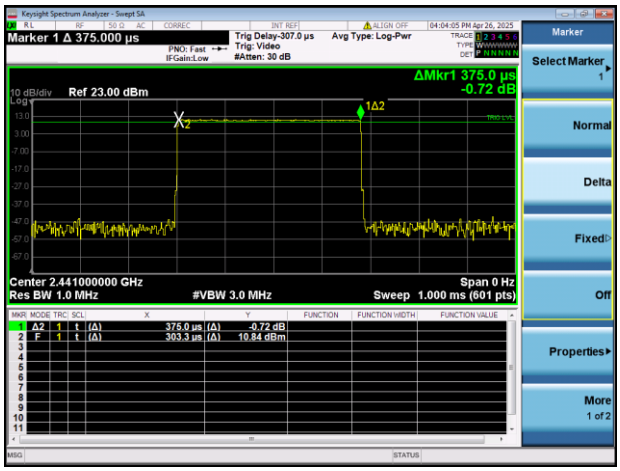
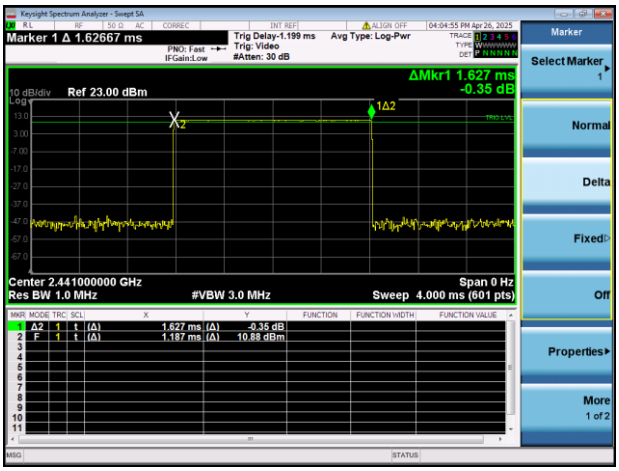
Test Plots

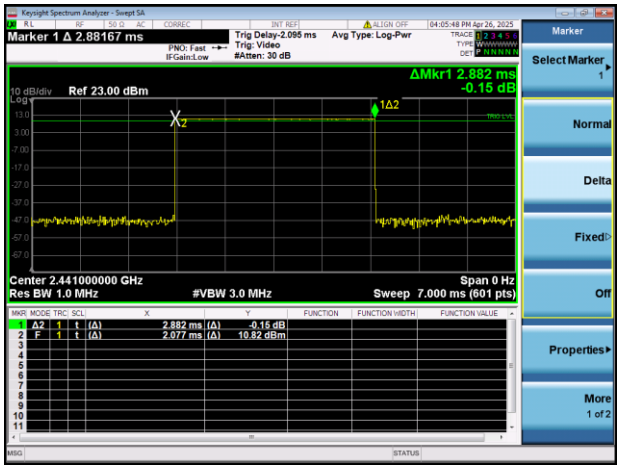
GFSK DH1



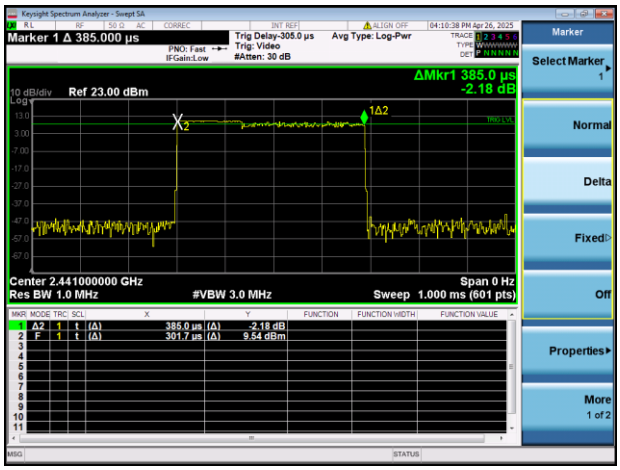
GFSK DH3



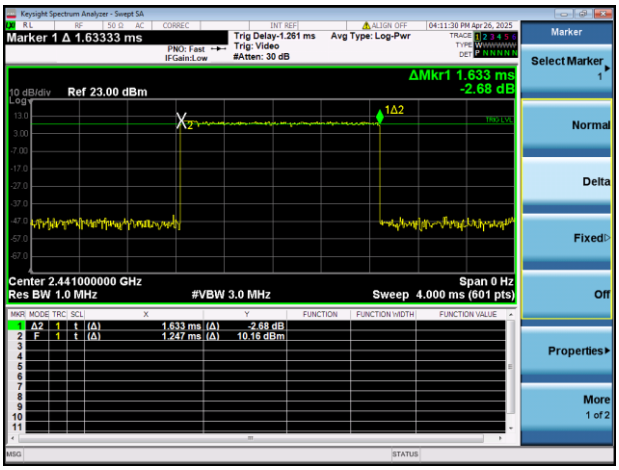
GFSK DH5



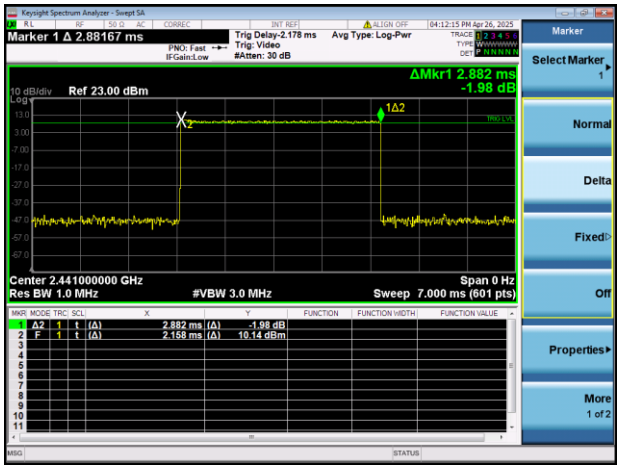
8-DPSK DH1



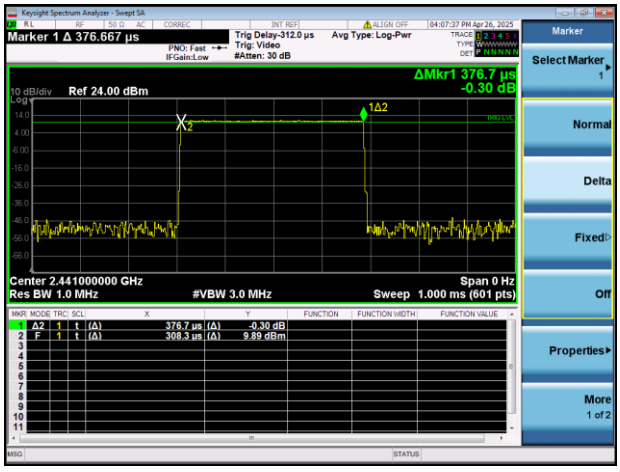
8-DPSK DH3



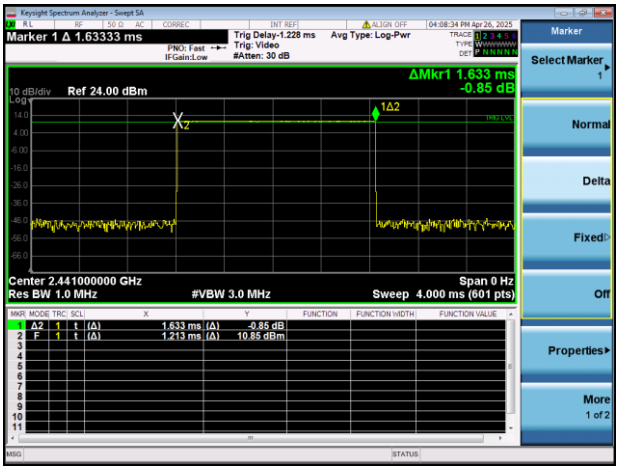
8-DPSK DH5



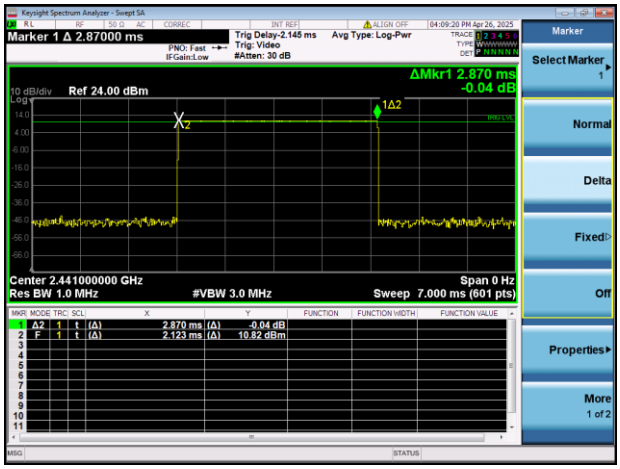
AFH Mode DH1



AFH Mode DH3



AFH Mode DH5



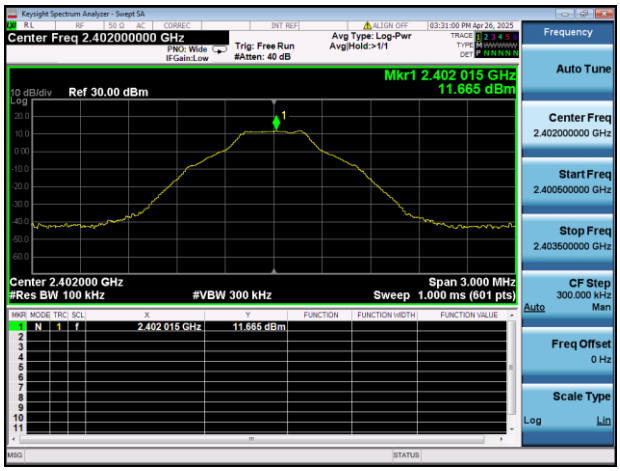
A.6 Conducted Spurious Emissions & Authorized-band band-edge

