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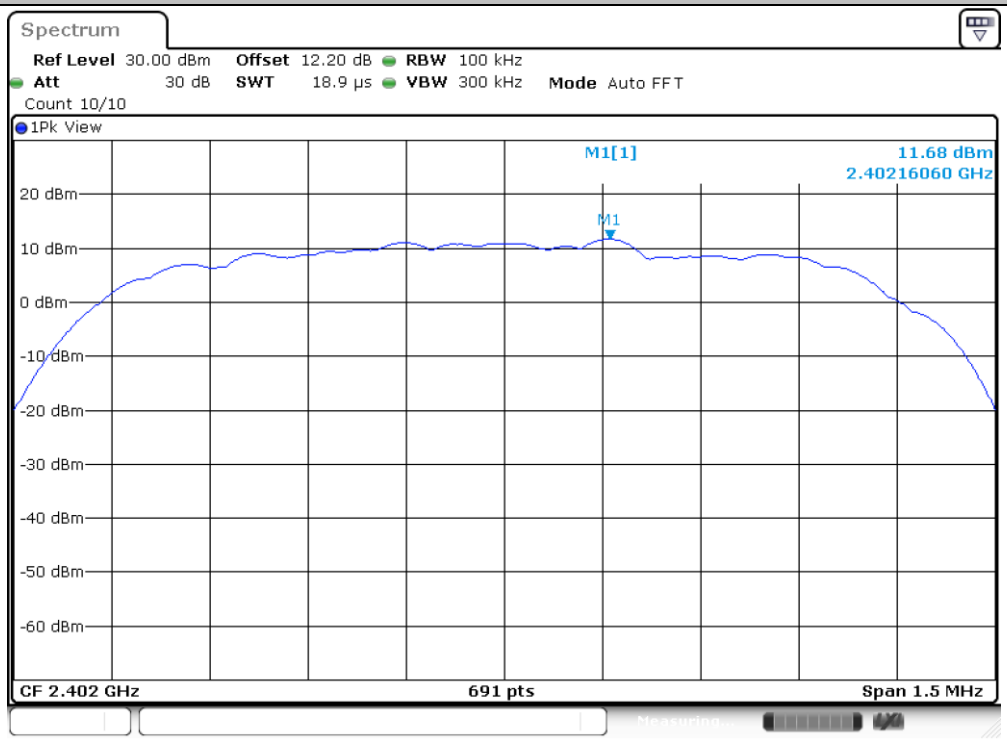
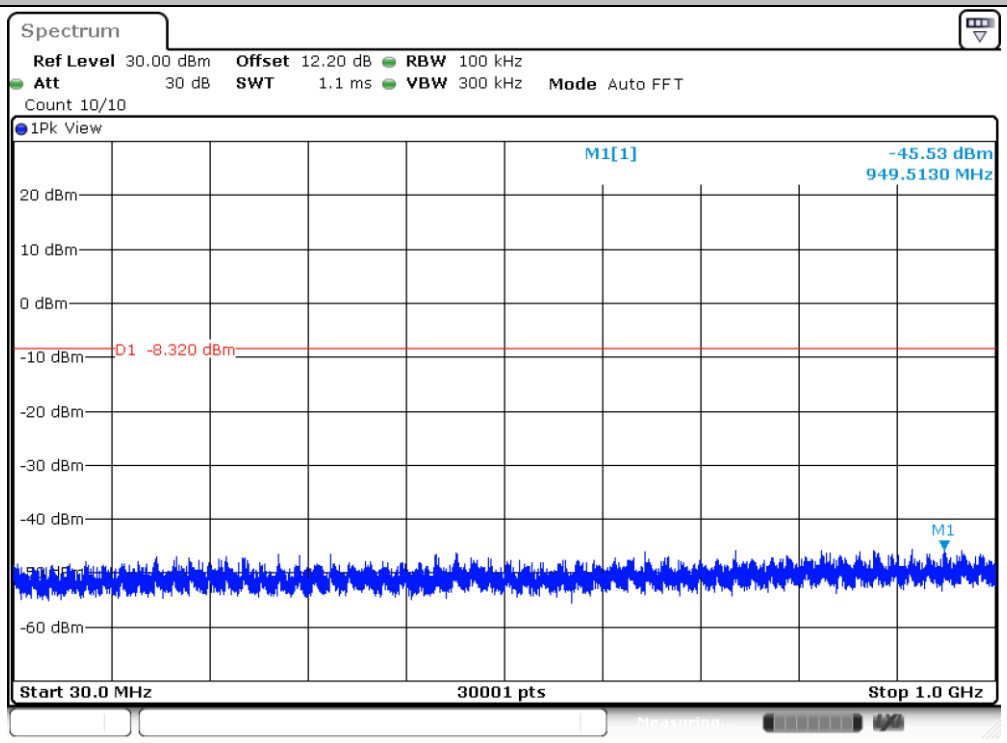
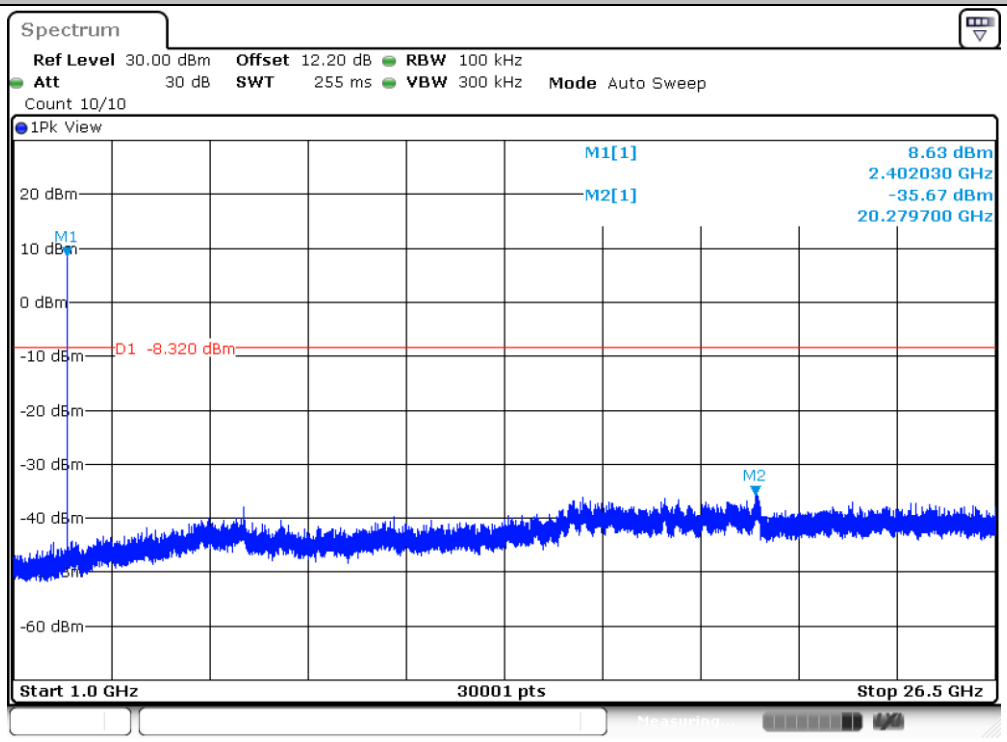


