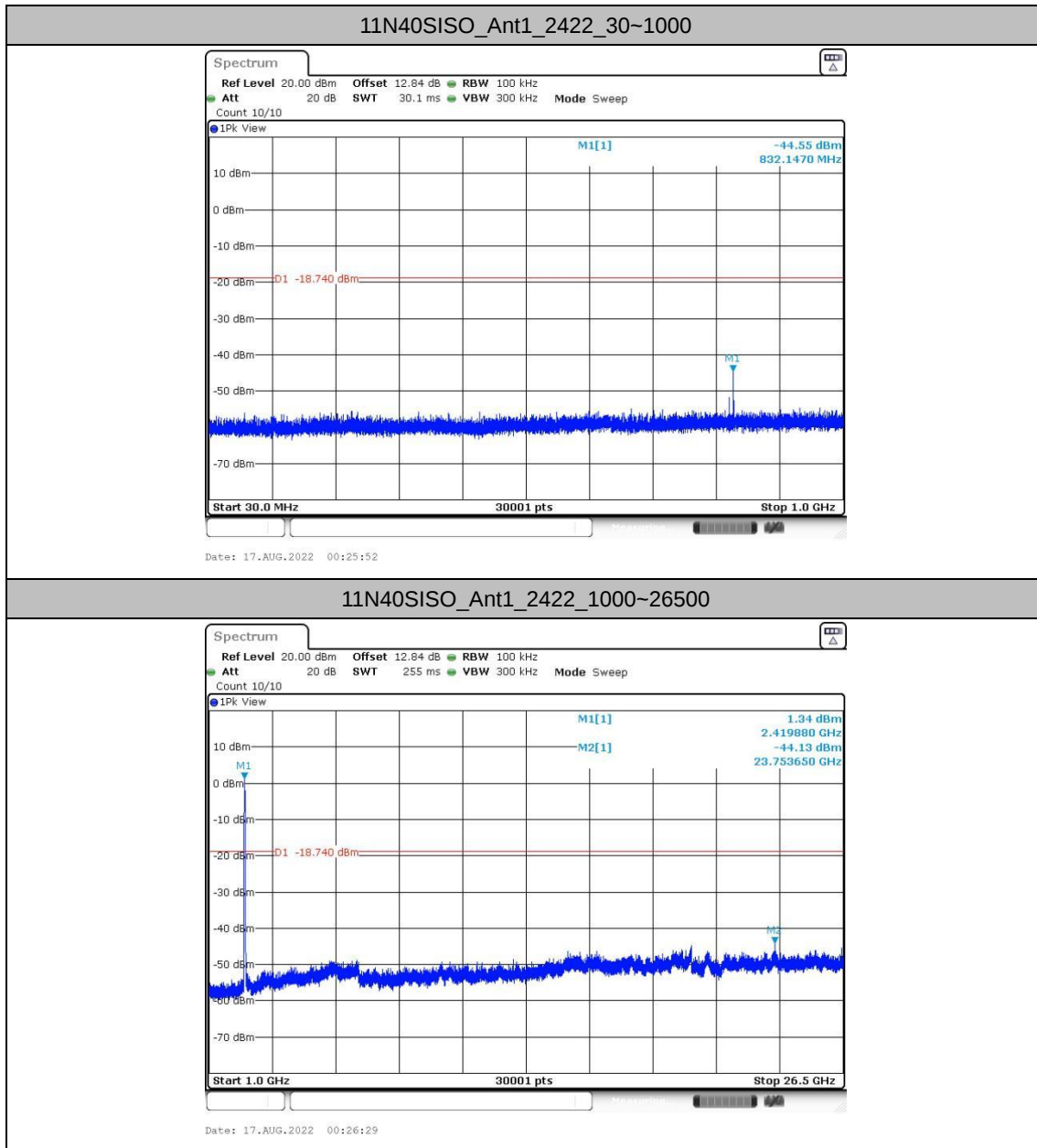


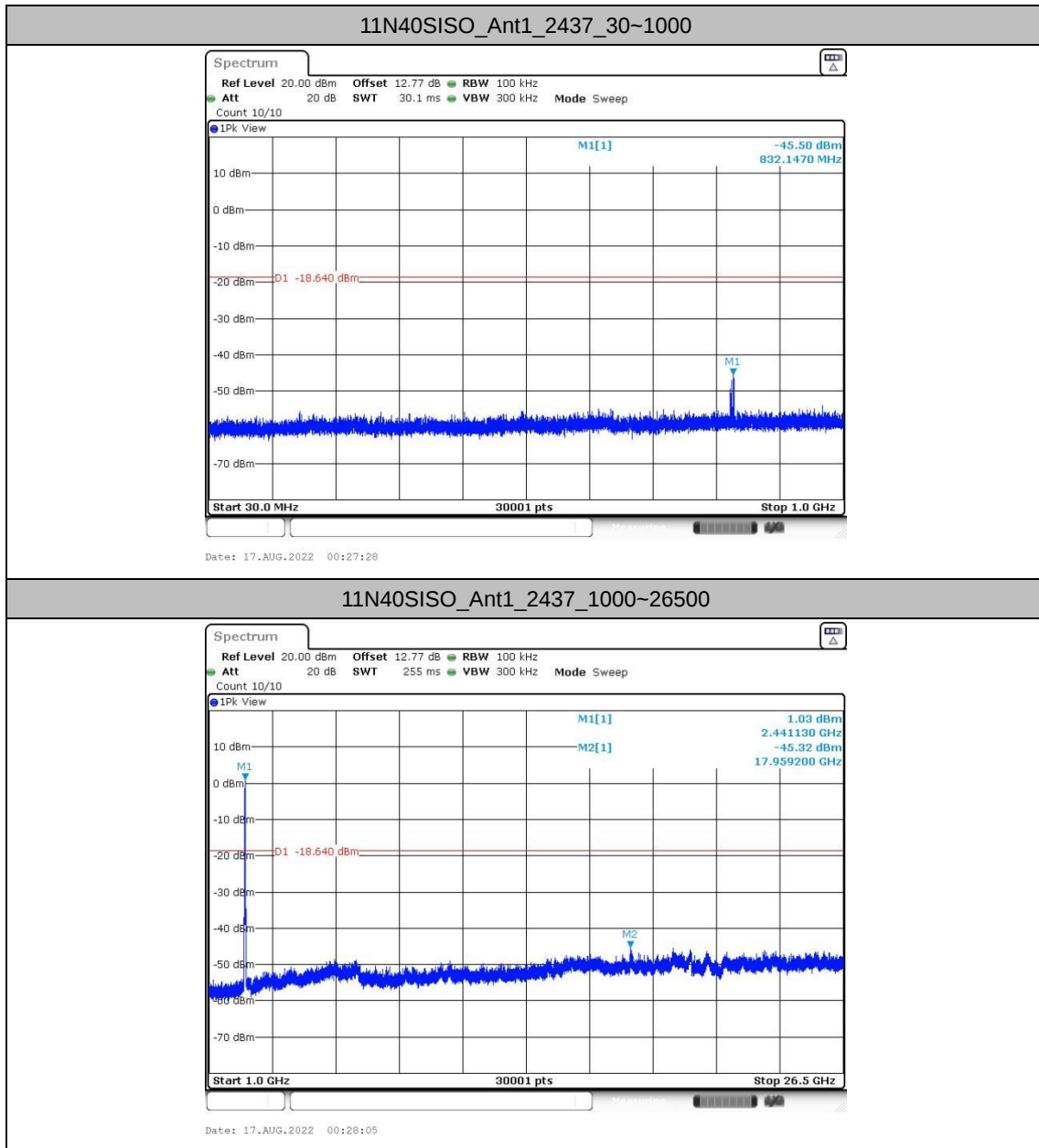
11N20SISO_Ant1_2462_30~1000

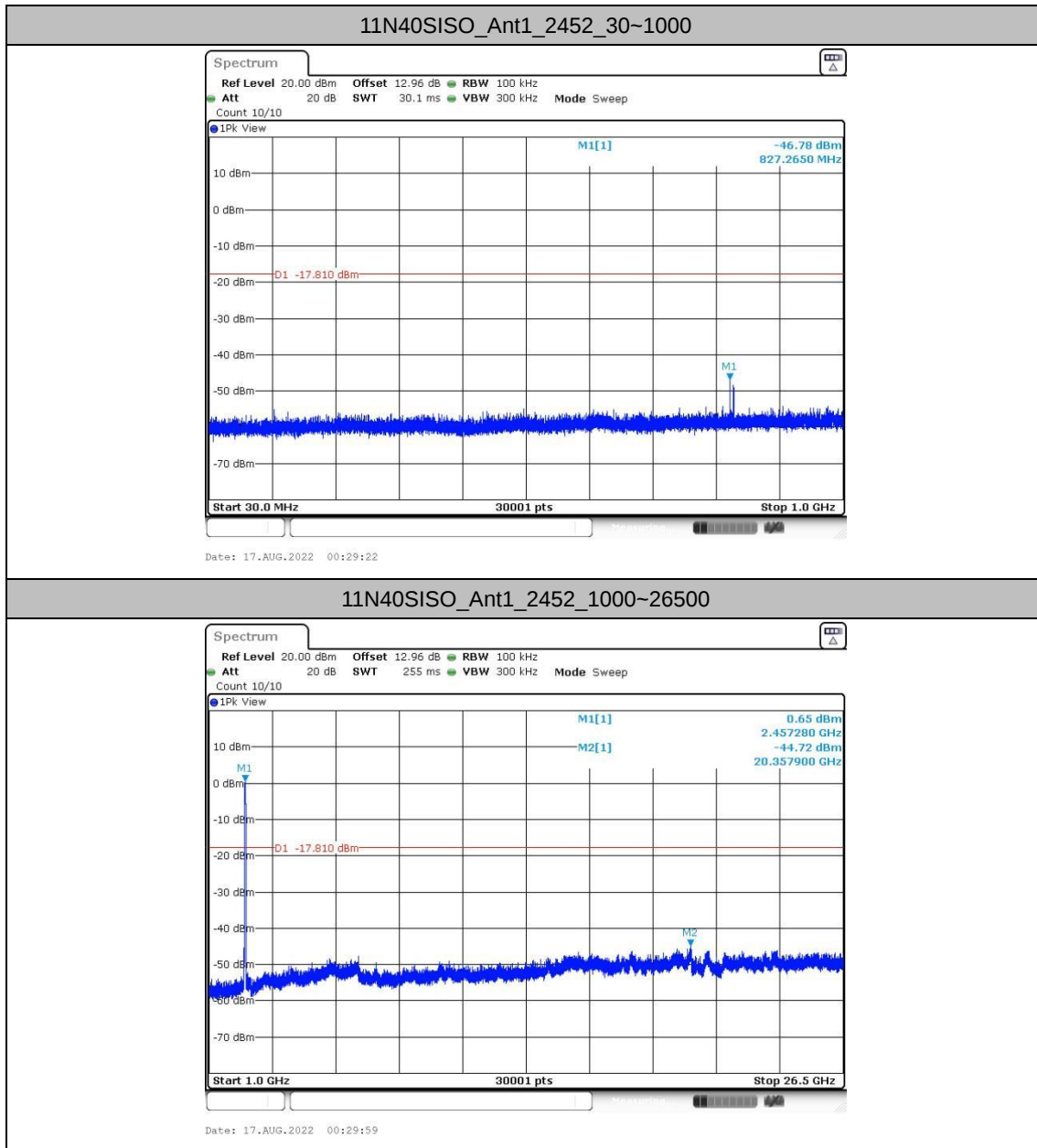


11N20SISO_Ant1_2462_1000~26500



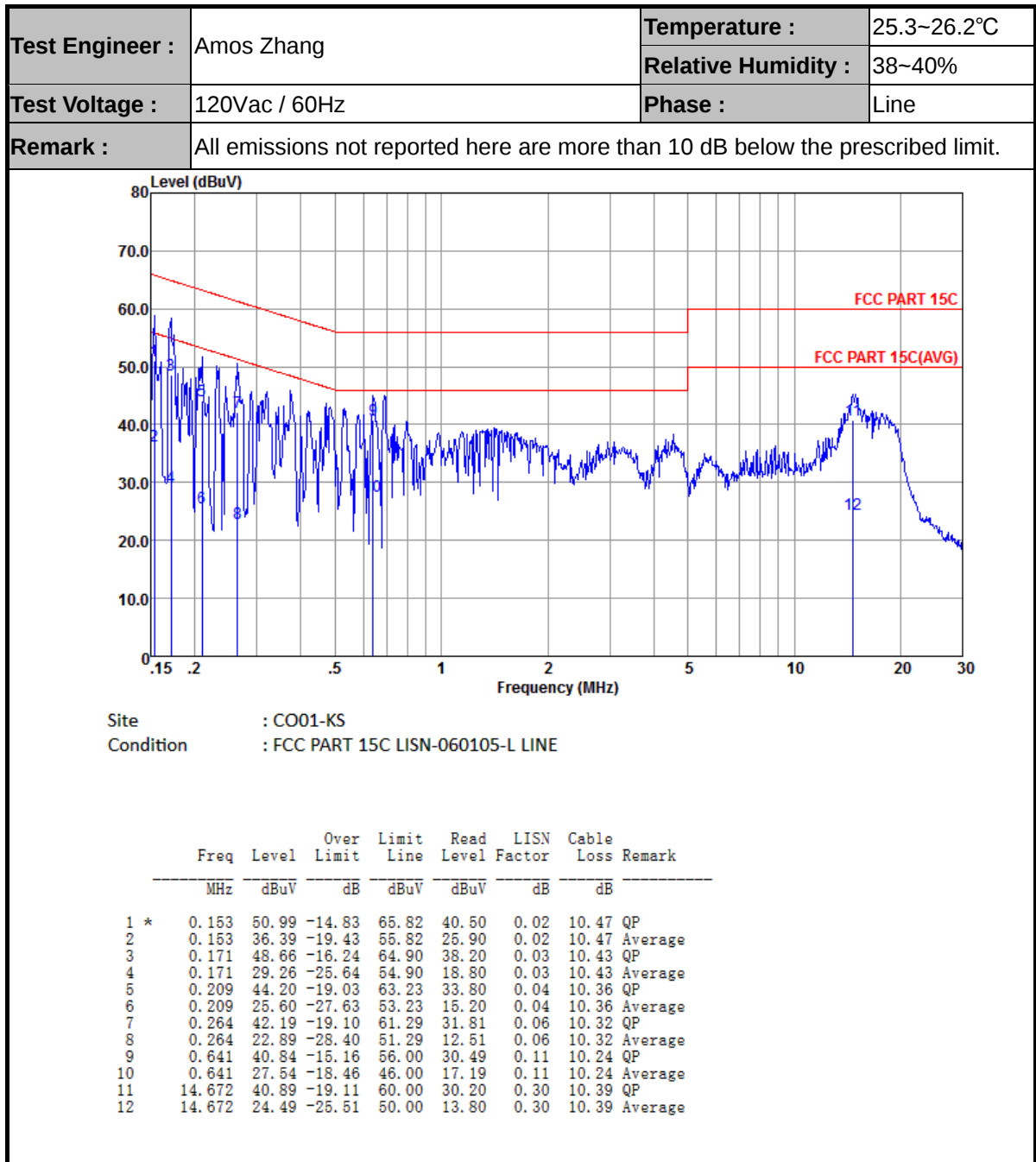