Test Data

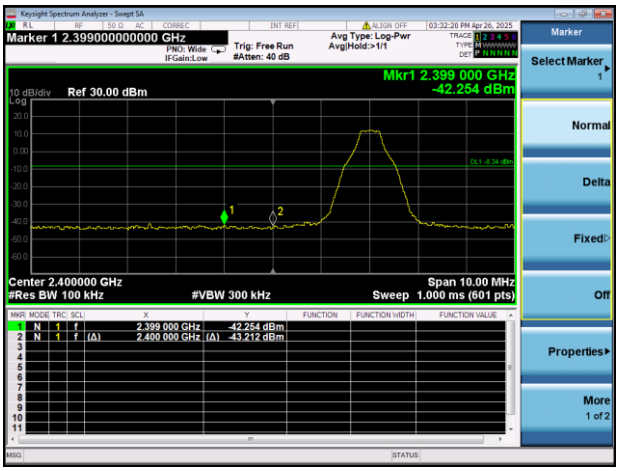
GFSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-25.13	11.66	-8.34	Pass
Middle	-24.97	10.33	-9.67	Pass
High	-25.25	11.24	-8.76	Pass
8-DPSK				
Channel	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
Low	-24.59	10.77	-9.23	Pass
Middle	-24.17	10.03	-9.97	Pass
High	-25.31	10.70	-9.30	Pass
Hopping Mode				
Mode	Measured Max. Out of Band Emission (dBm)	Limit (dBm)		Verdict
		Carrier Level	Calculated 20 dBc Limit	
GFSK	-25.70	11.30	-8.70	Pass
8-DPSK	-24.94	10.41	-9.59	Pass

Test Plots

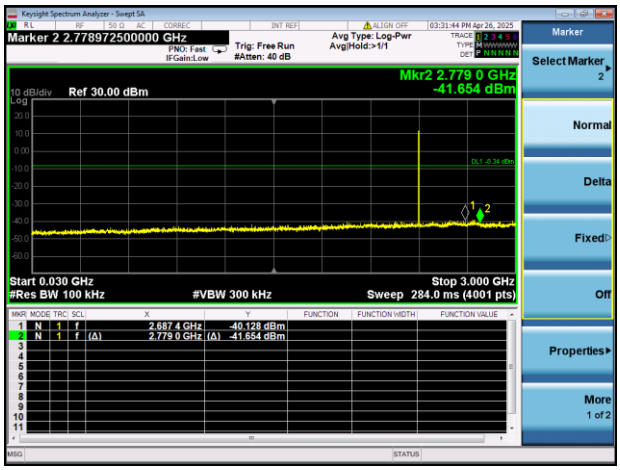
GFSK LOW CHANNEL, CARRIER LEVEL



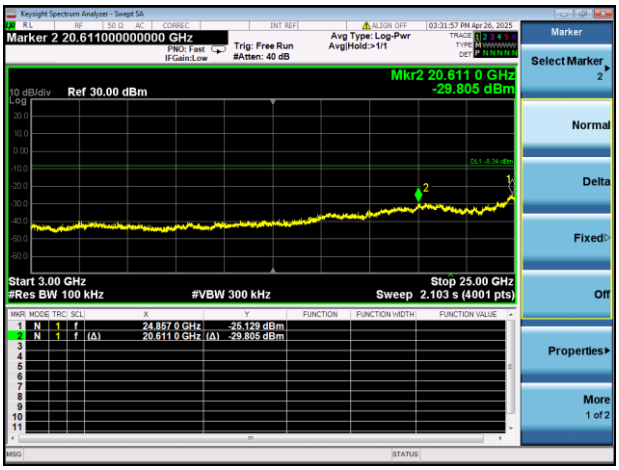
GFSK LOW CHANNEL, BAND EDGE



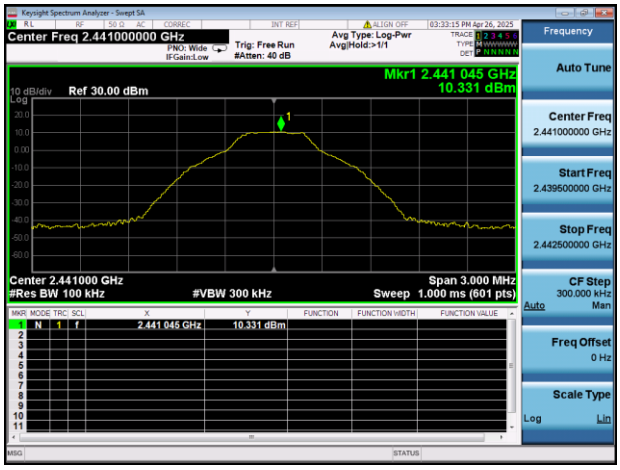
GFSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



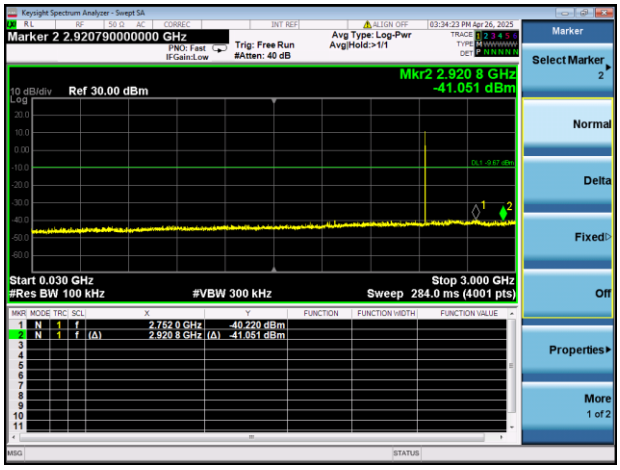
GFSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz



GFSK MIDDLE CHANNEL, CARRIER LEVEL

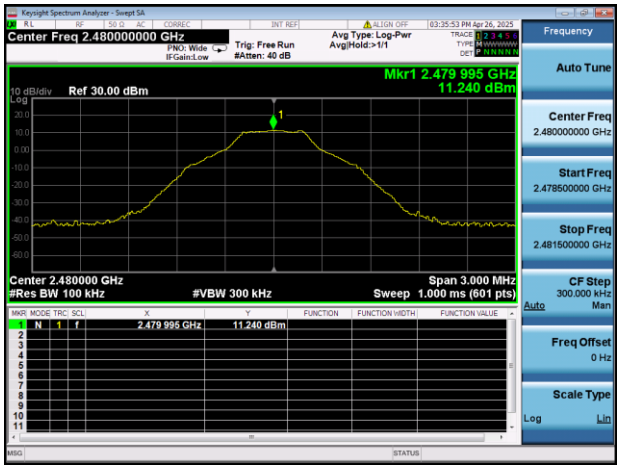


GFSK MIDDLE CHANNEL, SPURIOUS
30 MHz ~ 3 GHz

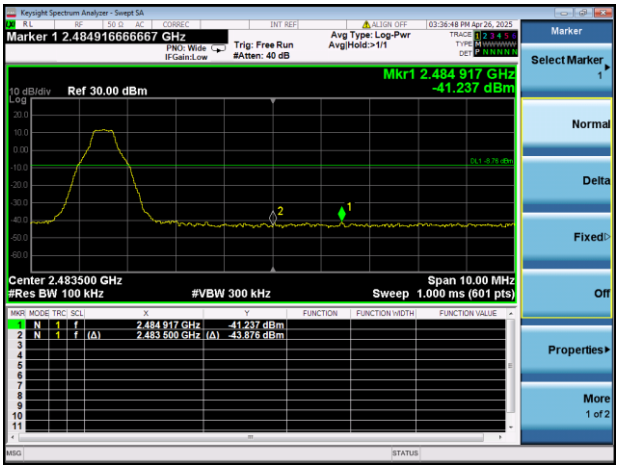


GFSK MIDDLE CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

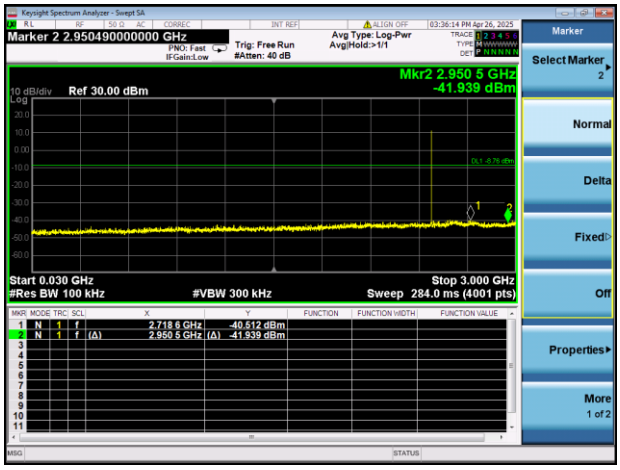
GFSK HIGH CHANNEL, CARRIER LEVEL



GFSK HIGH CHANNEL, BAND EDGE

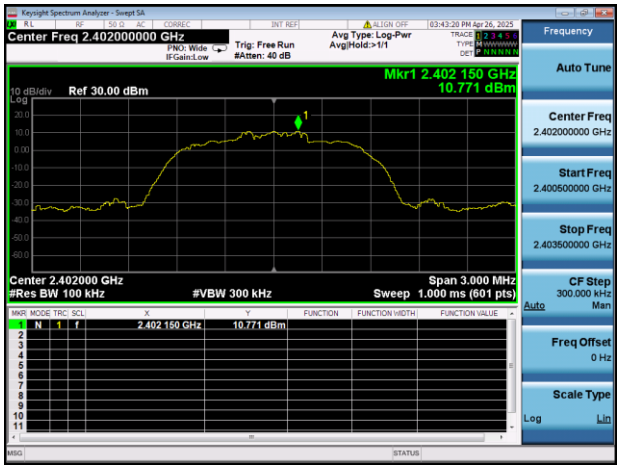


GFSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz

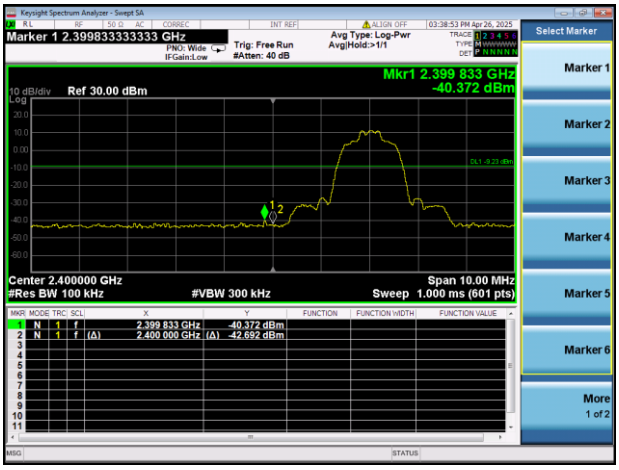


GFSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz

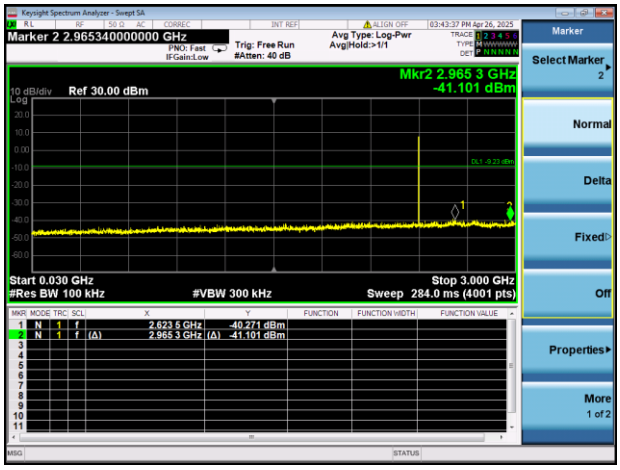
8-DPSK LOW CHANNEL, CARRIER LEVEL



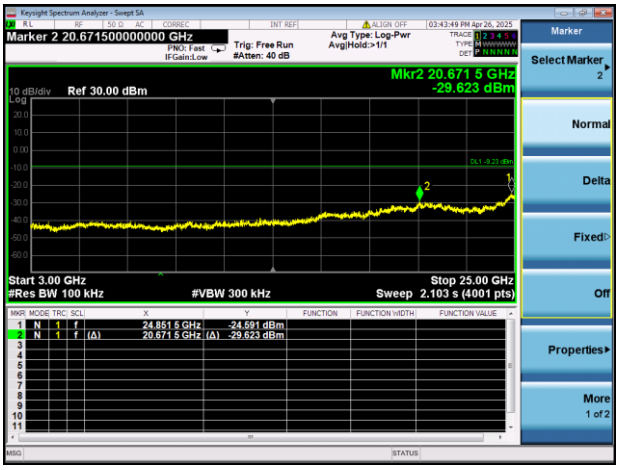
8-DPSK LOW CHANNEL, BAND EDGE



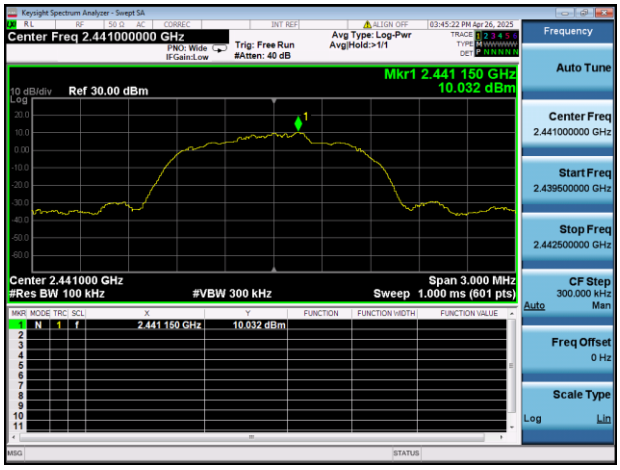
8-DPSK LOW CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



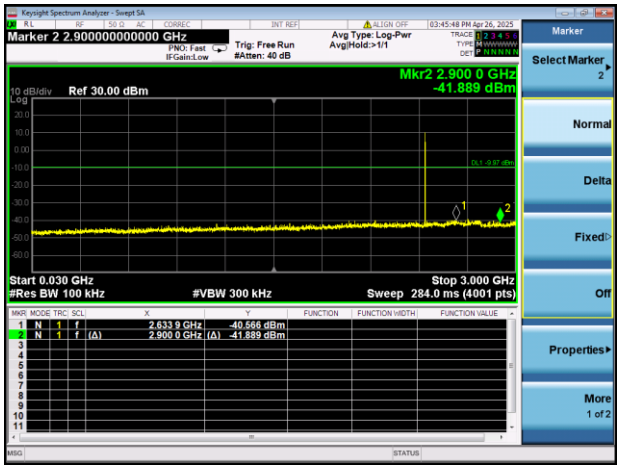
8-DPSK LOW CHANNEL, SPURIOUS
3 GHz ~ 25 GHz



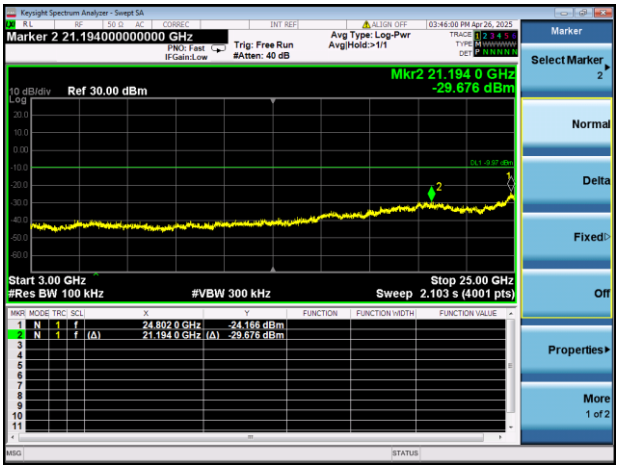
8-DPSK MIDDLE CHANNEL, CARRIER LEVEL



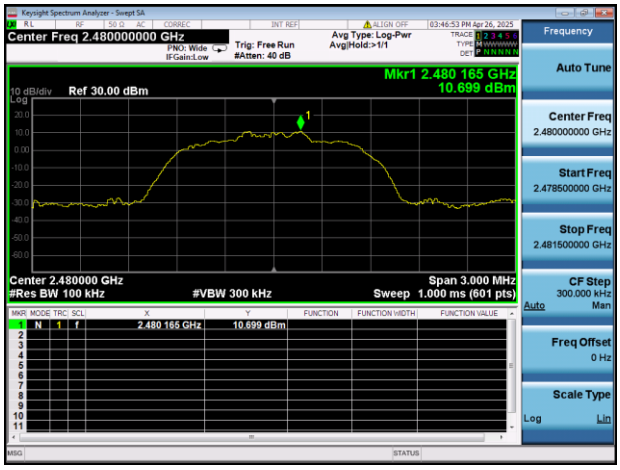
8-DPSK MIDDLE CHANNEL, SPURIOUS 30 MHz ~ 3 GHz



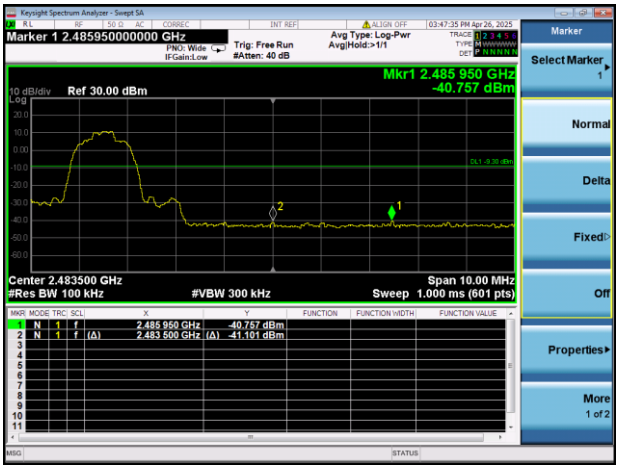
8-DPSK MIDDLE CHANNEL, SPURIOUS 3 GHz ~ 25 GHz