3DH5_Ant17_2402_30~1000

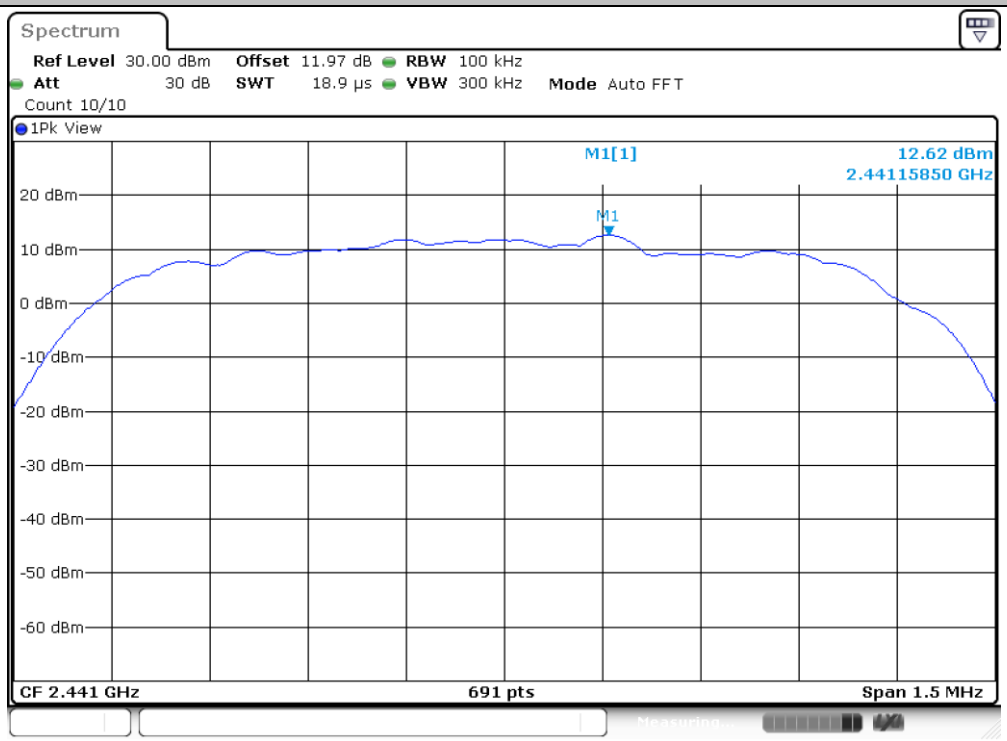


3DH5_Ant17_2402_1000~26500



Date: 12.OCT.2024 19:37:03

3DH5_Ant17_2441_0~Reference



