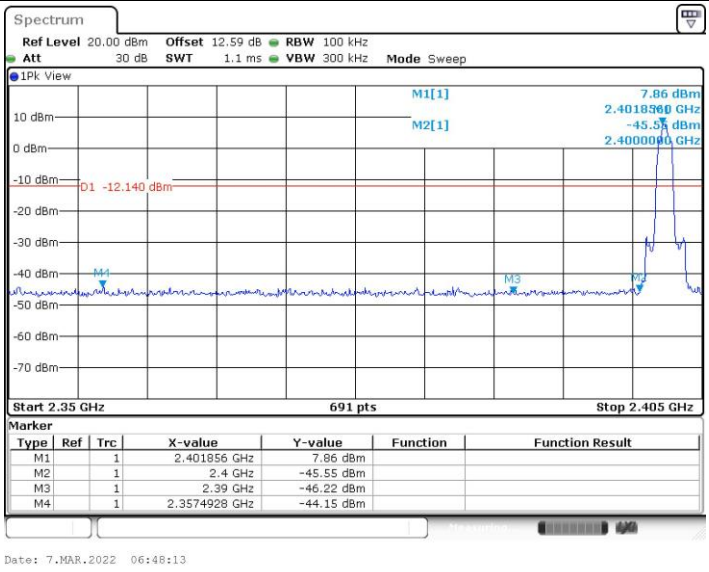
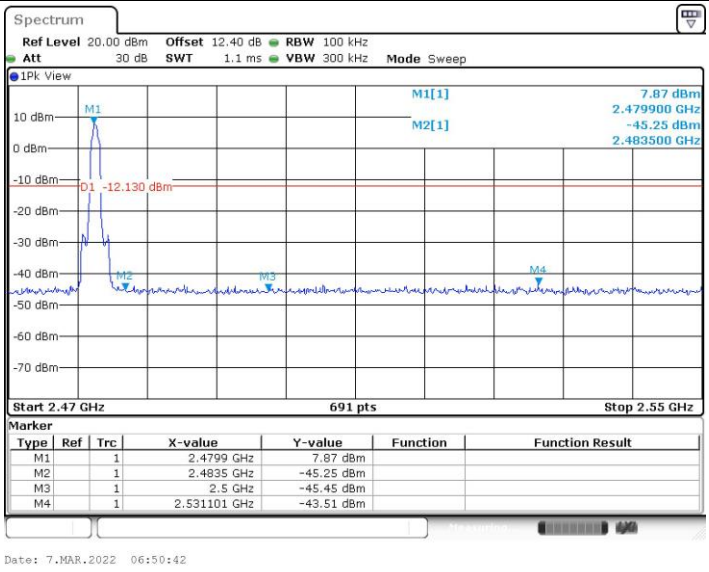
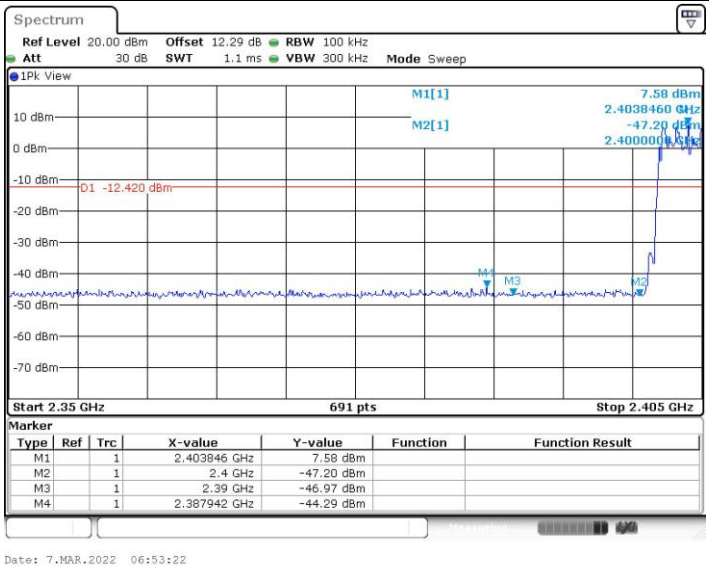
3DH1_Ant1_Low_2402



