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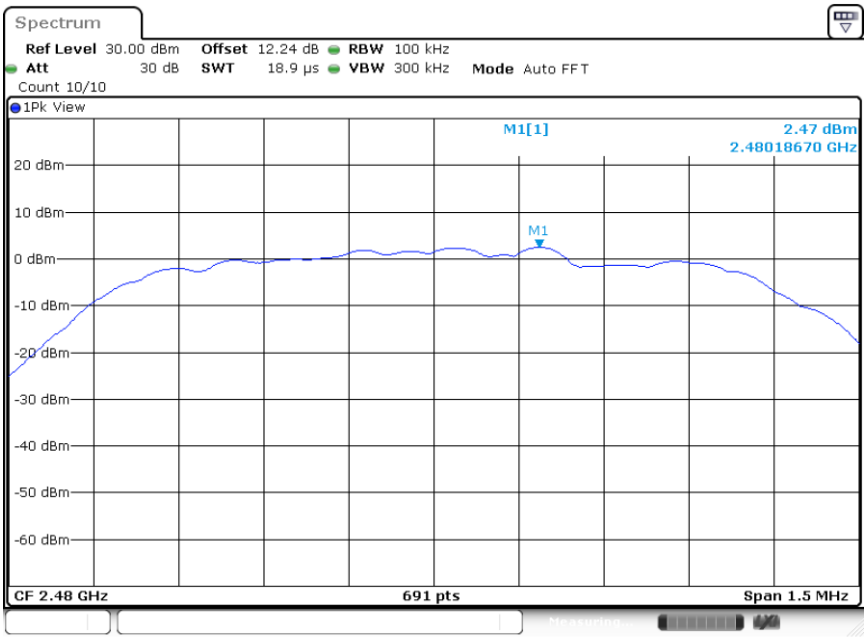
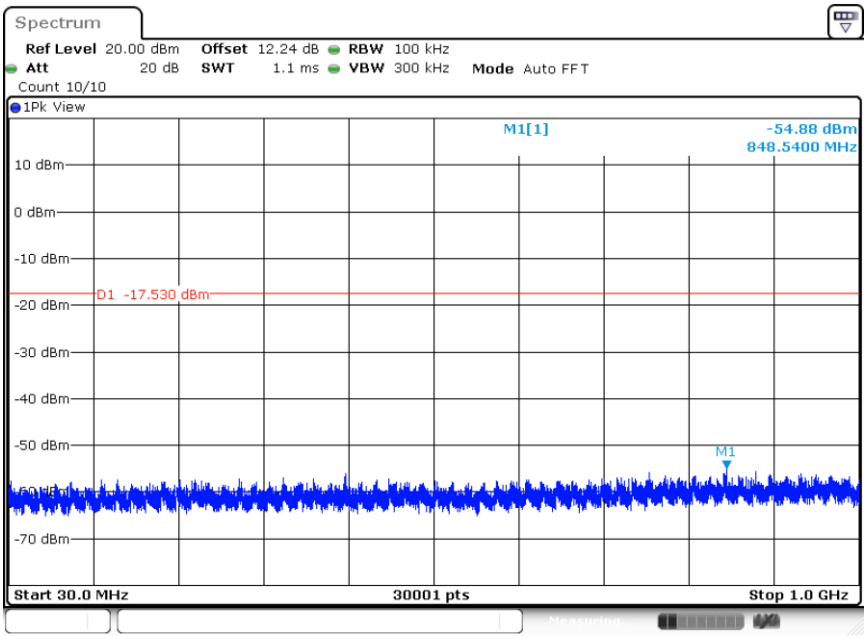


