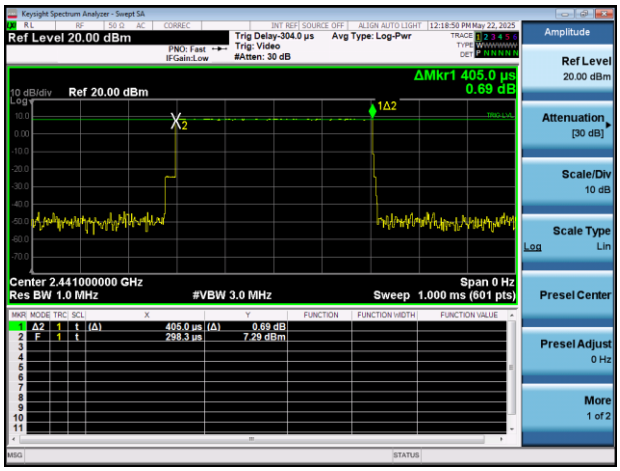
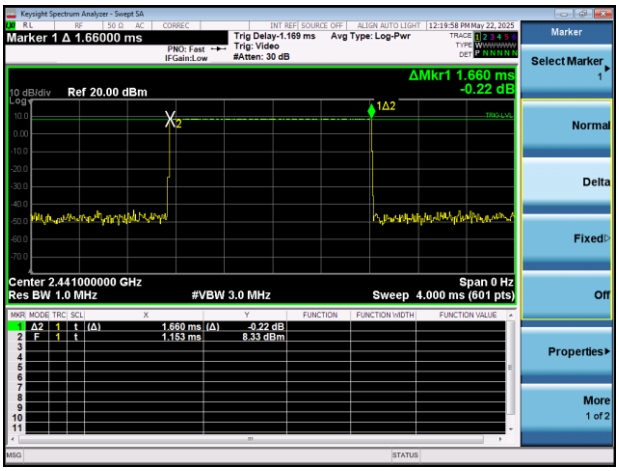
Test Plots

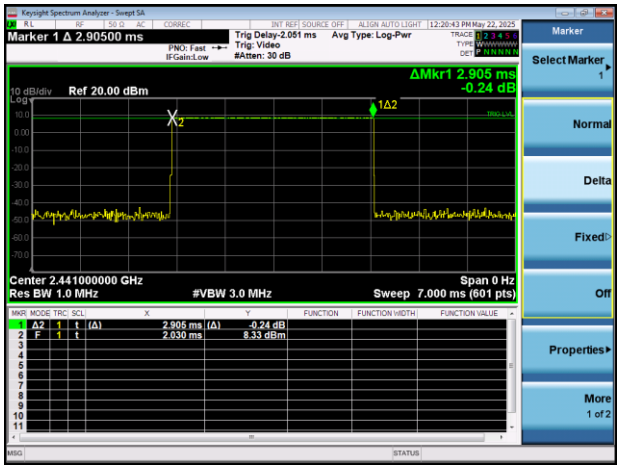
GFSK DH1



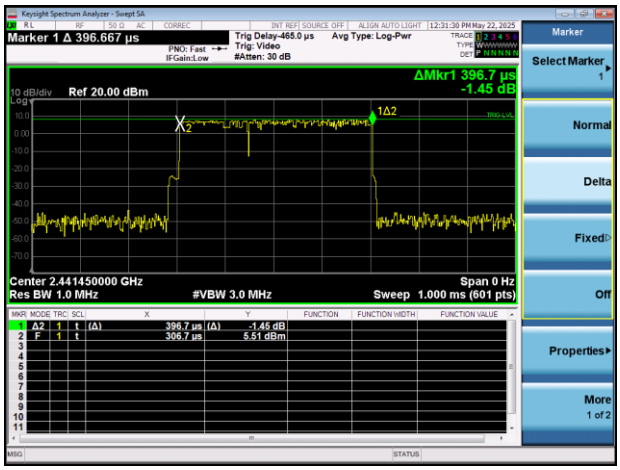
GFSK DH3



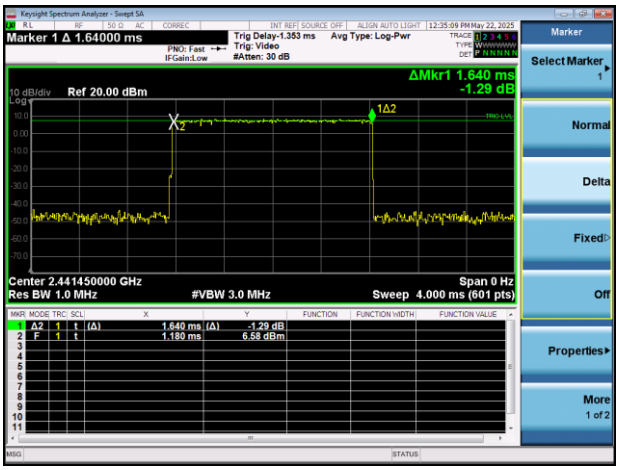
GFSK DH5



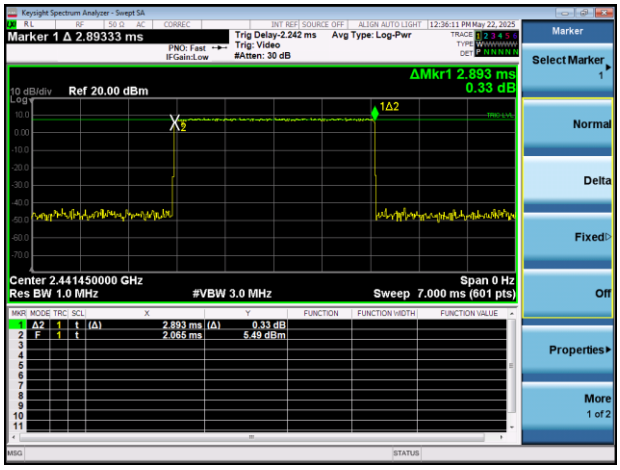
8-DPSK DH1



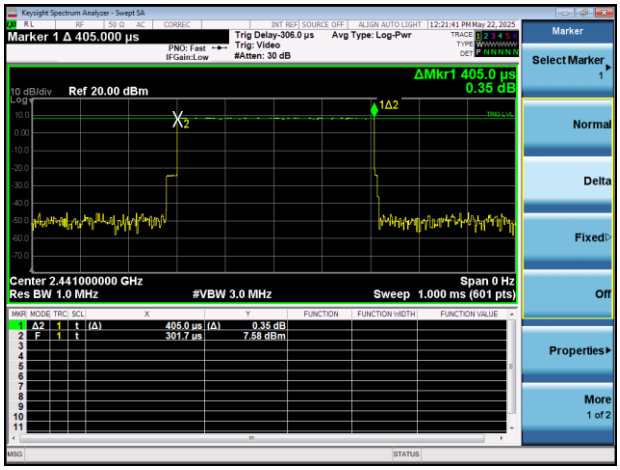
8-DPSK DH3



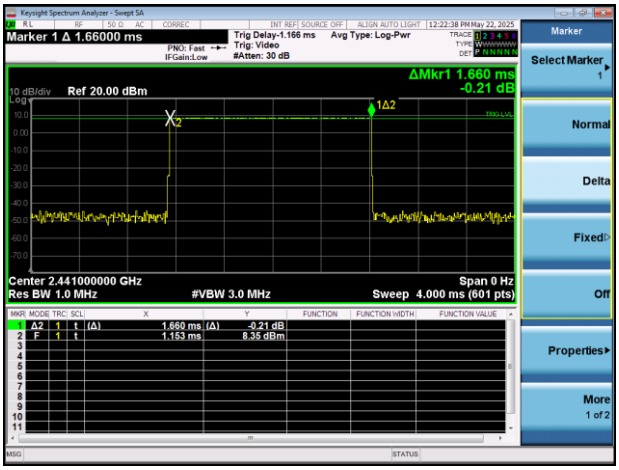
8-DPSK DH5



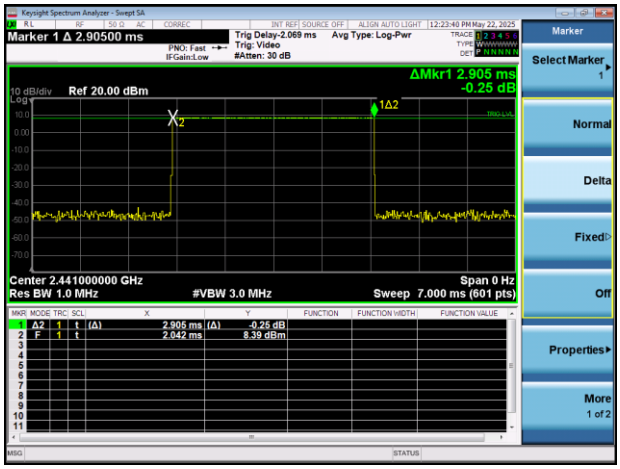
AFH Mode DH1



AFH Mode DH3



AFH Mode DH5



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

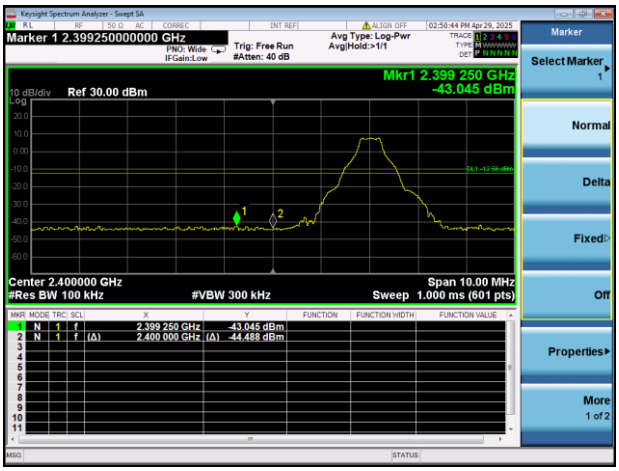
Test Data

GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-26.41	7.44	-12.56	Pass
Middle	-26.44	7.88	-12.12	Pass
High	-26.83	7.25	-12.75	Pass
8-DPSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-26.43	6.86	-13.14	Pass
Middle	-25.89	7.41	-12.59	Pass
High	-26.06	6.19	-13.81	Pass
Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-26.52	8.70	-11.30	Pass
8-DPSK	-25.87	8.29	-11.71	Pass