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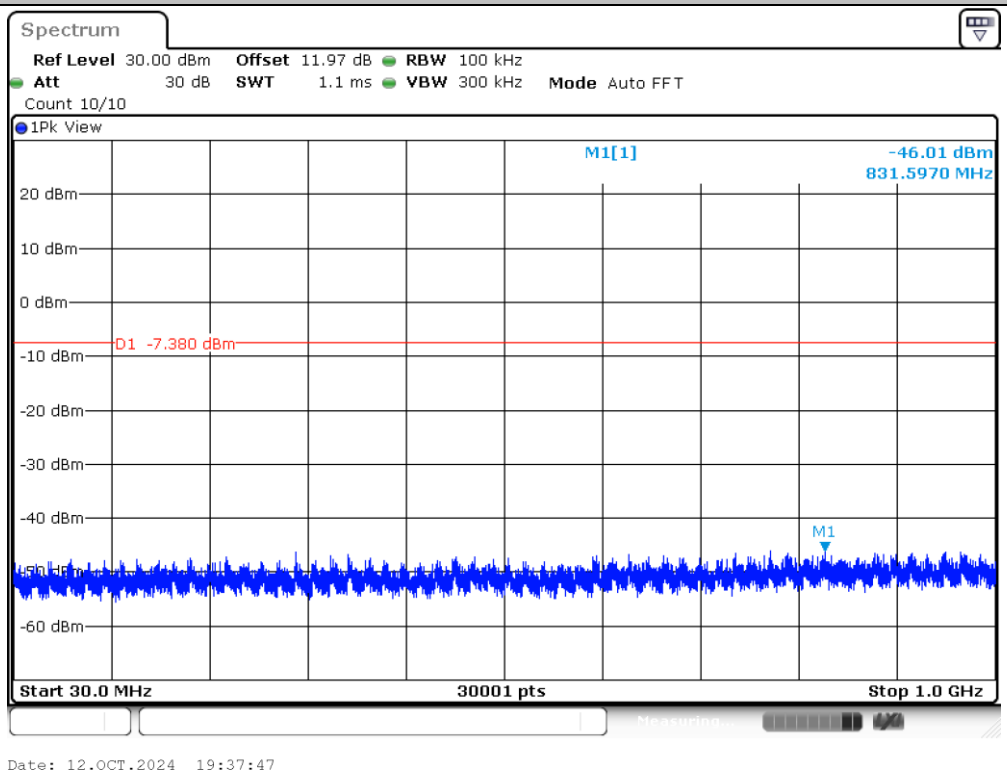
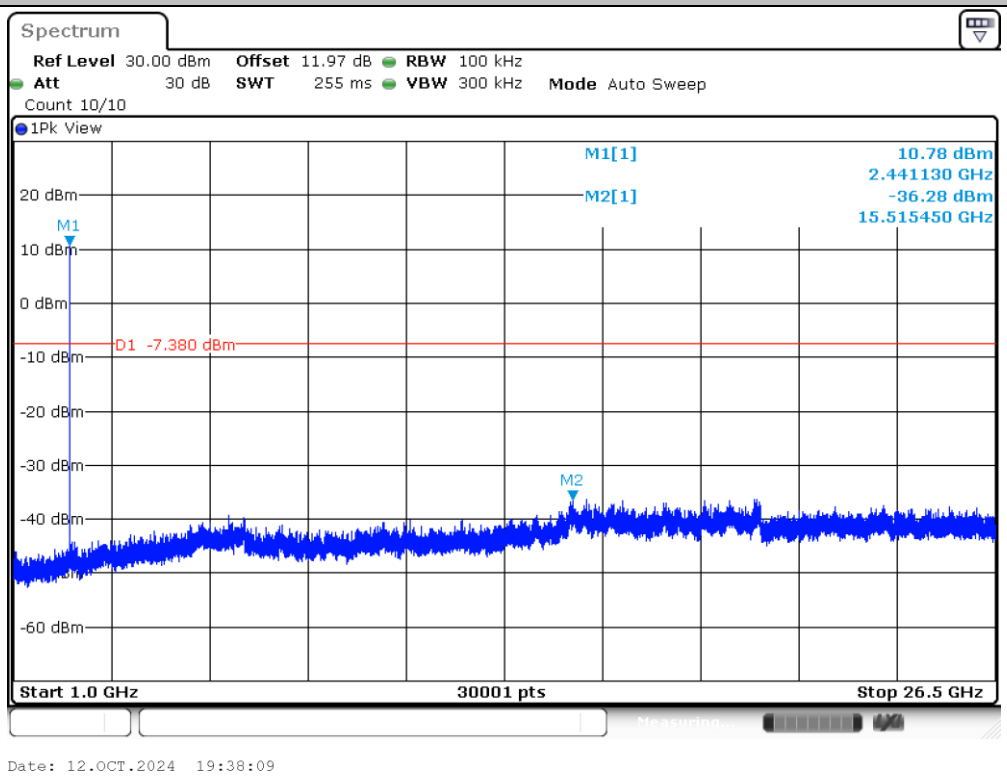
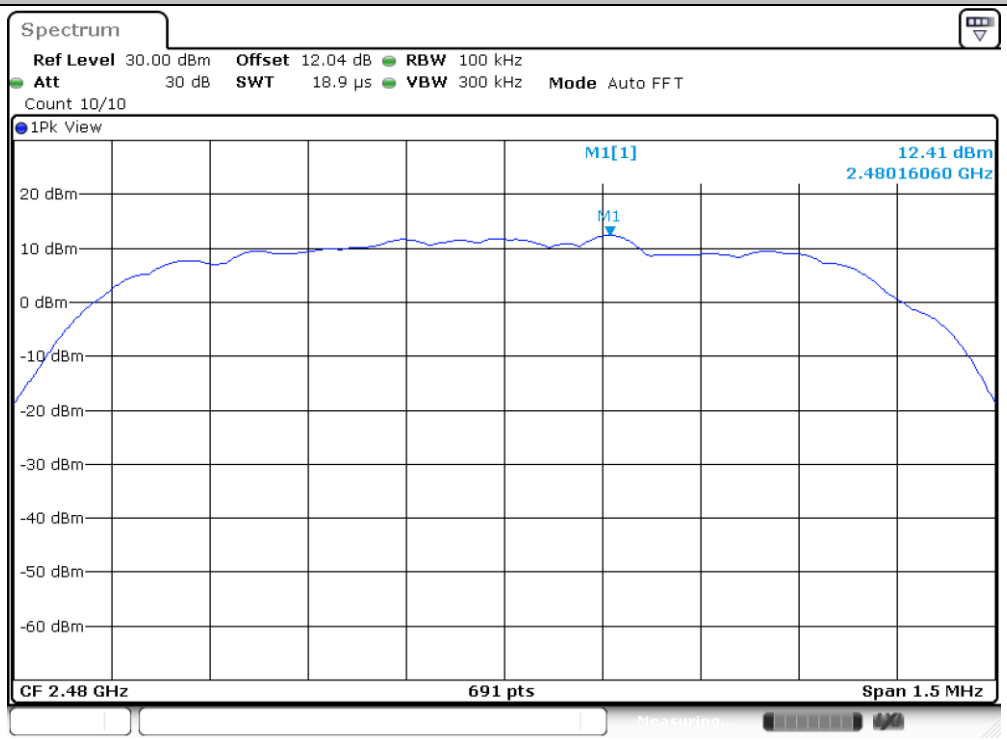
3DH5_Ant17_2441_30~1000