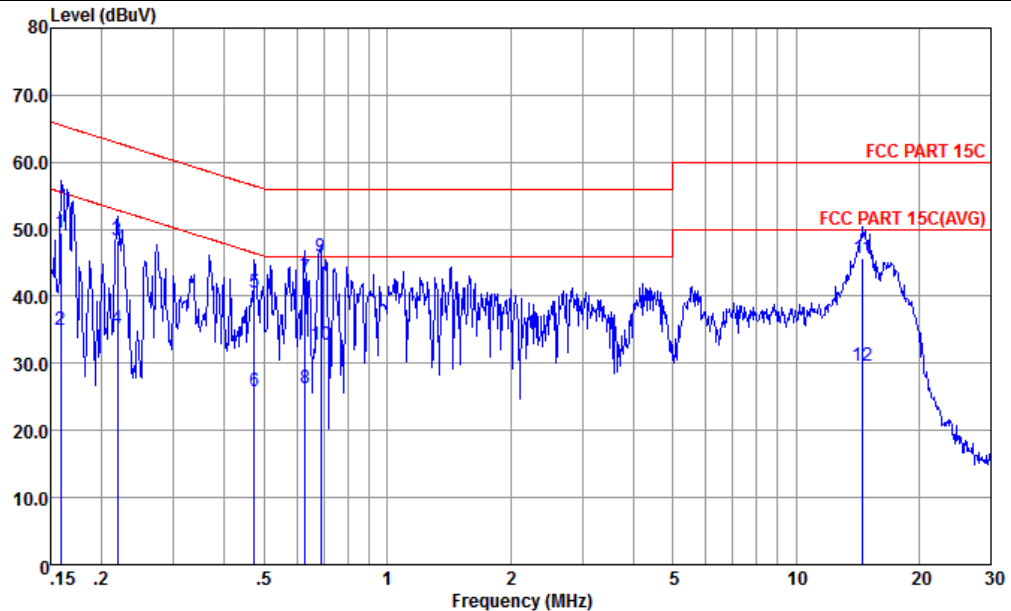


Appendix B. AC Conducted Emission Test Results





Test Engineer :	Amos Zhang	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	0.159	49.36	-16.16	65.52	38.79	0.11	10.46	QP
2	0.159	35.06	-20.46	55.52	24.49	0.11	10.46	Average
3	0.219	48.25	-14.63	62.88	37.80	0.10	10.35	QP
4	0.219	35.25	-17.63	52.88	24.80	0.10	10.35	Average
5	0.474	40.55	-15.90	56.45	30.20	0.11	10.24	QP
6	0.474	25.95	-20.50	46.45	15.60	0.11	10.24	Average
7	0.630	42.85	-13.15	56.00	32.50	0.11	10.24	QP
8	0.630	26.25	-19.75	46.00	15.90	0.11	10.24	Average
9 *	0.686	45.85	-10.15	56.00	35.50	0.11	10.24	QP
10	0.686	32.65	-13.35	46.00	22.30	0.11	10.24	Average
11	14.594	45.60	-14.40	60.00	34.91	0.30	10.39	QP
12	14.594	29.60	-20.40	50.00	18.91	0.30	10.39	Average

Note:

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



Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl 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)
802.11b CH 01 2412MHz		2389.56	54.42	-19.58	74	47.25	30.94	7.13	30.9	164	320	P	H
		2389.95	42.84	-11.16	54	35.65	30.94	7.13	30.88	164	320	A	H
	*	2414	102.37	-	-	95.09	31	7.16	30.88	164	320	P	H
	*	2414	99.81	-	-	92.53	31	7.16	30.88	164	320	A	H
		2361.48	53.26	-20.74	74	46.27	30.83	7.08	30.92	377	41	P	V
		2389.82	42.47	-11.53	54	35.28	30.94	7.13	30.88	377	41	A	V
	*	2414	99.56	-	-	92.28	31	7.16	30.88	377	41	P	V
	*	2414	97.33	-	-	90.05	31	7.16	30.88	377	41	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		4824	53.44	-20.56	74	73.45	34.57	10.85	65.43	100	109	P	H
CH 01		4824	50.59	-3.41	54	70.6	34.57	10.85	65.43	100	109	A	H
2412MHz		4824	48.65	-25.35	74	68.66	34.57	10.85	65.43	300	360	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	*	2464	105.72	-	-	98.11	31.1	7.25	30.74	132	315	P	H
	*	2464	98.33	-	-	90.72	31.1	7.25	30.74	132	315	A	H
		2483.8	65.04	-8.96	74	57.3	31.13	7.28	30.67	132	315	P	H
		2483.62	50.69	-3.31	54	42.95	31.13	7.28	30.67	132	315	A	H
	*	2464	101.57	-	-	93.96	31.1	7.25	30.74	400	54	P	V
	*	2464	94.46	-	-	86.85	31.1	7.25	30.74	400	54	A	V
		2484.04	65.22	-8.78	74	57.48	31.13	7.28	30.67	400	54	P	V
		2483.8	48.69	-5.31	54	40.95	31.13	7.28	30.67	400	54	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		4924	42.89	-31.11	74	63.12	34.75	10.46	65.44	300	0	P	H
HT20		7386	45.7	-28.3	74	61.58	36.58	12.84	65.3	300	0	P	H
CH 11		4924	43.59	-30.41	74	63.82	34.75	10.46	65.44	100	0	P	V
2462MHz		7386	44.16	-29.84	74	60.04	36.58	12.84	65.3	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 09 2452MHz		2372.14	53.96	-20.04	74	48.03	32.23	6.58	32.88	217	29	P	H
		2388.13	43.85	-10.15	54	37.82	32.3	6.61	32.88	217	29	A	H