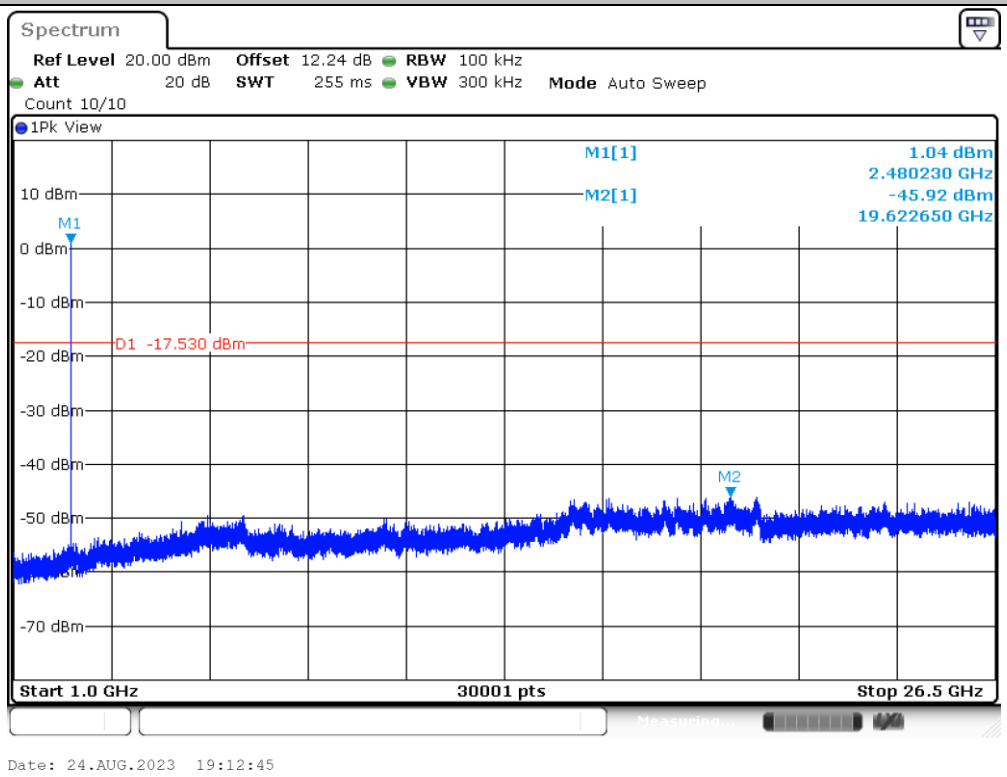
Date: 24.AUG.2023 19:12:17

3DH5_Ant1_2480_30~1000



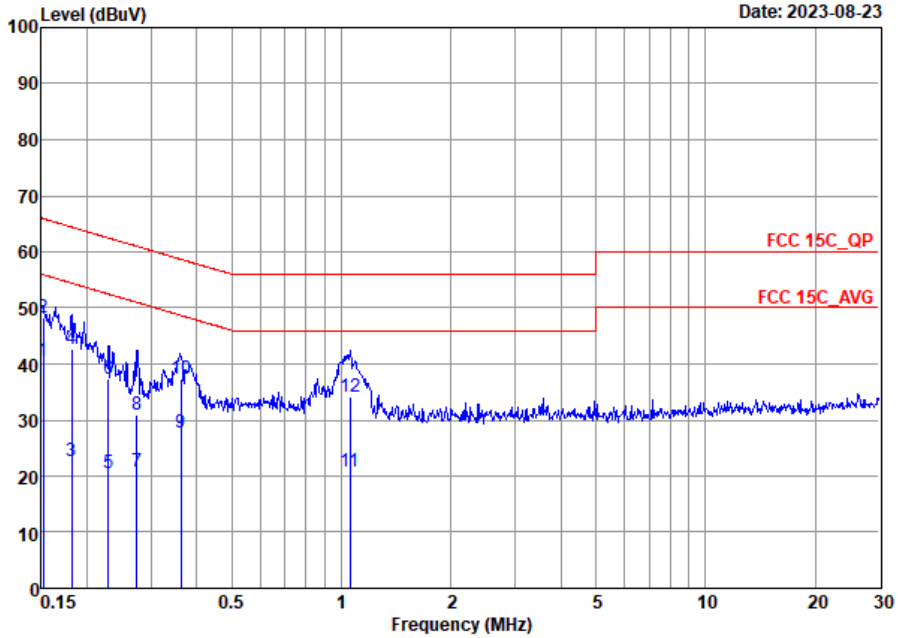
Date: 24.AUG.2023 19:12:23

3DH5_Ant1_2480_1000~26500



Appendix B. AC Conducted Emission Test Results

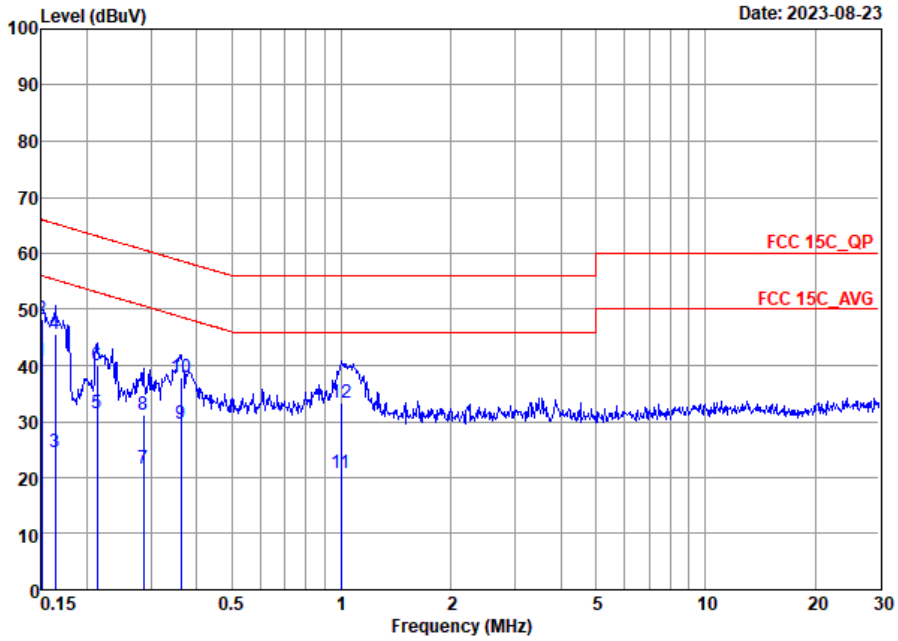
Test Engineer :	Lily Qiu	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20230420_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.15	40.40	-15.51	55.91	19.80	10.47	10.13	Average
2		0.15	48.20	-17.71	65.91	27.60	10.47	10.13	QP
3		0.18	22.80	-31.62	54.42	2.21	10.45	10.14	Average
4		0.18	42.80	-21.62	64.42	22.21	10.45	10.14	QP
5		0.23	20.44	-32.04	52.48	-0.10	10.39	10.15	Average
6		0.23	37.34	-25.14	62.48	16.80	10.39	10.15	QP
7		0.27	20.83	-30.15	50.98	0.30	10.38	10.15	Average
8		0.27	30.83	-30.15	60.98	10.30	10.38	10.15	QP
9		0.36	27.86	-20.83	48.69	7.40	10.30	10.16	Average
10		0.36	37.36	-21.33	58.69	16.90	10.30	10.16	QP
11		1.05	20.90	-25.10	46.00	0.50	10.24	10.16	Average