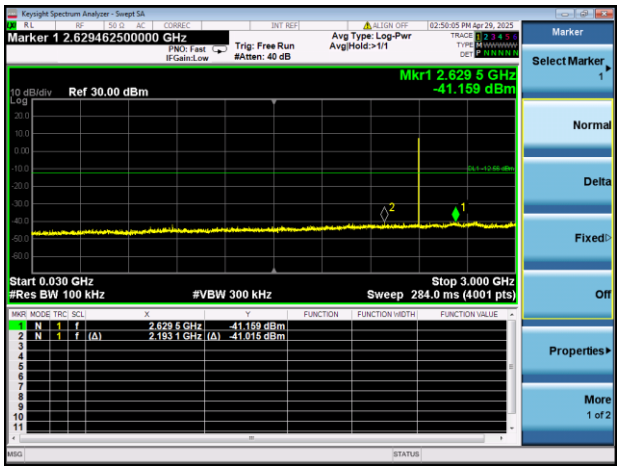
Test Plots

GFSK LOW CHANNEL, CARRIER LEVEL

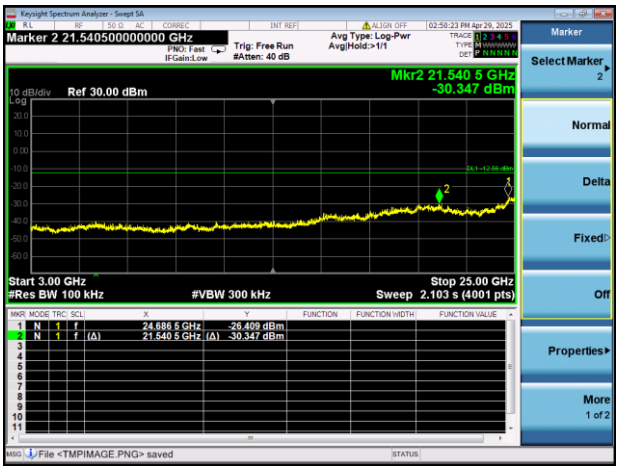
GFSK LOW CHANNEL, BAND EDGE



GFSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz

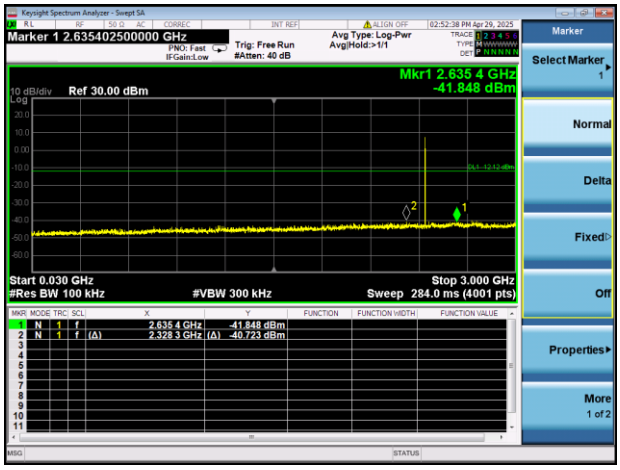


GFSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

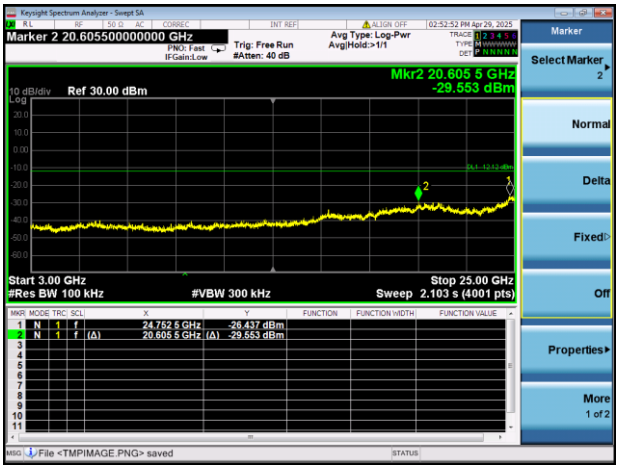


GFSK MIDDLE CHANNEL, CARRIER LEVEL

GFSK MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz

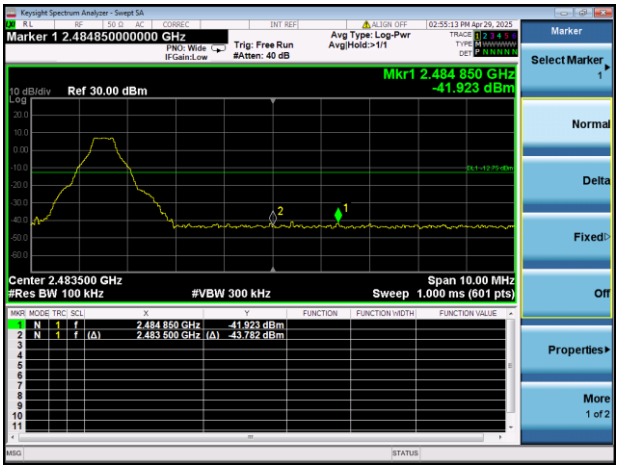


GFSK MIDDLE CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

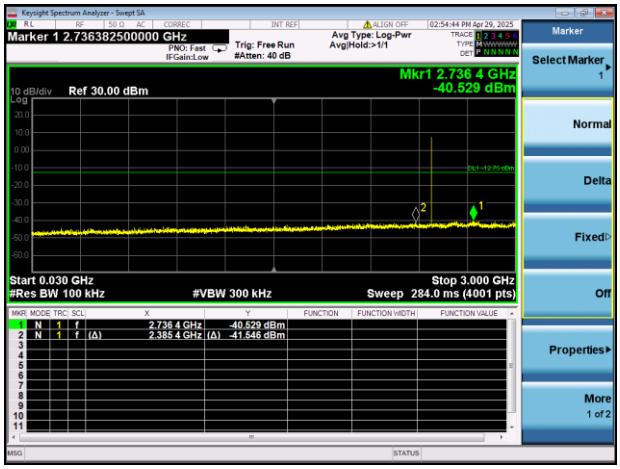


GFSK HIGH CHANNEL, CARRIER LEVEL

GFSK HIGH CHANNEL, BAND EDGE

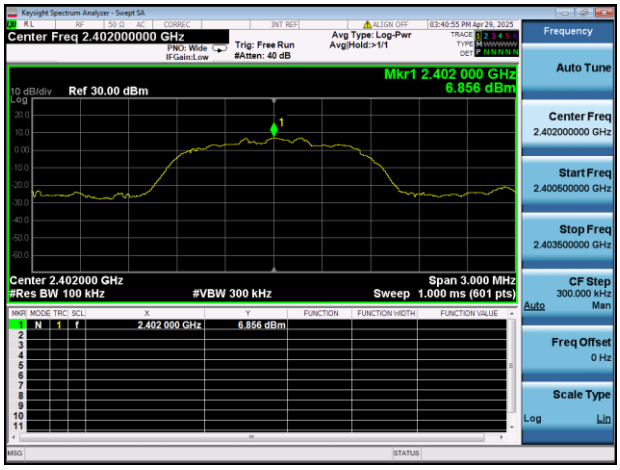


GFSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz

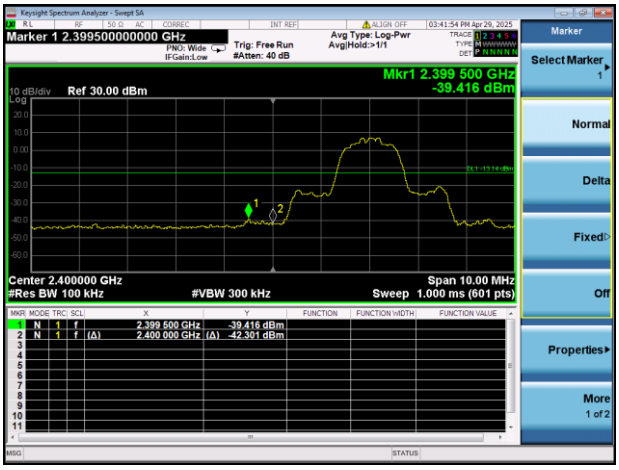


GFSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

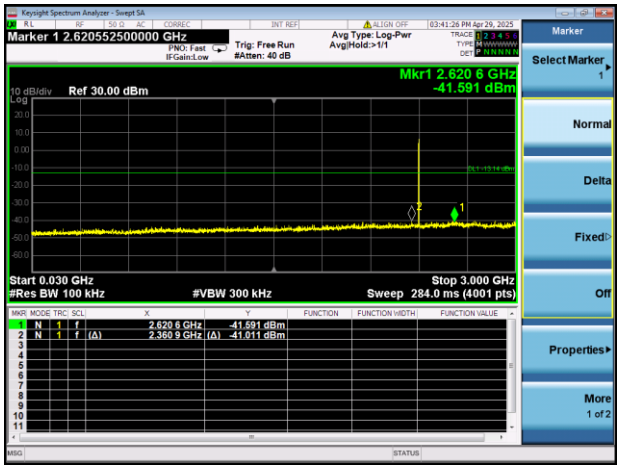
8-DPSK LOW CHANNEL, CARRIER LEVEL