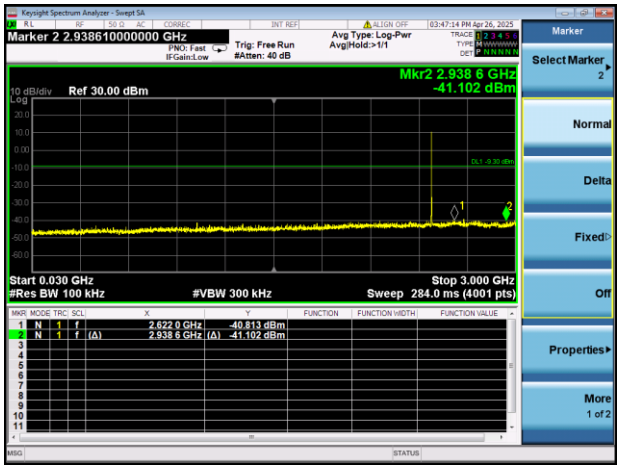
8-DPSK HIGH CHANNEL, CARRIER LEVEL



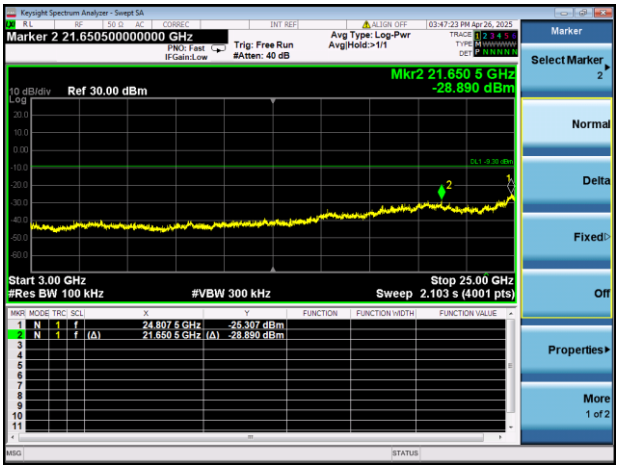
8-DPSK HIGH CHANNEL, BAND EDGE



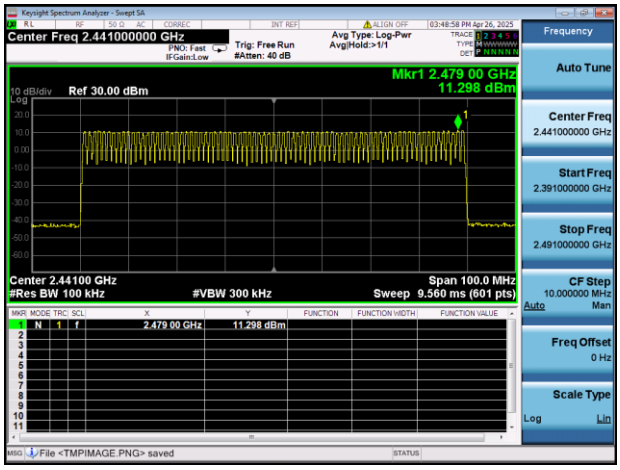
8-DPSK HIGH CHANNEL, SPURIOUS
30 MHz ~ 3 GHz



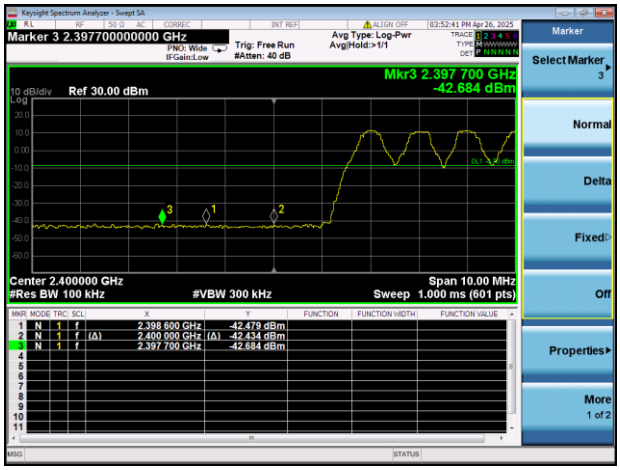
8-DPSK HIGH CHANNEL, SPURIOUS
3 GHz ~ 25 GHz



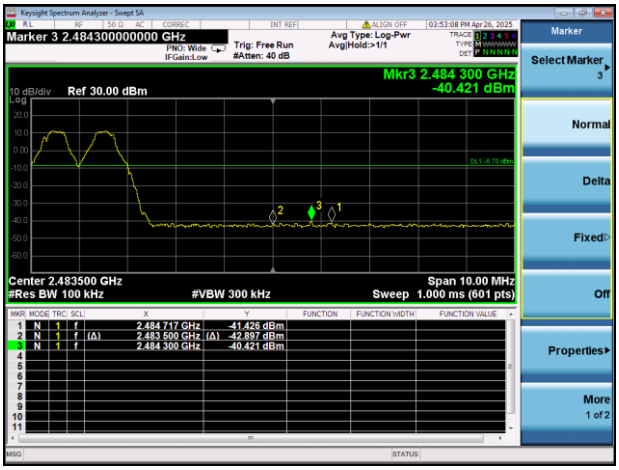
GFSK HOPPING, CARRIER LEVEL



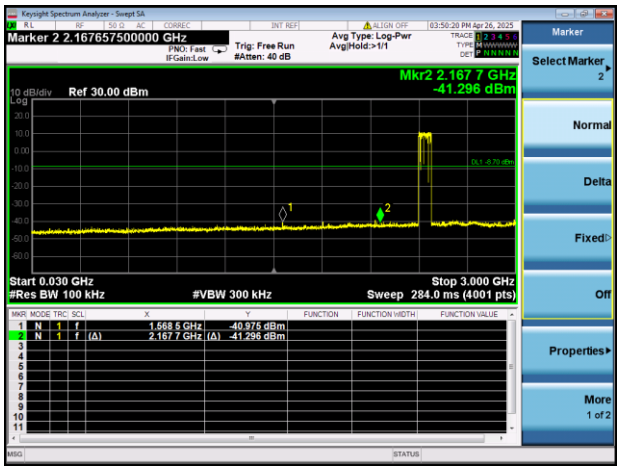
GFSK HOPPING BAND EDGE (LOW)



GFSK HOPPING BAND EDGE (HIGH)

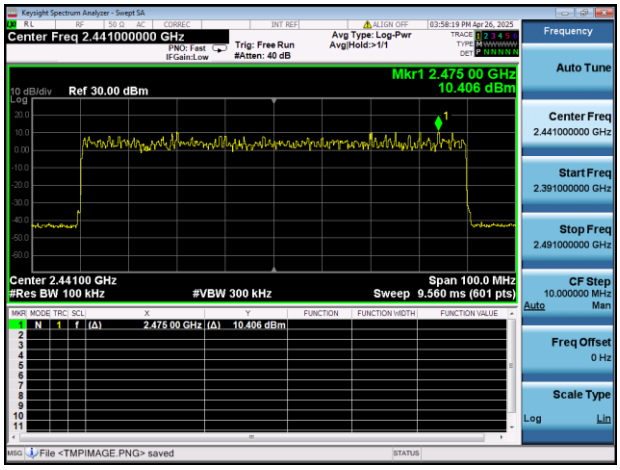


GFSK Hopping Mode, SPURIOUS 30 MHz ~ 3 GHz

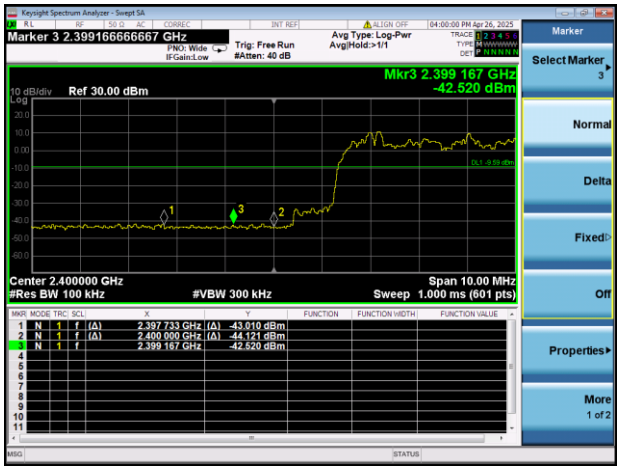


GFSK Hopping Mode, SPURIOUS 3GHz ~ 25 GHz

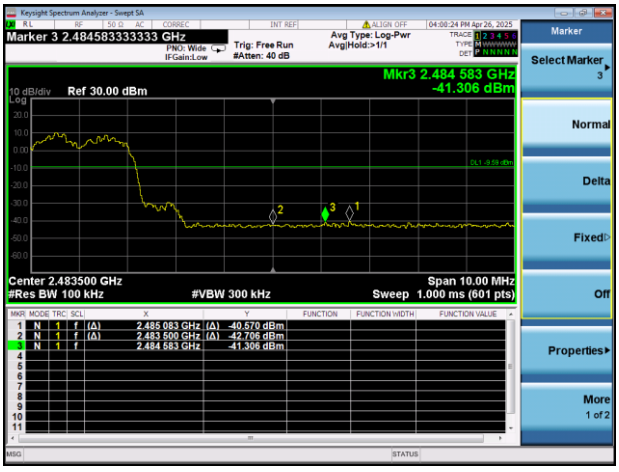
8-DPSK HOPPING, CARRIER LEVEL



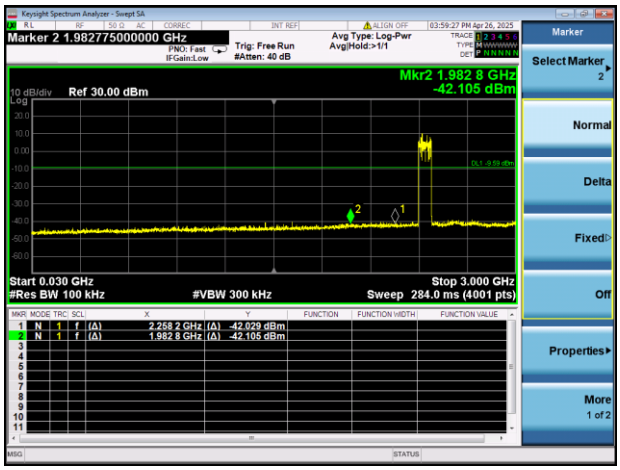
8-DPSK Hopping BAND EDGE (LOW)