12		1.05	34.10	-21.90	56.00	13.70	10.24	10.16	QP

Test Engineer :	Lily Qiu	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20230420_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	*	0.15	40.69	-15.31	56.00	20.10	10.46	10.13	Average
2		0.15	48.19	-17.81	66.00	27.60	10.46	10.13	QP
3		0.16	24.58	-30.72	55.30	4.00	10.44	10.14	Average
4		0.16	45.68	-19.62	65.30	25.10	10.44	10.14	QP
5		0.21	31.59	-21.51	53.10	11.10	10.34	10.15	Average
6		0.21	39.89	-23.21	63.10	19.40	10.34	10.15	QP
7		0.29	21.57	-29.06	50.63	1.11	10.31	10.15	Average
8		0.29	31.27	-29.36	60.63	10.81	10.31	10.15	QP
9		0.36	29.51	-19.18	48.69	9.10	10.25	10.16	Average
10		0.36	37.91	-20.78	58.69	17.50	10.25	10.16	QP
11		1.00	20.70	-25.30	46.00	0.30	10.24	10.16	Average
12		1.00	33.40	-22.60	56.00	13.00	10.24	10.16	QP

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 Data

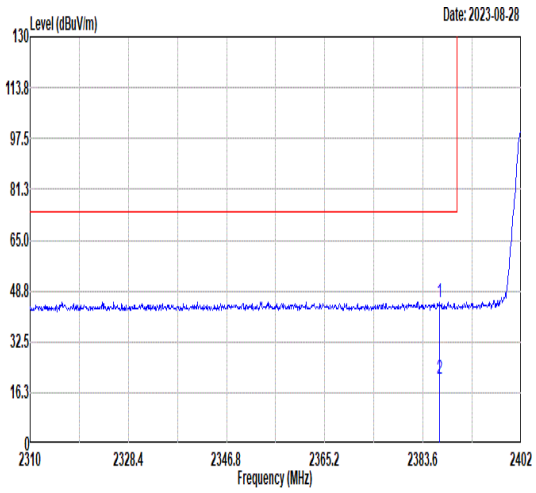
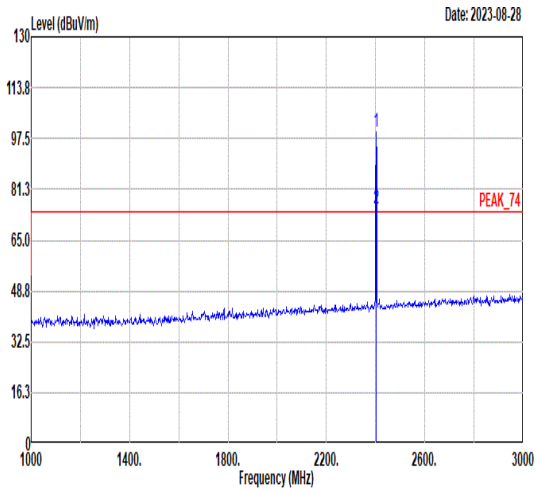
Test Engineer :	Reid Huang	Relative Humidity :	48~49%
		Temperature :	24~25℃