	*	2466	101.01	-	-	94.65	32.37	6.7	32.71	217	29	P	H
	*	2466	93.65	-	-	87.29	32.37	6.7	32.71	217	29	A	H
		2486.32	65.56	-8.44	74	59.04	32.43	6.73	32.64	217	29	P	H
		2488	49.94	-4.06	54	43.33	32.5	6.75	32.64	217	29	A	H
		2387.22	53.43	-20.57	74	47.4	32.3	6.61	32.88	306	246	P	V
		2388.39	43.81	-10.19	54	37.78	32.3	6.61	32.88	306	246	A	V
	*	2468	99.34	-	-	92.91	32.37	6.7	32.64	306	246	P	V
	*	2466	92.04	-	-	85.68	32.37	6.7	32.71	306	246	A	V
		2486.38	63.08	-10.92	74	56.56	32.43	6.73	32.64	306	246	P	V
		2489.56	47.63	-6.37	54	41.02	32.5	6.75	32.64	306	246	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		4905	41	-33	74	60.84	34.72	10.88	65.44	100	0	P	H
HT40		7356	43.73	-30.27	74	58.96	36.57	13.48	65.28	100	0	P	H
CH 09		4904	41.06	-32.94	74	60.93	34.69	10.88	65.44	300	0	P	V
2452MHz		7350	45.13	-28.87	74	60.36	36.57	13.48	65.28	300	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 HT20 (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 HT20 LF		31.94	24.85	-15.15	40	30.65	24.39	0.52	30.71	-	-	P	H
		77.53	22.95	-17.05	40	38.44	14.12	1.14	30.75	-	-	P	H
		90.14	22.03	-21.47	43.5	36.59	14.84	1.32	30.72	-	-	P	H
		266.68	17.19	-28.81	46	26.35	19.42	2.38	30.96	-	-	P	H
		412.18	20.62	-25.38	46	26.83	22.14	2.96	31.31	-	-	P	H
		569.32	24.5	-21.5	46	27.5	25.52	3.47	31.99	-	-	P	H
		32.91	23.55	-16.45	40	30.02	23.71	0.54	30.72	-	-	P	V
		127	14.67	-28.83	43.5	26.26	17.55	1.63	30.77	-	-	P	V
		258.92	16.44	-29.56	46	25.48	19.56	2.34	30.94	-	-	P	V
		386.96	19.68	-26.32	46	26.46	21.55	2.87	31.2	-	-	P	V
		542.16	23.2	-22.8	46	26.76	24.94	3.39	31.89	-	-	P	V
		751.68	24.47	-21.53	46	25.49	27.48	3.99	32.49	-	-	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)

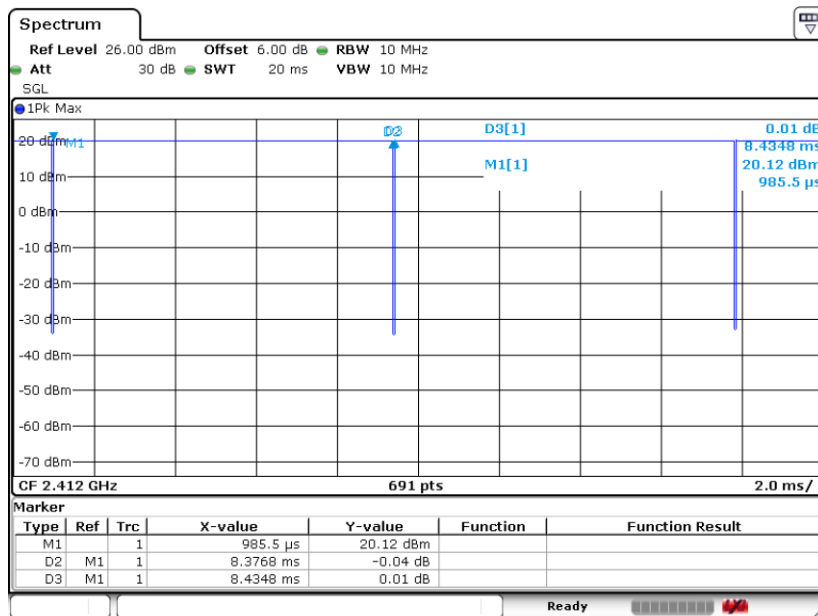
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