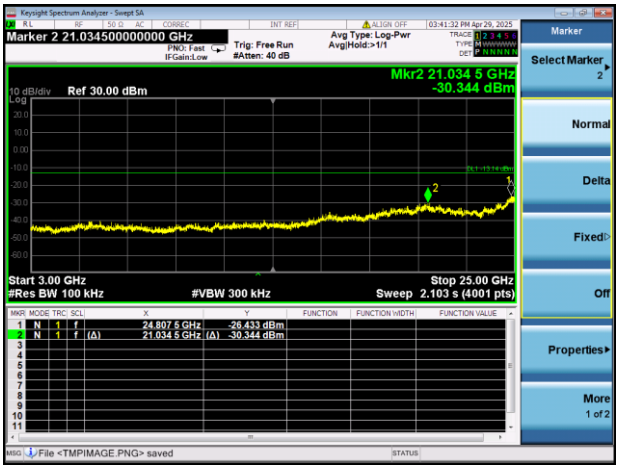
8-DPSK LOW CHANNEL, BAND EDGE



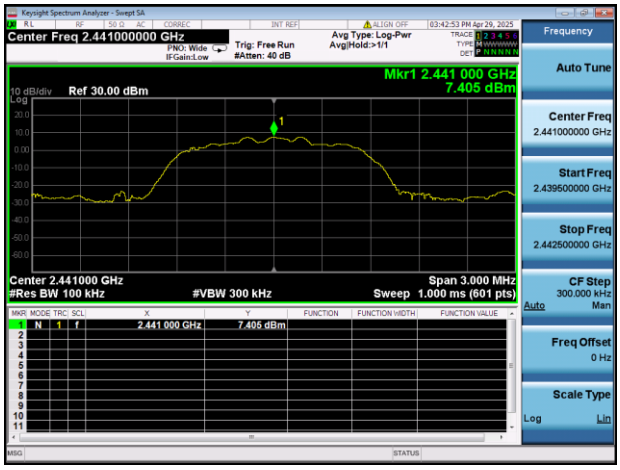
8-DPSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



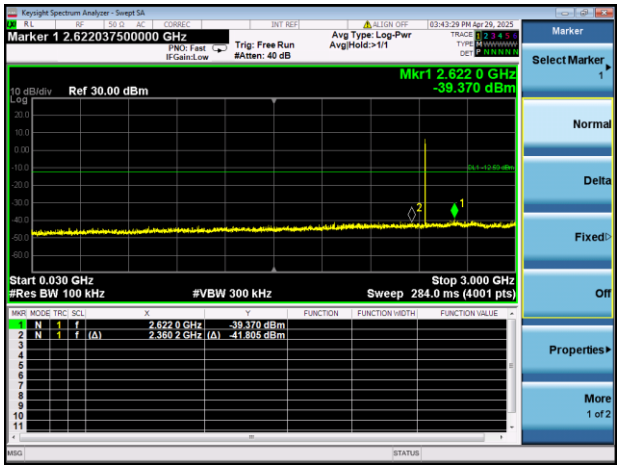
8-DPSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz



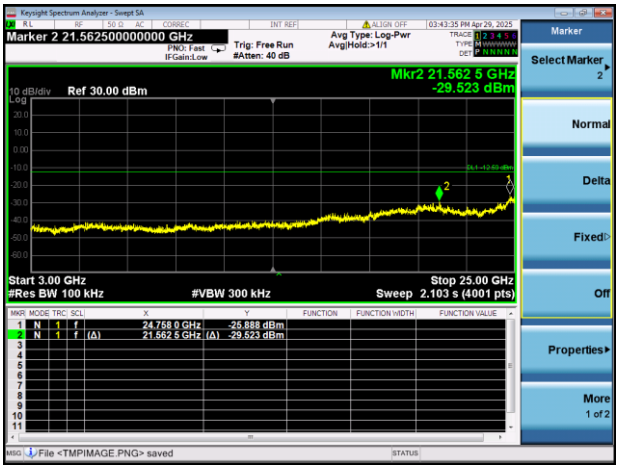
8-DPSK MIDDLE CHANNEL, CARRIER LEVEL



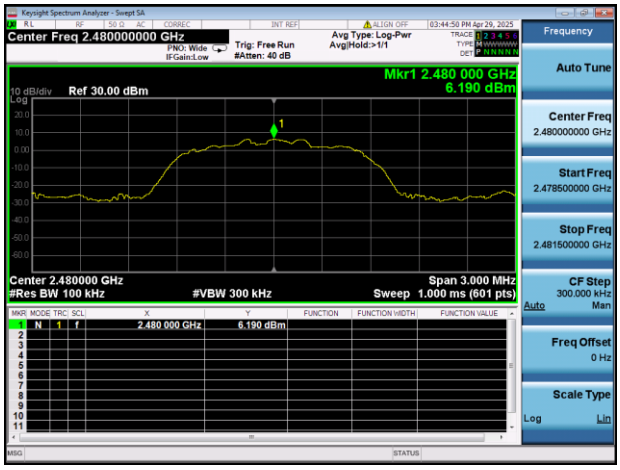
8-DPSK MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



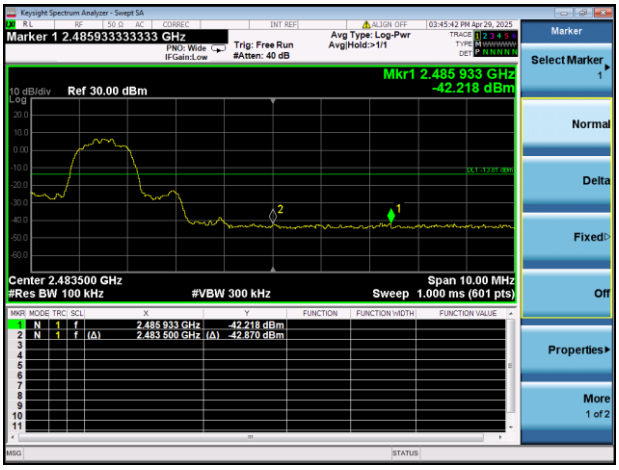
8-DPSK MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



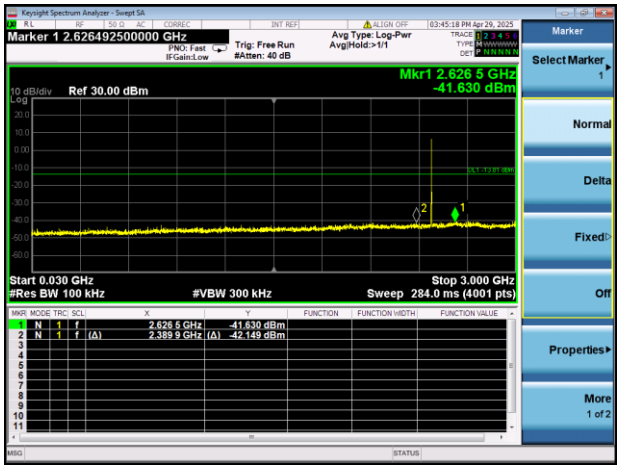
8-DPSK HIGH CHANNEL, CARRIER LEVEL



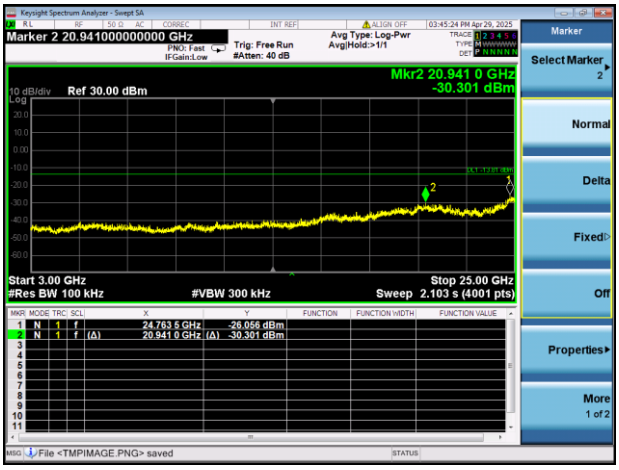
8-DPSK HIGH CHANNEL, BAND EDGE



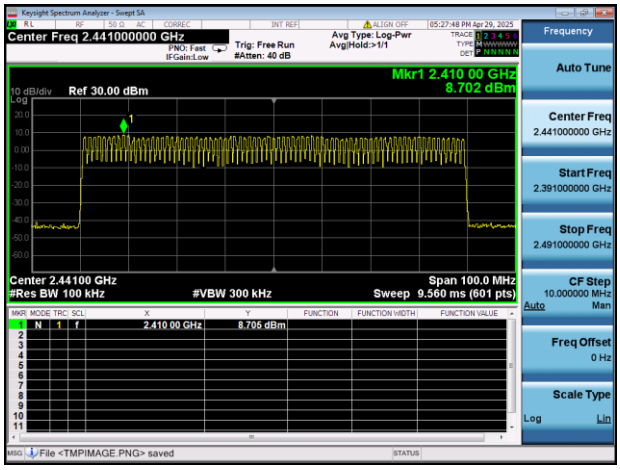
8-DPSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



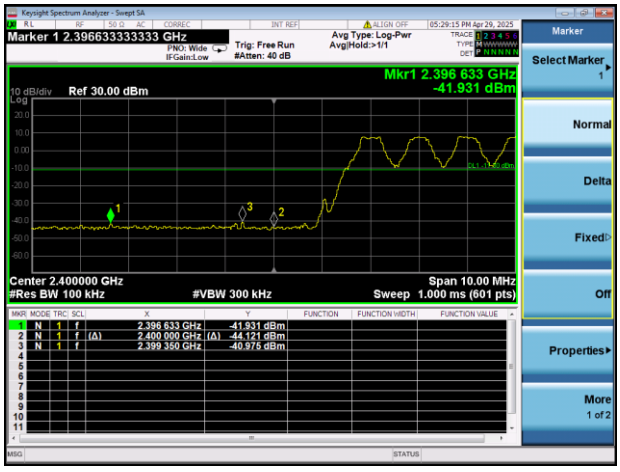
8-DPSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz



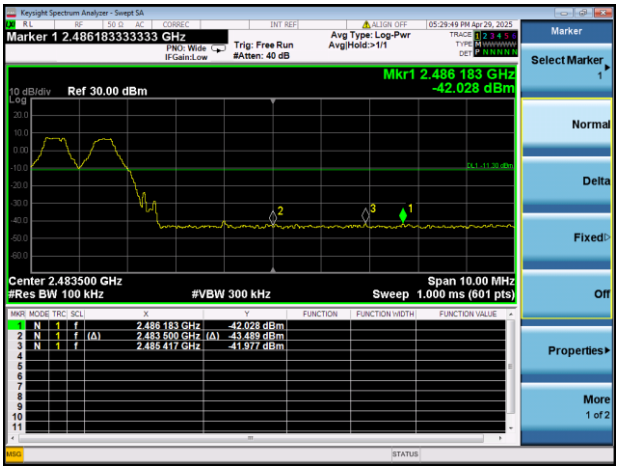
GFSK HOPPING, CARRIER LEVEL



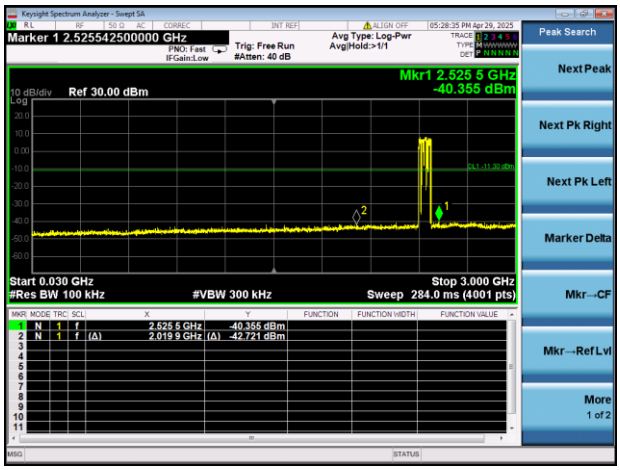
GFSK HOPPING BAND EDGE (LOW)



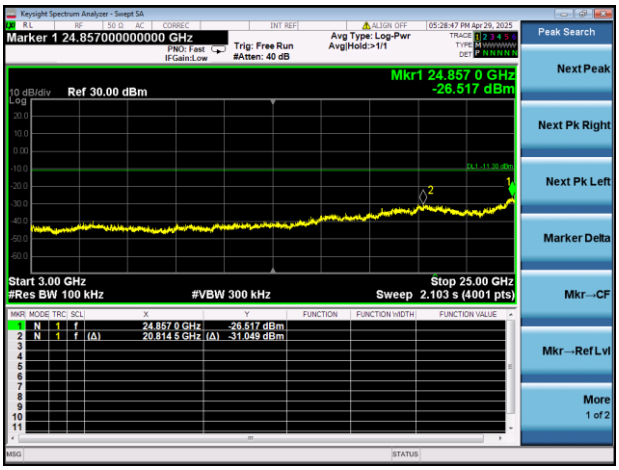
GFSK HOPPING BAND EDGE (HIGH)



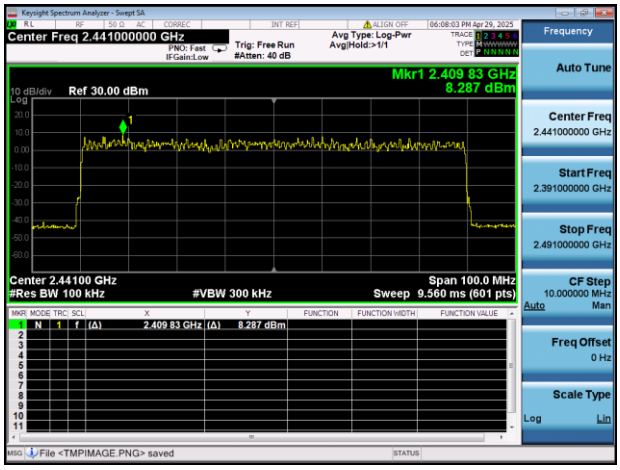
GFSK Hopping Mode, SPURIOUS 30 MHz ~ 3 GHz



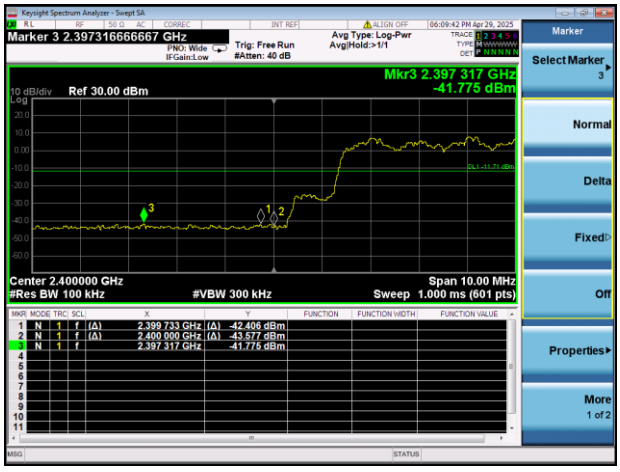
GFSK Hopping Mode, SPURIOUS 3GHz ~ 25 GHz



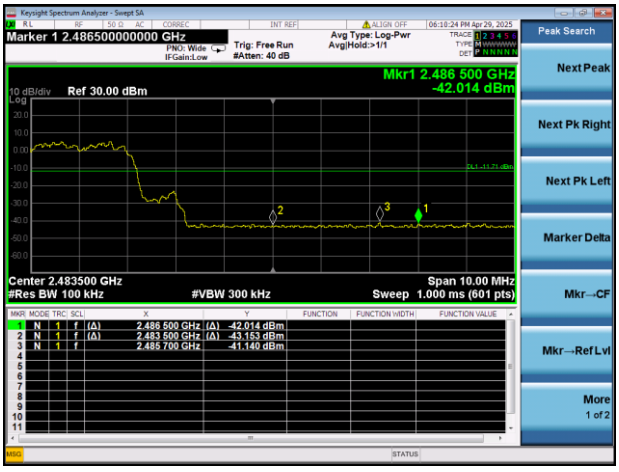
8-DPSK HOPPING, CARRIER LEVEL



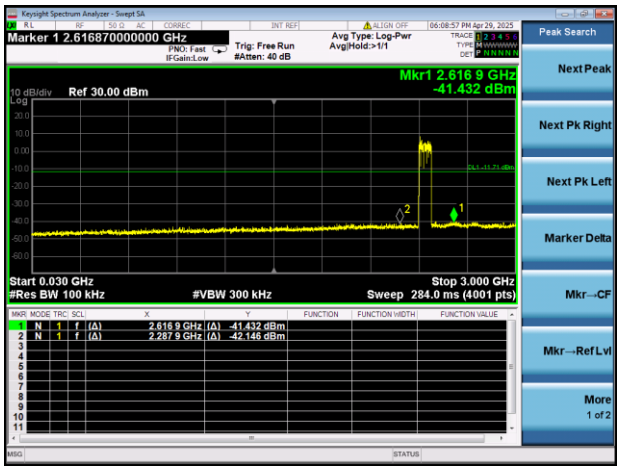
8-DPSK Hopping BAND EDGE (LOW)



8-DPSK Hopping BAND EDGE (HIGH)



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



8-DPSK Hopping Mode, SPURIOUS 3GHz ~ 25 GHz

A.7 Conducted Emission

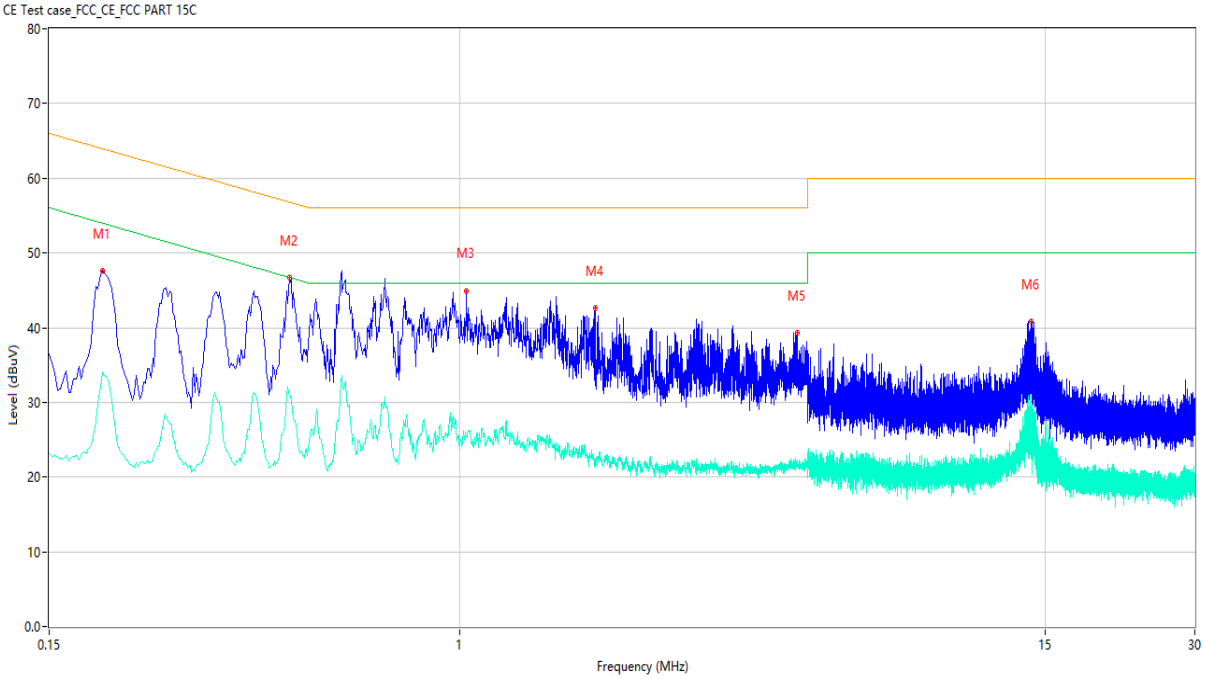
Note 1: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