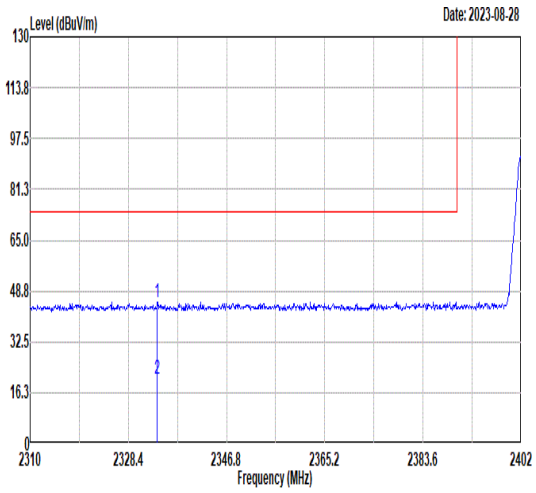
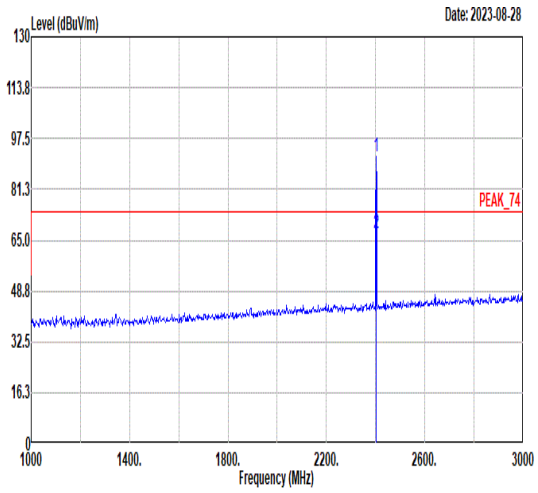
Radiated Spurious Emission Test Modes

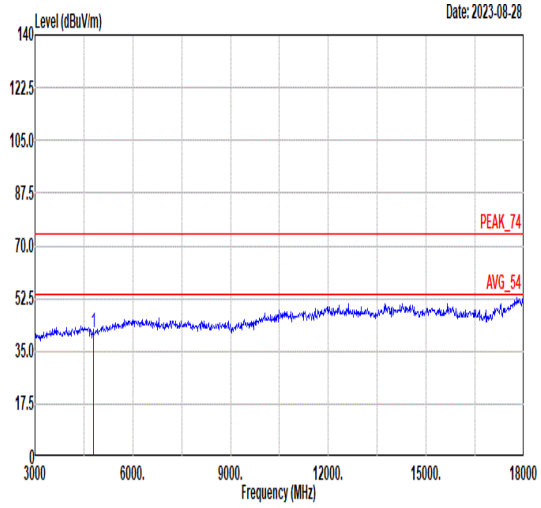
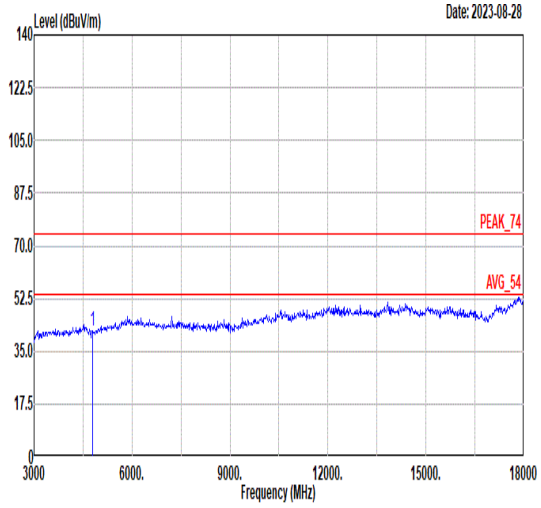
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	Remark
Mode 1	2400-2483.5	SISO	Bluetooth BR_GFSK	00	2402	1DH5	-
Mode 2	2400-2483.5	SISO	Bluetooth BR_GFSK	39	2441	1DH5	-
Mode 3	2400-2483.5	SISO	Bluetooth BR_GFSK	78	2480	1DH5	-
Mode 4	2400-2483.5	SISO	Bluetooth BR_GFSK	78	2480	1DH5	LF