3DH5_Ant17_2441_1000~26500

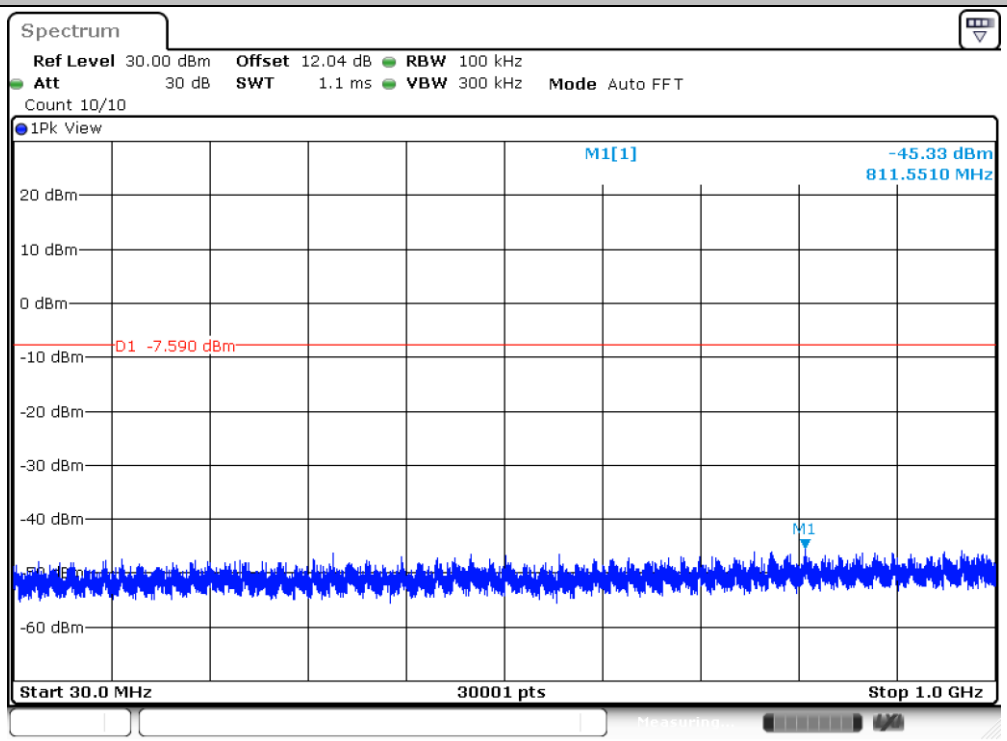


3DH5_Ant17_2480_0~Reference



Date: 12.OCT.2024 19:38:59

3DH5_Ant17_2480_30~1000



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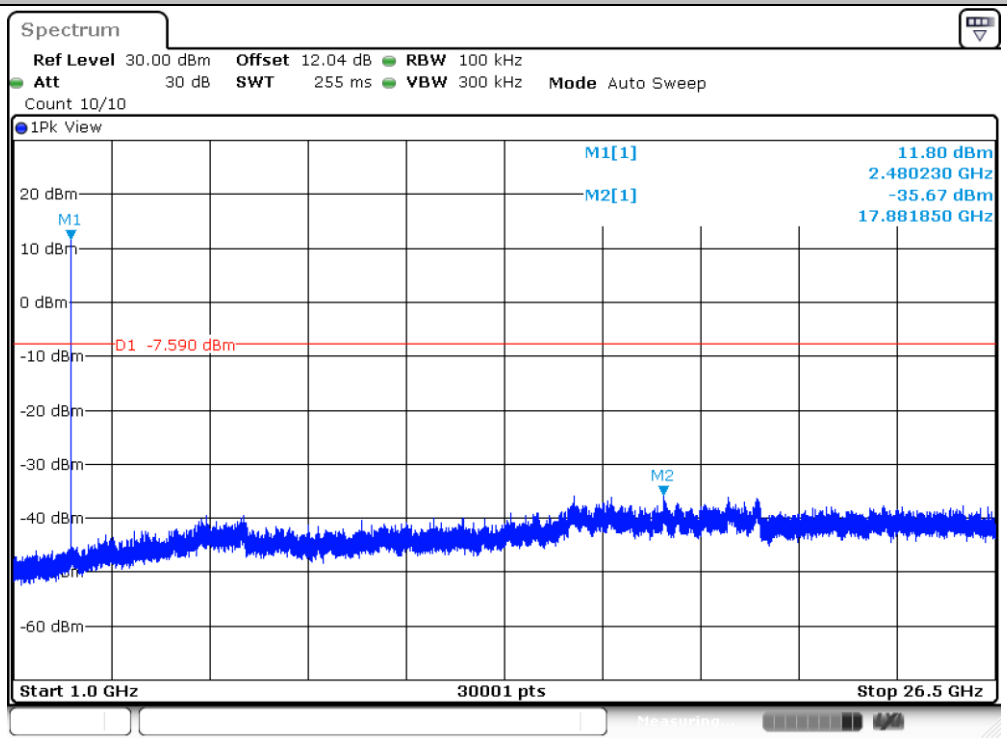
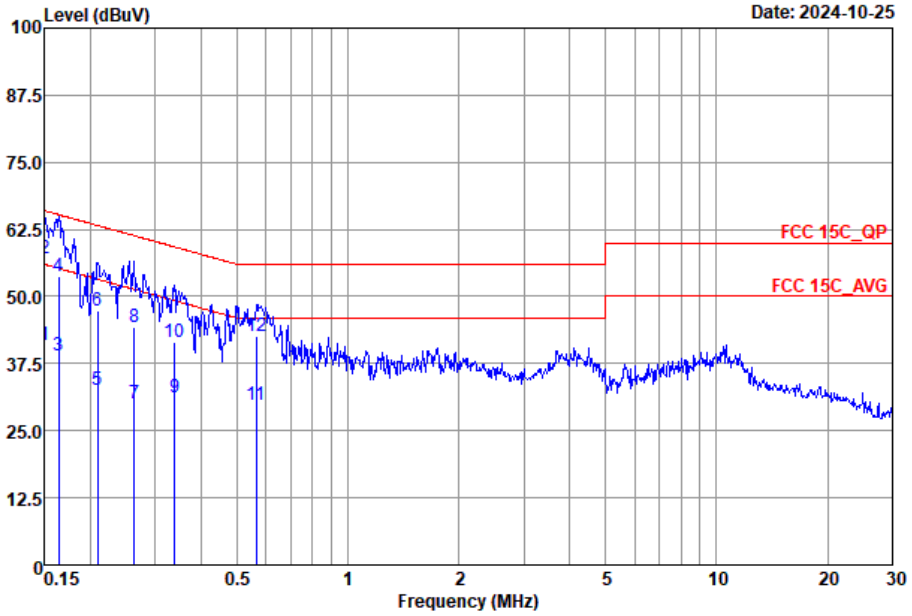
3DH5_Ant17_2480_1000~26500



Appendix B. AC Conducted Emission Test Results

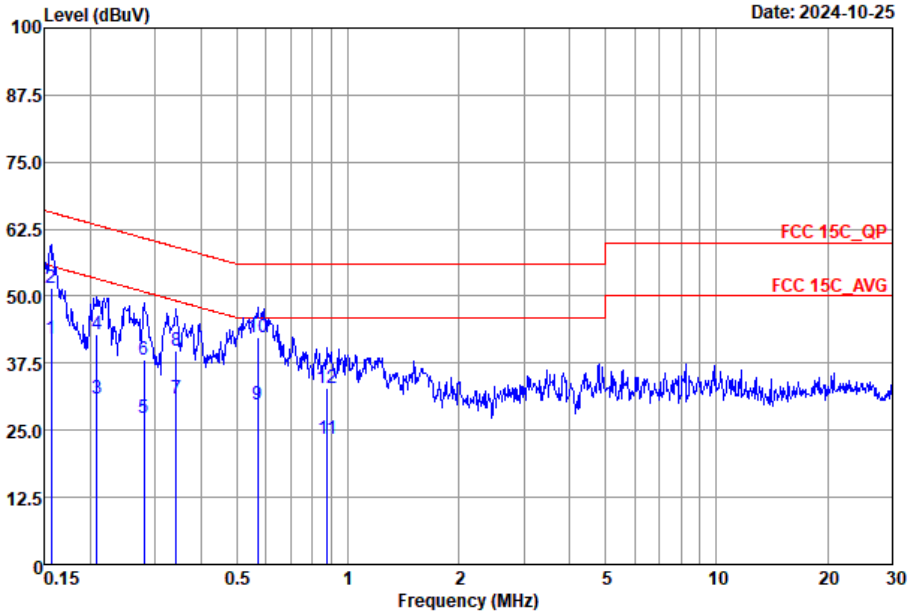
Test Engineer :	Nathon	**Temperature :**	22~24℃
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO02-SZ
Condition : FCC 15C_QP LISN_2024-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	41.00	-15.00	56.00	20.70	10.14	10.16	Average
2	*	0.15	57.20	-8.80	66.00	36.90	10.14	10.16	QP
3		0.16	38.97	-16.28	55.25	18.70	10.11	10.16	Average
4		0.16	53.77	-11.48	65.25	33.50	10.11	10.16	QP
5		0.21	32.71	-20.52	53.23	12.49	10.06	10.16	Average
6		0.21	47.31	-15.92	63.23	27.09	10.06	10.16	QP
7		0.26	29.98	-21.36	51.34	9.80	10.03	10.15	Average
8		0.26	44.28	-17.06	61.34	24.10	10.03	10.15	QP
9		0.34	31.07	-18.15	49.22	10.90	10.01	10.16	Average
10		0.34	41.37	-17.85	59.22	21.20	10.01	10.16	QP
11		0.56	29.89	-16.11	46.00	9.70	9.98	10.21	Average
12		0.56	42.49	-13.51	56.00	22.30	9.98	10.21	QP