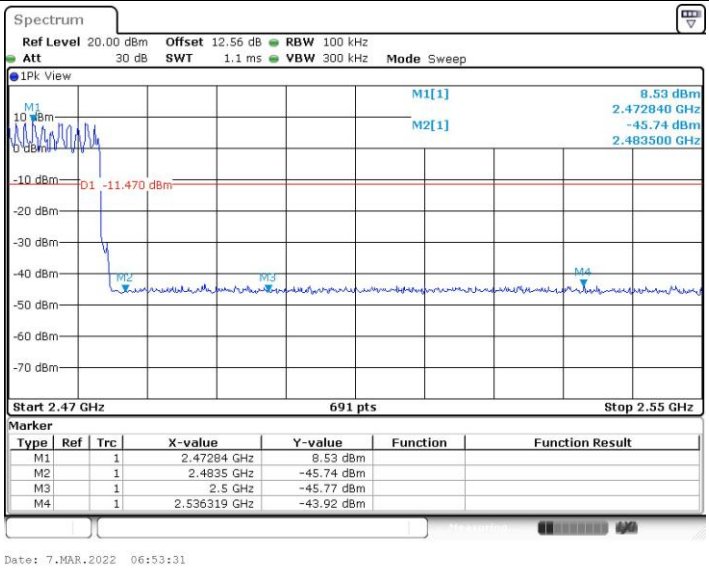
3DH1_Ant1_High_2480



3DH1_Ant1_Low_Hop_2402



3DH1_Ant1_High_Hop_2480



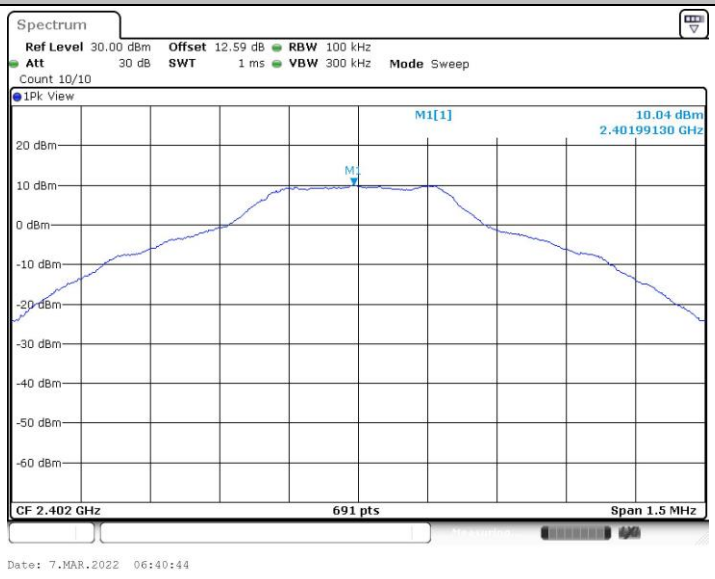
Conducted Spurious Emission

Test Result

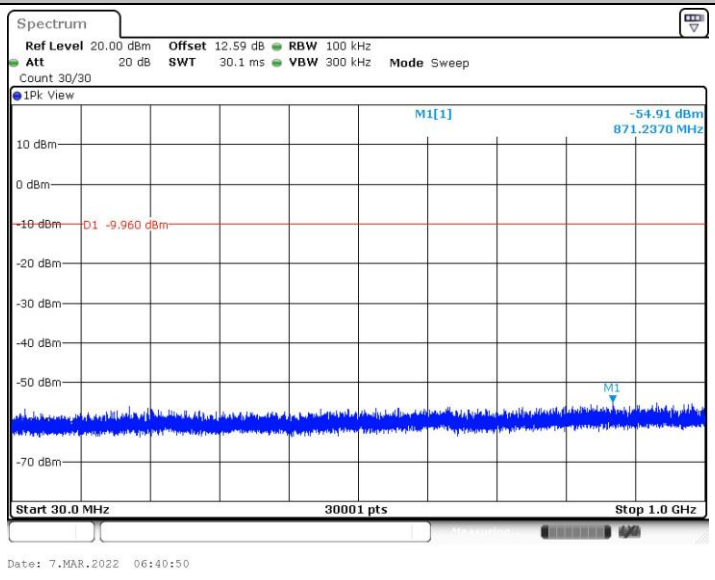
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	10.04	10.04	---	PASS
			30~1000	10.04	-54.91	≤-9.96	PASS
			1000~26500	10.04	-45.51	≤-9.96	PASS
		2441	Reference	9.63	9.63	---	PASS
			30~1000	9.63	-54.69	≤-10.37	PASS
			1000~26500	9.63	-46.4	≤-10.37	PASS
		2480	Reference	9.69	9.69	---	PASS
			30~1000	9.69	-55.07	≤-10.31	PASS
			1000~26500	9.69	-45.3	≤-10.31	PASS
2DH1	Ant1	2402	Reference	7.83	7.83	---	PASS
			30~1000	7.83	-54.96	≤-12.17	PASS
			1000~26500	7.83	-46.25	≤-12.17	PASS
		2441	Reference	7.14	7.14	---	PASS
			30~1000	7.14	-55.09	≤-12.86	PASS
			1000~26500	7.14	-45.93	≤-12.86	PASS
		2480	Reference	7.57	7.57	---	PASS
			30~1000	7.57	-55.56	≤-12.43	PASS
			1000~26500	7.57	-46.11	≤-12.43	PASS
3DH1	Ant1	2402	Reference	7.97	7.97	---	PASS
			30~1000	7.97	-55.43	≤-12.03	PASS
			1000~26500	7.97	-44.86	≤-12.03	PASS
		2441	Reference	7.25	7.25	---	PASS
			30~1000	7.25	-55.25	≤-12.75	PASS
			1000~26500	7.25	-46.31	≤-12.75	PASS
		2480	Reference	7.85	7.85	---	PASS
			30~1000	7.85	-54.81	≤-12.15	PASS
			1000~26500	7.85	-45.67	≤-12.15	PASS

