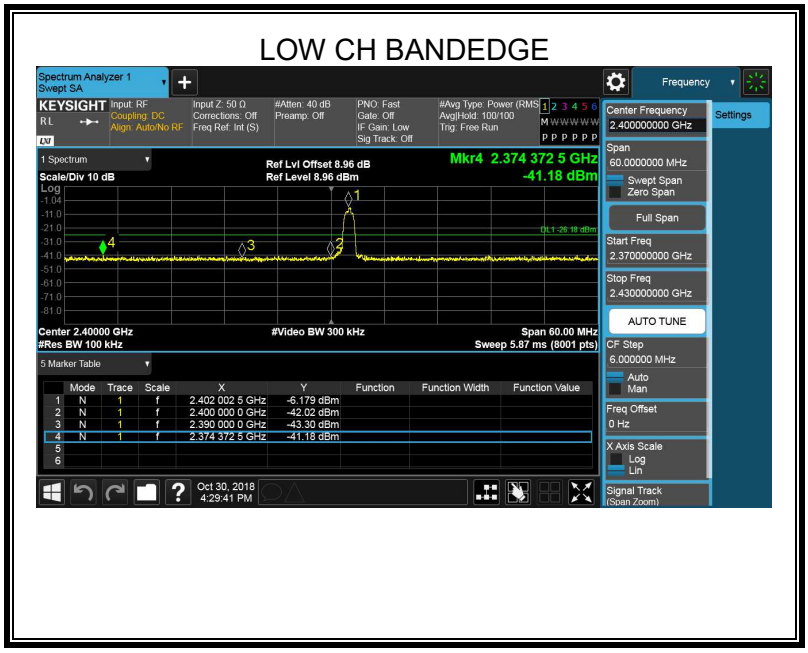
6.7.2. 8DPSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL



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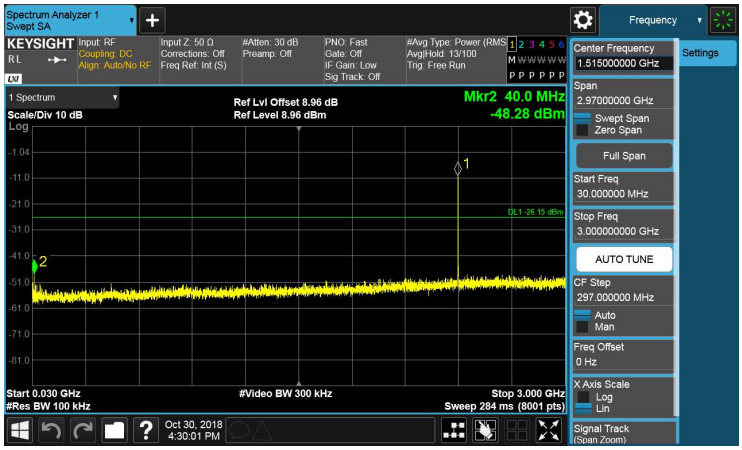
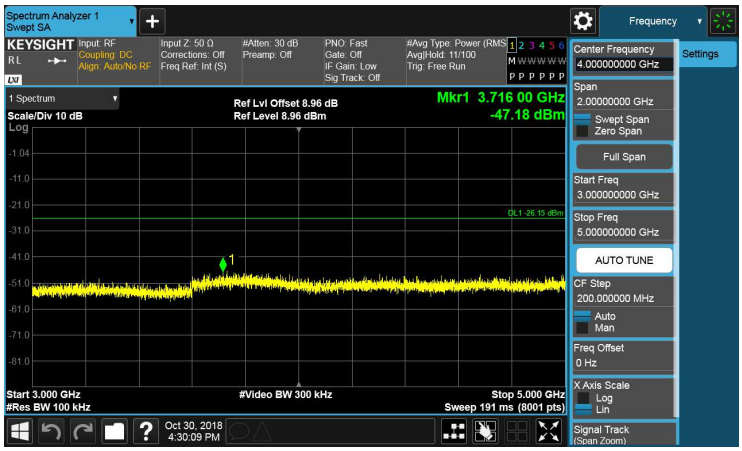
LOW CH SPURIOUS