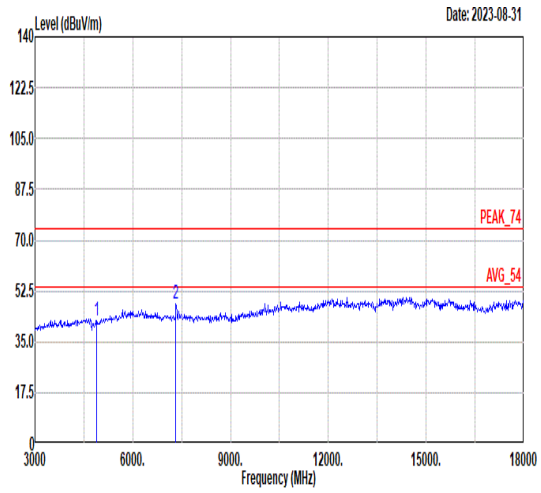
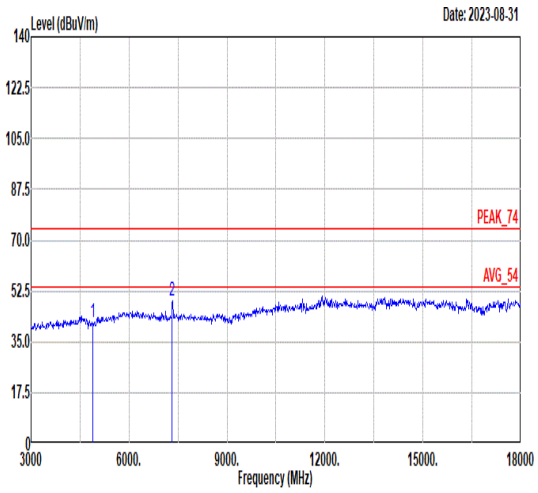
Summary of each worse mode

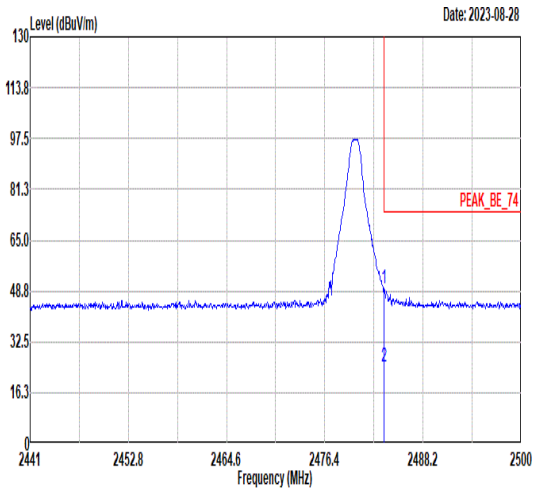
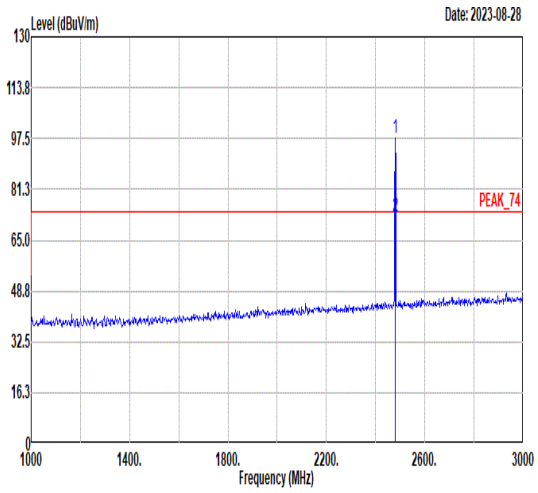
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth BR_GFSK	00	2386.73	45.37	74.00	-28.63	H	PEAK	Pass	Band Edge
1	Bluetooth BR_GFSK	00	4804.00	41.74	74.00	-32.26	V	Peak	Pass	Harmonic
2	Bluetooth BR_GFSK	39	-	-	-	-	-	-	-	Band Edge
2	Bluetooth BR_GFSK	39	7323.00	49.04	74.00	-24.96	V	Peak	Pass	Harmonic
3	Bluetooth BR_GFSK	78	2483.78	50.28	74.00	-23.72	V	PEAK	Pass	Band Edge
3	Bluetooth BR_GFSK	78	7440.00	49.38	74.00	-24.62	V	Peak	Pass	Harmonic
4	Bluetooth BR_GFSK	78	32.91	32.45	40	-7.55	V	Peak -	Pass -	LF