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)

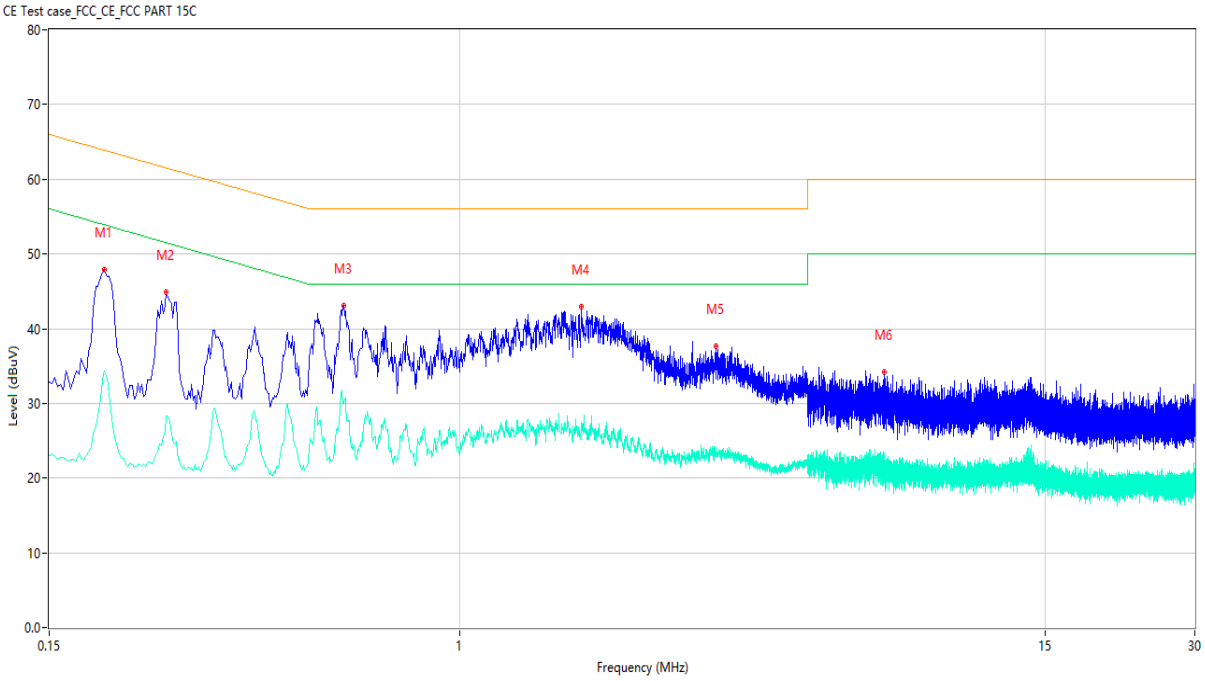
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.192	47.60	9.79	63.95	16.35	Peak	L	Pass
1**	0.192	34.02	9.79	53.95	19.93	AV	L	Pass
2	0.456	46.69	9.77	56.77	10.08	Peak	L	Pass
2**	0.456	31.00	9.77	46.77	15.77	AV	L	Pass
3	1.034	44.95	9.78	56.00	11.05	Peak	L	Pass
3**	1.034	25.53	9.78	46.00	20.47	AV	L	Pass
4	1.874	42.67	9.67	56.00	13.33	Peak	L	Pass
4**	1.874	22.23	9.67	46.00	23.77	AV	L	Pass
5	4.776	39.27	9.59	56.00	16.73	Peak	L	Pass
5**	4.776	21.90	9.59	46.00	24.10	AV	L	Pass
6	14.050	40.80	8.97	60.00	19.20	Peak	L	Pass
6**	14.050	27.68	8.97	50.00	22.32	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.194	47.91	9.74	63.86	15.95	Peak	N	Pass
1**	0.194	34.30	9.74	53.86	19.56	AV	N	Pass
2	0.258	44.82	9.73	61.50	16.68	Peak	N	Pass
2**	0.258	28.27	9.73	51.50	23.23	AV	N	Pass
3	0.586	43.07	9.74	56.00	12.93	Peak	N	Pass
3**	0.586	30.05	9.74	46.00	15.95	AV	N	Pass
4	1.760	42.90	9.75	56.00	13.10	Peak	N	Pass
4**	1.760	27.26	9.75	46.00	18.74	AV	N	Pass
5	3.282	37.59	9.69	56.00	18.41	Peak	N	Pass
5**	3.282	23.13	9.69	46.00	22.87	AV	N	Pass
6	7.126	34.22	9.45	60.00	25.78	Peak	N	Pass
6**	7.126	23.40	9.45	50.00	26.60	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.

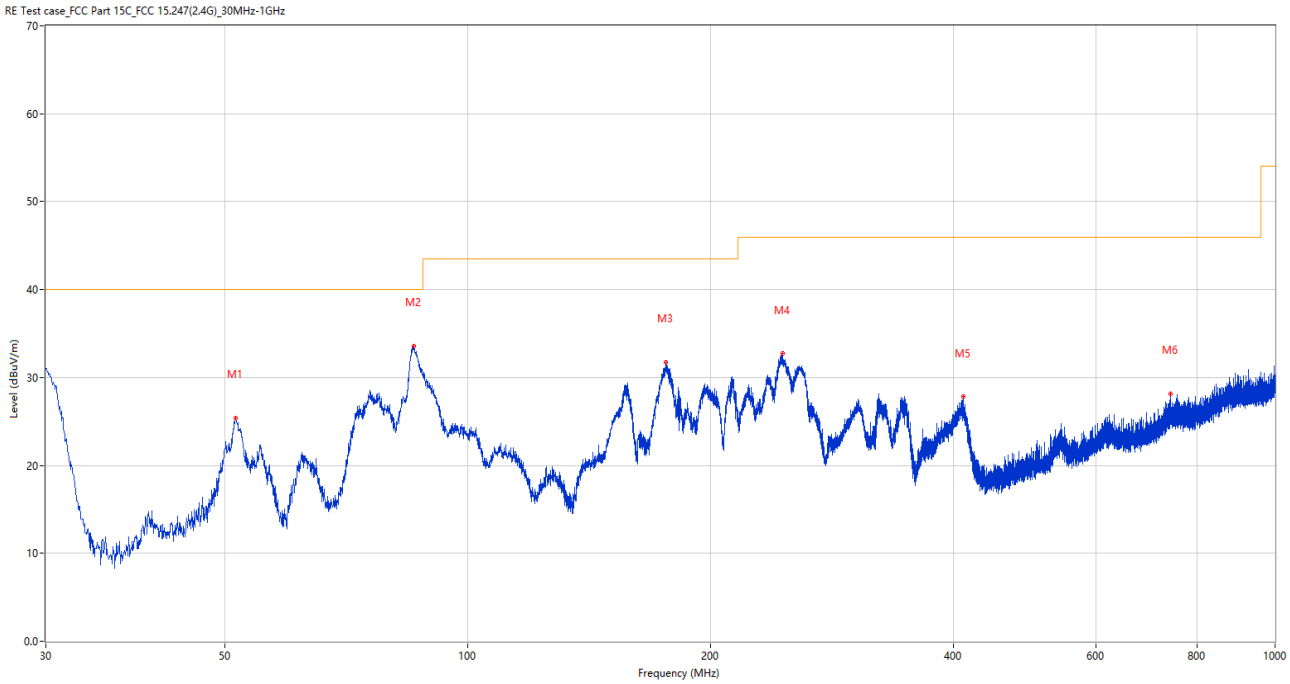
Note 3: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested.

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

Note 5: 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.