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

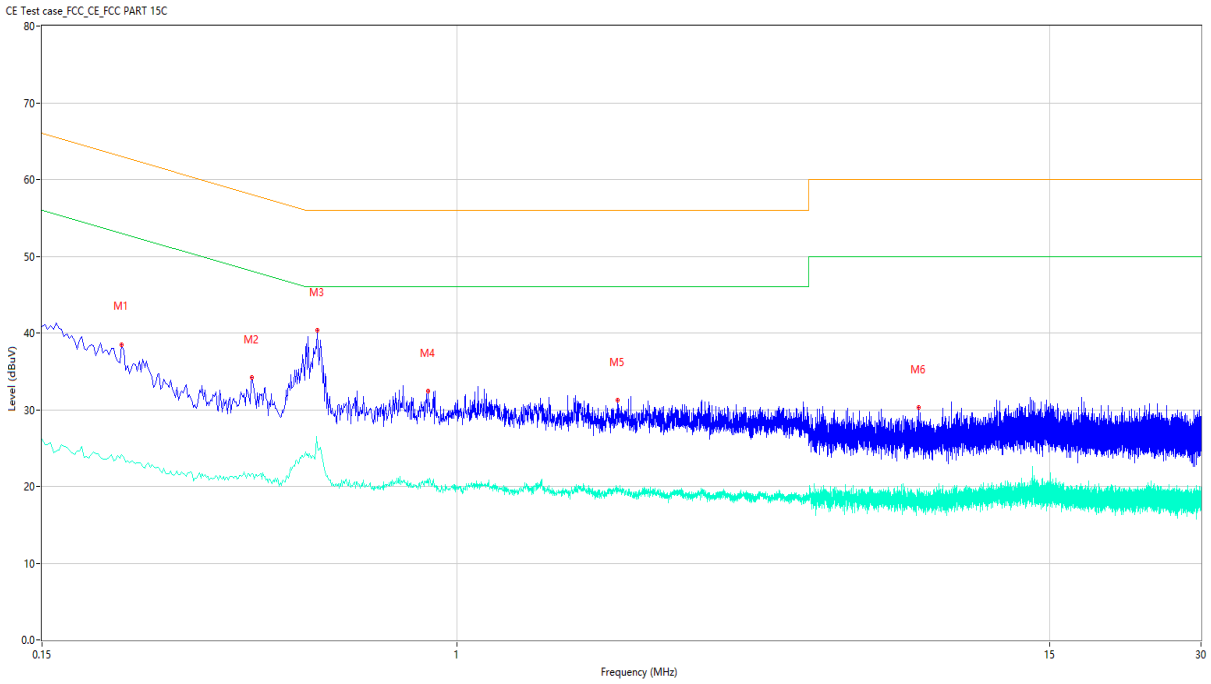
Note 1: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

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)

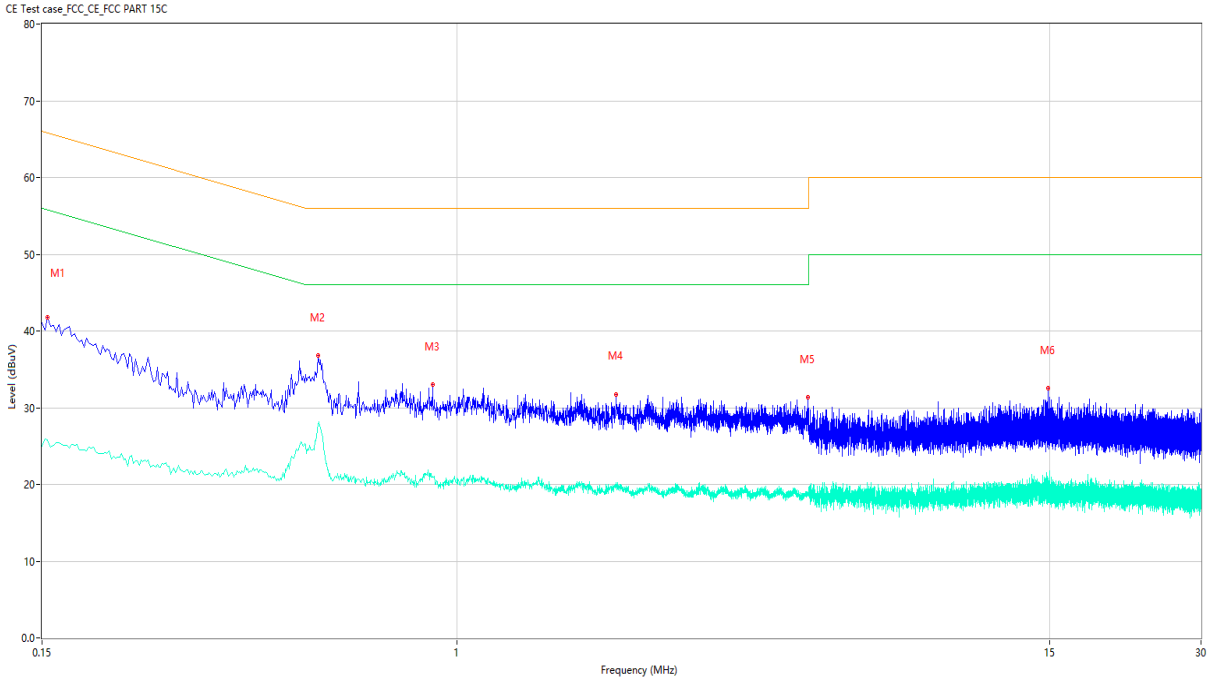
Test Data and Plots

PHASE L



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.216	38.50	9.74	62.97	24.47	Peak	L	Pass
1**	0.216	24.10	9.74	52.97	28.87	AV	L	Pass
2	0.392	34.16	9.74	58.02	23.86	Peak	L	Pass
2**	0.392	21.61	9.74	48.02	26.41	AV	L	Pass
3	0.528	40.30	9.75	56.00	15.70	Peak	L	Pass
3**	0.528	25.33	9.75	46.00	20.67	AV	L	Pass
4	0.876	32.43	9.72	56.00	23.57	Peak	L	Pass
4**	0.876	20.72	9.72	46.00	25.28	AV	L	Pass
5	2.082	31.24	9.76	56.00	24.76	Peak	L	Pass
5**	2.082	19.41	9.76	46.00	26.59	AV	L	Pass
6	8.250	30.28	9.33	60.00	29.72	Peak	L	Pass
6**	8.250	18.78	9.33	50.00	31.22	AV	L	Pass

PHASE N



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.154	41.83	9.83	65.78	23.95	Peak	N	Pass
1**	0.154	25.84	9.83	55.78	29.94	AV	N	Pass
2	0.530	36.77	9.76	56.00	19.23	Peak	N	Pass
2**	0.530	27.76	9.76	46.00	18.24	AV	N	Pass
3	0.894	33.02	9.75	56.00	22.98	Peak	N	Pass
3**	0.894	21.09	9.75	46.00	24.91	AV	N	Pass
4	2.072	31.77	9.65	56.00	24.23	Peak	N	Pass
4**	2.072	20.28	9.65	46.00	25.72	AV	N	Pass
5	4.972	31.32	9.59	56.00	24.68	Peak	N	Pass
5**	4.972	18.75	9.59	46.00	27.25	AV	N	Pass
6	14.930	32.52	8.93	60.00	27.48	Peak	N	Pass
6**	14.930	19.04	8.93	50.00	30.96	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.

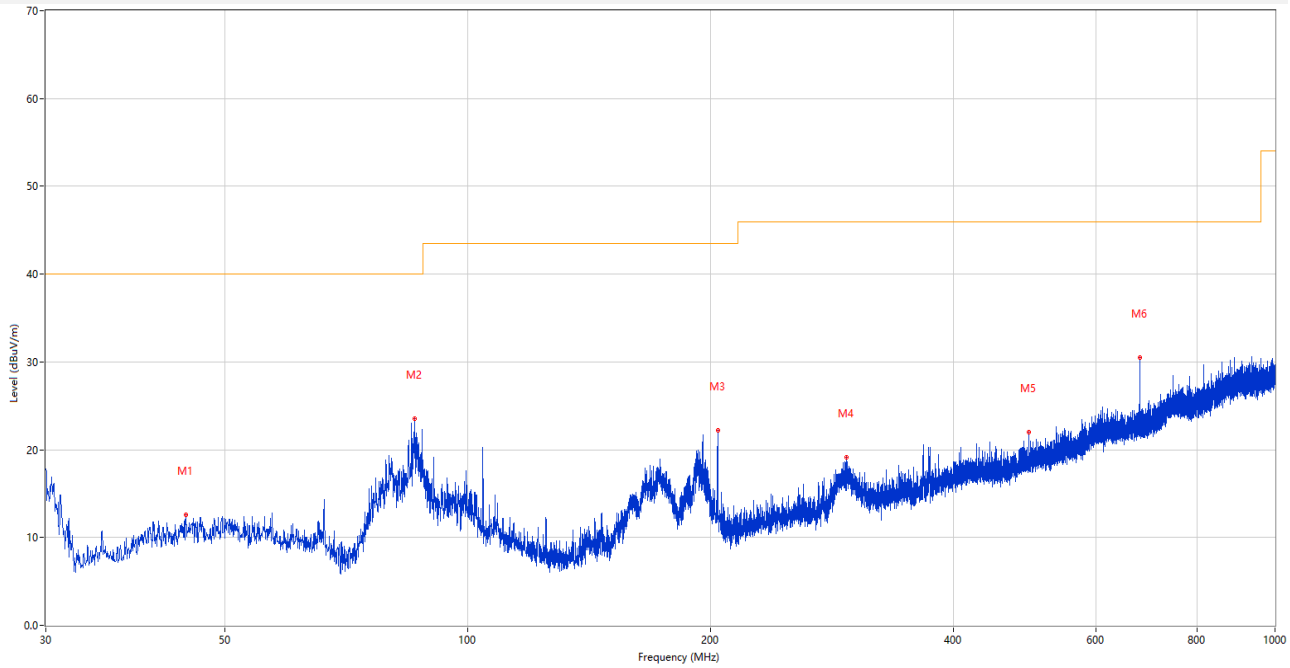
Note 3: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested.

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.