30MHz-3GHz



3GHz-5GHz



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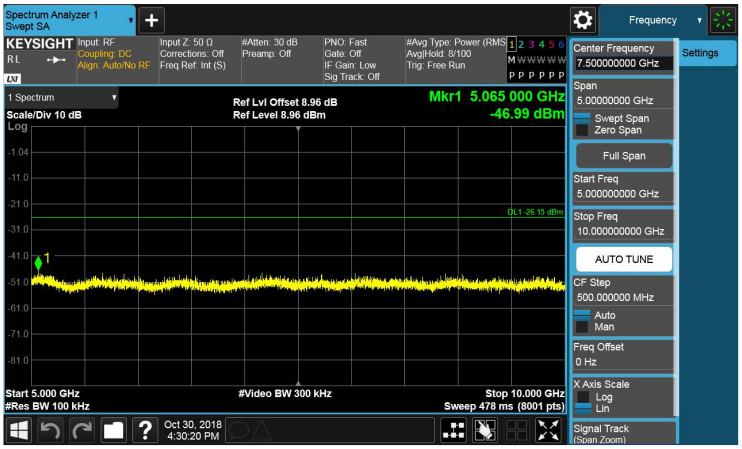
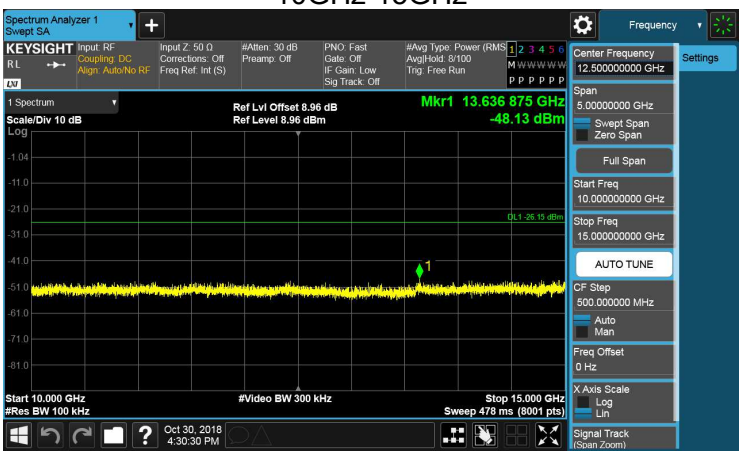
LOW CH SPURIOUS

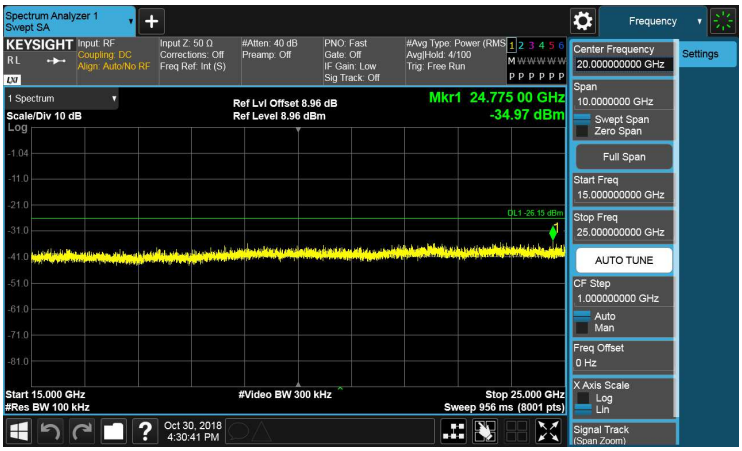
5GHz-10GHz



10GHz-15GHz



15GHz-25GHz



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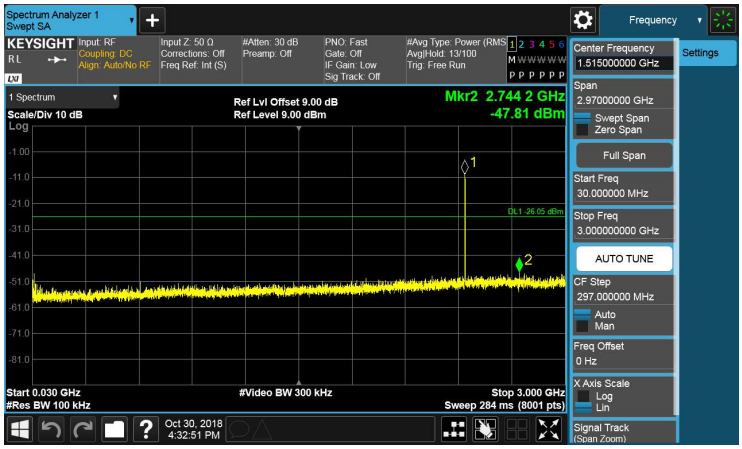
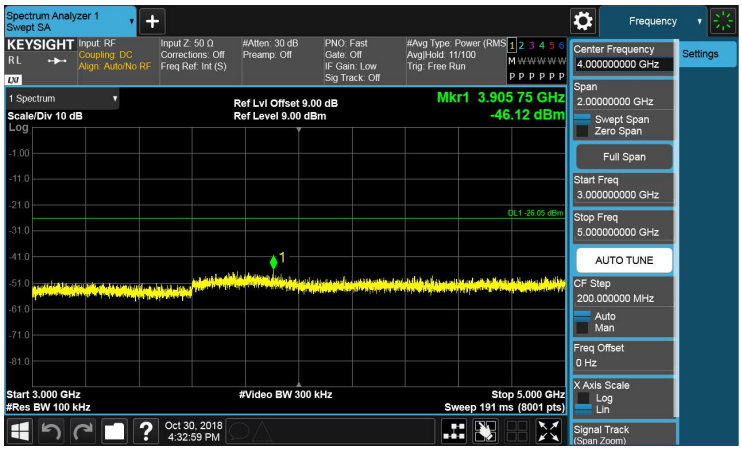
SPURIOUS EMISSIONS, MID CHANNEL

