

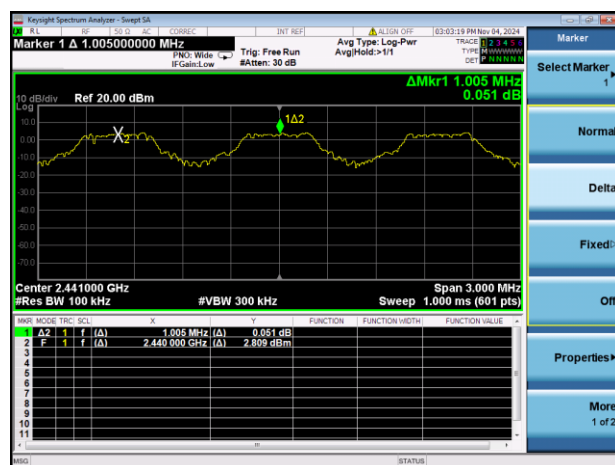
A.4 Hopping Frequency Separation

Test Data

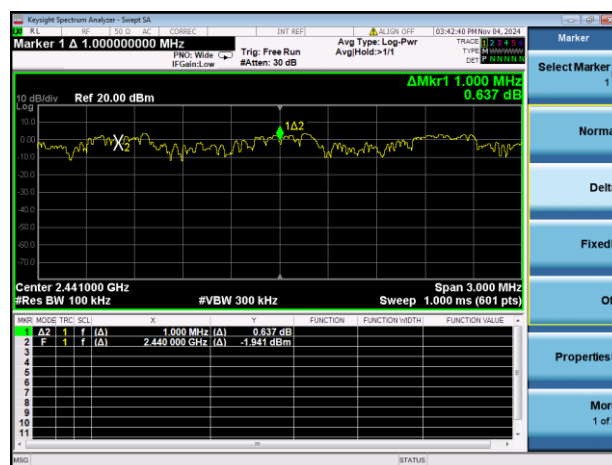
Mode	Frequency separation (MHz)	2/3 of the 20 dB Bandwidth (MHz)	Verdict
GFSK	1.005	0.595	Pass
8-DPSK	1.000	0.810	Pass

Test Plots

GFSK



8-DPSK



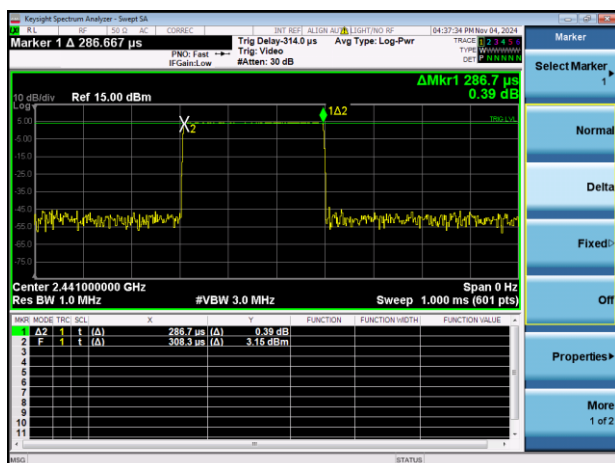
A.5 Average Time of Occupancy

Test Data

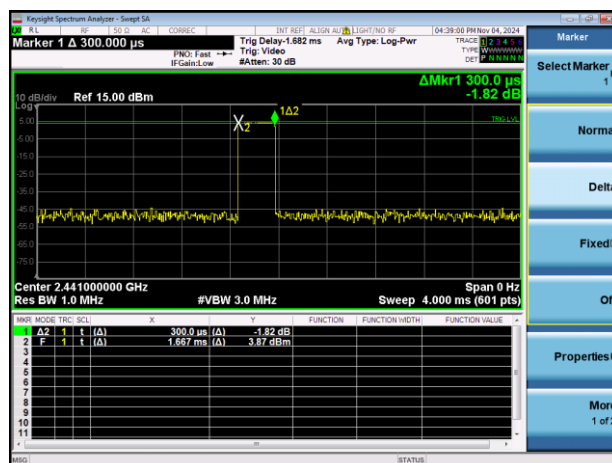
GFSK				
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.287	91.744	0.4	Pass
DH 3	0.300	48.000	0.4	Pass
DH 5	0.303	32.352	0.4	Pass
8-DPSK				
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
3DH 1	0.200	64.000	0.4	Pass
3DH 3	0.207	33.072	0.4	Pass
3DH 5	0.198	21.152	0.4	Pass
AFH Mode				
DH Packet	Pulse Width (ms)	Total of Dwell (ms)	Limit (sec)	Verdict
DH 1	0.293	46.928	0.4	Pass
DH 3	0.293	23.464	0.4	Pass
DH 5	0.303	16.176	0.4	Pass