Test Graphs

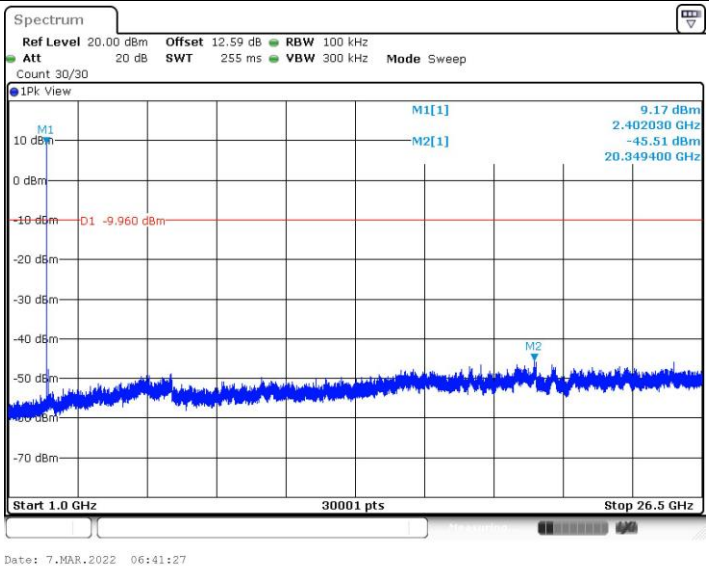
DH5_Ant1_2402_0~Reference



DH5_Ant1_2402_30~1000

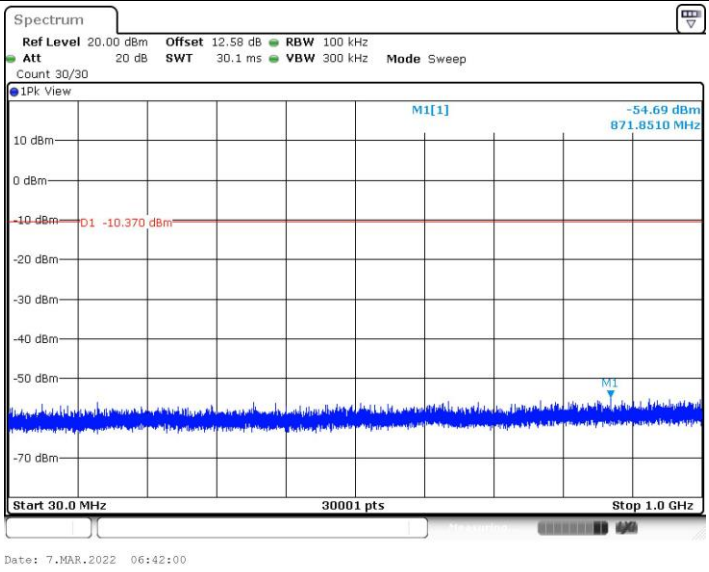


DH5_Ant1_2402_1000~26500

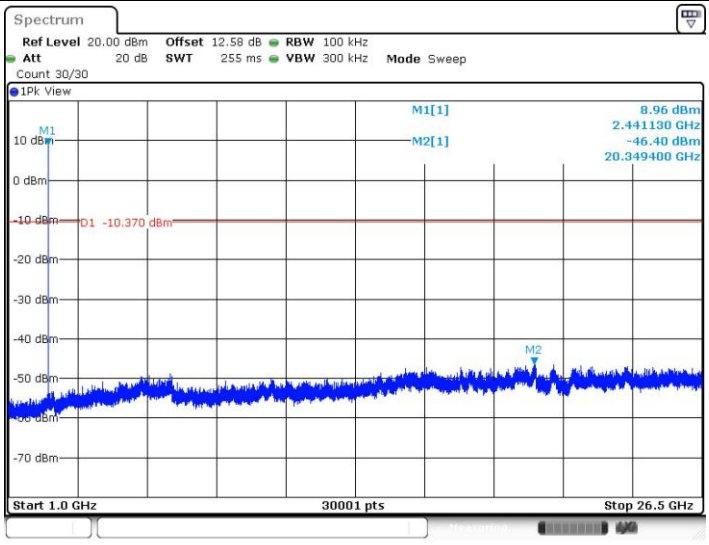


DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000

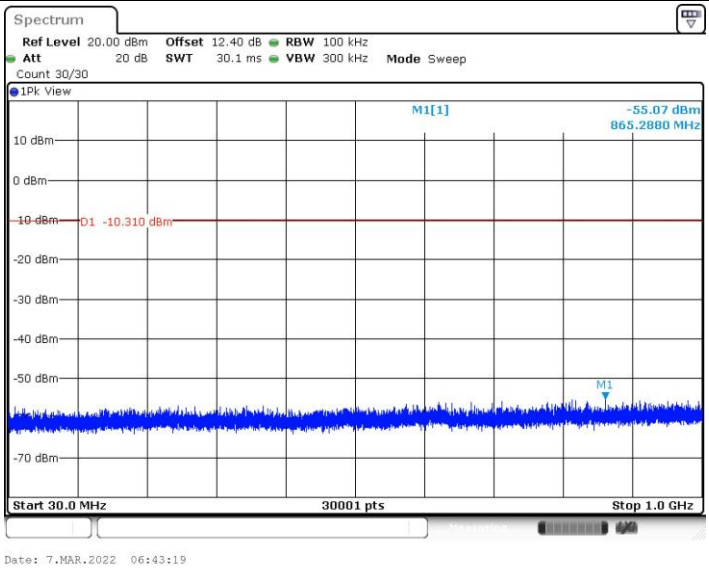


DH5_Ant1_2441_1000~26500

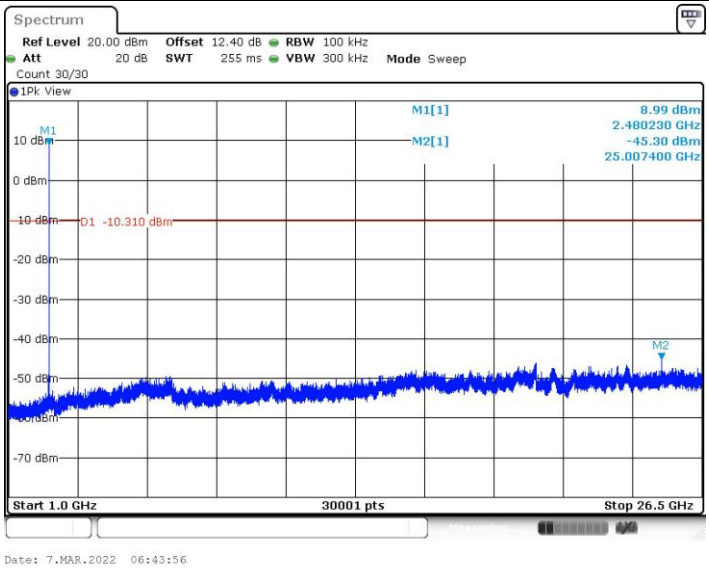


DH5_Ant1_2480_0~Reference