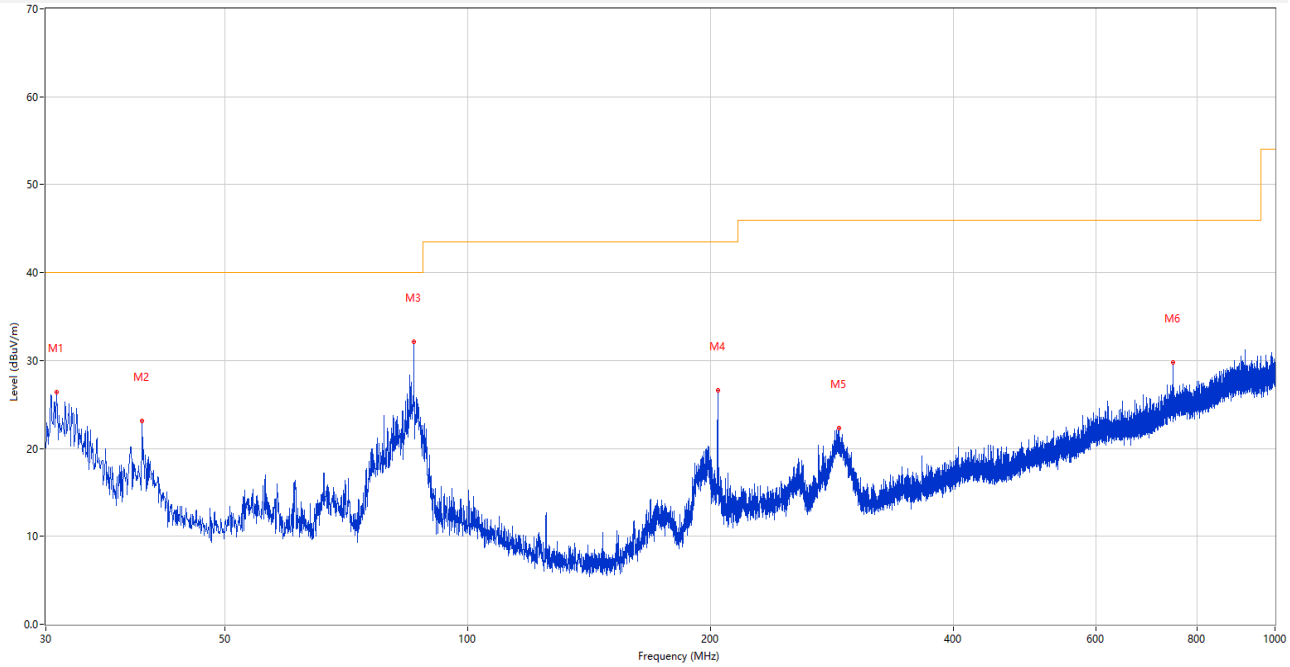
Test Data and Plots

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	44.696	12.63	-24.79	40.0	27.37	Peak	319.00	100	Horizontal	Pass
2	85.872	23.57	-29.44	40.0	16.43	Peak	360.00	100	Horizontal	Pass
3	203.970	22.20	-26.28	43.5	21.30	Peak	81.00	200	Horizontal	Pass
4	294.762	19.16	-23.23	46.0	26.84	Peak	174.00	100	Horizontal	Pass
5	495.018	21.97	-18.19	46.0	24.03	Peak	360.00	100	Horizontal	Pass
6	679.997	30.49	-14.11	46.0	15.51	Peak	252.00	200	Horizontal	Pass

30 MHz to 1 GHz, ANT V

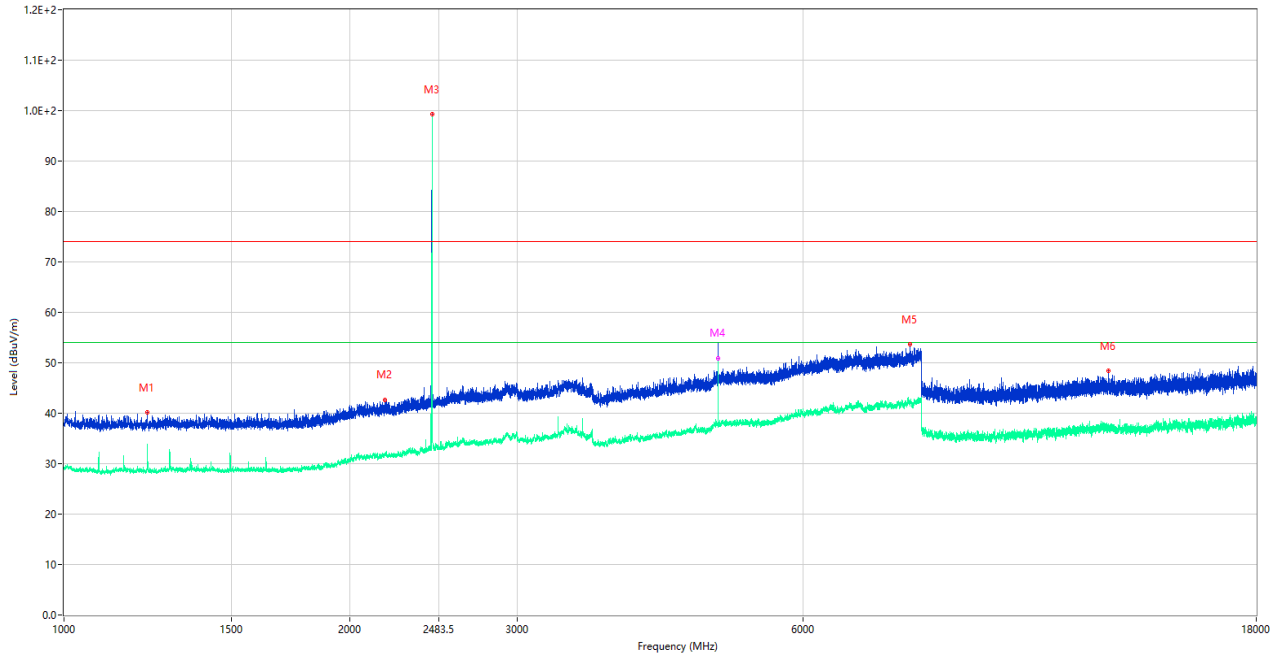


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	30.970	26.37	-29.10	40.0	13.63	Peak	0.00	100	Vertical	Pass
2	39.506	23.17	-26.08	40.0	16.83	Peak	332.00	100	Vertical	Pass
3	85.727	32.12	-29.50	40.0	7.88	Peak	270.00	100	Vertical	Pass
4	204.018	26.61	-26.29	43.5	16.89	Peak	142.00	200	Vertical	Pass
5	288.020	22.35	-23.22	46.0	23.65	Peak	209.00	100	Vertical	Pass
6	747.994	29.78	-11.98	46.0	16.22	Peak	343.00	100	Vertical	Pass

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

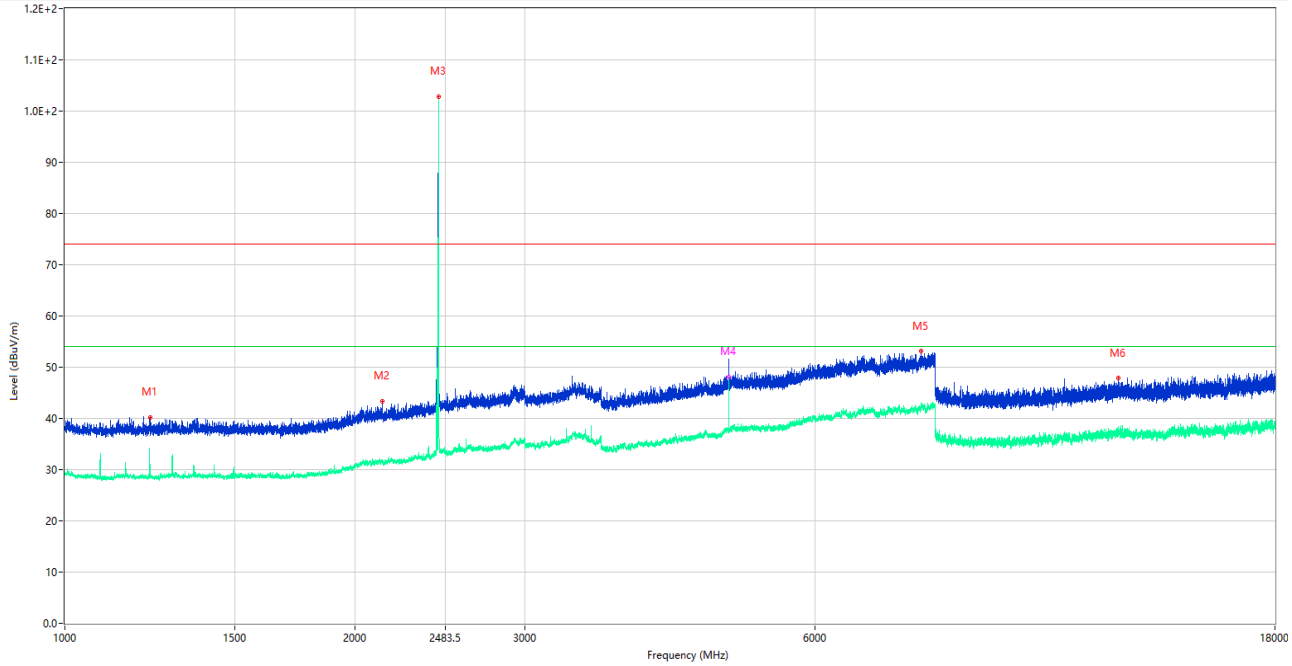
Note 2: The spurious from 18GHz-25GHz is noise only, do not show on the report.