Test Plots

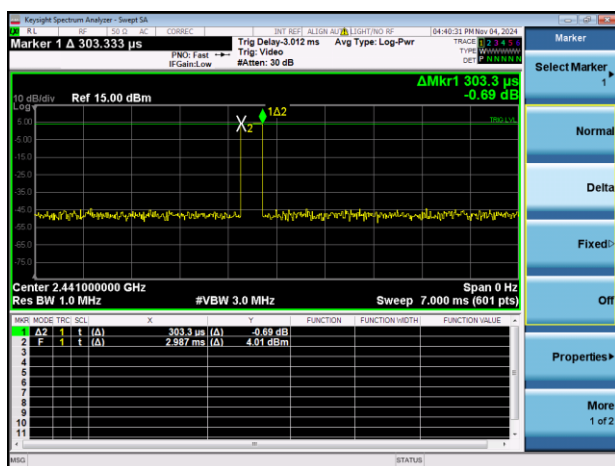
GFSK DH1



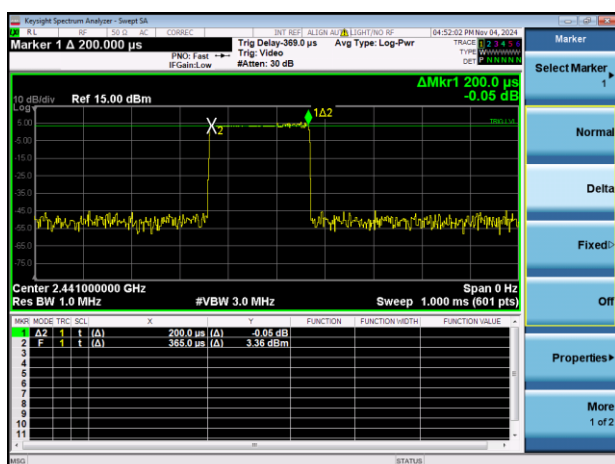
GFSK DH3



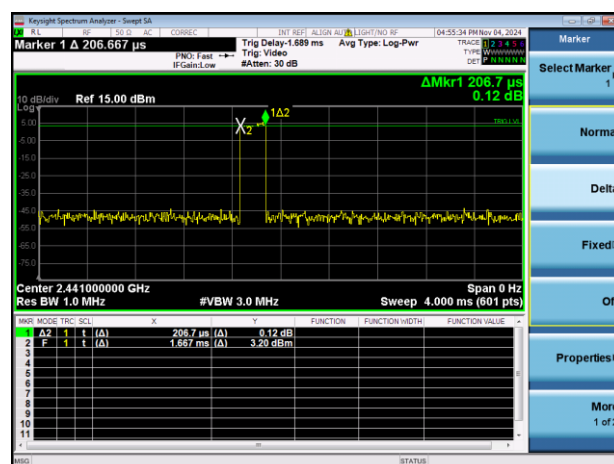
GFSK DH5



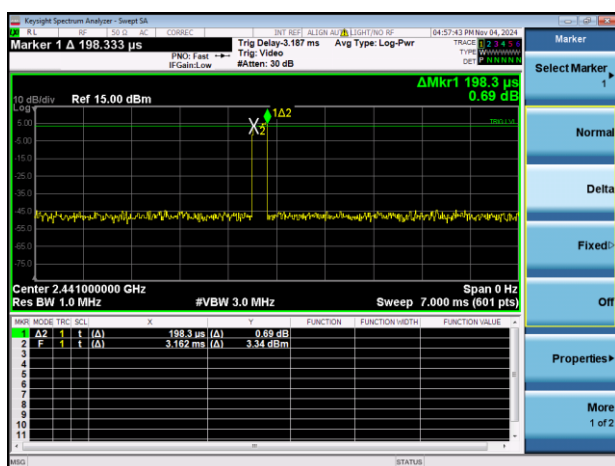
8-DPSK 3DH1



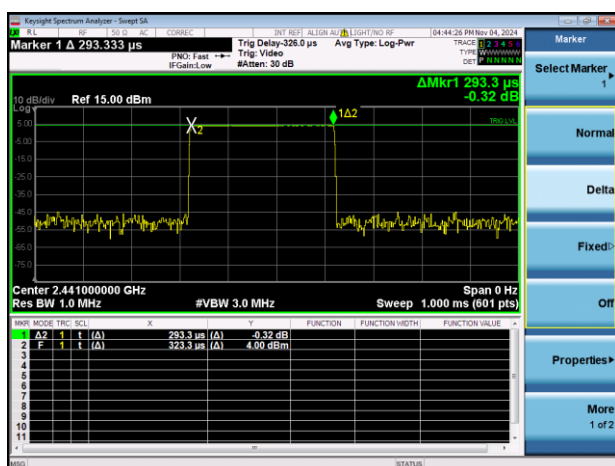
8-DPSK 3DH3



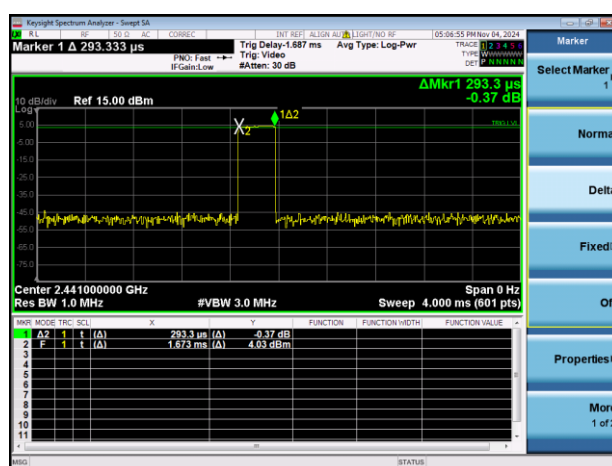
8-DPSK 3DH5



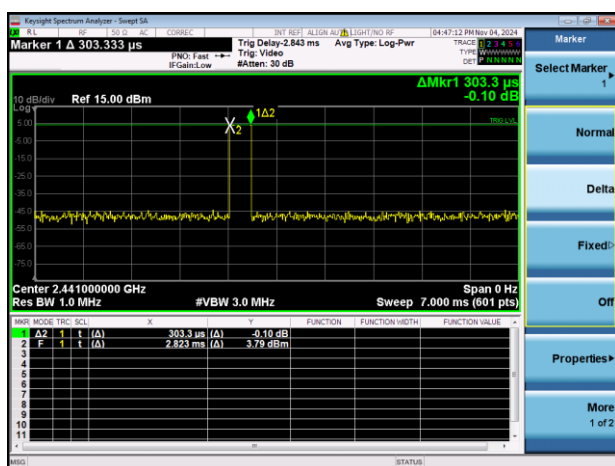
AFH Mode DH1



AFH Mode DH3



AFH Mode DH5



A.6 Conducted Spurious Emissions & Authorized-band band-edge

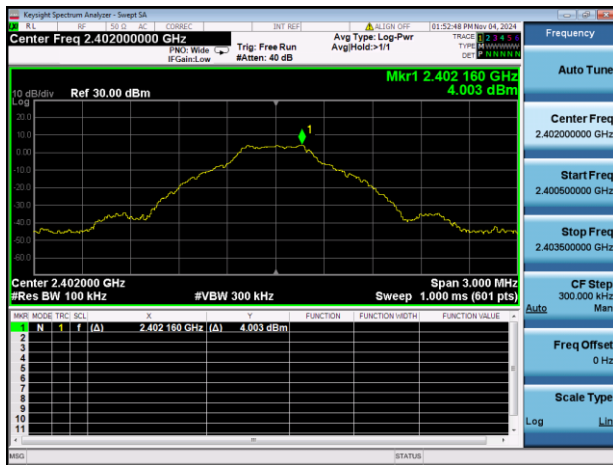
Test Data

GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-25.60	4.00	-16.00	Pass
Middle	-26.43	3.95	-16.05	Pass
High	-26.72	3.79	-16.21	Pass
8-DPSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-26.61	3.40	-16.60	Pass
Middle	-25.16	3.29	-16.71	Pass
High	-25.77	3.09	-16.91	Pass

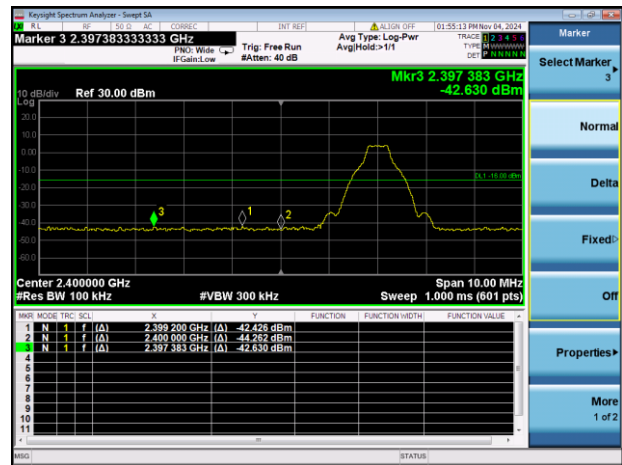
Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-25.63	4.10	-15.90	Pass
8-DPSK	-25.74	3.50	-16.50	Pass

Test Plots

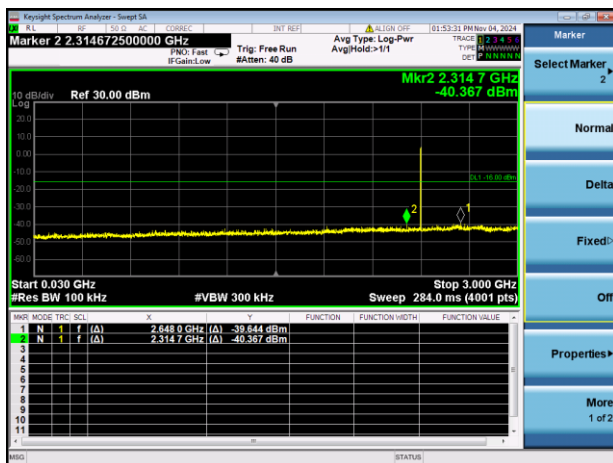
GFSK LOW CHANNEL, CARRIER LEVEL



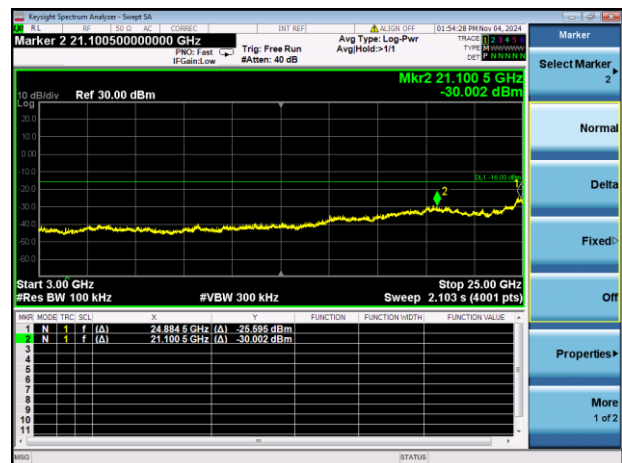
GFSK LOW CHANNEL, BAND EDGE



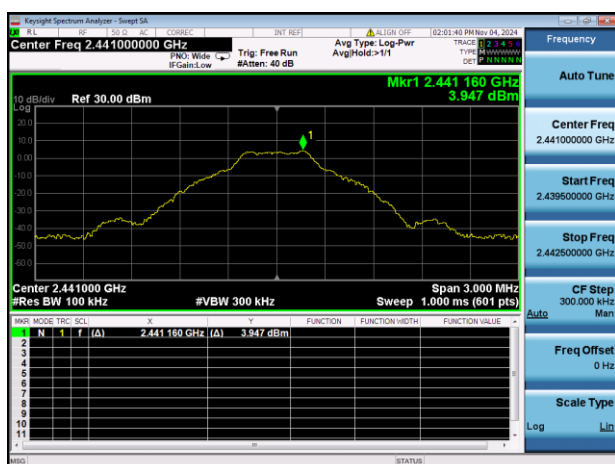
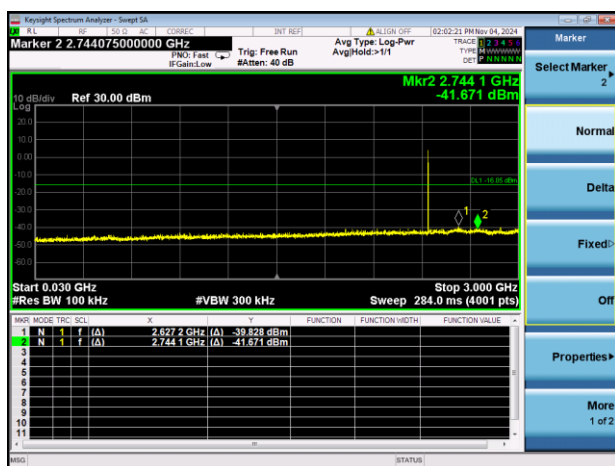
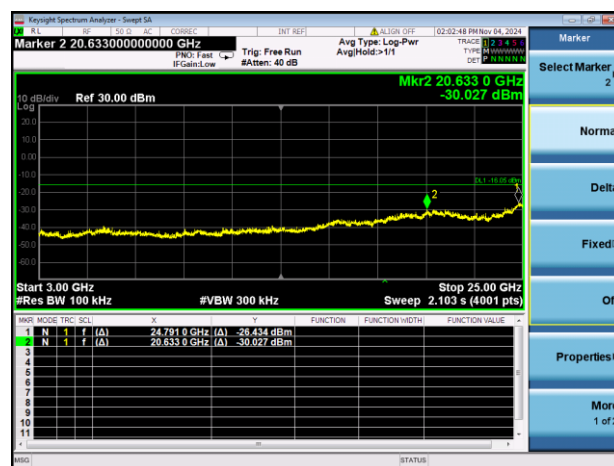
GFSK LOW CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



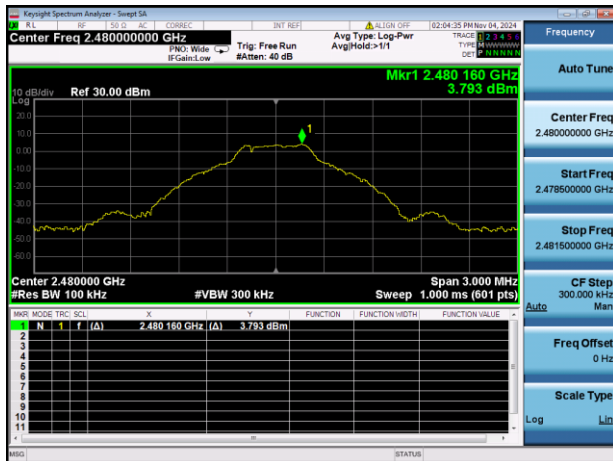
GFSK LOW CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



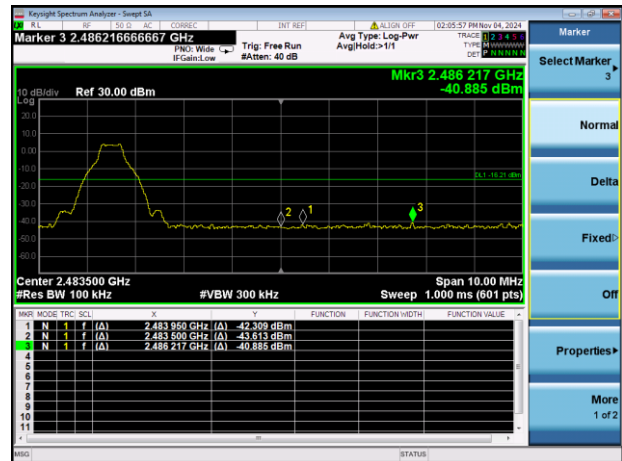
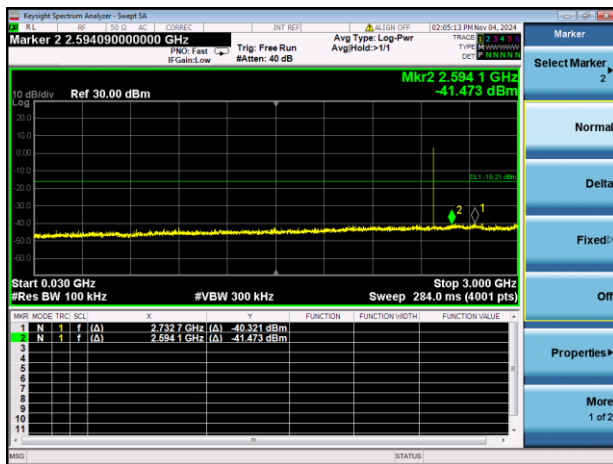
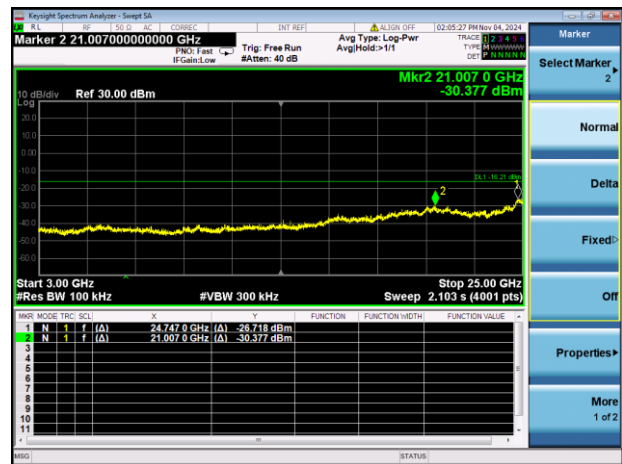
GFSK MIDDLE CHANNEL, CARRIER LEVEL