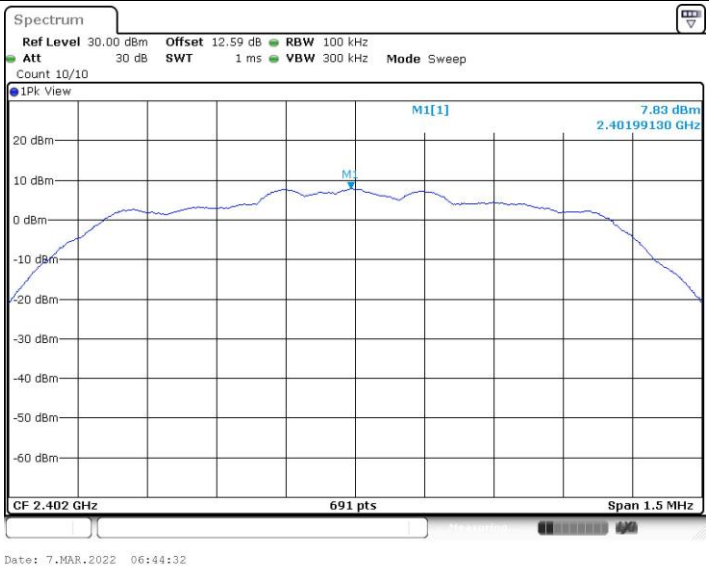
DH5_Ant1_2480_30~1000

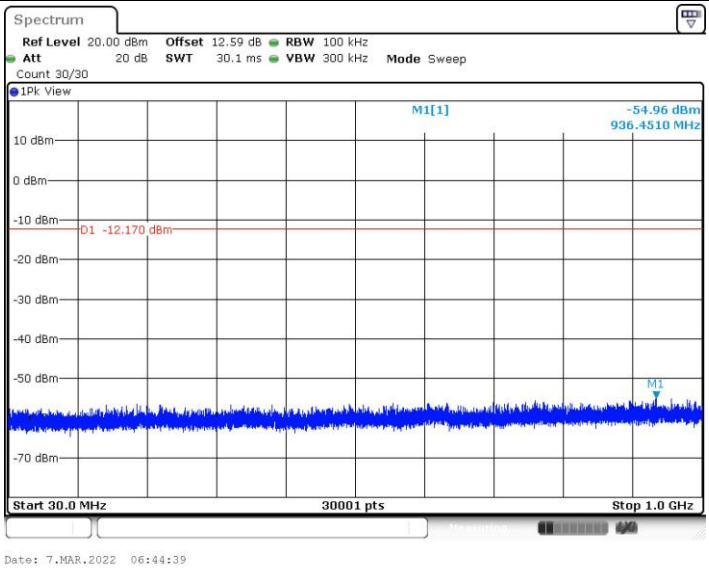


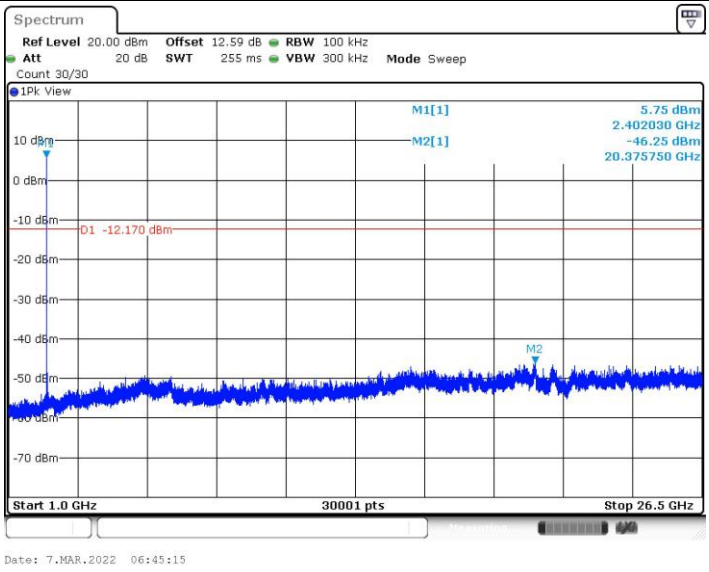
DH5_Ant1_2480_1000~26500

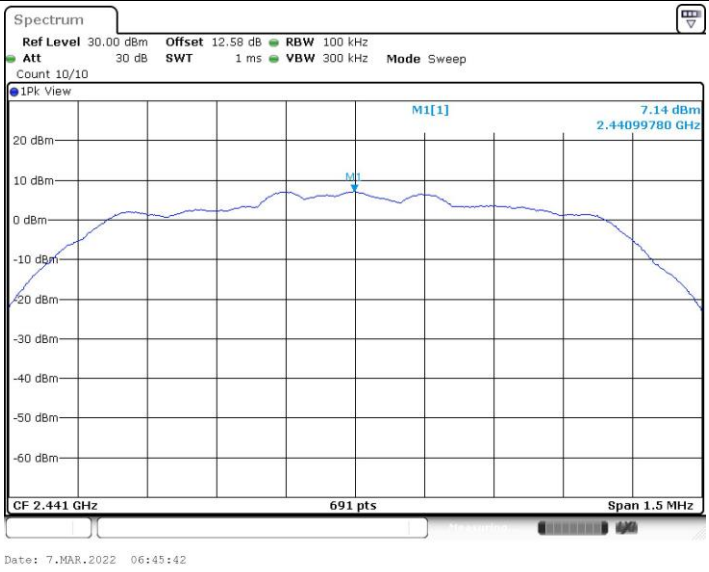


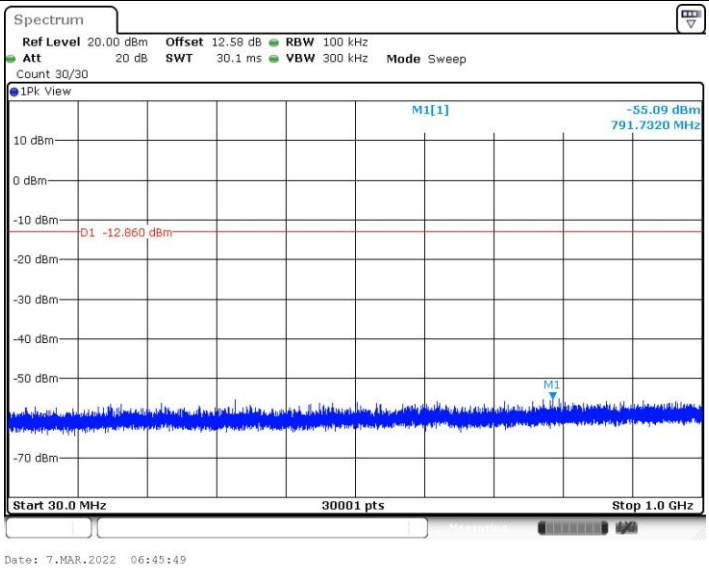
2DH1_Ant1_2402_0~Reference

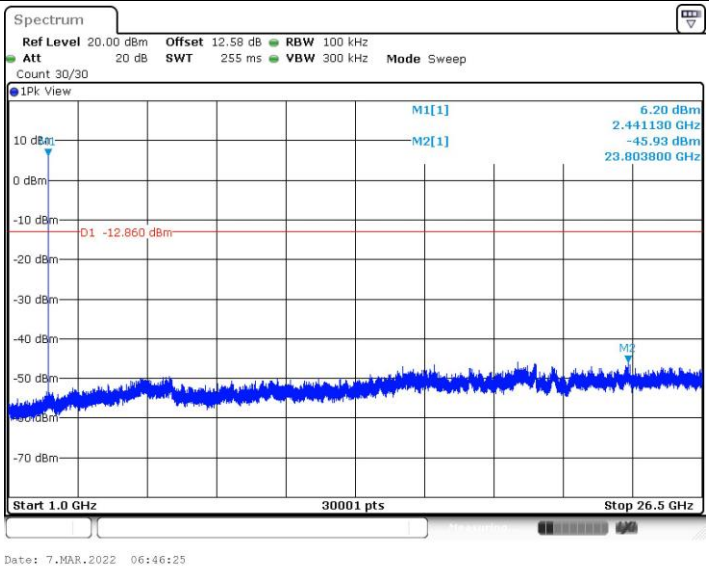


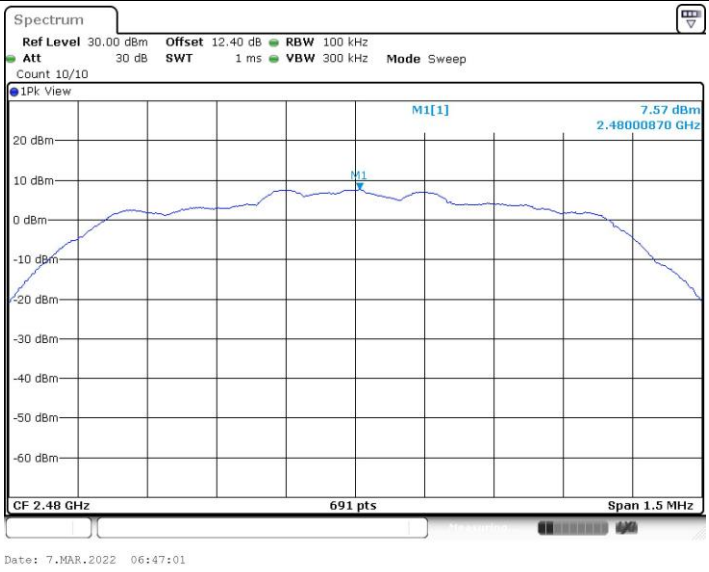
2DH1_Ant1_2402_30~1000