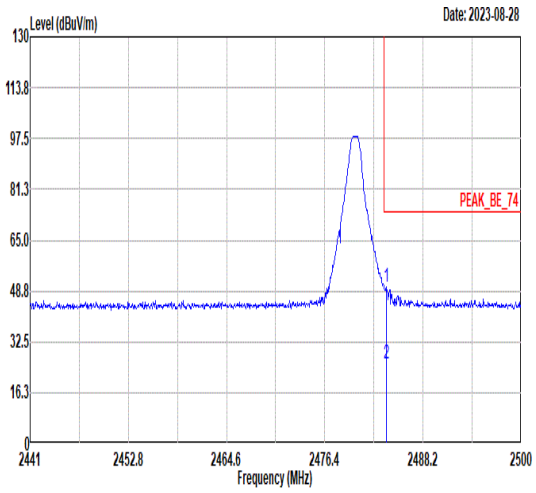
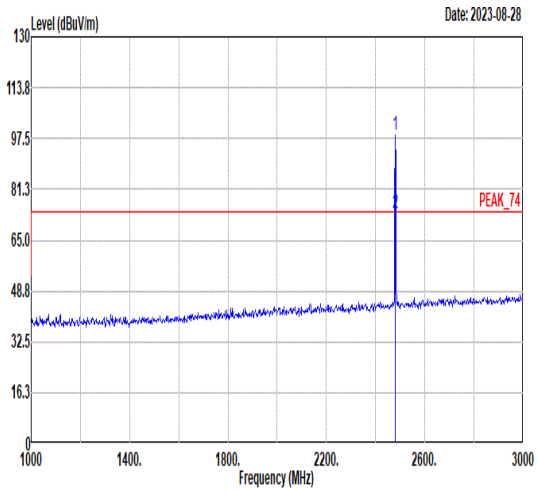
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2386.73 45.37 74.00 -28.63 42.04 32.21 4.79 33.67 100 249 PEAK 2 2386.73 20.58 54.00 -33.42 17.25 32.21 4.79 33.67 100 249 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2402.00 99.75 ------ ------ 96.35 32.25 4.81 33.66 100 249 Peak 2 2402.00 74.96 54.00 20.96 71.56 32.25 4.81 33.66 100 249 AVERAGE

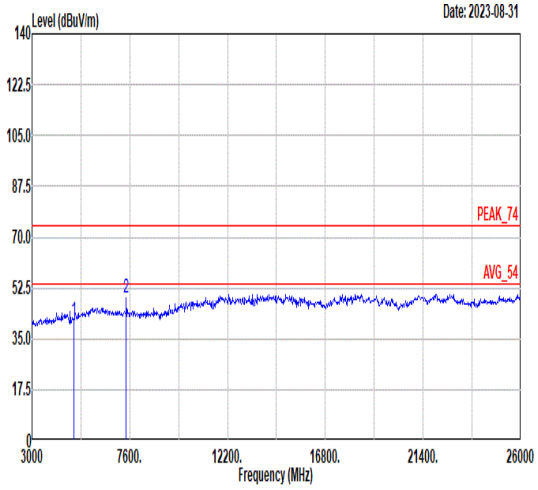
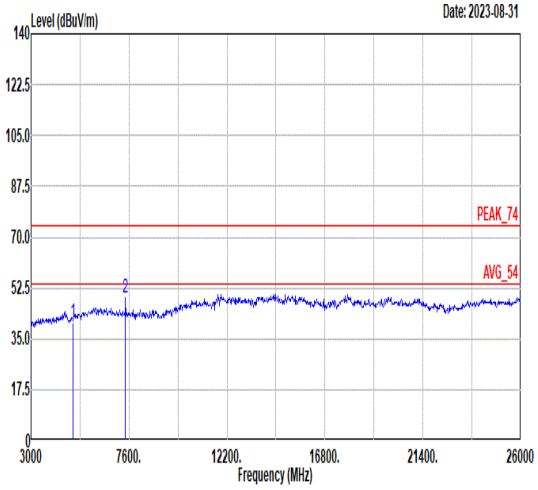
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2333.83 45.36 74.00 -28.64 42.25 32.07 4.74 33.70 400 53 PEAK 2 2333.83 20.57 54.00 -33.43 17.46 32.07 4.74 33.70 400 53 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2402.00 91.83 ------ ------ 88.43 32.25 4.81 33.66 400 53 Peak 2 2402.00 67.04 54.00 13.04 63.64 32.25 4.81 33.66 400 53 AVERAGE