GFSK MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHzGFSK MIDDLE CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

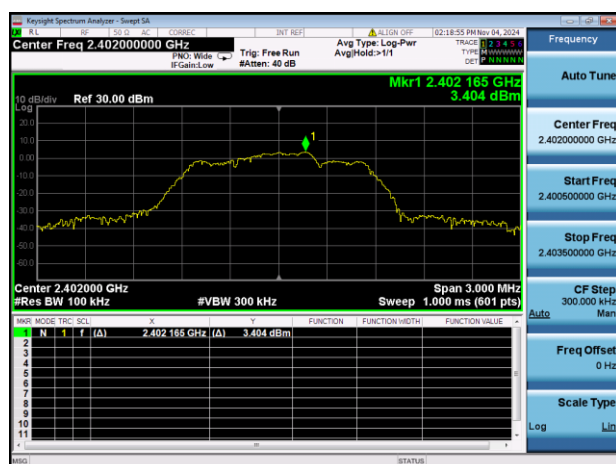
GFSK HIGH CHANNEL, CARRIER LEVEL



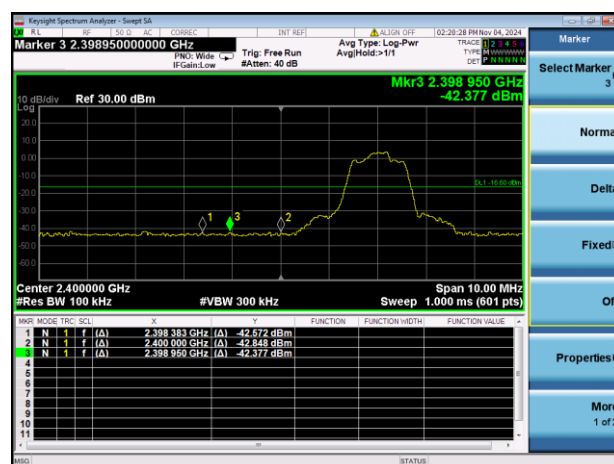
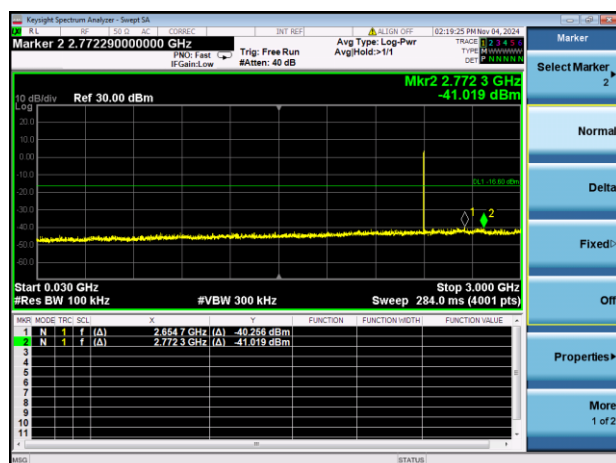
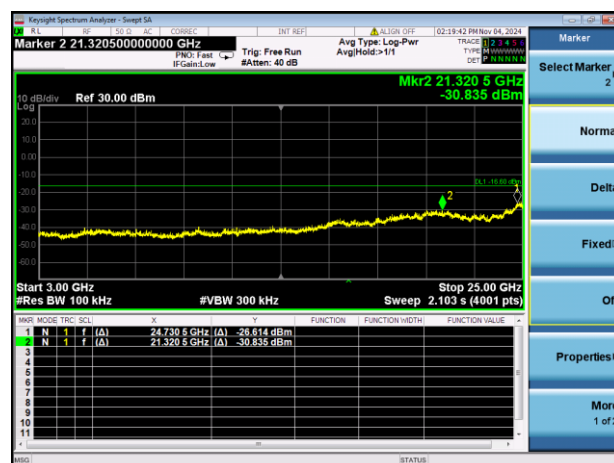
GFSK HIGH CHANNEL, BAND EDGE

GFSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHzGFSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

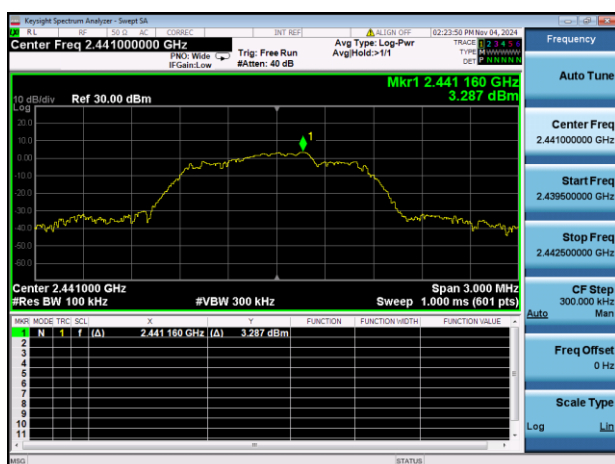
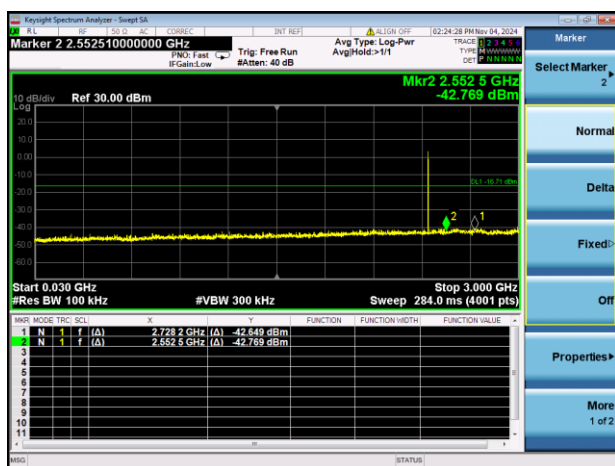
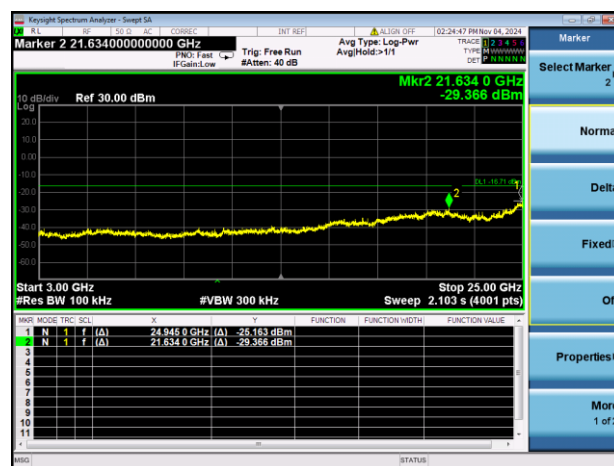
8-DPSK LOW CHANNEL, CARRIER LEVEL



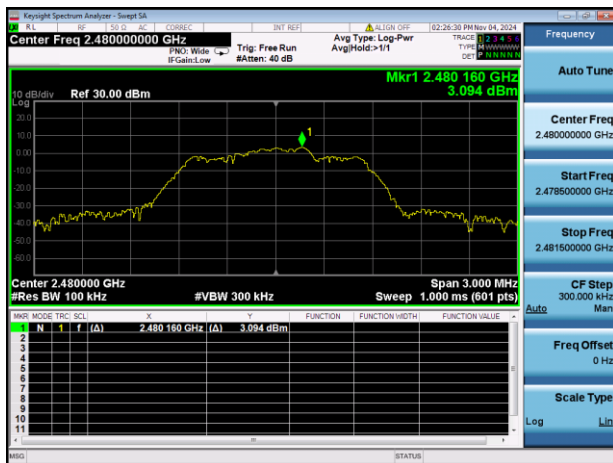
8-DPSK LOW CHANNEL, BAND EDGE

8-DPSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz8-DPSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

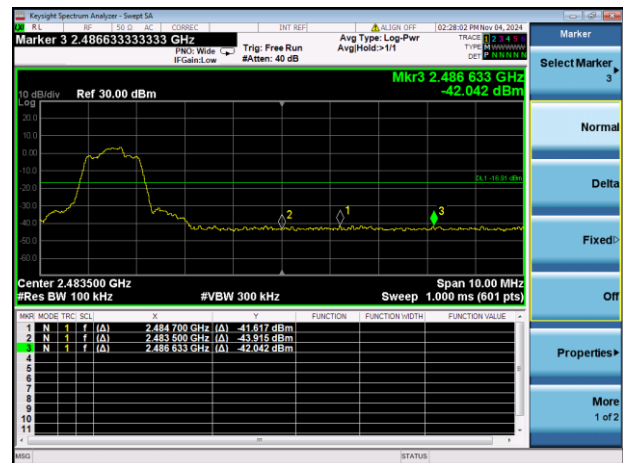
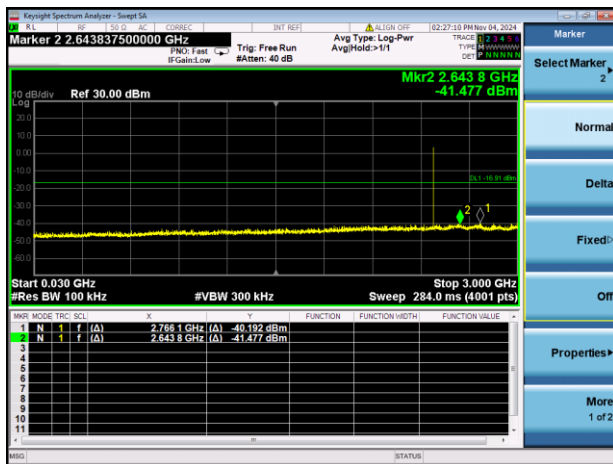
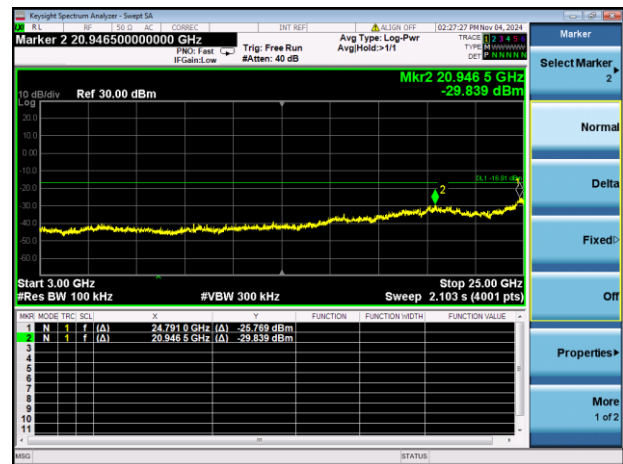
8-DPSK MIDDLE CHANNEL, CARRIER LEVEL