2DH1_Ant1_2402_1000~26500


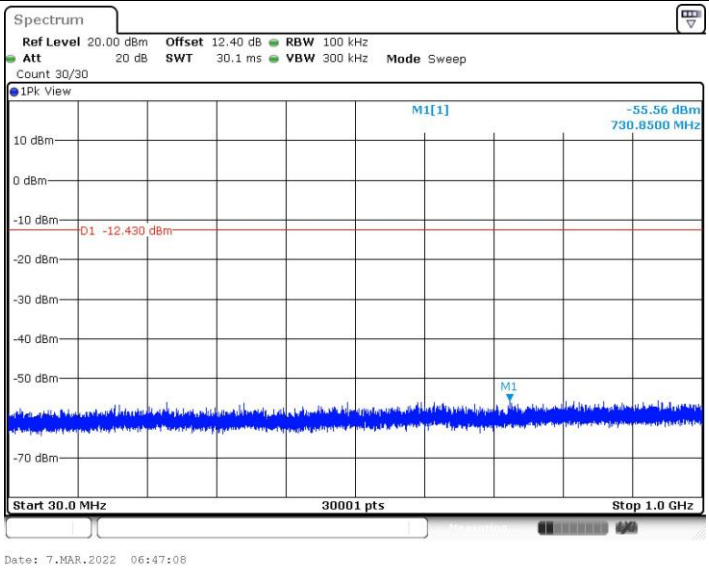
2DH1_Ant1_2441_0~Reference


2DH1_Ant1_2441_30~1000


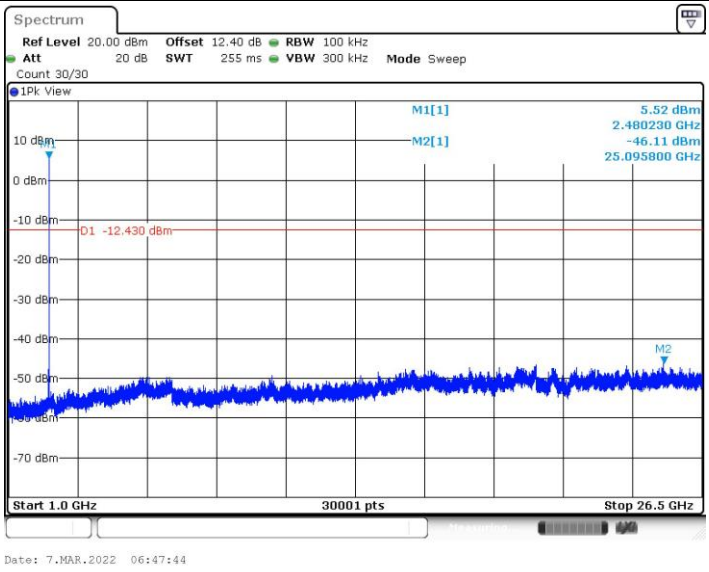
2DH1_Ant1_2441_1000~26500


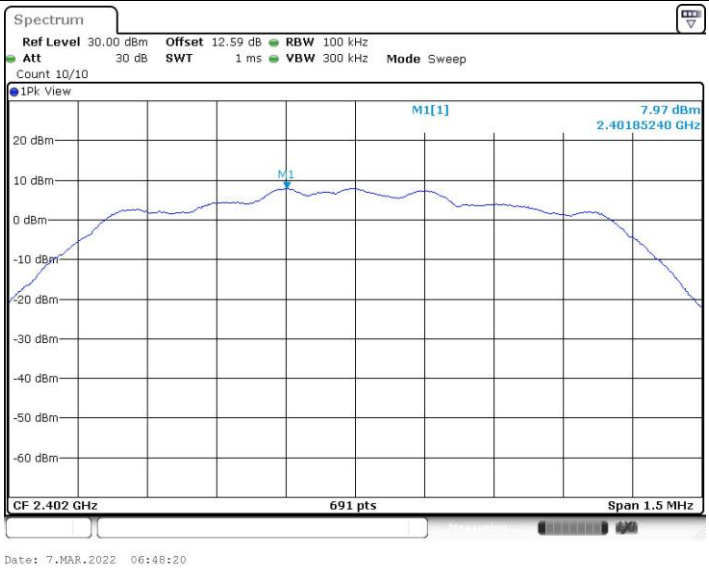
2DH1_Ant1_2480_0~Reference


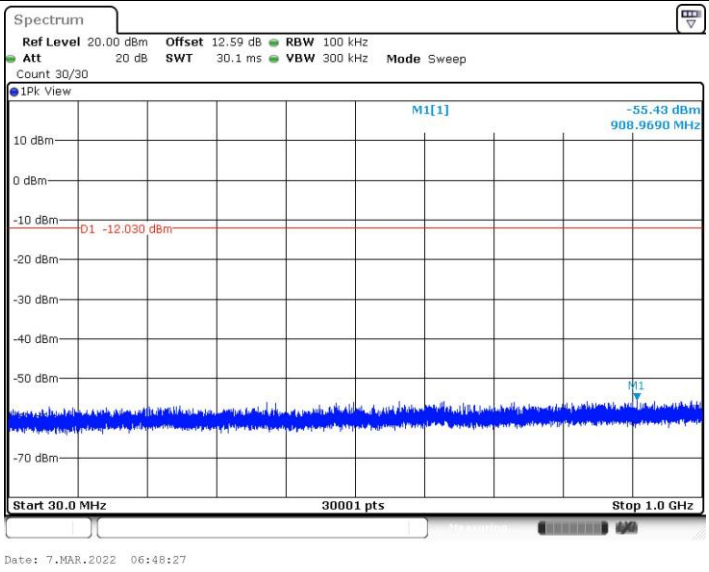
2DH1_Ant1_2480_30~1000

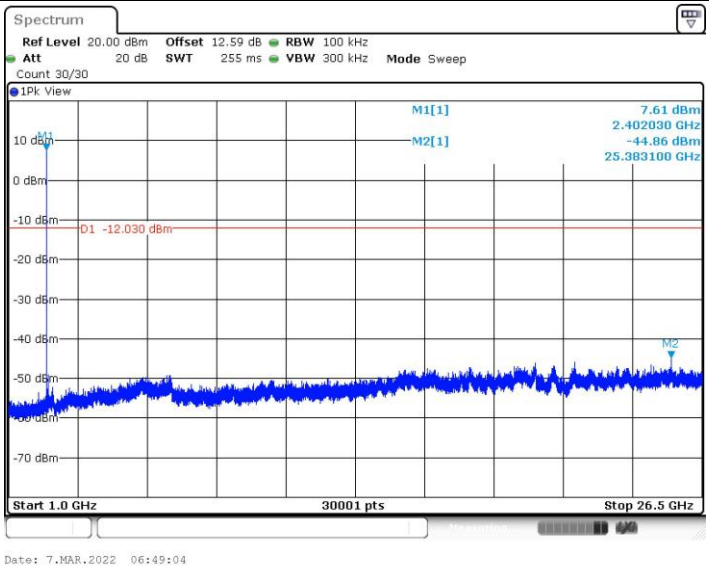
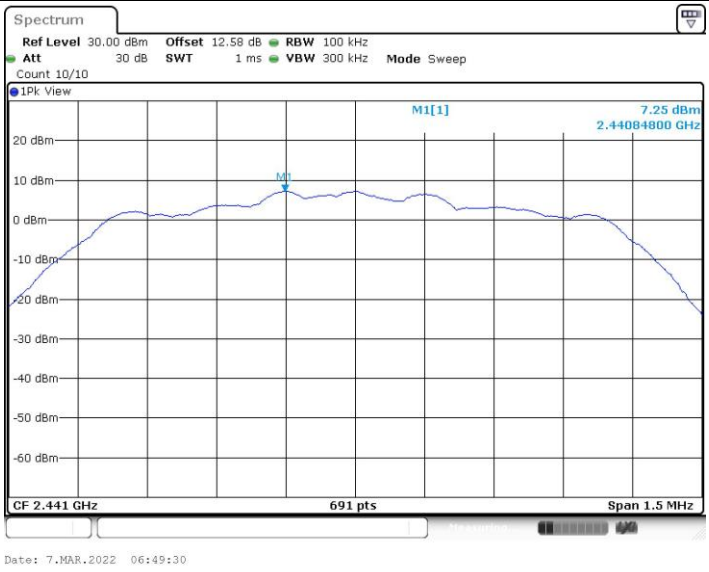