Mode	1	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 41.25 74.00 -32.75 56.56 34.42 7.74 57.47 -- -- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 41.74 74.00 -32.26 57.05 34.42 7.74 57.47 -- -- Peak

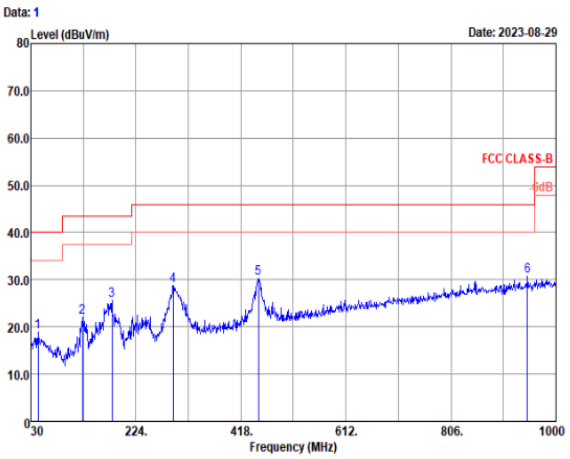
Mode	2	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH39_2441MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4882.00 42.05 74.00 -31.95 57.43 34.37 7.77 57.52 -- -- Peak 2 7323.00 47.98 74.00 -26.02 61.90 36.04 8.97 58.93 -- -- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4882.00 41.62 74.00 -32.38 57.00 34.37 7.77 57.52 -- -- Peak 2 7323.00 49.04 74.00 -24.96 62.96 36.04 8.97 58.93 -- -- Peak

Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	SISO	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2483.54 49.34 74.00 -24.66 45.57 32.46 4.92 33.61 200 223 PEAK 2 2483.54 24.55 54.00 -29.45 20.78 32.46 4.92 33.61 200 223 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2480.00 97.41 ------ ------ 93.65 32.45 4.92 33.61 200 223 Peak 2 2480.00 72.62 54.00 18.62 68.86 32.45 4.92 33.61 200 223 AVERAGE

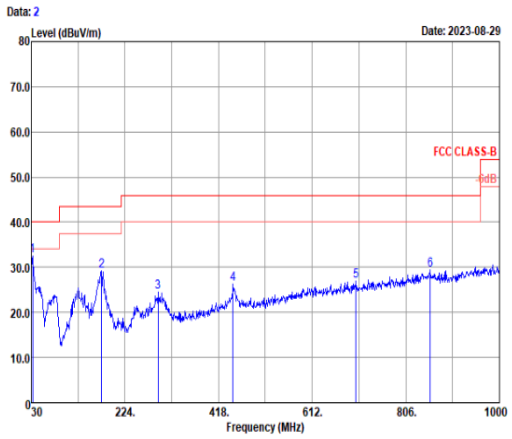
Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	SISO	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2483.78 50.28 74.00 -23.72 46.51 32.46 4.92 33.61 104 115 PEAK 2 2483.78 25.49 54.00 -28.51 21.72 32.46 4.92 33.61 104 115 AVERAGE	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2480.00 98.50 ------ ------ 94.74 32.45 4.92 33.61 104 115 Peak 2 2480.00 73.71 54.00 19.71 69.95 32.45 4.92 33.61 104 115 AVERAGE

Mode	3	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	SISO	
Pol.	Horizontal	Vertical
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 41.16 74.00 -32.84 56.61 34.32 7.81 57.58 -- -- Peak 2 7440.00 48.90 74.00 -25.10 62.75 35.94 9.19 58.98 -- -- Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4960.00 40.87 74.00 -33.13 56.32 34.32 7.81 57.58 -- -- Peak 2 7440.00 49.38 74.00 -24.62 63.23 35.94 9.19 58.98 -- -- Peak