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT H



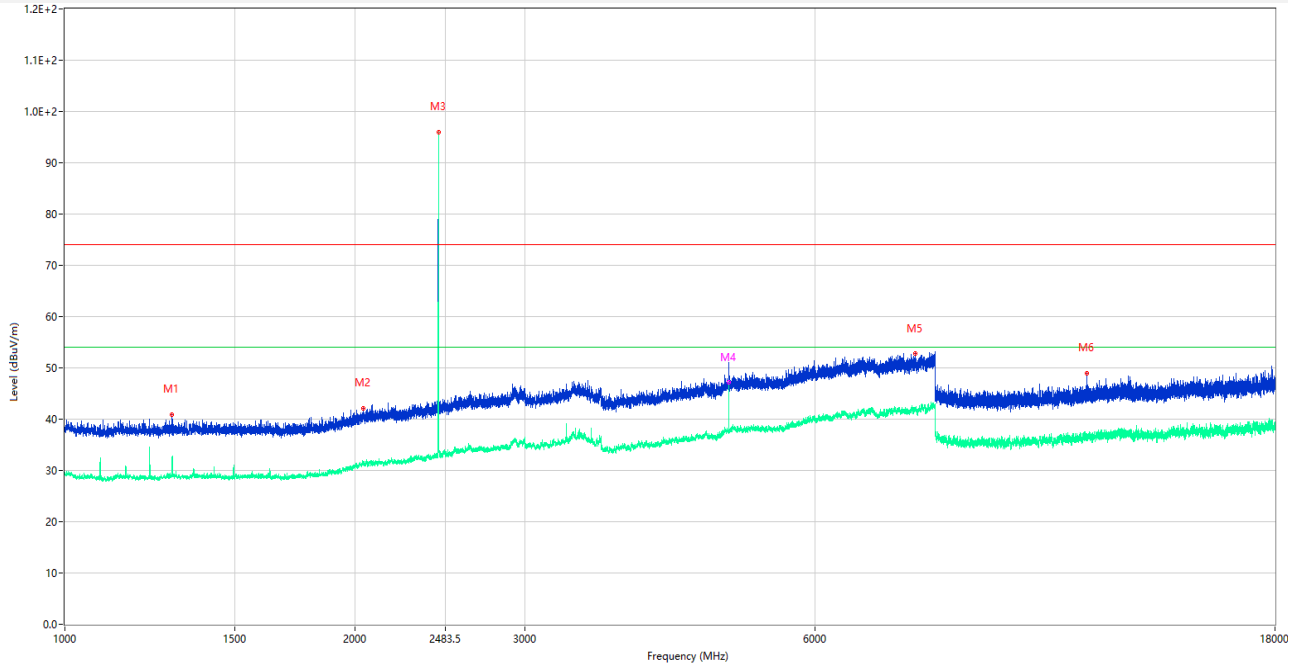
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1223.500	40.11	-15.99	74.0	33.89	Peak	239.00	150	Horizontal	Pass
1**	1223.500	31.50	-15.99	54.0	22.50	AV	239.00	150	Horizontal	Pass
2	2178.000	42.67	-12.84	74.0	31.33	Peak	136.00	150	Horizontal	Pass
2**	2178.000	31.75	-12.84	54.0	22.25	AV	136.00	150	Horizontal	Pass
3	2440.750	99.24	-12.38	74.0	-25.24	Peak	95.00	150	Horizontal	N/A
3**	2440.750	97.84	-12.38	54.0	-43.84	AV	95.00	150	Horizontal	N/A
4	4882.000	54.01	-2.31	74.0	19.99	Peak	121.00	150	Horizontal	Pass
4**	4882.000	50.90	-2.31	54.0	3.10	AV	121.00	150	Horizontal	Pass
5	7774.500	53.60	1.16	74.0	20.40	Peak	212.00	150	Horizontal	Pass
5**	7774.500	41.60	1.16	54.0	12.40	AV	212.00	150	Horizontal	Pass
6	12585.500	48.40	-2.73	74.0	25.60	Peak	9.00	150	Horizontal	Pass
6**	12585.500	37.03	-2.73	54.0	16.97	AV	9.00	150	Horizontal	Pass

GFSK MIDDLE CHANNEL 1 GHz to 18 GHz, ANT V



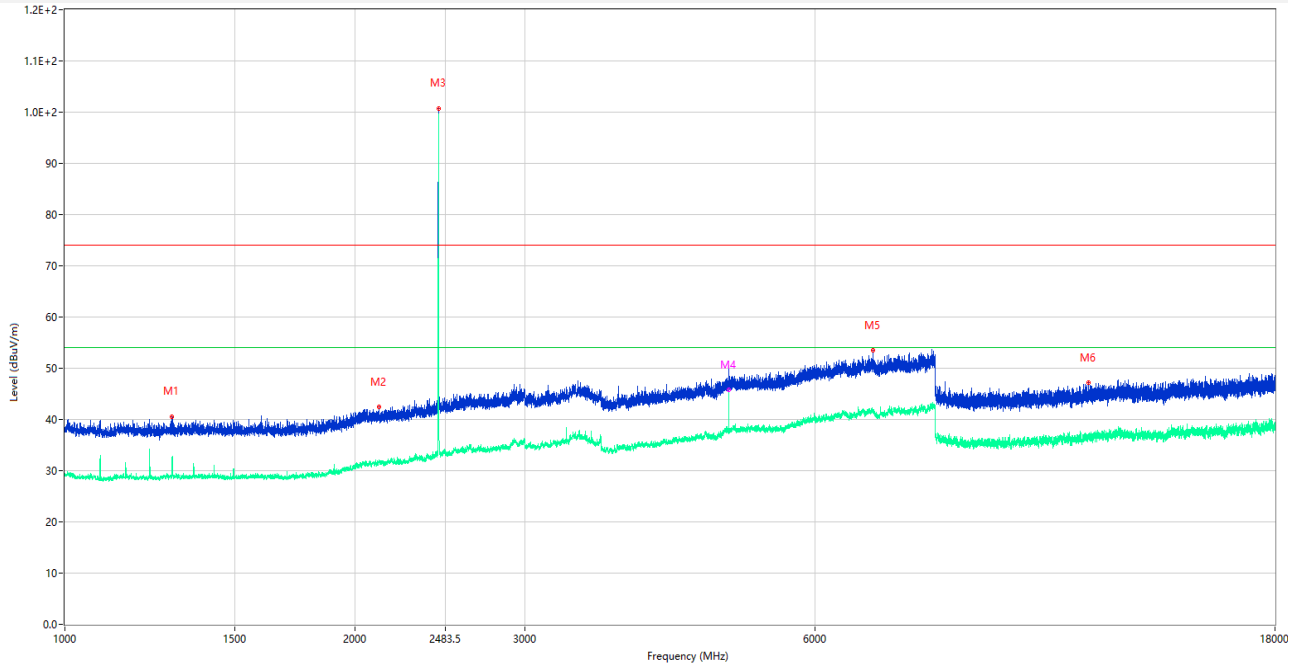
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1225.500	40.19	-15.99	74.0	33.81	Peak	171.00	150	Vertical	Pass
1**	1225.500	28.88	-15.99	54.0	25.12	AV	171.00	150	Vertical	Pass
2	2136.000	43.41	-13.52	74.0	30.59	Peak	358.00	150	Vertical	Pass
2**	2136.000	31.32	-13.52	54.0	22.68	AV	358.00	150	Vertical	Pass
3	2440.750	102.84	-12.38	74.0	-28.84	Peak	225.00	150	Vertical	N/A
3**	2440.750	101.42	-12.38	54.0	-47.42	AV	225.00	150	Vertical	N/A
4	4882.000	51.64	-2.31	74.0	22.36	Peak	320.00	150	Vertical	Pass
4**	4882.000	48.10	-2.31	54.0	5.90	AV	320.00	150	Vertical	Pass
5	7734.500	53.12	1.16	74.0	20.88	Peak	1.00	150	Vertical	Pass
5**	7734.500	42.45	1.16	54.0	11.55	AV	1.00	150	Vertical	Pass
6	12376.001	47.84	-2.23	74.0	26.16	Peak	152.00	150	Vertical	Pass
6**	12376.001	38.06	-2.23	54.0	15.94	AV	152.00	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	1292.000	40.90	-15.81	74.0	33.10	Peak	236.00	150	Horizontal	Pass
1**	1292.000	32.56	-15.81	54.0	21.44	AV	236.00	150	Horizontal	Pass
2	2039.250	42.12	-13.27	74.0	31.88	Peak	267.00	150	Horizontal	Pass
2**	2039.250	31.33	-13.27	54.0	22.67	AV	267.00	150	Horizontal	Pass
3	2441.000	96.02	-12.39	74.0	-22.02	Peak	84.00	150	Horizontal	N/A
3**	2441.000	95.29	-12.39	54.0	-41.29	AV	84.00	150	Horizontal	N/A
4	4882.500	49.49	-2.31	74.0	24.51	Peak	105.00	150	Horizontal	Pass
4**	4882.500	47.12	-2.31	54.0	6.88	AV	105.00	150	Horizontal	Pass
5	7623.000	52.78	0.50	74.0	21.22	Peak	145.00	150	Horizontal	Pass
5**	7623.000	41.99	0.50	54.0	12.01	AV	145.00	150	Horizontal	Pass
6	11473.000	49.02	-2.95	74.0	24.98	Peak	244.00	150	Horizontal	Pass
6**	11473.000	35.75	-2.95	54.0	18.25	AV	244.00	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	1292.000	40.59	-15.81	74.0	33.41	Peak	221.00	150	Vertical	Pass
1**	1292.000	32.67	-15.81	54.0	21.33	AV	221.00	150	Vertical	Pass
2	2117.250	42.37	-13.43	74.0	31.63	Peak	109.00	150	Vertical	Pass
2**	2117.250	32.13	-13.43	54.0	21.87	AV	109.00	150	Vertical	Pass
3	2441.000	100.72	-12.39	74.0	-26.72	Peak	197.00	150	Vertical	N/A
3**	2441.000	99.01	-12.39	54.0	-45.01	AV	197.00	150	Vertical	N/A
4	4882.500	49.42	-2.31	74.0	24.58	Peak	187.00	150	Vertical	Pass
4**	4882.500	45.75	-2.31	54.0	8.25	AV	187.00	150	Vertical	Pass
5	6887.500	53.48	0.63	74.0	20.52	Peak	285.00	150	Vertical	Pass
5**	6887.500	41.55	0.63	54.0	12.45	AV	285.00	150	Vertical	Pass
6	11529.000	47.15	-2.70	74.0	26.85	Peak	119.00	150	Vertical	Pass
6**	11529.000	36.11	-2.70	54.0	17.89	AV	119.00	150	Vertical	Pass