8-DPSK MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz8-DPSK MIDDLE CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

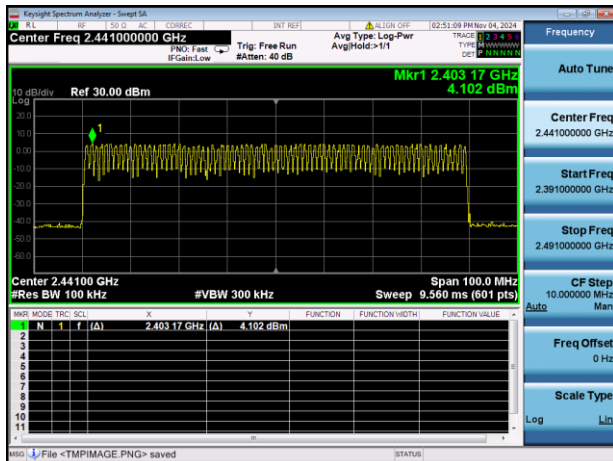
8-DPSK HIGH CHANNEL, CARRIER LEVEL



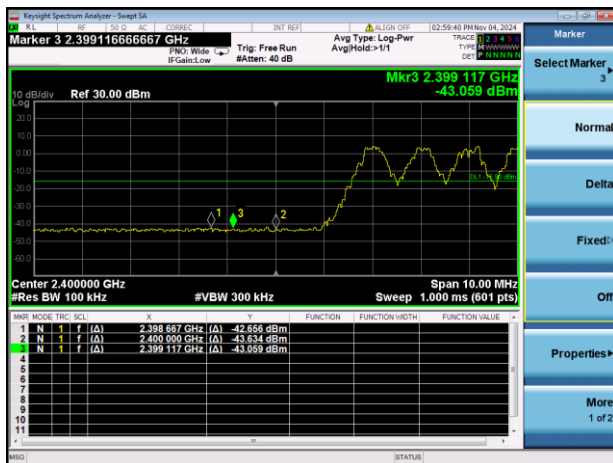
8-DPSK HIGH CHANNEL, BAND EDGE

8-DPSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz8-DPSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

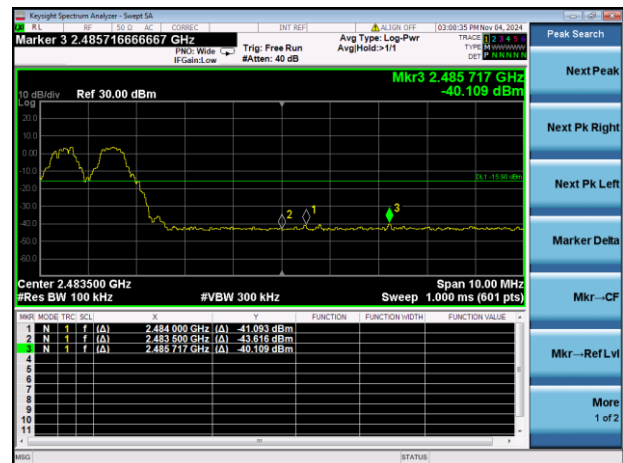
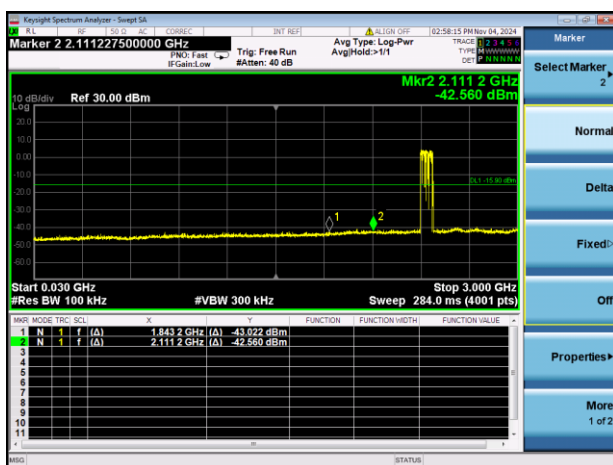
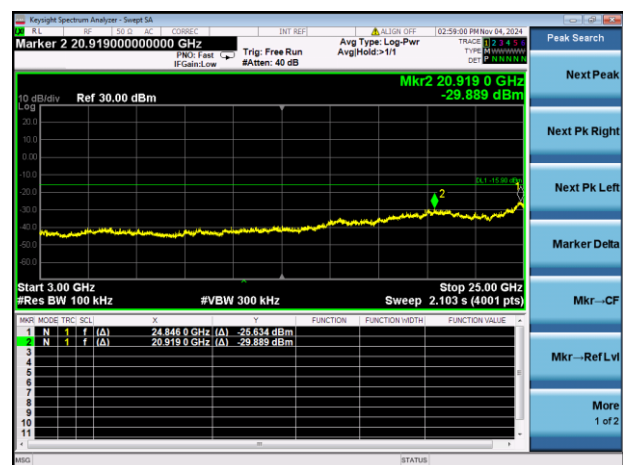
GFSK HOPPING, CARRIER LEVEL



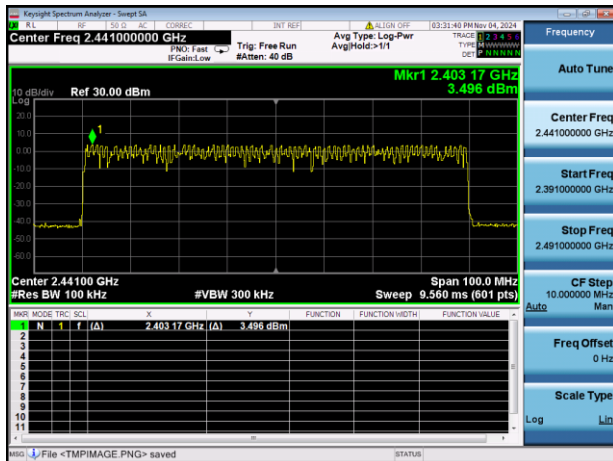
GFSK HOPPING BAND EDGE (LOW)



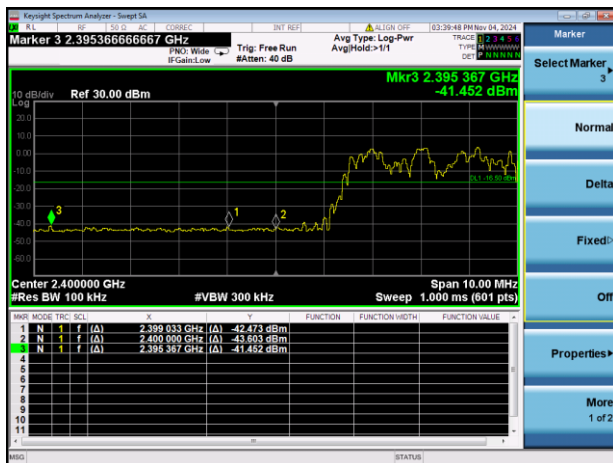
GFSK HOPPING BAND EDGE (HIGH)

GFSK Hopping Mode, SPURIOUS
30 MHz ~ 3 GHzGFSK Hopping Mode, SPURIOUS
3GHz ~ 25 GHz

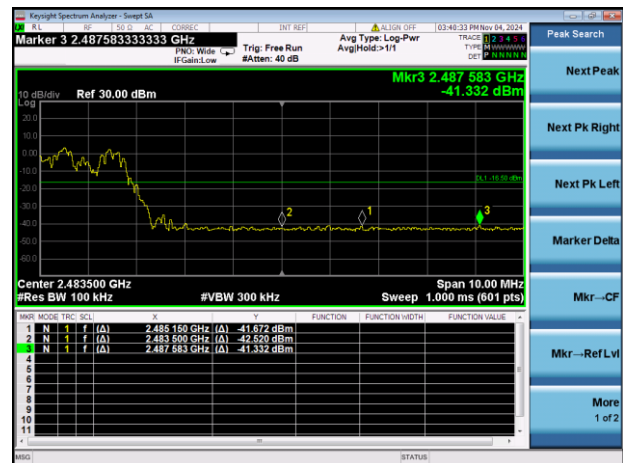
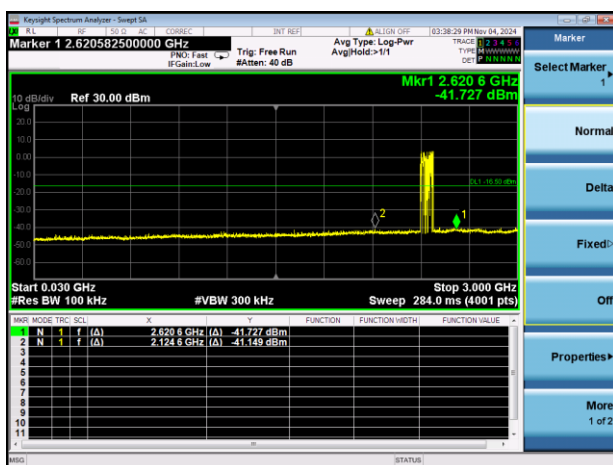
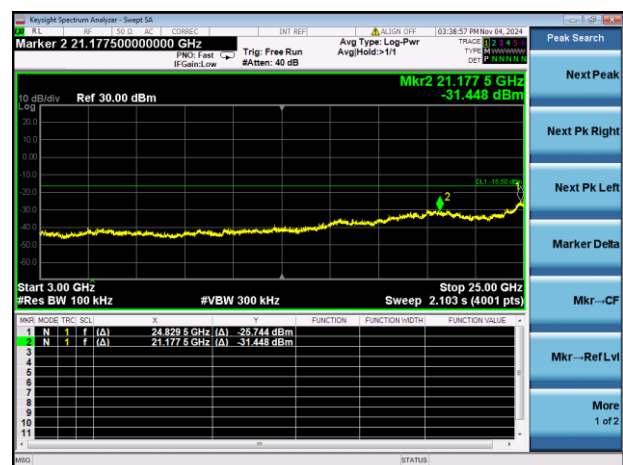
8-DPSK HOPPING, CARRIER LEVEL