Test Engineer :	Nathon	**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 : CO02-SZ
Condition : FCC 15C_QP LISN_2024-N NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	42.17	-13.48	55.65	21.90	10.11	10.16	Average
2	0.16	51.47	-14.18	65.65	31.20	10.11	10.16	QP
3	0.21	30.89	-22.38	53.27	10.70	10.03	10.16	Average
4	0.21	42.89	-20.38	63.27	22.70	10.03	10.16	QP
5	0.28	27.35	-23.46	50.81	7.20	10.00	10.15	Average
6	0.28	38.15	-22.66	60.81	18.00	10.00	10.15	QP
7	0.34	30.94	-18.19	49.13	10.80	9.98	10.16	Average
8	0.34	39.74	-19.39	59.13	19.60	9.98	10.16	QP
9	0.57	29.88	-16.12	46.00	9.71	9.96	10.21	Average
10 *	0.57	42.28	-13.72	56.00	22.11	9.96	10.21	QP
11	0.88	23.49	-22.51	46.00	3.30	9.96	10.23	Average
12	0.88	32.89	-23.11	56.00	12.70	9.96	10.23	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

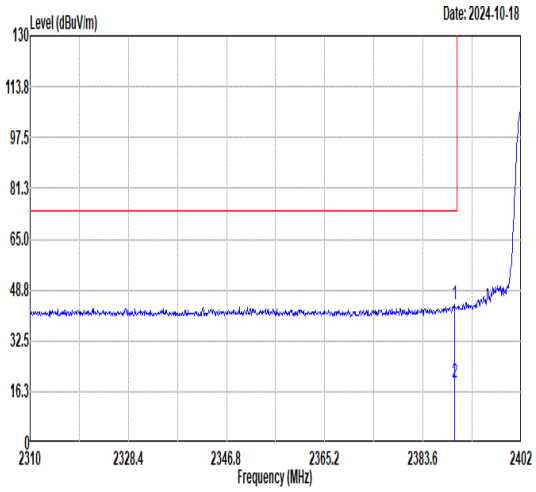
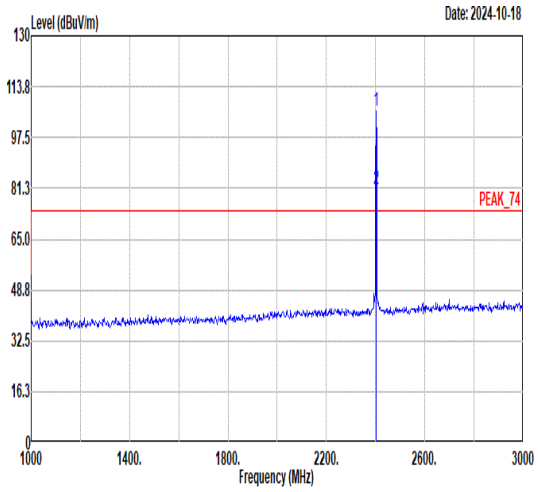
Test Engineer :	Reid Huang	**Relative Humidity :**	48~49%
		Temperature :	24-25℃

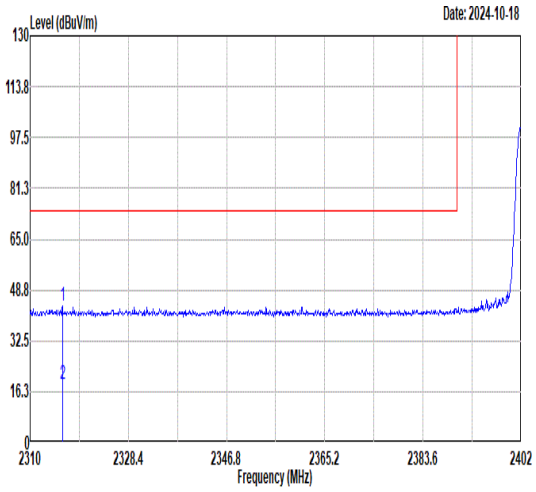
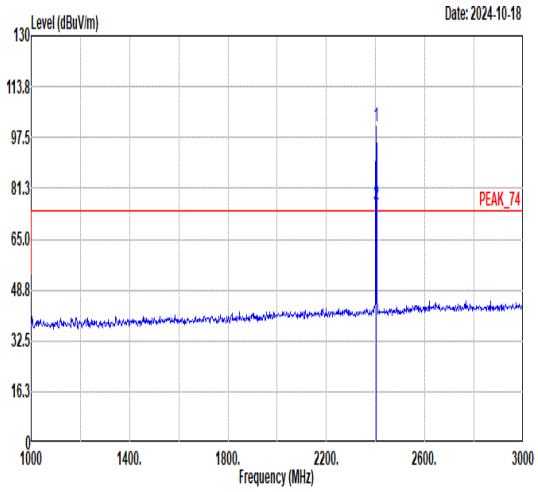
Radiated Spurious Emission Test Modes

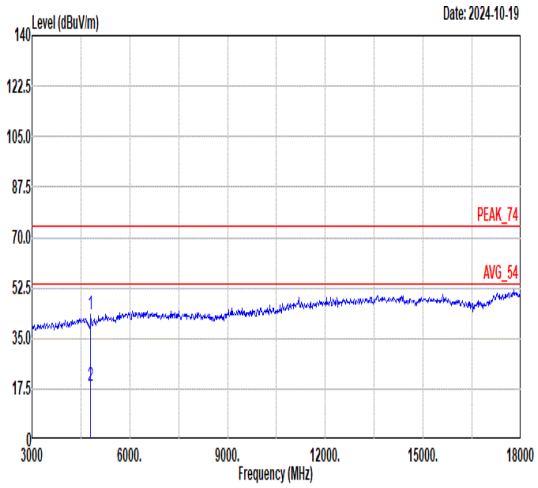
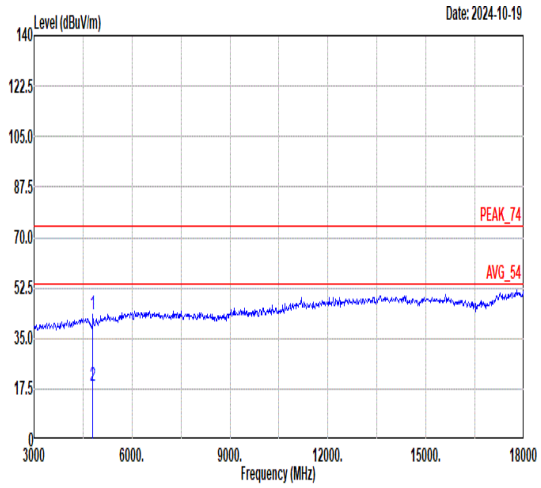
Mode	Band (MHz)	Antenna	Modulation	Channel	Frequency	Data Rate	RU	Remark
Mode 1	2400-2483.5	17	Bluetooth BR_GFSK	00	2402	1DH5	-	-
Mode 2	2400-2483.5	17	Bluetooth BR_GFSK	39	2441	1DH5	-	-
Mode 3	2400-2483.5	17	Bluetooth BR_GFSK	78	2480	1DH5	-	-
Mode 4	2400-2483.5	17	Bluetooth BR_GFSK-LF	78	2480	1DH5	-	-