2DH1_Ant1_2480_1000~26500

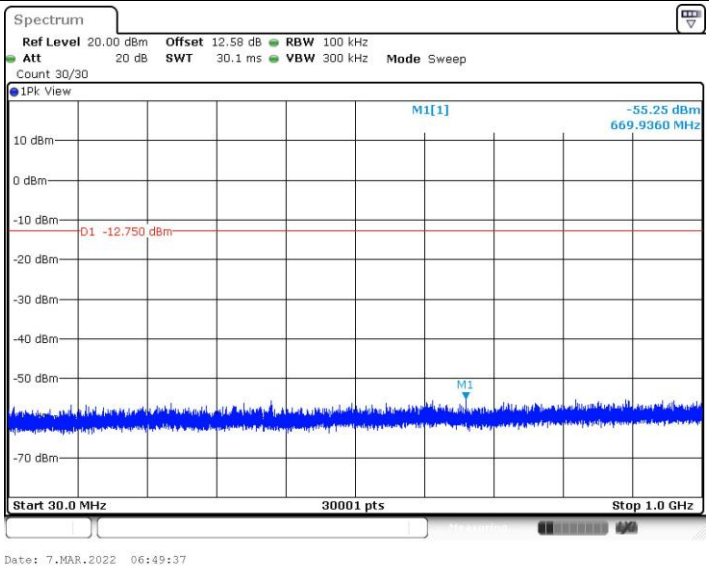


3DH1_Ant1_2402_0~Reference


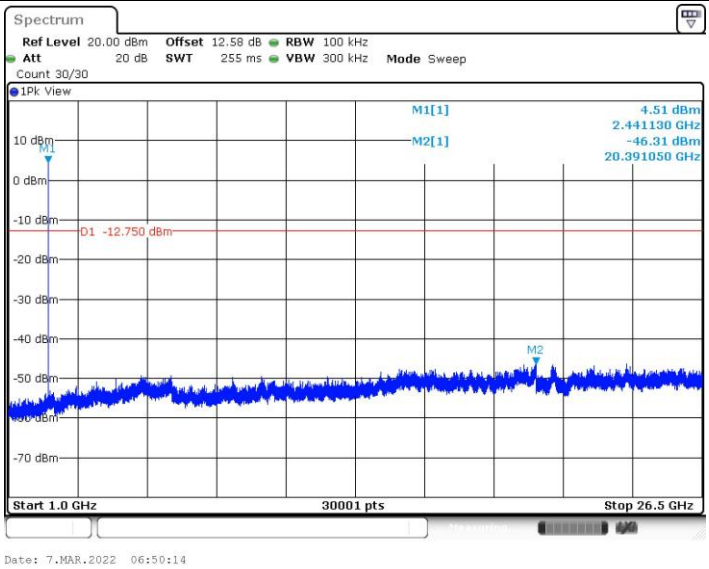
3DH1_Ant1_2402_30~1000


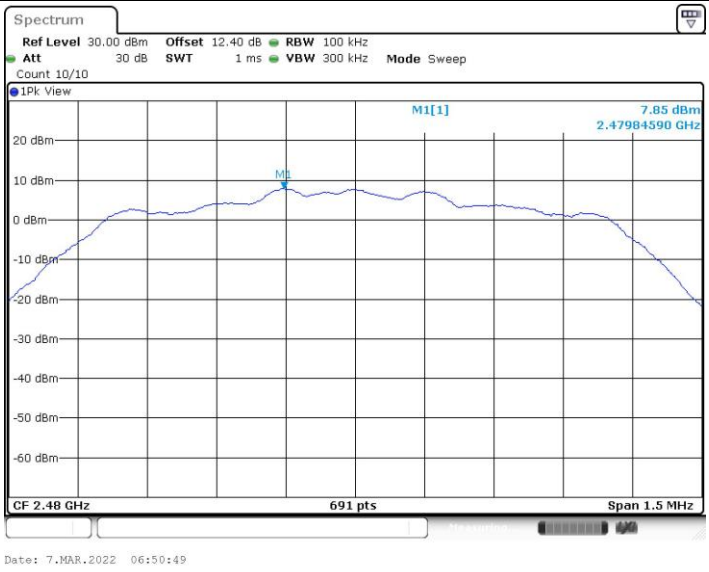
3DH1_Ant1_2402_1000~26500

3DH1_Ant1_2441_0~Reference


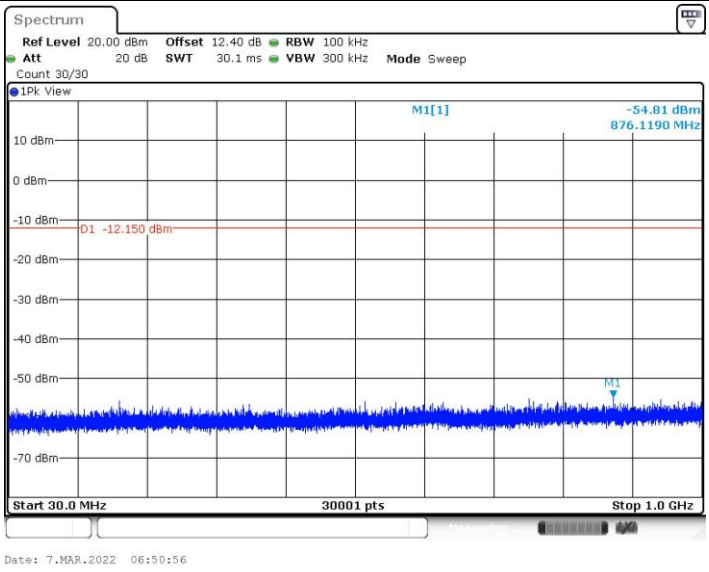
3DH1_Ant1_2441_30~1000

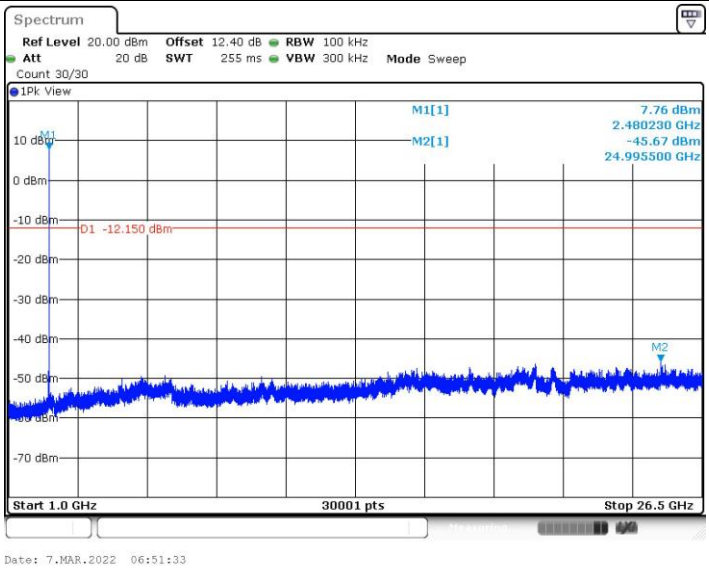


3DH1_Ant1_2441_1000~26500



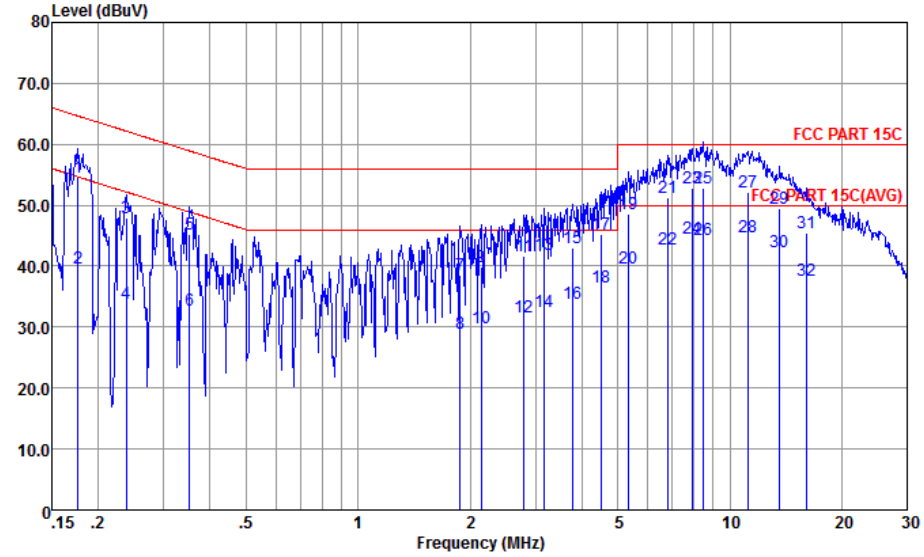
3DH1_Ant1_2480_0~Reference


3DH1_Ant1_2480_30~1000


3DH1_Ant1_2480_1000~26500


Appendix B. AC Conducted Emission Test Results

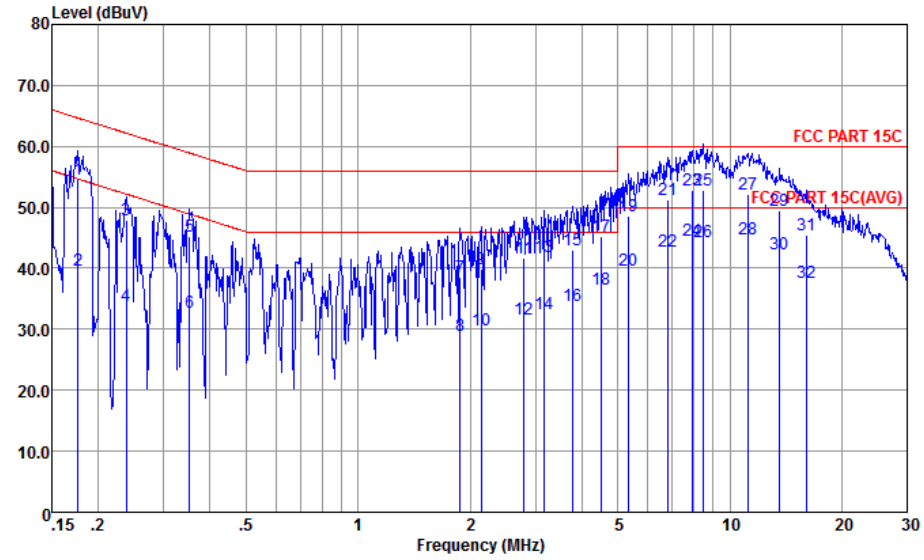
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15C LISN-060105-L LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.177	54.65	-9.99	64.64	44.21	0.03	10.41	QP
2	0.177	39.75	-14.89	54.64	29.31	0.03	10.41	Average
3	0.238	47.89	-14.28	62.17	37.50	0.05	10.34	QP
4	0.238	33.89	-18.28	52.17	23.50	0.05	10.34	Average
5	0.352	45.16	-13.75	58.91	34.80	0.08	10.28	QP
6	0.352	32.66	-16.25	48.91	22.30	0.08	10.28	Average
7	1.878	38.57	-17.43	56.00	28.20	0.14	10.23	QP
8	1.878	28.97	-17.03	46.00	18.60	0.14	10.23	Average
9	2.144	39.97	-16.03	56.00	29.60	0.14	10.23	QP
10	2.144	29.87	-16.13	46.00	19.50	0.14	10.23	Average
11	2.794	41.59	-14.41	56.00	31.20	0.15	10.24	QP
12	2.794	31.69	-14.31	46.00	21.30	0.15	10.24	Average
13	3.173	42.00	-14.00	56.00	31.61	0.15	10.24	QP