8-DPSK Hopping BAND EDGE (LOW)



8-DPSK Hopping BAND EDGE (HIGH)

8-DPSK Hopping Mode, SPURIOUS
30 MHz ~ 3 GHz8-DPSK Hopping Mode, SPURIOUS
3GHz ~ 25 GHz

A.7 Conducted Emissions

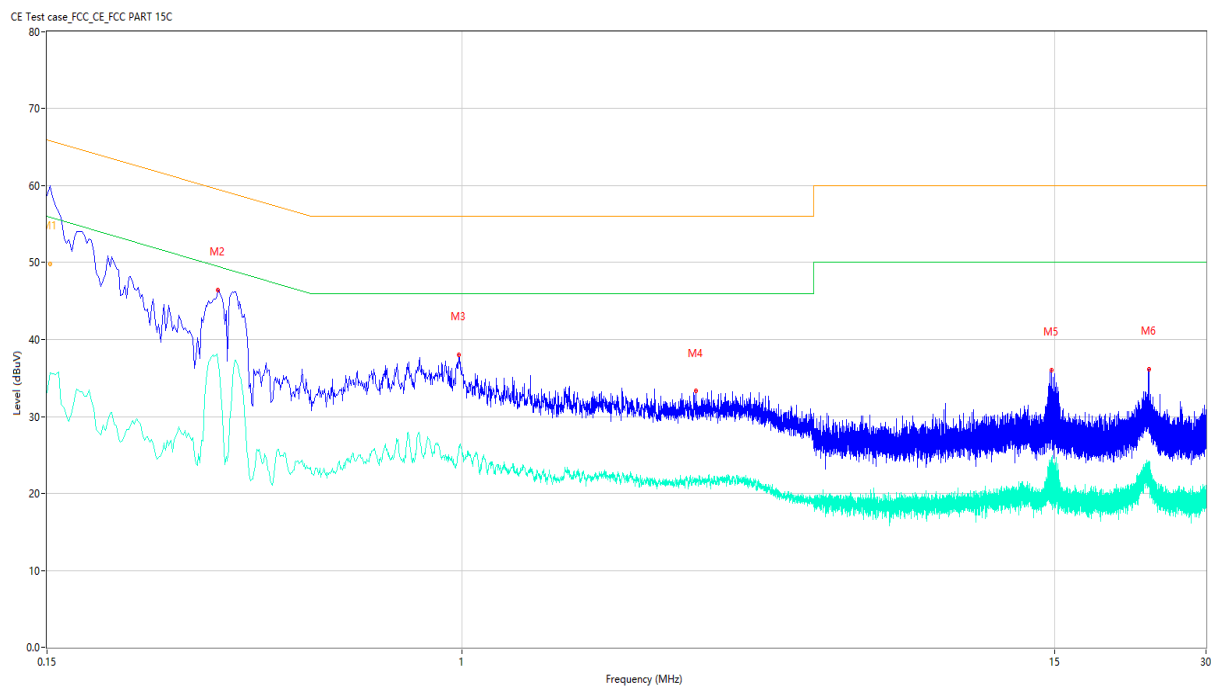
Note ¹: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

Note ²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Note ³: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

Test Data and Plots

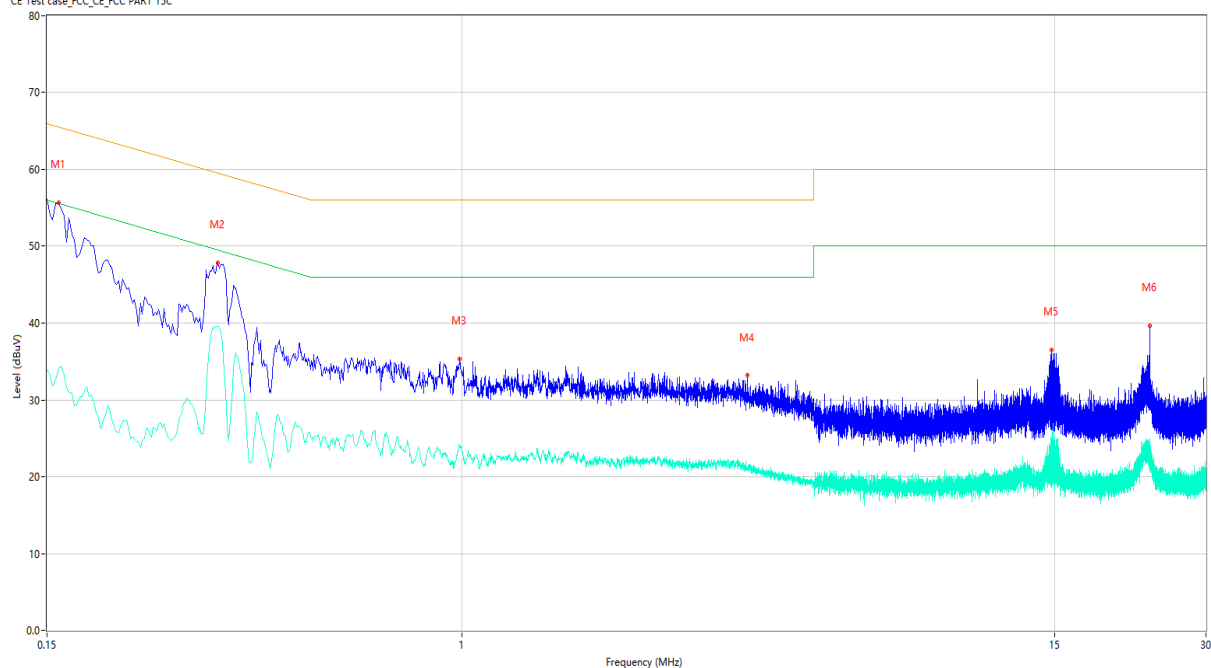
PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.152	54.87	9.75	65.89	11.02	Peak	L	Pass
1**	0.152	35.71	9.75	55.89	20.18	AV	L	Pass
2	0.328	46.42	9.74	59.50	13.08	Peak	L	Pass
2**	0.328	37.36	9.74	49.50	12.14	AV	L	Pass
3	0.984	38.04	9.70	56.00	17.96	Peak	L	Pass
3**	0.984	25.38	9.70	46.00	20.62	AV	L	Pass
4	2.910	33.28	9.67	56.00	22.72	Peak	L	Pass
4**	2.910	21.32	9.67	46.00	24.68	AV	L	Pass
5	14.802	36.07	9.26	60.00	23.93	Peak	L	Pass
5**	14.802	23.89	9.26	50.00	26.11	AV	L	Pass
6	23.100	36.17	8.88	60.00	23.83	Peak	L	Pass
6**	23.100	22.35	8.88	50.00	27.65	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.158	55.69	9.70	65.57	9.88	Peak	N	Pass
1**	0.158	34.14	9.70	55.57	21.43	AV	N	Pass
2	0.328	47.85	9.77	59.50	11.65	Peak	N	Pass
2**	0.328	39.59	9.77	49.50	9.91	AV	N	Pass
3	0.990	35.32	9.86	56.00	20.68	Peak	N	Pass
3**	0.990	23.87	9.86	46.00	22.13	AV	N	Pass
4	3.690	33.18	9.84	56.00	22.82	Peak	N	Pass
4**	3.690	21.04	9.84	46.00	24.96	AV	N	Pass
5	14.796	36.52	9.52	60.00	23.48	Peak	N	Pass
5**	14.796	23.19	9.52	50.00	26.81	AV	N	Pass
6	23.202	39.63	9.03	60.00	20.37	Peak	N	Pass
6**	23.202	23.04	9.03	50.00	26.96	AV	N	Pass

A.8 Radiated Spurious Emission

Note ¹: The symbol of "--" in the table which means not application.

Note ²: For the test data above 1 GHz, according the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note ³: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and DH5-Hopping mode is the worst.

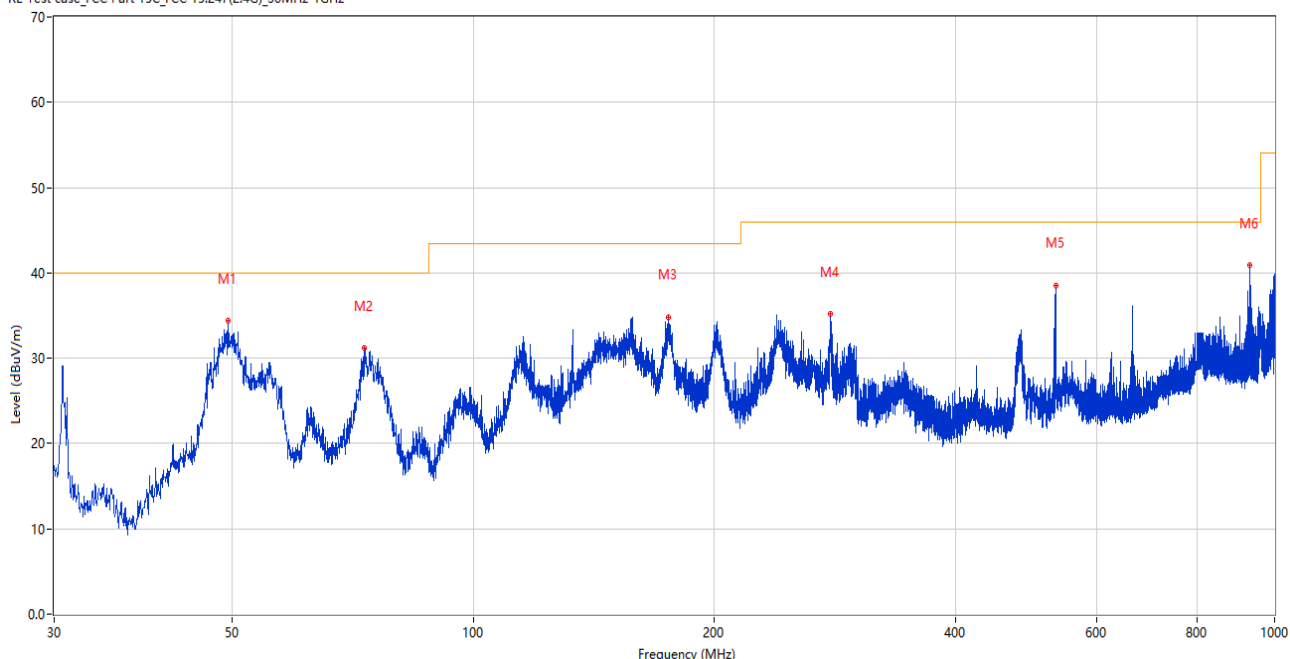
Note ⁴: Results (dBuV/m) = Original reading level of Spectrum Analyzer (dBuV/m) + Factor (dB)