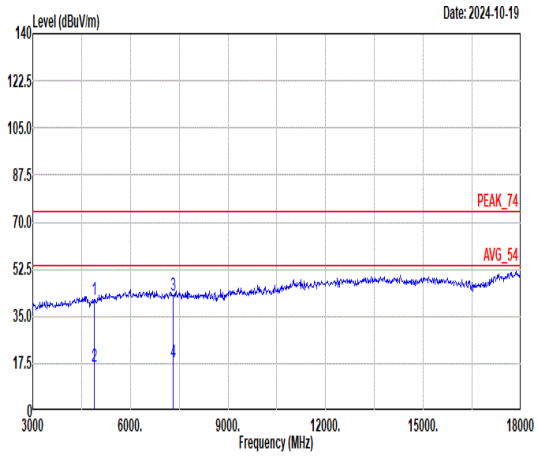
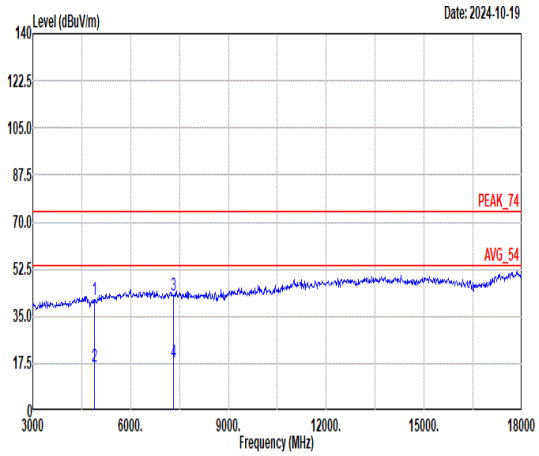
Summary of each worse mode

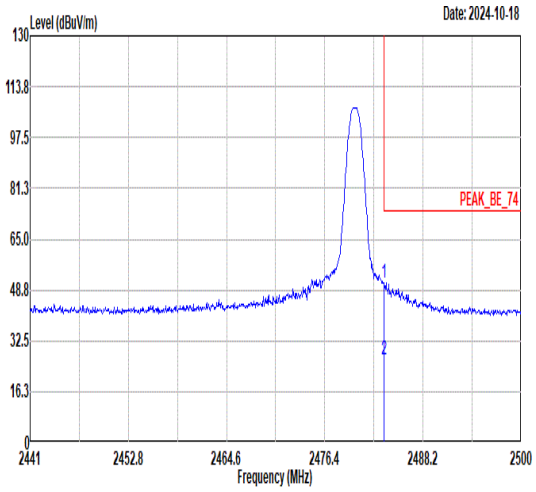
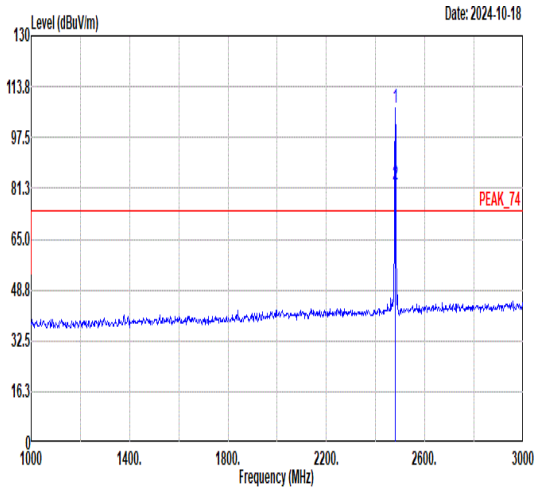
Mode	Modulation	Ch.	Freq. (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol.	Peak Avg.	Result	Remark
1	Bluetooth BR_GFSK	00	2389.49	44.05	74.00	-29.95	H	PEAK	Pass	Band Edge
1	Bluetooth BR_GFSK	00	4804.00	43.27	74.00	-30.73	H	Peak	Pass	Harmonic
2	Bluetooth BR_GFSK	39	-	-	-	-	-	-	-	Band Edge
2	Bluetooth BR_GFSK	39	7323.00	43.55	74.00	-30.45	V	Peak	Pass	Harmonic
3	Bluetooth BR_GFSK	78	2483.54	51.08	74.00	-22.92	H	PEAK	Pass	Band Edge
3	Bluetooth BR_GFSK	78	4960.00	45.72	74.00	-28.28	V	Peak	Pass	Harmonic
4	Bluetooth BR_GFSK-LF	78	844.8	31.81	46	-14.19	V	Peak	Pass	LF

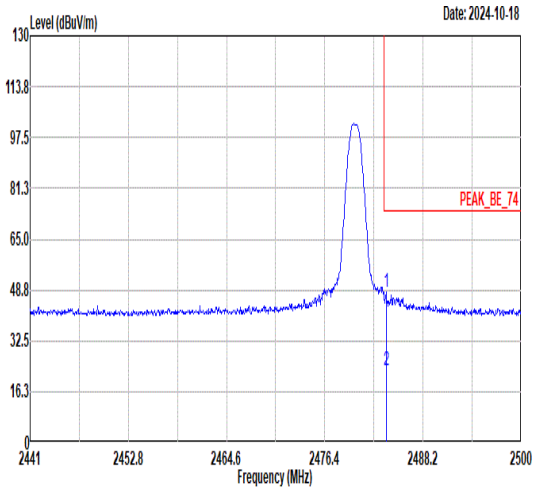
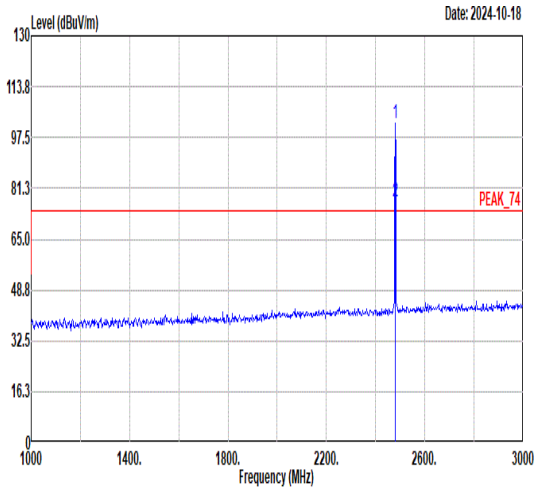
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	17	
Pol.	Horizontal	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2389.49 44.05 74.00 -29.95 42.21 30.61 4.80 33.57 400 360 PEAK 2 2389.49 19.26 54.00 -34.74 17.42 30.61 4.80 33.57 400 360 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 2402.00 105.72 ------ ------ 103.85 30.62 4.81 33.56 400 360 PEAK 2 2402.00 80.93 ------ ------ 79.06 30.62 4.81 33.56 400 360 AVERAGE