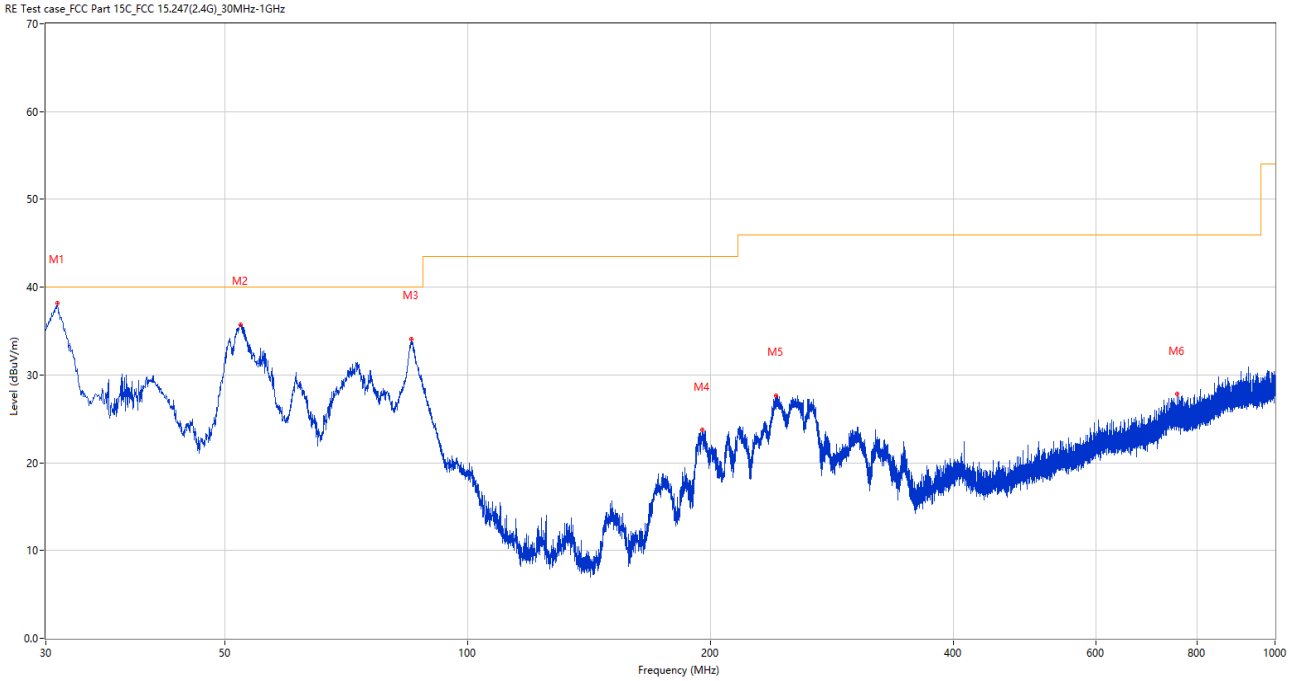
Test Data and Plots

30 MHz to 1 GHz, ANT H



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	51.583	25.35	-24.67	40.0	14.65	Peak	360.00	200	Horizontal	Pass
2	85.678	33.55	-29.52	40.0	6.45	Peak	160.00	200	Horizontal	Pass
3	176.082	31.72	-28.18	43.5	11.78	Peak	237.00	100	Horizontal	Pass
4	245.340	32.71	-24.25	46.0	13.29	Peak	251.00	200	Horizontal	Pass
5	411.210	27.79	-20.17	46.0	18.21	Peak	243.00	100	Horizontal	Pass
6	741.980	28.15	-12.06	46.0	17.85	Peak	233.00	200	Horizontal	Pass

30 MHz to 1 GHz, ANT V

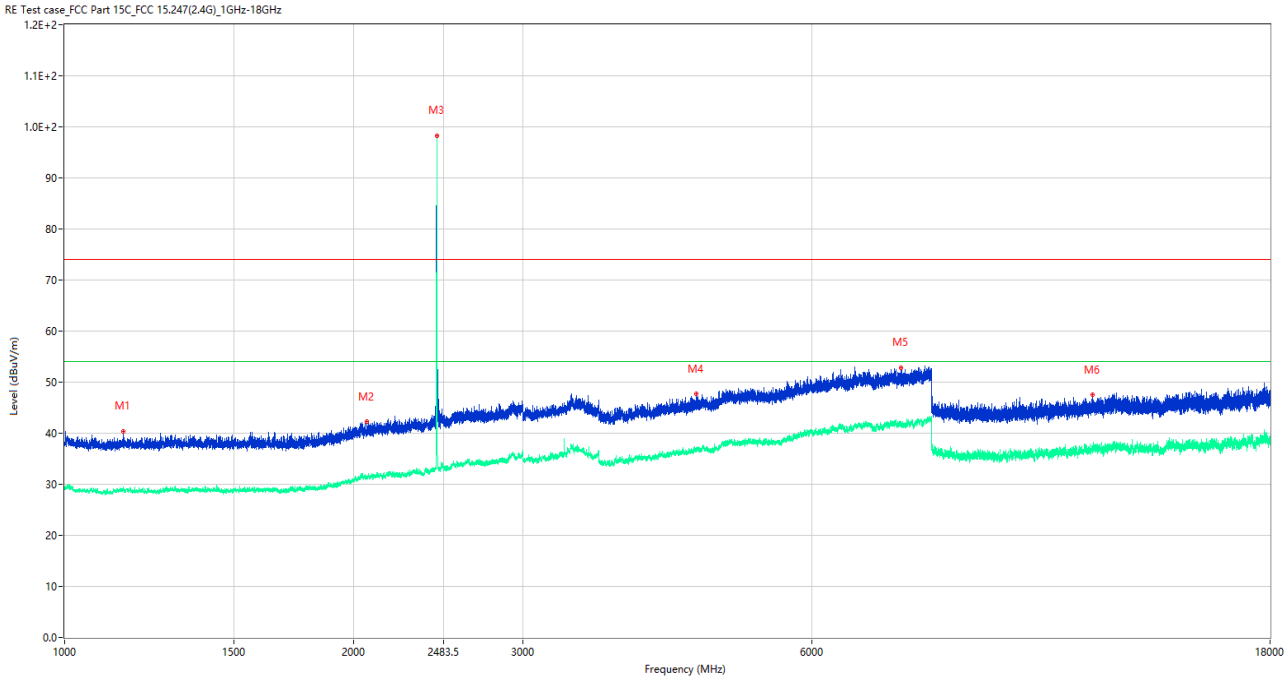


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	31.018	38.15	-29.10	40.0	1.85	Peak	103.00	100	Vertical	Pass
2	52.261	35.77	-24.71	40.0	4.23	Peak	233.00	200	Vertical	Pass
3	85.193	34.08	-29.68	40.0	5.92	Peak	245.00	100	Vertical	Pass
4	194.997	23.70	-25.60	43.5	19.80	Peak	170.00	200	Vertical	Pass
5	240.732	27.65	-24.43	46.0	18.35	Peak	164.00	100	Vertical	Pass
6	756.385	27.79	-11.93	46.0	18.21	Peak	170.00	100	Vertical	Pass

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

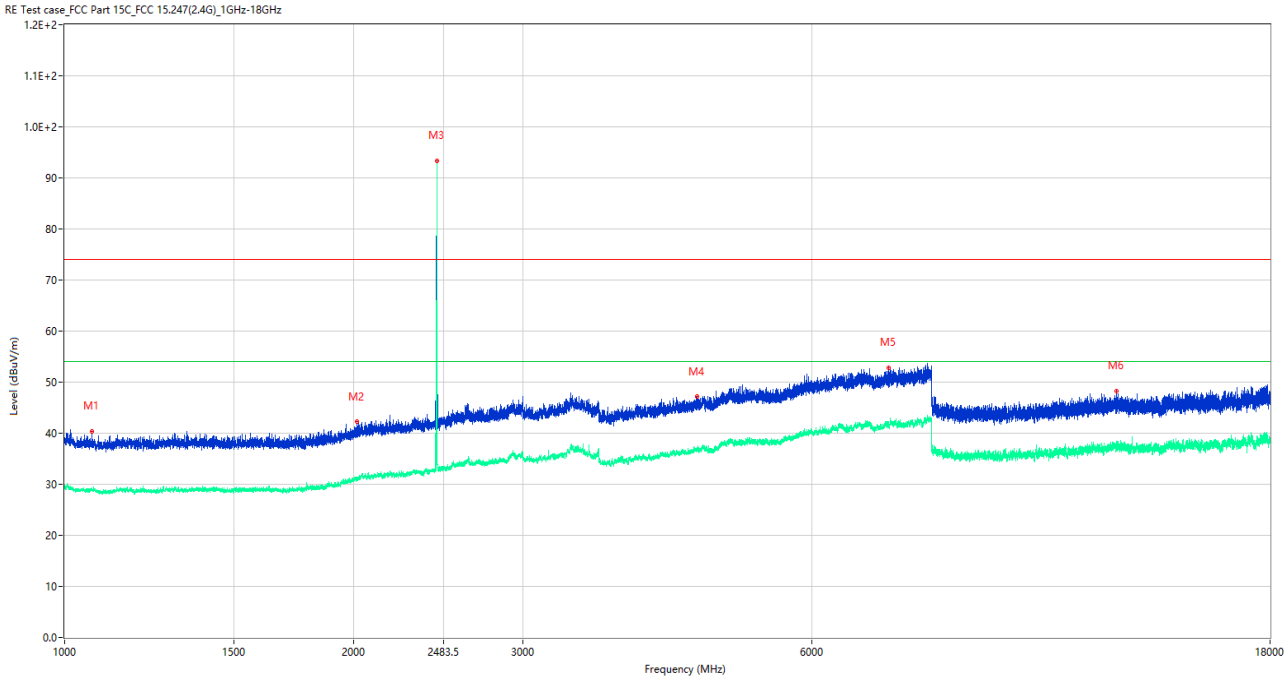
Note 2: The spurious from 18GHz-25GHz is noise only, do not show on the report.