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Test Data and Plots

30 MHz to 1 GHz, ANT H

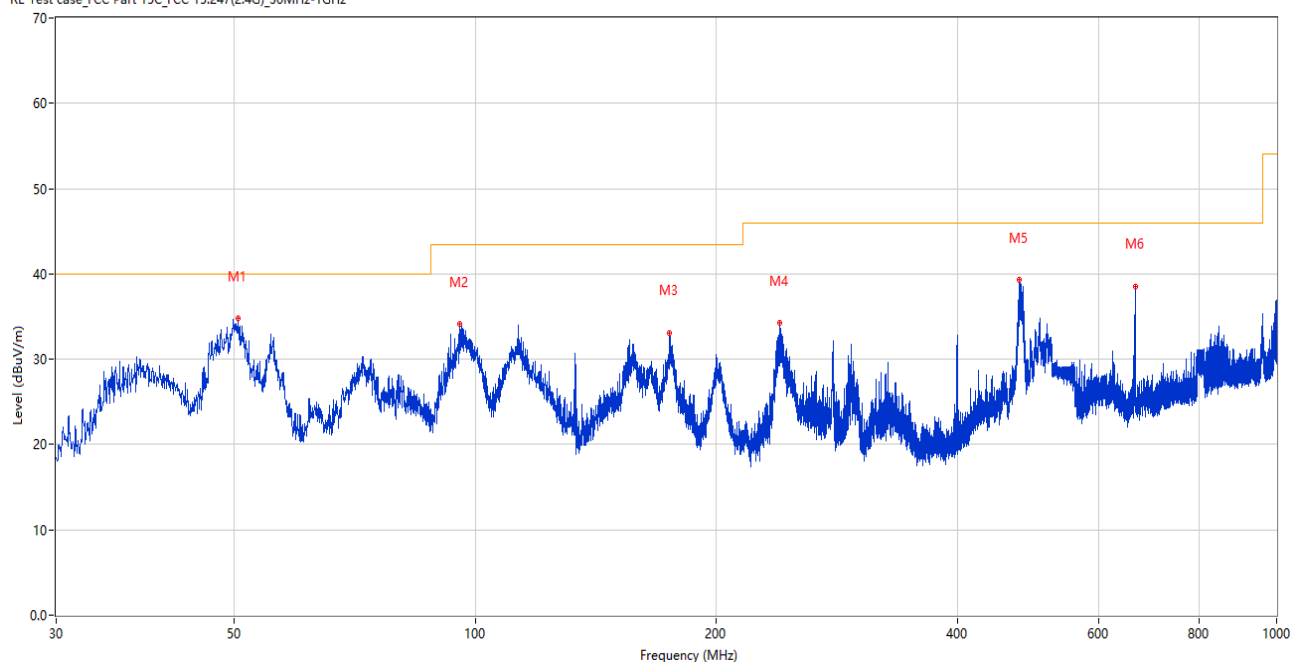
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	49.449	34.35	-24.53	40.0	5.65	Peak	35.00	200	Horizontal	Pass
2	73.214	31.15	-30.00	40.0	8.85	Peak	0.00	200	Horizontal	Pass
3	175.258	34.81	-28.24	43.5	8.69	Peak	82.00	100	Horizontal	Pass
4	279.241	35.20	-23.74	46.0	10.80	Peak	360.00	100	Horizontal	Pass
5	533.236	38.55	-17.34	46.0	7.45	Peak	359.00	200	Horizontal	Pass
6	930.742	40.85	-8.79	46.0	5.15	Peak	107.00	100	Horizontal	Pass

30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.247(2.4G)_30MHz-1GHz



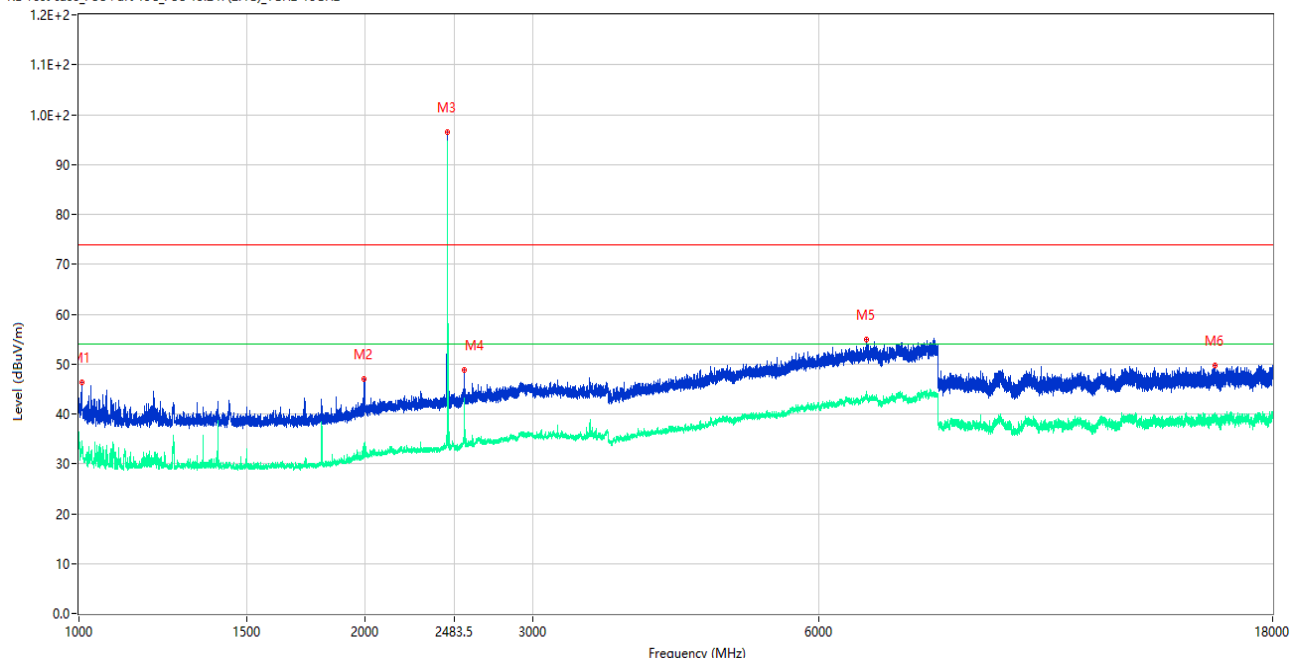
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	50.661	34.77	-24.56	40.0	5.23	Peak	300.00	100	Vertical	Pass
2	95.766	34.09	-26.57	43.5	9.41	Peak	243.00	100	Vertical	Pass
3	174.918	33.06	-28.23	43.5	10.44	Peak	274.00	100	Vertical	Pass
4	240.005	34.24	-24.48	46.0	11.76	Peak	360.00	100	Vertical	Pass
5	477.994	39.32	-18.74	46.0	6.68	Peak	16.00	100	Vertical	Pass
6	665.883	38.58	-14.38	46.0	7.42	Peak	105.00	200	Vertical	Pass

Note ¹: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental signal.

Note ²: The spurious from 18GHz-25GHz is noise only, do not show on the report.

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H

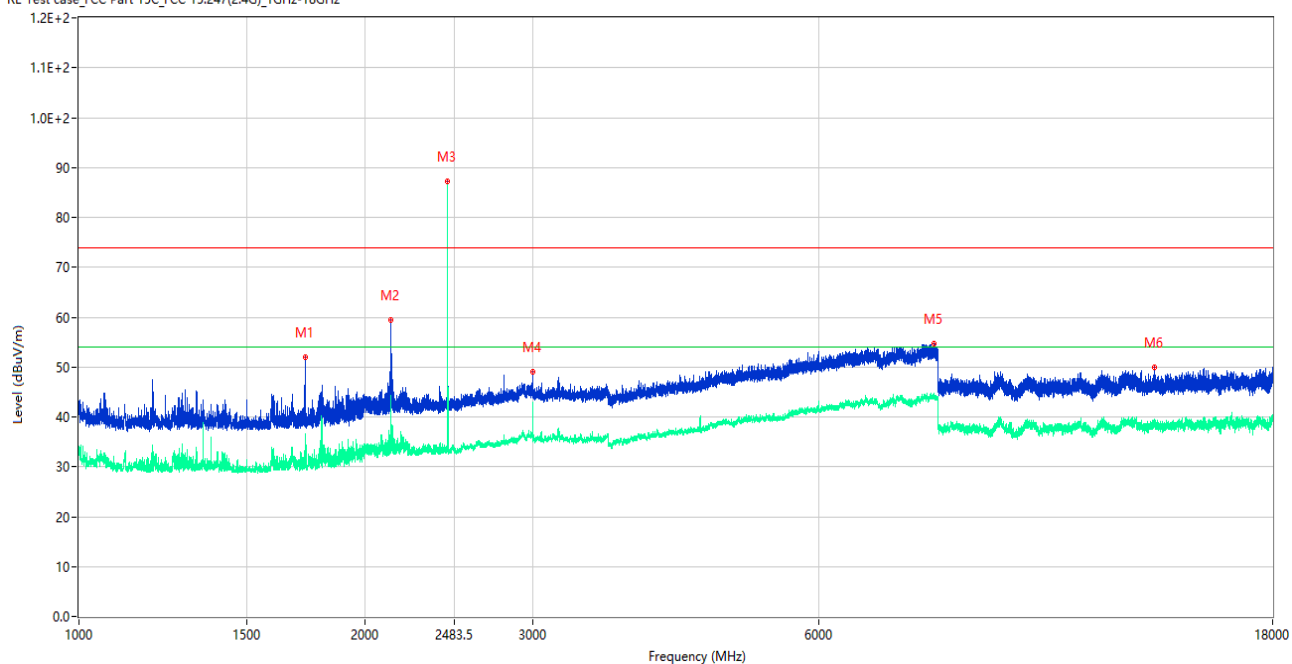
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1006.250	46.34	-13.32	74.0	27.66	Peak	194.00	150	Horizontal	Pass
1**	1006.250	32.82	-13.32	54.0	21.18	AV	194.00	150	Horizontal	Pass
2	1993.250	47.01	-13.42	74.0	26.99	Peak	168.00	150	Horizontal	Pass
2**	1993.250	31.57	-13.42	54.0	22.43	AV	168.00	150	Horizontal	Pass
3	2440.750	96.58	-11.38	74.0	-22.58	Peak	231.00	150	Horizontal	N/A
3**	2440.750	94.29	-11.38	54.0	-40.29	AV	231.00	150	Horizontal	N/A
4	2542.250	48.72	-9.98	74.0	25.28	Peak	241.00	150	Horizontal	Pass
4**	2542.250	41.70	-9.98	54.0	12.30	AV	241.00	150	Horizontal	Pass
5	6726.000	54.98	2.52	74.0	19.02	Peak	21.00	150	Horizontal	Pass
5**	6726.000	44.43	2.52	54.0	9.57	AV	21.00	150	Horizontal	Pass
6	15669.500	49.75	1.73	74.0	24.25	Peak	69.00	150	Horizontal	Pass
6**	15669.500	38.83	1.73	54.0	15.17	AV	69.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V