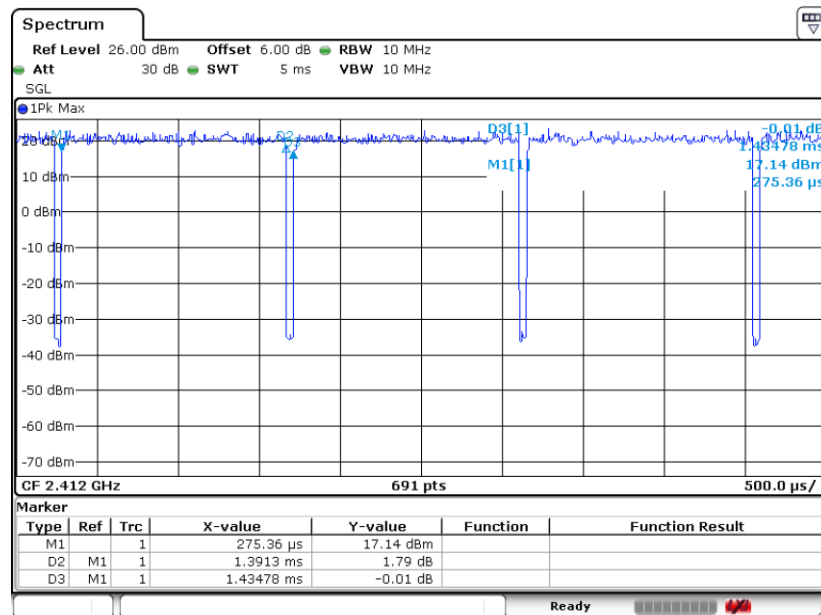
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.31	-	-	10Hz
802.11g	96.98	1.391	0.719	0.75kHz
802.11n HT20	96.24	1.297	0.771	0.82kHz
802.11n HT40	93.71	0.648	1.544	1.6kHz

802.11b

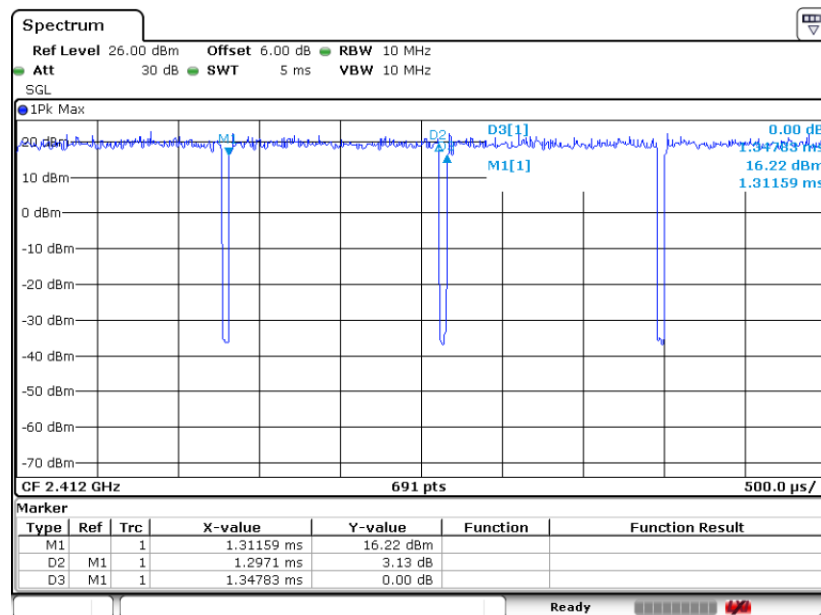




802.11g



802.11n HT20





802.11n HT40