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H



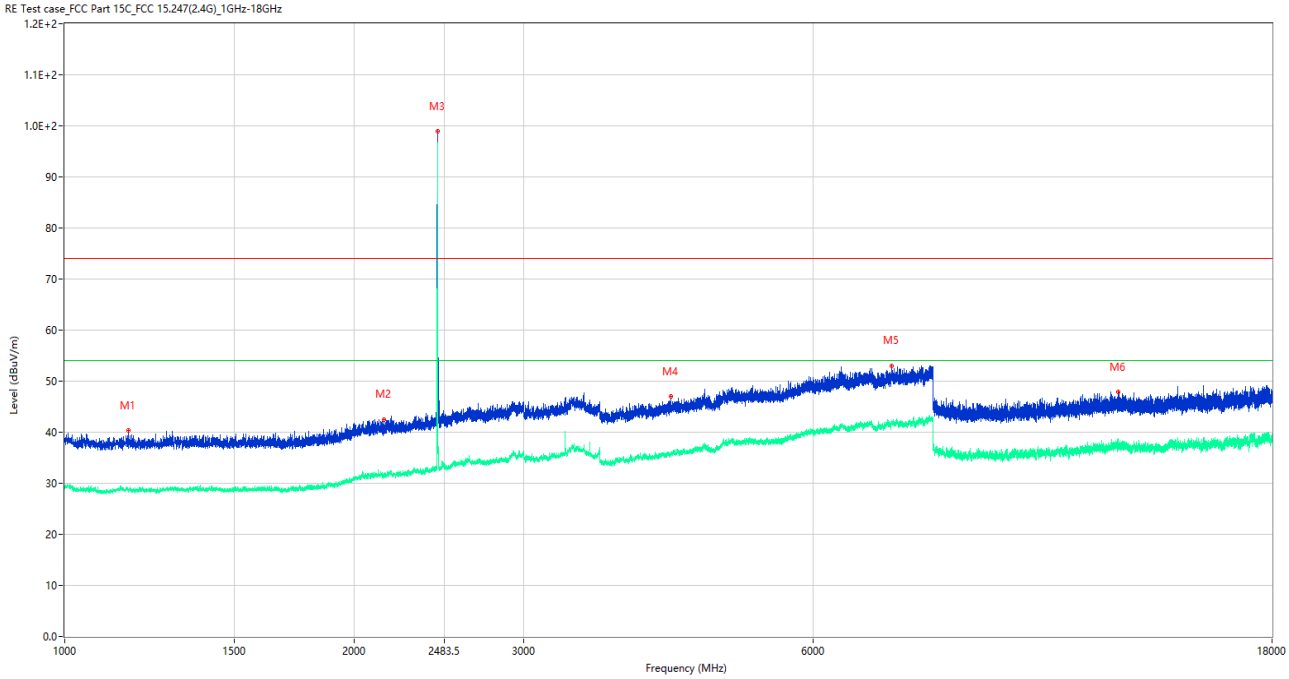
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1150.500	40.44	-15.65	74.0	33.56	Peak	83.00	150	Horizontal	Pass
1**	1150.500	28.73	-15.65	54.0	25.27	AV	83.00	150	Horizontal	Pass
2	2062.500	42.27	-13.84	74.0	31.73	Peak	33.00	150	Horizontal	Pass
2**	2062.500	31.46	-13.84	54.0	22.54	AV	33.00	150	Horizontal	Pass
3	2440.750	98.32	-12.38	74.0	-24.32	Peak	355.00	150	Horizontal	N/A
3**	2440.750	96.92	-12.38	54.0	-42.92	AV	355.00	150	Horizontal	N/A
4	4545.000	47.68	-3.25	74.0	26.32	Peak	258.00	150	Horizontal	Pass
4**	4545.000	36.65	-3.25	54.0	17.35	AV	258.00	150	Horizontal	Pass
5	7422.500	52.78	1.04	74.0	21.22	Peak	58.00	150	Horizontal	Pass
5**	7422.500	41.89	1.04	54.0	12.11	AV	58.00	150	Horizontal	Pass
6	11771.000	47.51	-3.51	74.0	26.49	Peak	62.00	150	Horizontal	Pass
6**	11771.000	36.63	-3.51	54.0	17.37	AV	62.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V



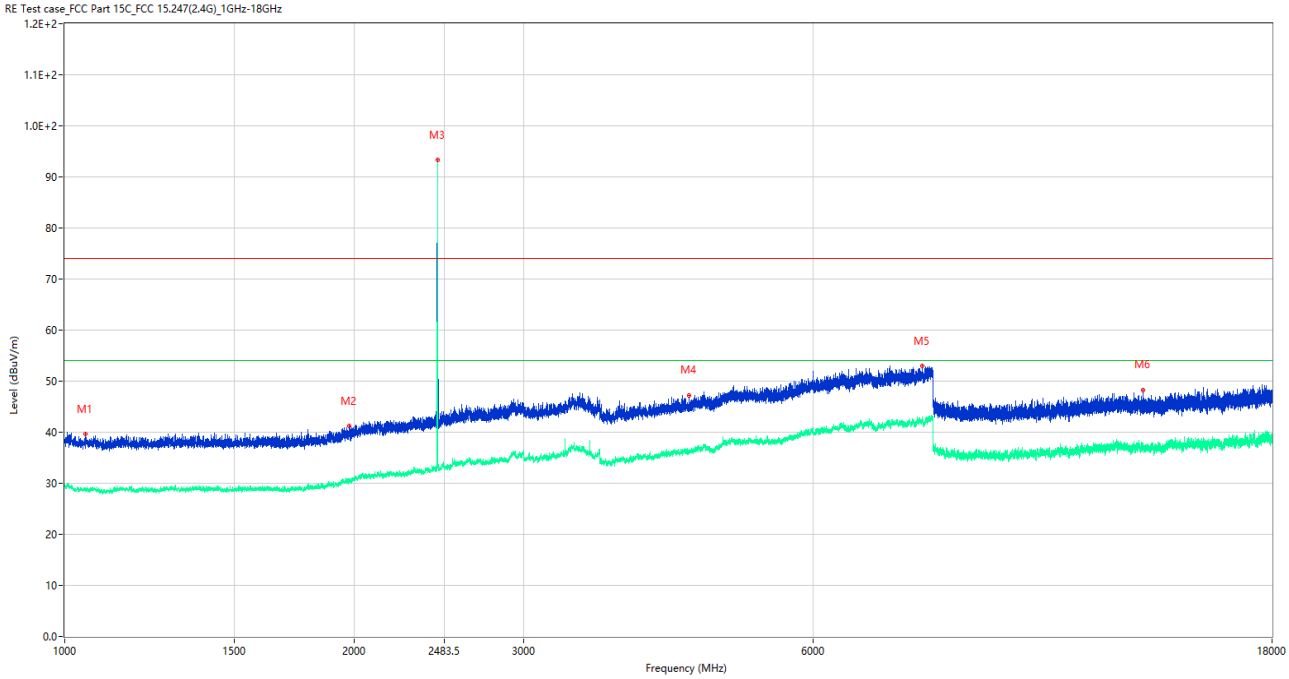
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1067.250	40.31	-15.18	74.0	33.69	Peak	72.00	150	Vertical	Pass
1**	1067.250	28.69	-15.18	54.0	25.31	AV	72.00	150	Vertical	Pass
2	2016.500	42.23	-14.18	74.0	31.77	Peak	281.00	150	Vertical	Pass
2**	2016.500	31.03	-14.18	54.0	22.97	AV	281.00	150	Vertical	Pass
3	2440.750	93.41	-12.38	74.0	-19.41	Peak	315.00	150	Vertical	N/A
3**	2440.750	92.00	-12.38	54.0	-38.00	AV	315.00	150	Vertical	N/A
4	4556.000	47.17	-2.83	74.0	26.83	Peak	2.00	150	Vertical	Pass
4**	4556.000	37.07	-2.83	54.0	16.93	AV	2.00	150	Vertical	Pass
5	7206.500	52.86	0.82	74.0	21.14	Peak	69.00	150	Vertical	Pass
5**	7206.500	42.16	0.82	54.0	11.84	AV	69.00	150	Vertical	Pass
6	12466.000	48.26	-2.30	74.0	25.74	Peak	360.00	150	Vertical	Pass
6**	12466.000	37.59	-2.30	54.0	16.41	AV	360.00	150	Vertical	Pass

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



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1165.250	40.30	-15.44	74.0	33.70	Peak	155.00	150	Horizontal	Pass
1**	1165.250	28.79	-15.44	54.0	25.21	AV	155.00	150	Horizontal	Pass
2	2145.250	42.53	-13.79	74.0	31.47	Peak	360.00	150	Horizontal	Pass
2**	2145.250	31.37	-13.79	54.0	22.63	AV	360.00	150	Horizontal	Pass
3	2440.750	98.89	-12.38	74.0	-24.89	Peak	346.00	150	Horizontal	N/A
3**	2440.750	94.99	-12.38	54.0	-40.99	AV	346.00	150	Horizontal	N/A
4	4269.500	46.97	-3.40	74.0	27.03	Peak	316.00	150	Horizontal	Pass
4**	4269.500	35.91	-3.40	54.0	18.09	AV	316.00	150	Horizontal	Pass
5	7241.000	52.99	0.96	74.0	21.01	Peak	219.00	150	Horizontal	Pass
5**	7241.000	41.86	0.96	54.0	12.14	AV	219.00	150	Horizontal	Pass
6	12454.000	47.84	-2.31	74.0	26.16	Peak	236.00	150	Horizontal	Pass
6**	12454.000	37.95	-2.31	54.0	16.05	AV	236.00	150	Horizontal	Pass

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



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1049.750	39.58	-15.40	74.0	34.42	Peak	0.00	150	Vertical	Pass
1**	1049.750	28.72	-15.40	54.0	25.28	AV	0.00	150	Vertical	Pass
2	1974.000	41.15	-14.78	74.0	32.85	Peak	0.00	150	Vertical	Pass
2**	1974.000	30.36	-14.78	54.0	23.64	AV	0.00	150	Vertical	Pass
3	2441.000	93.30	-12.39	74.0	-19.30	Peak	44.00	150	Vertical	N/A
3**	2441.000	92.60	-12.39	54.0	-38.60	AV	44.00	150	Vertical	N/A
4	4460.000	47.26	-3.62	74.0	26.74	Peak	271.00	150	Vertical	Pass
4**	4460.000	36.11	-3.62	54.0	17.89	AV	271.00	150	Vertical	Pass
5	7797.000	53.02	1.68	74.0	20.98	Peak	89.00	150	Vertical	Pass
5**	7797.000	42.67	1.68	54.0	11.33	AV	89.00	150	Vertical	Pass
6	13223.999	48.33	-2.61	74.0	25.67	Peak	331.00	150	Vertical	Pass
6**	13223.999	37.56	-2.61	54.0	16.44	AV	331.00	150	Vertical	Pass