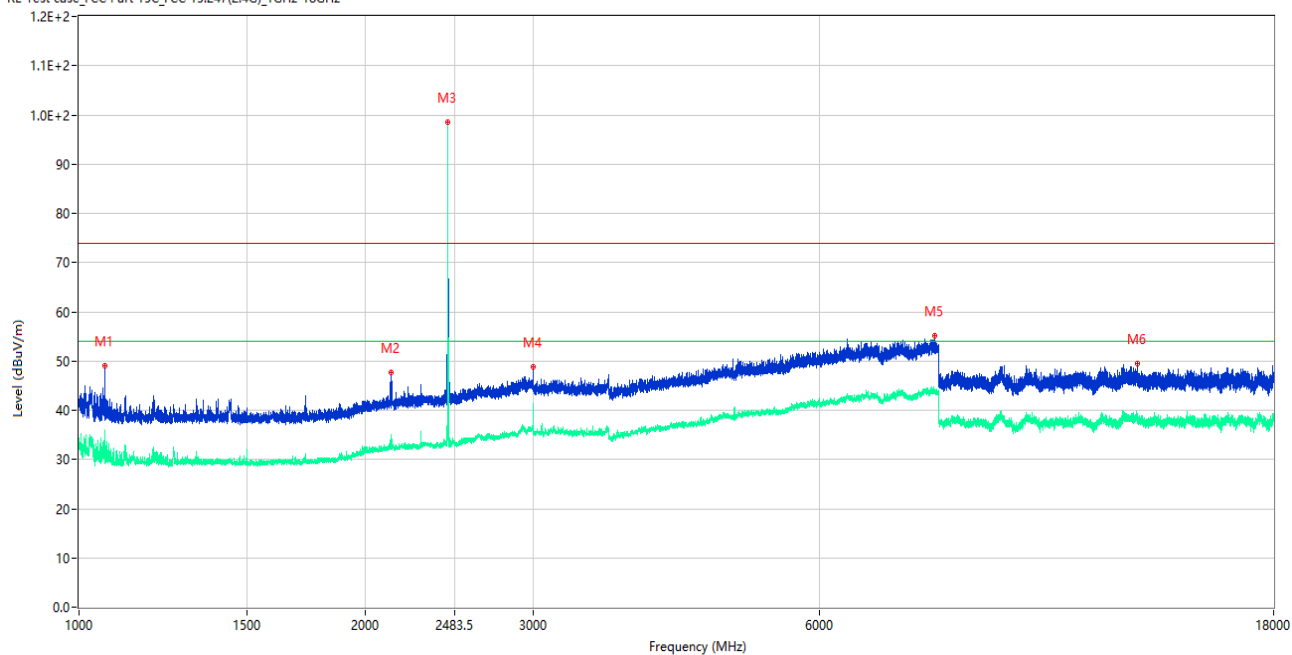
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1732.000	51.94	-15.09	74.0	22.06	Peak	115.00	150	Vertical	Pass
1**	1732.000	34.64	-15.09	54.0	19.36	AV	115.00	150	Vertical	Pass
2	2127.750	59.34	-11.99	74.0	14.66	Peak	125.00	150	Vertical	Pass
2**	2127.750	35.43	-11.99	54.0	18.57	AV	125.00	150	Vertical	Pass
3	2441.250	87.17	-11.41	74.0	-13.17	Peak	70.00	150	Vertical	N/A
3**	2441.250	86.81	-11.41	54.0	-32.81	AV	70.00	150	Vertical	N/A
4	2999.750	49.09	-7.46	74.0	24.91	Peak	101.00	150	Vertical	Pass
4**	2999.750	41.18	-7.46	54.0	12.82	AV	101.00	150	Vertical	Pass
5	7937.000	54.69	3.58	74.0	19.31	Peak	0.00	150	Vertical	Pass
5**	7937.000	43.91	3.58	54.0	10.09	AV	0.00	150	Vertical	Pass
6	13525.000	49.85	0.42	74.0	24.15	Peak	350.00	150	Vertical	Pass
6**	13525.000	38.83	0.42	54.0	15.17	AV	350.00	150	Vertical	Pass

8-DPSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H

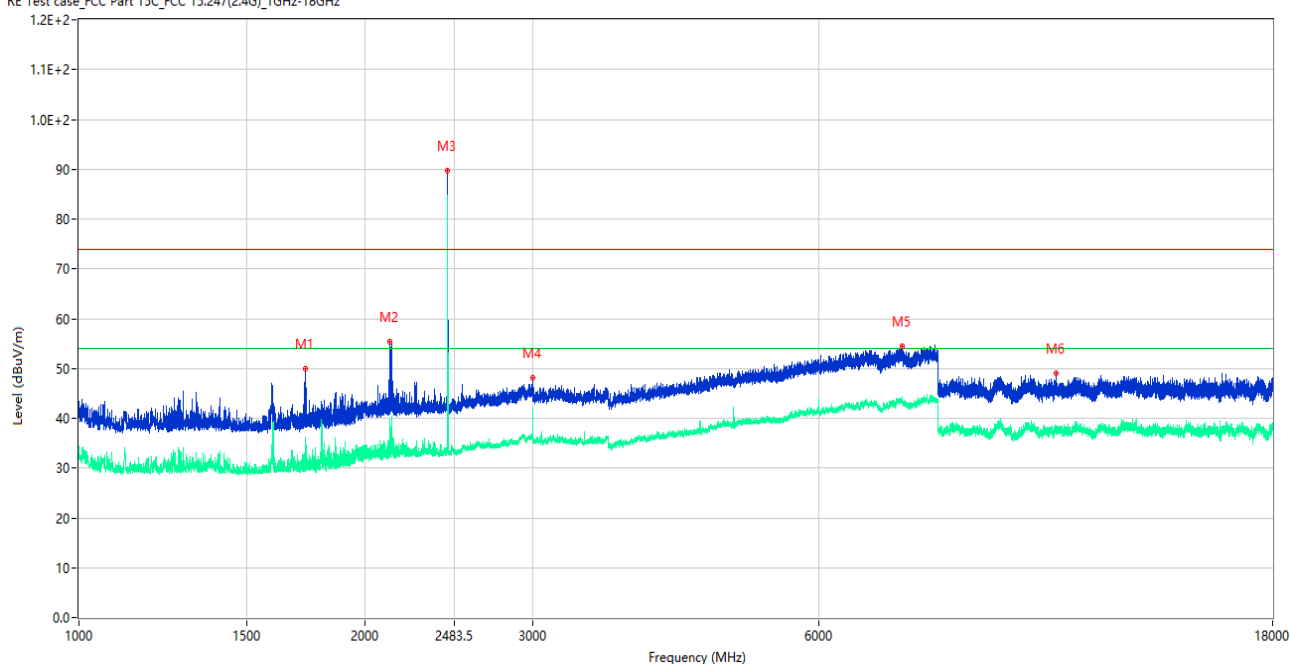
RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1064.000	49.10	-14.28	74.0	24.90	Peak	166.00	150	Horizontal	Pass
1**	1064.000	30.38	-14.28	54.0	23.62	AV	166.00	150	Horizontal	Pass
2	2128.500	47.63	-11.99	74.0	26.37	Peak	88.00	150	Horizontal	Pass
2**	2128.500	32.43	-11.99	54.0	21.57	AV	88.00	150	Horizontal	Pass
3	2441.500	98.58	-11.41	74.0	-24.58	Peak	161.00	150	Horizontal	N/A
3**	2441.500	97.37	-11.41	54.0	-43.37	AV	161.00	150	Horizontal	N/A
4	2999.500	48.74	-7.46	74.0	25.26	Peak	41.00	150	Horizontal	Pass
4**	2999.500	39.24	-7.46	54.0	14.76	AV	41.00	150	Horizontal	Pass
5	7927.500	55.22	3.77	74.0	18.78	Peak	15.00	150	Horizontal	Pass
5**	7927.500	43.76	3.77	54.0	10.24	AV	15.00	150	Horizontal	Pass
6	12934.000	49.46	0.65	74.0	24.54	Peak	98.00	150	Horizontal	Pass
6**	12934.000	39.02	0.65	54.0	14.98	AV	98.00	150	Horizontal	Pass

8-DPSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.247(2.4G)_1GHz-18GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1732.000	49.92	-15.09	74.0	24.08	Peak	112.00	150	Vertical	Pass
1**	1732.000	29.99	-15.09	54.0	24.01	AV	112.00	150	Vertical	Pass
2	2124.750	55.27	-12.04	74.0	18.73	Peak	94.00	150	Vertical	Pass
2**	2124.750	33.90	-12.04	54.0	20.10	AV	94.00	150	Vertical	Pass
3	2440.500	89.71	-11.38	74.0	-15.71	Peak	117.00	150	Vertical	N/A
3**	2440.500	84.73	-11.38	54.0	-30.73	AV	117.00	150	Vertical	N/A
4	2999.500	48.15	-7.46	74.0	25.85	Peak	139.00	150	Vertical	Pass
4**	2999.500	39.88	-7.46	54.0	14.12	AV	139.00	150	Vertical	Pass
5	7332.500	54.49	2.81	74.0	19.51	Peak	0.00	150	Vertical	Pass
5**	7332.500	43.75	2.81	54.0	10.25	AV	0.00	150	Vertical	Pass
6	10644.500	49.01	-1.35	74.0	24.99	Peak	173.00	150	Vertical	Pass
6**	10644.500	38.43	-1.35	54.0	15.57	AV	173.00	150	Vertical	Pass

A.9 Band Edge (Restricted-band band-edge)