4	
LF	
2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
SISO	
Horizontal	**Vertical**



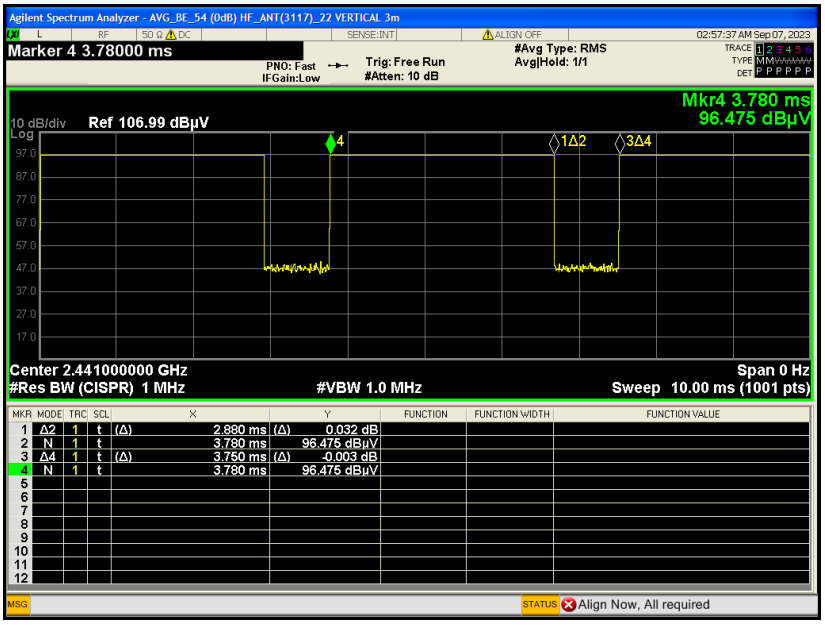
	Freq	Level	Over Limit	Limit Line	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	43.58	18.99	-21.01	40.00	32.84	19.54	1.55	34.94	---	---	Peak
2	125.06	21.99	-21.51	43.50	37.62	16.94	2.18	34.75	---	---	Peak
3	180.35	25.56	-17.94	43.50	40.60	17.16	2.50	34.70	---	---	Peak
4	292.87	28.67	-17.33	46.00	41.19	18.91	3.18	34.61	---	---	Peak
5	450.01	30.27	-15.73	46.00	38.55	22.75	3.47	34.50	---	---	Peak
6	947.62	30.84	-15.16	46.00	30.91	29.72	4.51	34.30	---	---	Peak



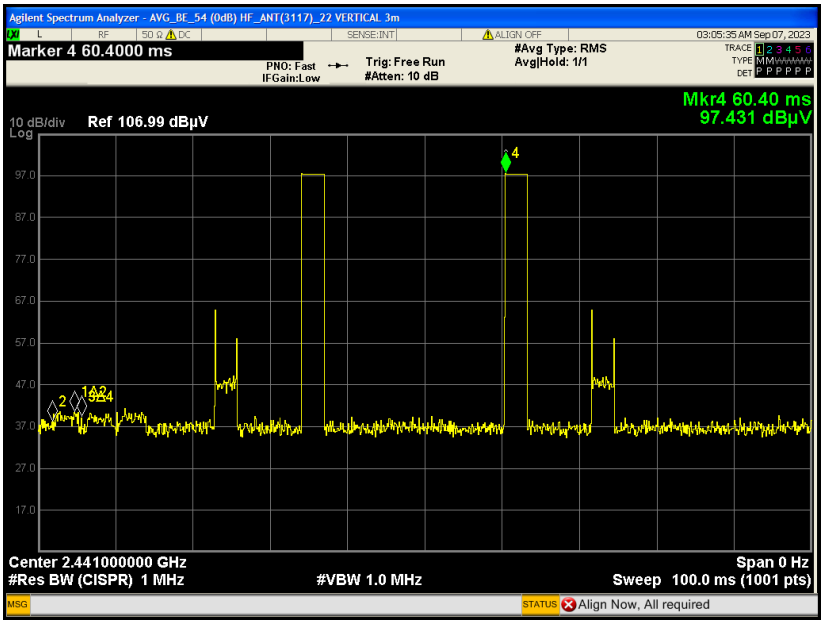
	Freq	Level	Over Limit	Limit Line	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	32.91	32.45	-7.55	40.00	47.72	18.23	1.26	34.76	---	---	Peak
2	175.50	29.26	-14.24	43.50	44.03	17.46	2.47	34.70	---	---	Peak
3	292.87	24.57	-21.43	46.00	37.09	18.91	3.18	34.61	---	---	Peak
4	448.07	26.25	-19.75	46.00	34.59	22.70	3.46	34.50	---	---	Peak
5	703.18	26.99	-19.01	46.00	30.52	27.13	3.74	34.40	---	---	Peak
6	856.44	29.46	-16.54	46.00	30.59	28.78	4.39	34.30	---	---	Peak

Appendix D. Duty Cycle Plots

DH5 on time (One Pulse) Plot



DH5 on time (Count Pulses) Plot on Channel 00



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.