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

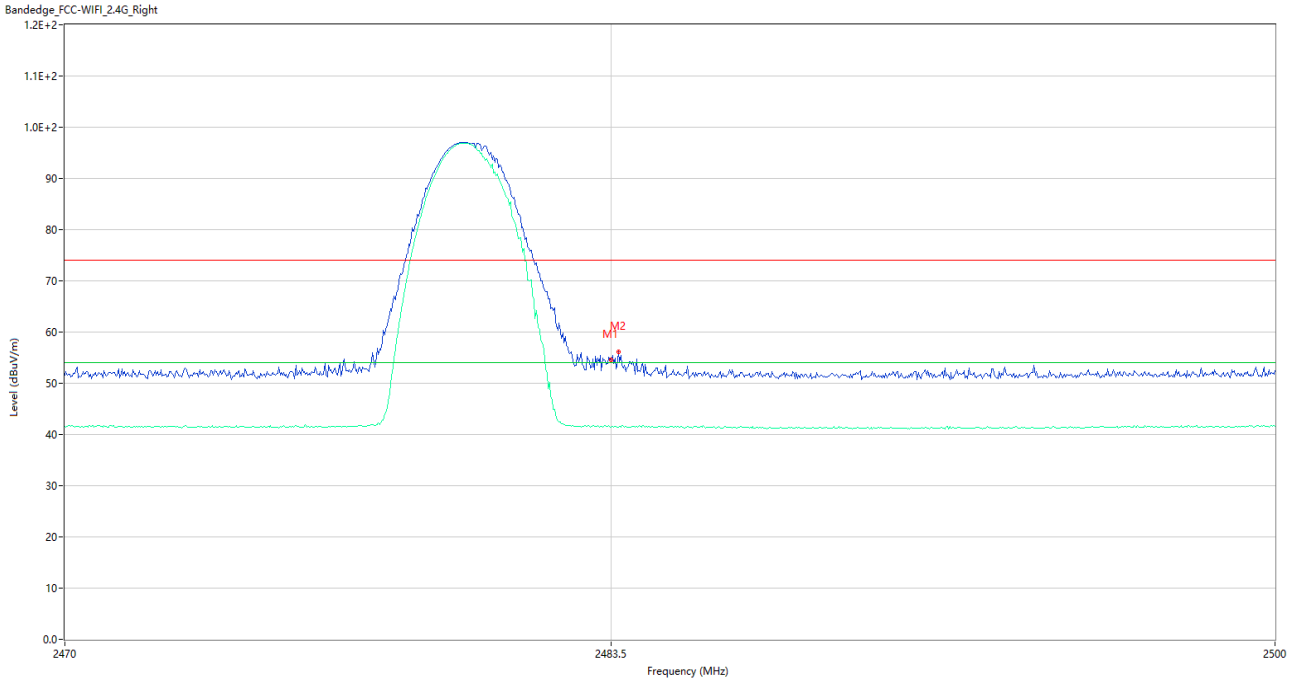
Note 1: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.
Note 2: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.
Note 3: 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

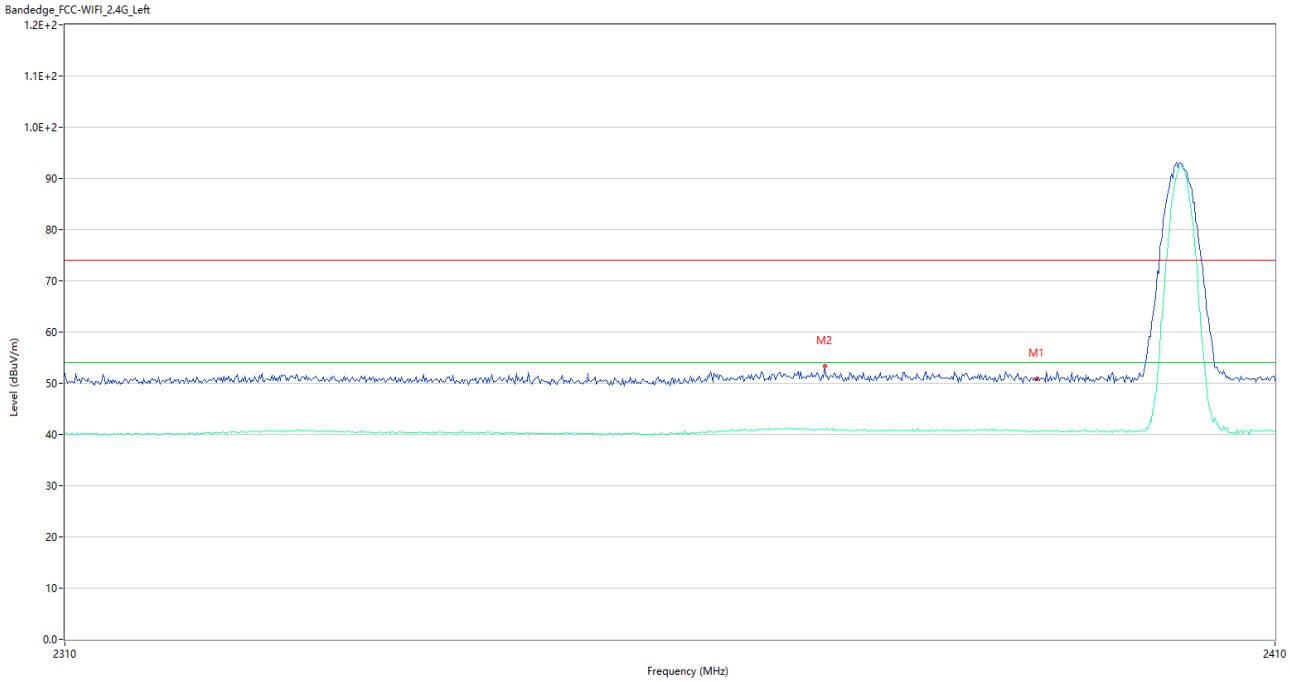
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2390.000	51.04	-4.87	74.0	22.96	Peak	308.71	150	Vertical	Pass
1**	2390.000	40.71	-4.87	54.0	13.29	AV	308.71	150	Vertical	Pass
2	2366.300	53.03	-4.40	74.0	20.97	Peak	236.00	150	Vertical	Pass
2**	2366.300	40.90	-4.40	54.0	13.10	AV	236.00	150	Vertical	Pass

GFSK HIGH CHANNEL



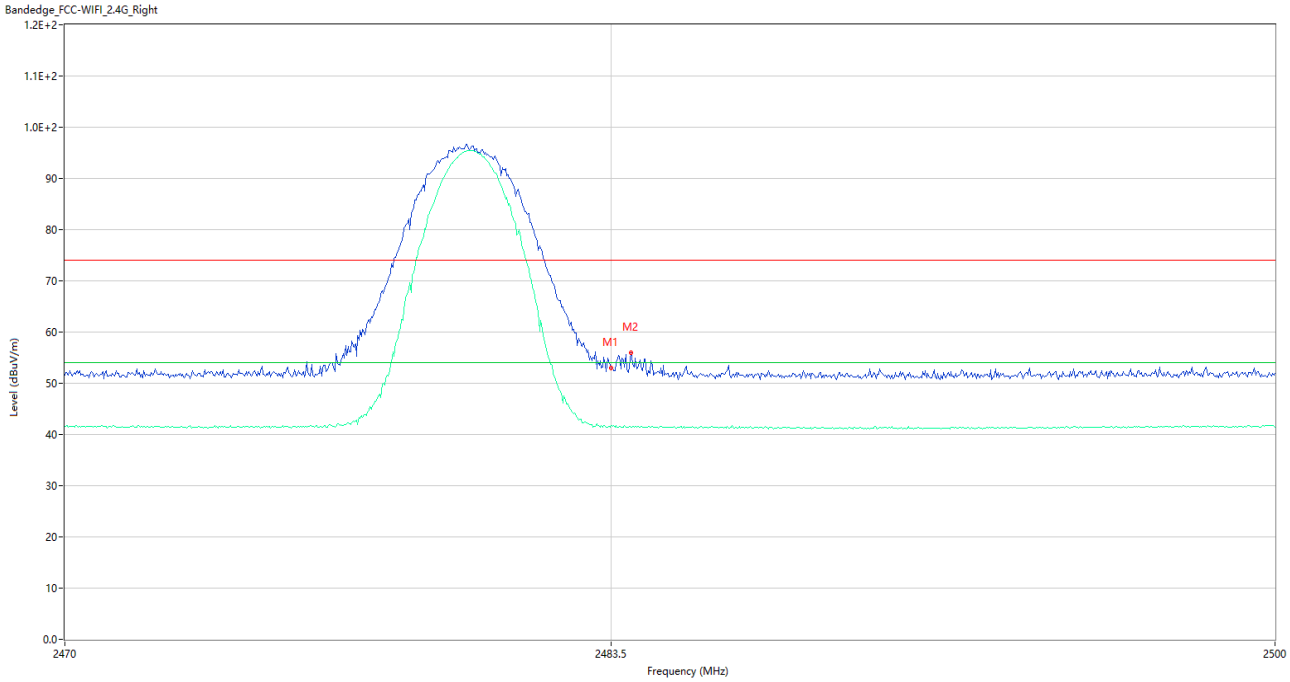
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	54.62	-3.78	74.0	19.38	Peak	360.00	150	Horizontal	Pass
1**	2483.500	41.49	-3.78	54.0	12.51	AV	360.00	150	Horizontal	Pass
2	2483.680	56.13	-3.78	74.0	17.87	Peak	360.00	150	Horizontal	Pass
2**	2483.680	41.35	-3.78	54.0	12.65	AV	360.00	150	Horizontal	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	50.88	-4.87	74.0	23.12	Peak	0.12	150	Horizontal	Pass
1**	2390.000	40.59	-4.87	54.0	13.41	AV	0.12	150	Horizontal	Pass
2	2372.300	53.32	-4.08	74.0	20.68	Peak	0.00	150	Horizontal	Pass
2**	2372.300	40.99	-4.08	54.0	13.01	AV	0.00	150	Horizontal	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	53.06	-3.78	74.0	20.94	Peak	360.00	150	Horizontal	Pass
1**	2483.500	41.69	-3.78	54.0	12.31	AV	360.00	150	Horizontal	Pass
2	2483.980	55.90	-3.78	74.0	18.10	Peak	356.00	150	Horizontal	Pass
2**	2483.980	41.32	-3.78	54.0	12.68	AV	356.00	150	Horizontal	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SH2540337-AR-1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SH2540337-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SH2540337-AI.PDF”.

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--END OF REPORT--