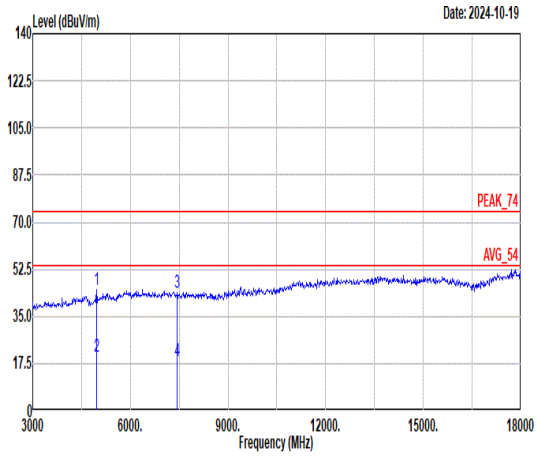
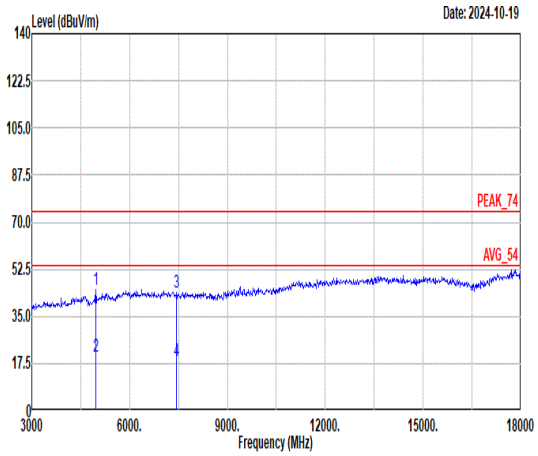
Mode	1	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	17	
Pol.	Vertical	Fundamental
Peak	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 2316.07 43.59 74.00 -30.41 41.73 30.75 4.72 33.61 200 227 PEAK 2 2316.07 18.80 54.00 -35.20 16.94 30.75 4.72 33.61 200 227 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 2402.00 100.83 ------ ------ 98.96 30.62 4.81 33.56 200 227 PEAK 2 2402.00 76.04 ------ ------ 74.17 30.62 4.81 33.56 200 227 AVERAGE

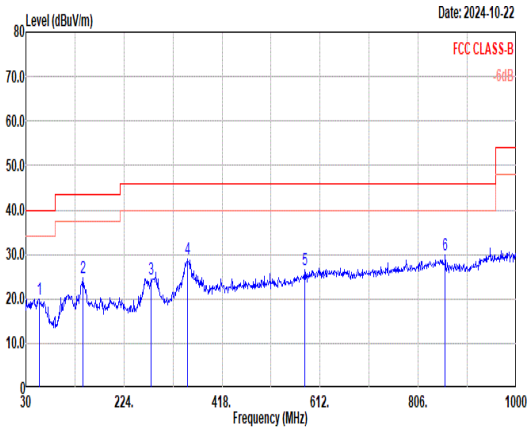
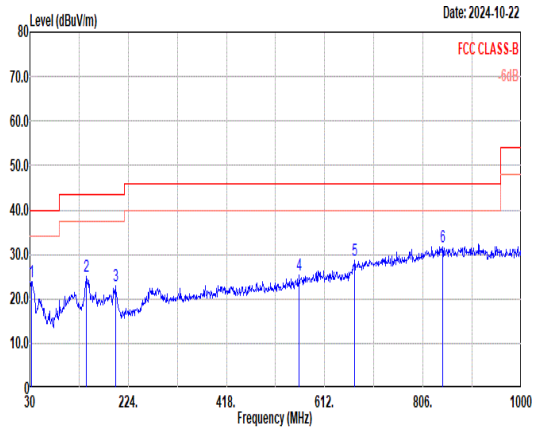
Mode	1	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH00_2402MHz	
ANT	17	
Pol.	Horizontal	Horizontal
Peak Avg	 Freq Level Limit Line Margin Read Level Ant Factor Cable Loss Preamp Factor APos TPos Remark MHz dBuV/m dBuV/m dB dBuV dB/m dB dB cm deg 1 4804.00 43.27 74.00 -30.73 66.52 34.23 7.74 65.22 -- -- Peak 2 4804.00 18.48 54.00 -35.52 41.73 34.23 7.74 65.22 -- -- 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 4804.00 43.27 74.00 -30.73 66.52 34.23 7.74 65.22 -- -- Peak 2 4804.00 18.48 54.00 -35.52 41.73 34.23 7.74 65.22 -- -- Average

Mode	2	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH39_2441MHz	
ANT	17	
Pol.	Horizontal	Horizontal
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 41.08 74.00 -32.92 64.22 34.34 7.77 65.25 -- -- Peak 2 4882.00 16.29 74.00 -57.71 39.43 34.34 7.77 65.25 -- -- Average 3 7323.00 42.75 54.00 -11.25 62.99 35.43 8.97 64.64 -- -- Peak 4 7323.00 17.96 54.00 -36.04 38.20 35.43 8.97 64.64 -- -- 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 4882.00 41.08 74.00 -32.92 64.22 34.34 7.77 65.25 -- -- Peak 2 4882.00 16.29 74.00 -57.71 39.43 34.34 7.77 65.25 -- -- Average 3 7323.00 42.75 54.00 -11.25 62.99 35.43 8.97 64.64 -- -- Peak 4 7323.00 17.96 54.00 -36.04 38.20 35.43 8.97 64.64 -- -- Average

Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	17	
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 51.08 74.00 -22.92 48.82 30.85 4.92 33.51 374 0 PEAK 2 2483.54 26.29 54.00 -27.71 24.03 30.85 4.92 33.51 374 0 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 2480.00 107.05 ------ ------ 104.80 30.84 4.92 33.51 374 0 PEAK 2 2480.00 82.26 ------ ------ 80.01 30.84 4.92 33.51 374 0 AVERAGE

Mode	3	
	Band Edge	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	17	
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 47.83 74.00 -26.17 45.57 30.85 4.92 33.51 400 246 PEAK 2 2483.78 23.04 54.00 -30.96 20.78 30.85 4.92 33.51 400 246 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 2480.00 101.82 ------ ------ 99.57 30.84 4.92 33.51 400 246 PEAK 2 2480.00 77.03 ------ ------ 74.78 30.84 4.92 33.51 400 246 AVERAGE

Mode	3	
	Harmonic	
	2400-2483.5_Bluetooth BR_GFSK_CH78_2480MHz	
ANT	17	
Pol.	Horizontal	Horizontal
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 44.98 74.00 -29.02 68.01 34.45 7.81 65.29 -- -- Peak 2 4960.00 20.19 74.00 -53.81 43.22 34.45 7.81 65.29 -- -- Average 3 7440.00 43.61 54.00 -10.39 63.55 35.41 9.19 64.54 -- -- Peak 4 7440.00 18.63 54.00 -35.37 38.57 35.41 9.19 64.54 -- -- 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 4960.00 44.98 74.00 -29.02 68.01 34.45 7.81 65.29 -- -- Peak 2 4960.00 20.19 74.00 -53.81 43.22 34.45 7.81 65.29 -- -- Average 3 7440.00 43.61 54.00 -10.39 63.55 35.41 9.19 64.54 -- -- Peak 4 7440.00 18.63 54.00 -35.37 38.57 35.41 9.19 64.54 -- -- Average

Mode	4	
	LF	
	2400-2483.5_Bluetooth BR_GFSK-LF_CH78_2480MHz	
ANT	17	
Pol.	Horizontal	Vertical
QP/ Peak		

Horizontal:

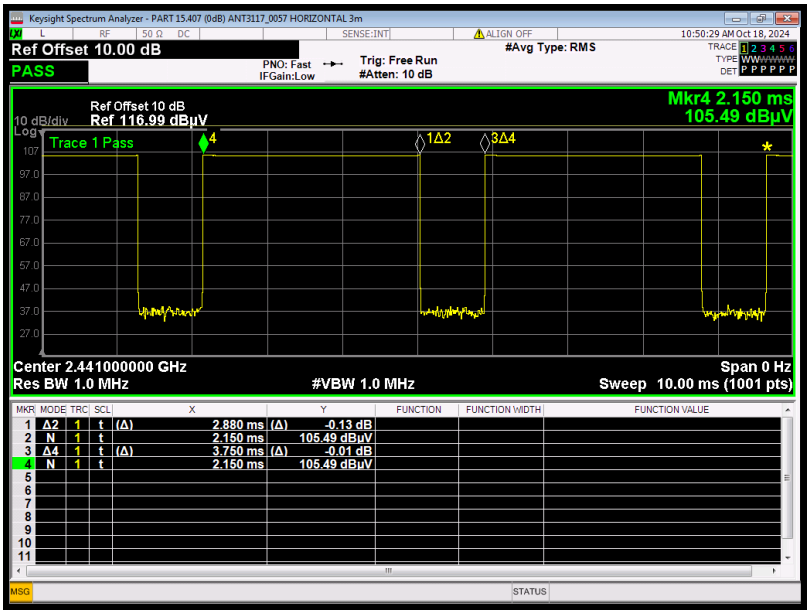
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	56.19	20.05	40.00	-19.95	34.93	19.26	0.76	34.90	--	--	Peak
2	142.52	24.81	43.50	-18.69	39.93	18.35	1.25	34.72	--	--	Peak
3	278.32	24.54	46.00	-21.46	39.00	18.45	1.73	34.64	--	--	Peak
4	349.13	28.91	46.00	-17.09	41.37	20.20	1.94	34.60	--	--	Peak
5	580.96	26.61	46.00	-19.39	33.25	25.36	2.56	34.56	--	--	Peak
6	859.35	29.78	46.00	-16.22	32.20	28.77	3.11	34.30	--	--	Peak

Vertical:

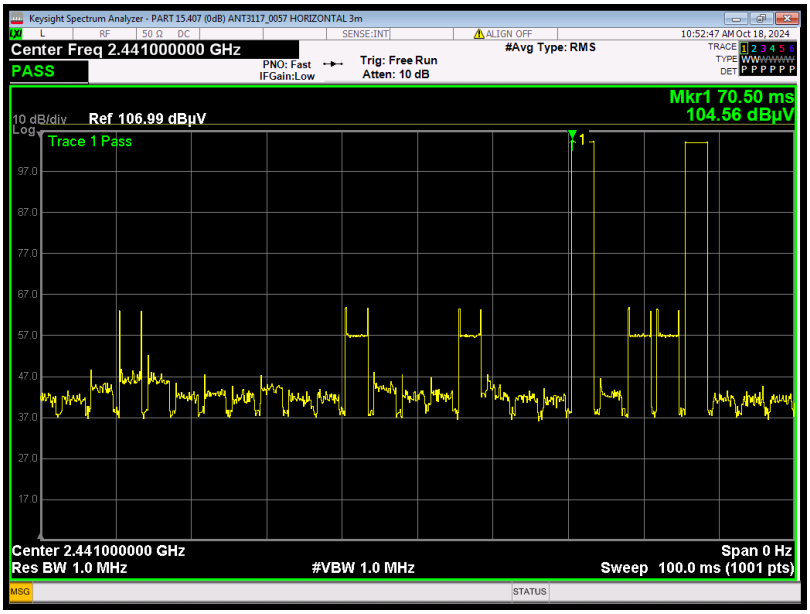
	Freq	Level	Limit Line	Margin	Read Level	Ant Factor	Cable Loss	Preamp Factor	APos	TPos	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	dB	dB	cm	deg	
1	33.88	23.98	40.00	-16.02	39.82	18.46	0.57	34.87	--	--	Peak
2	141.55	25.03	43.50	-18.47	40.23	18.27	1.25	34.72	--	--	Peak
3	198.78	22.84	43.50	-20.66	40.01	16.05	1.48	34.70	--	--	Peak
4	561.56	25.41	46.00	-20.59	32.78	24.63	2.52	34.52	--	--	Peak
5	671.17	28.82	46.00	-17.18	33.92	26.61	2.75	34.46	--	--	Peak
6	844.80	31.81	46.00	-14.19	34.31	28.71	3.09	34.30	--	--	Peak

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.