Note ¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

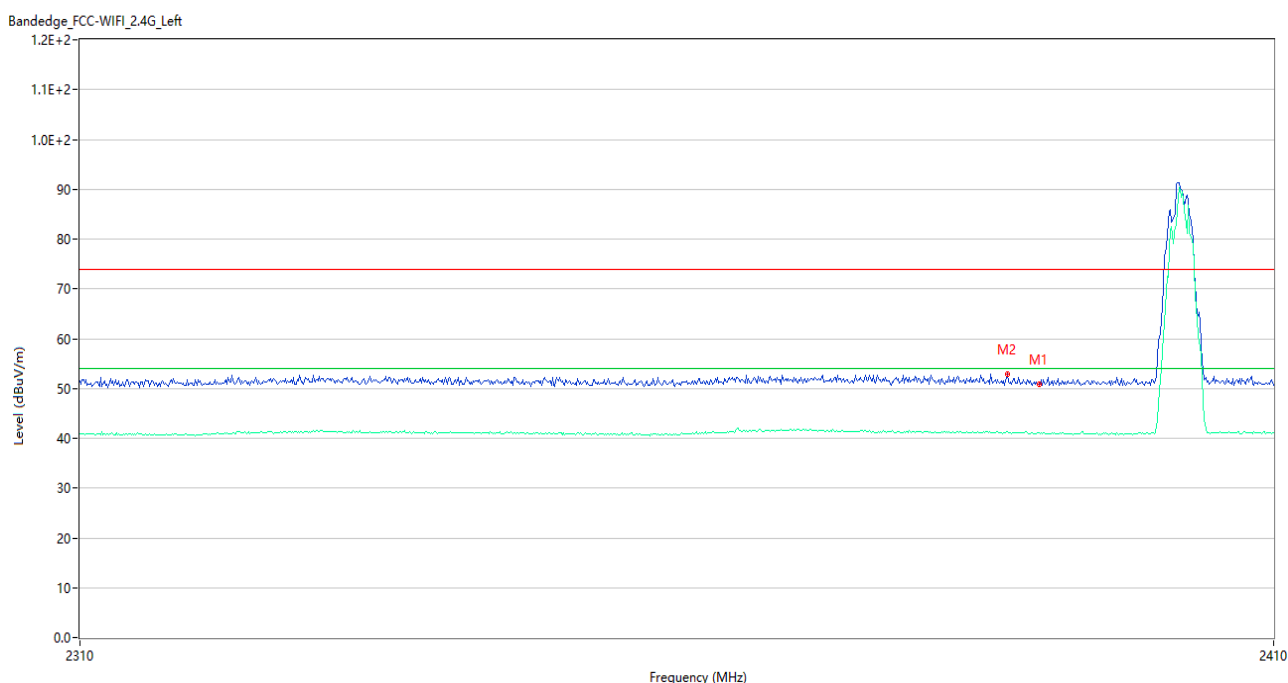
Note ²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

Note ³: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note ⁴: The Level (dBuV/m) has been corrected by factor.

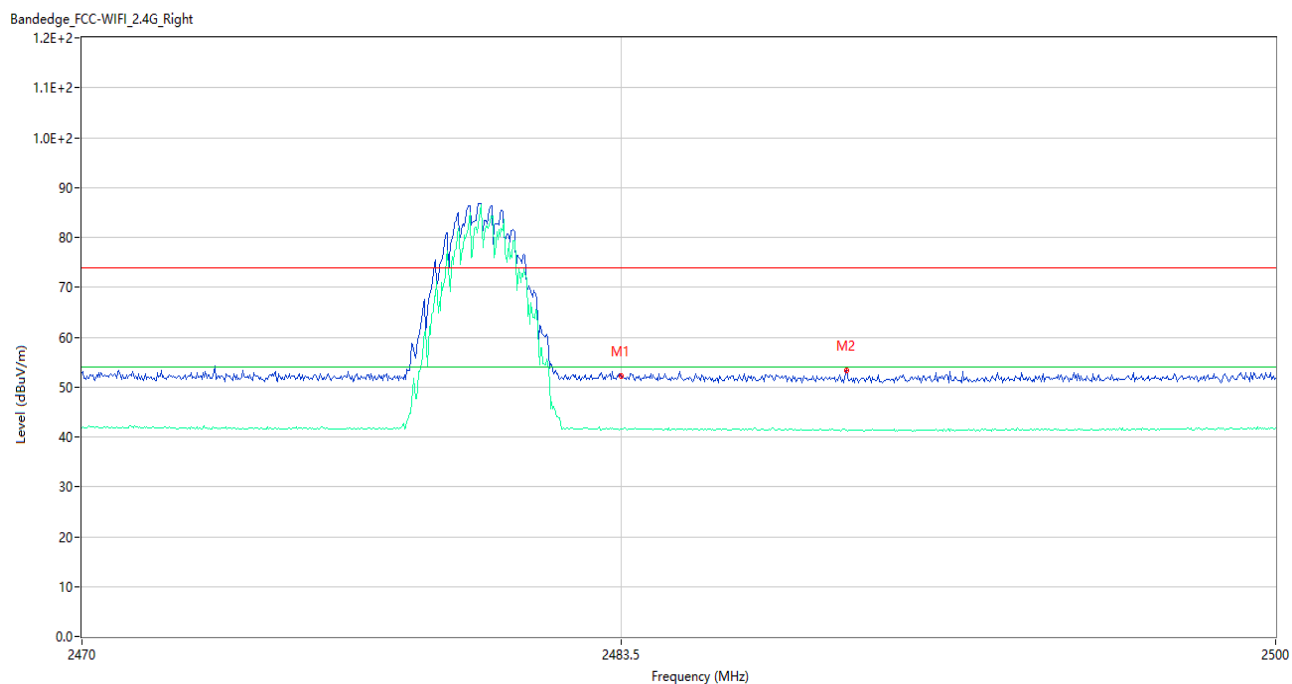
Test Data and Plots

GFSK LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2390.000	50.89	-3.73	74.0	23.11	Peak	197.16	150	Vertical	Pass
1**	2390.000	41.06	-3.73	54.0	12.94	AV	197.16	150	Vertical	Pass
2	2387.300	52.79	-3.58	74.0	21.21	Peak	239.00	150	Vertical	Pass
2**	2387.300	41.25	-3.58	54.0	12.75	AV	239.00	150	Vertical	Pass

GFSK HIGH CHANNEL



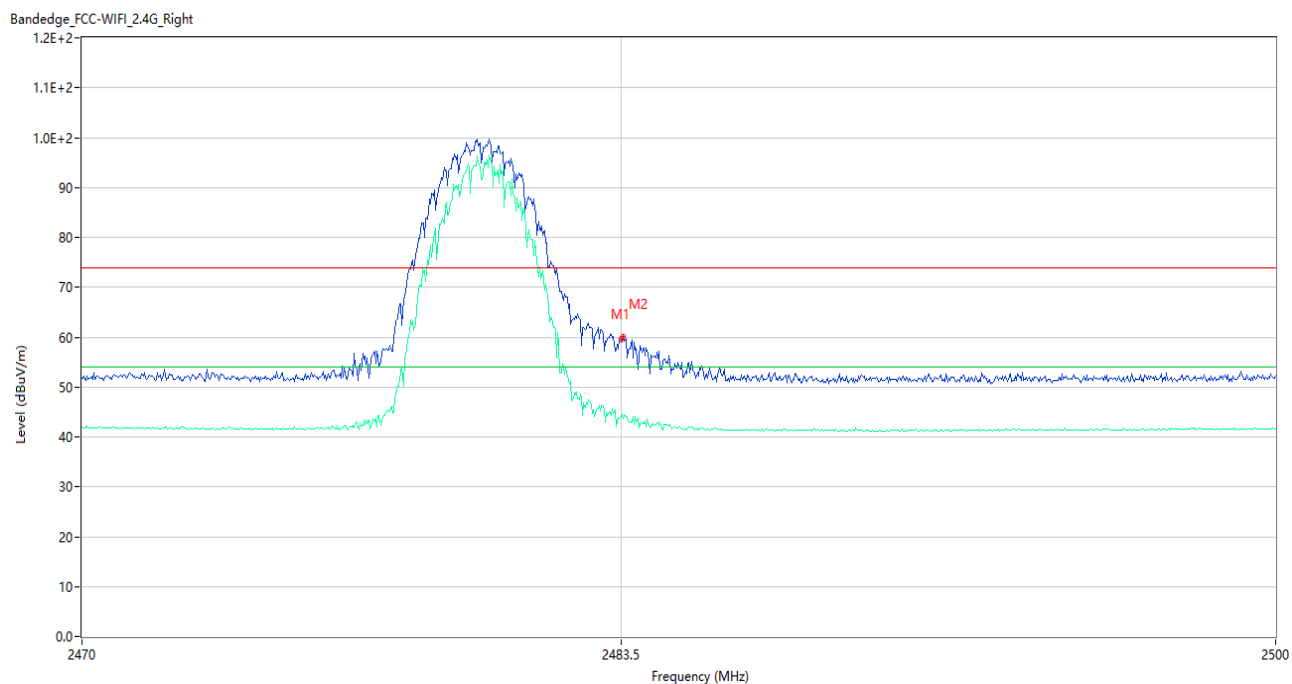
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	52.19	-2.60	74.0	21.81	Peak	161.00	150	Vertical	Pass
1**	2483.500	41.56	-2.60	54.0	12.44	AV	161.00	150	Vertical	Pass
2	2489.170	53.37	-2.68	74.0	20.63	Peak	64.00	150	Vertical	Pass
2**	2489.170	41.45	-2.68	54.0	12.55	AV	64.00	150	Vertical	Pass

8-DPSK LOW CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2390.000	51.09	-3.73	74.0	22.91	Peak	256.13	150	Vertical	Pass
1**	2390.000	41.10	-3.73	54.0	12.90	AV	256.13	150	Vertical	Pass
2	2373.300	53.06	-2.91	74.0	20.94	Peak	59.00	150	Vertical	Pass
2**	2373.300	41.42	-2.91	54.0	12.58	AV	59.00	150	Vertical	Pass

8-DPSK HIGH CHANNEL



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	59.60	-2.60	74.0	14.40	Peak	206.00	100	Horizontal	Pass
1**	2483.500	44.12	-2.60	54.0	9.88	AV	206.00	100	Horizontal	Pass
2	2483.560	60.21	-2.60	74.0	13.79	Peak	198.00	100	Horizontal	Pass
2**	2483.560	43.52	-2.60	54.0	10.48	AV	198.00	100	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SH24A0783-AR-1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SH24A0783-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SH24A0783-AI.PDF”.

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--END OF REPORT--