14	3.173	32.50	-13.50	46.00	22.11	0.15	10.24	Average
15	3.779	43.01	-12.99	56.00	32.60	0.16	10.25	QP
16	3.779	33.91	-12.09	46.00	23.50	0.16	10.25	Average
17	4.501	45.34	-10.66	56.00	34.91	0.17	10.26	QP
18	4.501	36.64	-9.36	46.00	26.21	0.17	10.26	Average
19	5.333	48.56	-11.44	60.00	38.10	0.18	10.28	QP
20	5.333	39.76	-10.24	50.00	29.30	0.18	10.28	Average
21	6.805	51.29	-8.71	60.00	40.80	0.19	10.30	QP
22	6.805	42.69	-7.31	50.00	32.20	0.19	10.30	Average
23	7.935	52.72	-7.28	60.00	42.20	0.20	10.32	QP

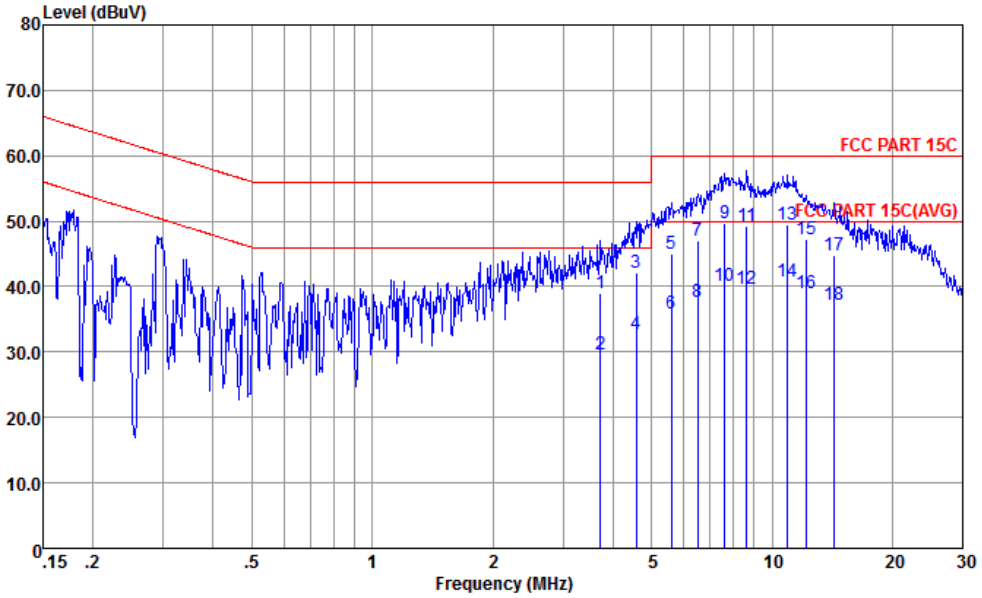
Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC PART 15C LISN-060105-L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
24		7.935	44.62	-5.38	50.00	34.10	0.20	10.32	Average
25		8.456	52.73	-7.27	60.00	42.20	0.21	10.32	QP
26		8.456	44.43	-5.57	50.00	33.90	0.21	10.32	Average
27		11.198	52.20	-7.80	60.00	41.60	0.24	10.36	QP
28	*	11.198	44.70	-5.30	50.00	34.10	0.24	10.36	Average
29		13.623	49.56	-10.44	60.00	38.90	0.28	10.38	QP
30		13.623	42.26	-7.74	50.00	31.60	0.28	10.38	Average
31		16.055	45.36	-14.64	60.00	34.60	0.34	10.42	QP
32		16.055	37.66	-12.34	50.00	26.90	0.34	10.42	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		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	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	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