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

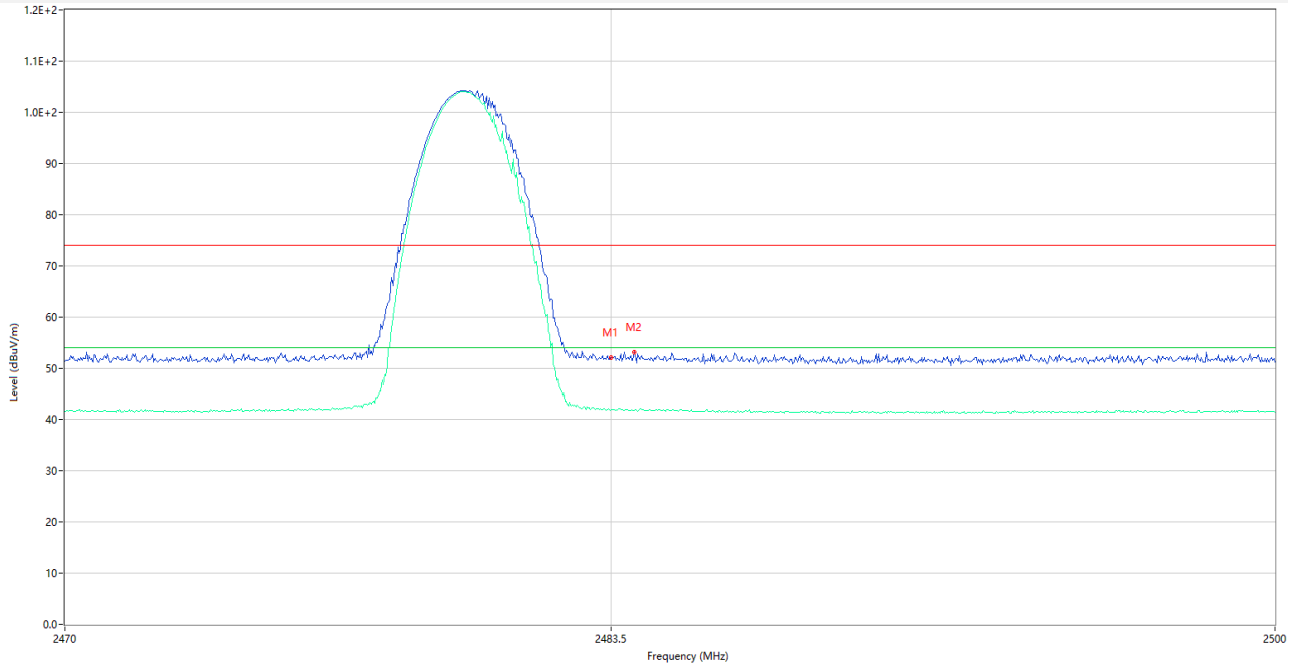
Note 1: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.
Note 2: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.
Note 3: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

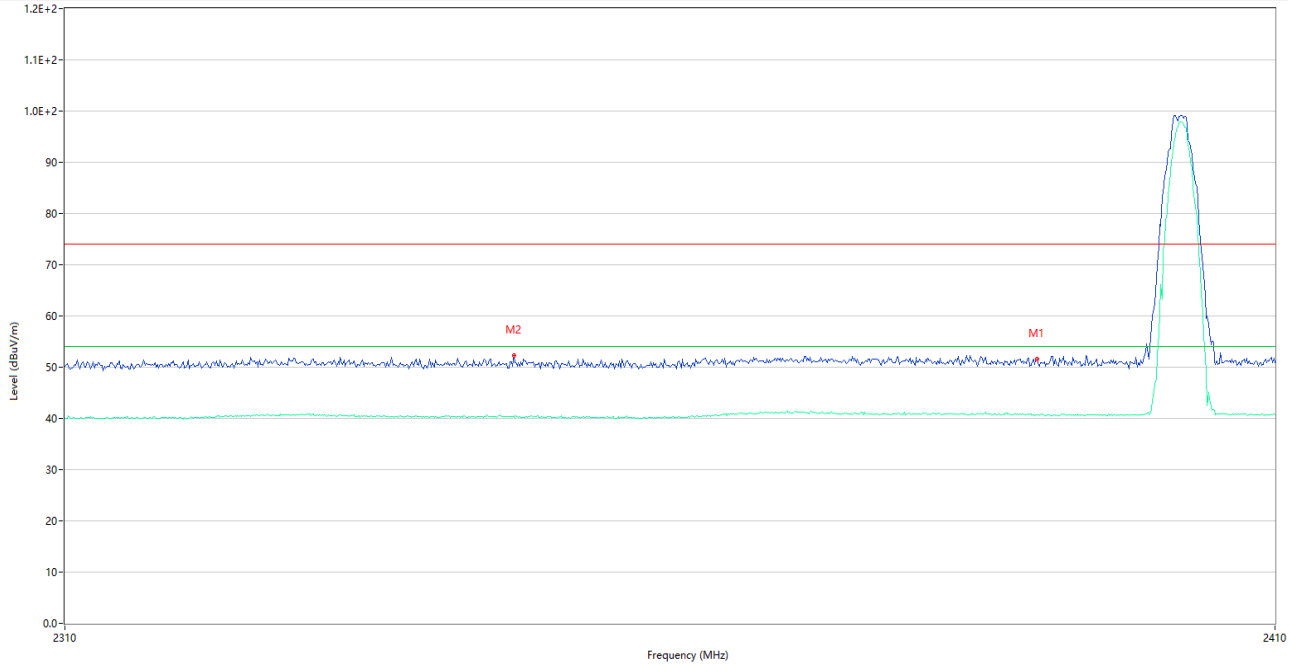
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2390.000	50.83	-4.87	74.0	23.17	Peak	295.63	150	Vertical	Pass
1**	2390.000	40.69	-4.87	54.0	13.31	AV	295.63	150	Vertical	Pass
2	2367.400	53.18	-4.29	74.0	20.82	Peak	45.00	150	Vertical	Pass
2**	2367.400	40.88	-4.29	54.0	13.12	AV	45.00	150	Vertical	Pass

GFSK HIGH CHANNEL



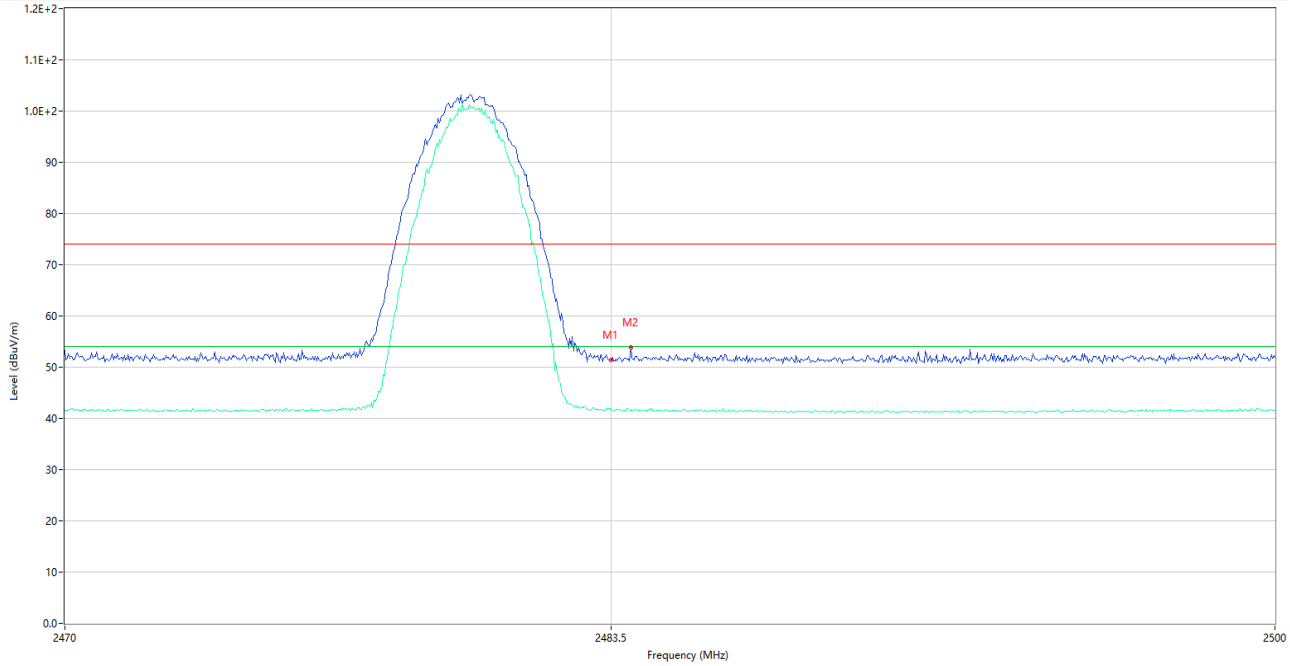
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	52.17	-3.78	74.0	21.83	Peak	280.00	150	Vertical	Pass
1**	2483.500	41.86	-3.78	54.0	12.14	AV	280.00	150	Vertical	Pass
2	2484.070	53.10	-3.78	74.0	20.90	Peak	360.00	150	Vertical	Pass
2**	2484.070	41.71	-3.78	54.0	12.29	AV	360.00	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	51.65	-4.87	74.0	22.35	Peak	5.28	150	Vertical	Pass
1**	2390.000	40.66	-4.87	54.0	13.34	AV	5.28	150	Vertical	Pass
2	2346.600	52.33	-4.81	74.0	21.67	Peak	25.00	150	Vertical	Pass
2**	2346.600	40.19	-4.81	54.0	13.81	AV	25.00	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	51.34	-3.78	74.0	22.66	Peak	187.00	150	Vertical	Pass
1**	2483.500	41.66	-3.78	54.0	12.34	AV	187.00	150	Vertical	Pass
2	2483.980	53.93	-3.78	74.0	20.07	Peak	200.00	150	Vertical	Pass
2**	2483.980	41.56	-3.78	54.0	12.44	AV	200.00	150	Vertical	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SH2540315-AR-1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SH2540315-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SH2540315-AI.PDF”.

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--END OF REPORT--