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 78 2480MHz		2483.68	54.40	-19.60	74	50.99	32.98	7.25	36.82	377	46	P	H
	*	2483.68	29.61	-24.39	54	-	-	-	-	-	-	A	H
		2480	104.66	-	-	101.25	32.98	7.25	36.82	377	46	P	H
		2480	79.87	-	-	-	-	-	-	-	-	A	H
		2483.5	60.05	-13.95	74	56.64	32.98	7.25	36.82	117	92	P	V
	*	2483.5	35.26	-18.74	54	-	-	-	-	-	-	A	V
		2480	108.25	-	-	104.84	32.98	7.25	36.82	117	92	P	V
		2480	83.46	-	-	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 78 2480MHz		4965	41.08	-32.92	74	61.86	34.28	10.41	65.47	300	0	P	H
		7440	42.99	-31.01	74	60.62	35.89	12.79	66.31	300	0	P	H
		4965	40.85	-33.15	74	61.63	34.28	10.41	65.47	100	0	P	V
		7440	42.23	-31.77	74	59.86	35.89	12.79	66.31	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 BT (LF)

BT	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		30	19.5	-20.5	40	25.84	25.1	0.76	32.2	-	-	P	H
		119.24	22.8	-20.7	43.5	35.79	17.55	1.62	32.16	-	-	P	H
		159.98	24.6	-18.9	43.5	38.36	16.5	1.84	32.1	-	-	P	H
		206.54	27.27	-16.23	43.5	42.12	15.17	2.09	32.11	-	-	P	H
		214.3	28.78	-14.72	43.5	43.58	15.24	2.09	32.13	-	-	P	H
		342.34	24.73	-21.27	46	33.92	20.26	2.73	32.18	-	-	P	H
		34.85	33.41	-6.59	40	42.4	22.45	0.76	32.2	-	-	P	V
		62.01	27.83	-12.17	40	46.81	12.02	1.1	32.1	-	-	P	V
		126.03	28.6	-14.9	43.5	41.48	17.6	1.67	32.15	-	-	P	V
		213.33	26.72	-16.78	43.5	41.53	15.23	2.09	32.13	-	-	P	V
		369.5	24.2	-21.8	46	32.6	20.99	2.85	32.24	-	-	P	V
		743.92	29.66	-16.34	46	29.88	28.02	4.05	32.29	-	-	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:

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		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)

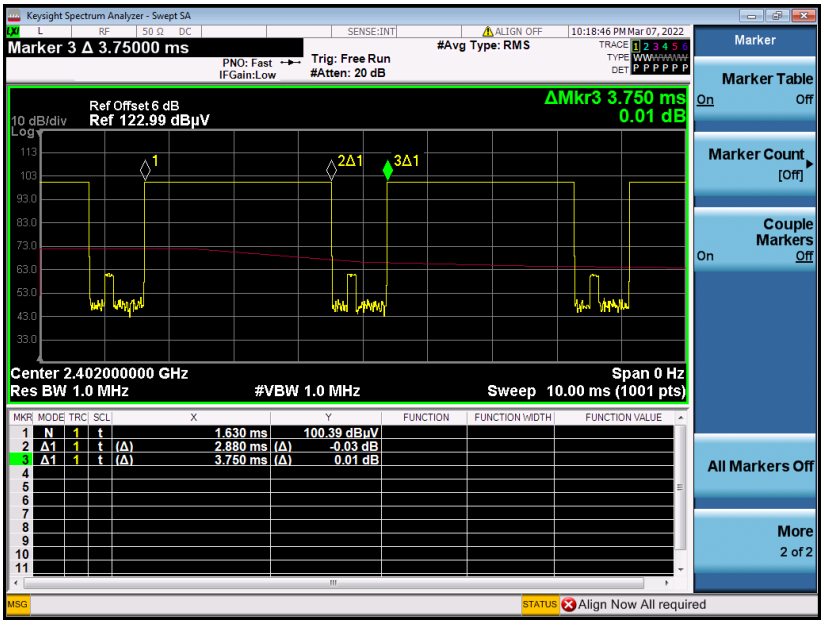
= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

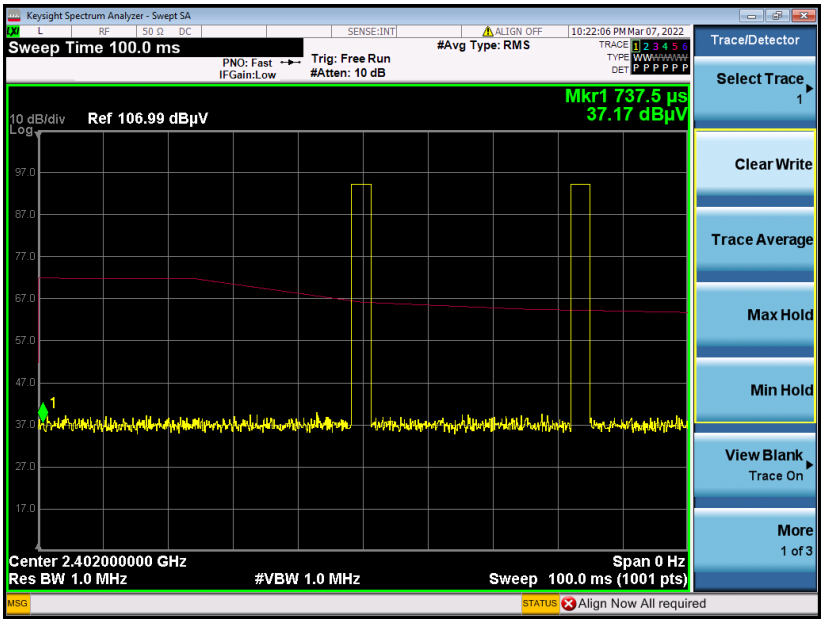
Both peak and average measured complies with the limit line, so test result is “PASS”.

Appendix D. Duty Cycle Plots

DH5 on time (One Pulse) Plot on Channel 39



DH5 on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. DH5 has the highest duty cycle worst case and is reported.