MID CH SPURIOUS

30MHz-3GHz



3GHz -5GHz



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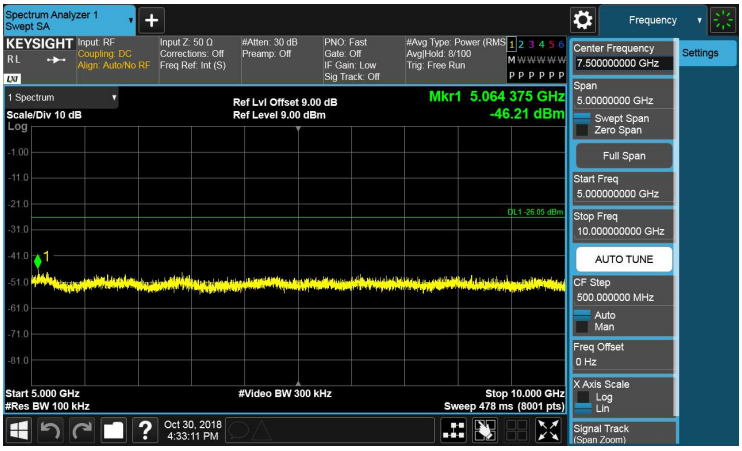
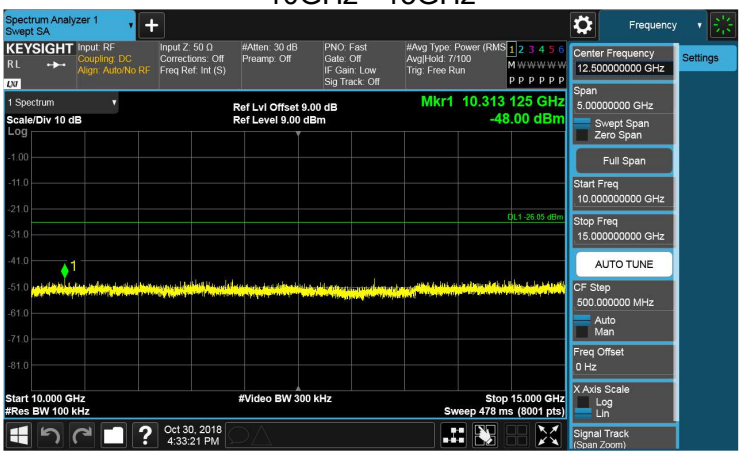
MID CH SPURIOUS

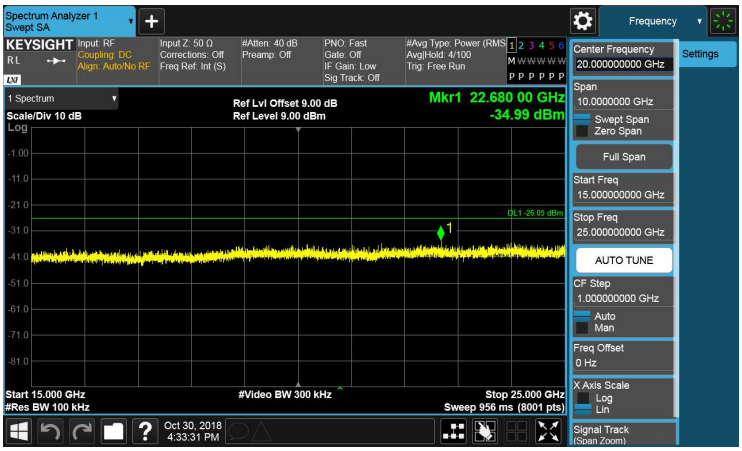
5GHz -10GHz



10GHz - 15GHz



15GHz - 25GHz



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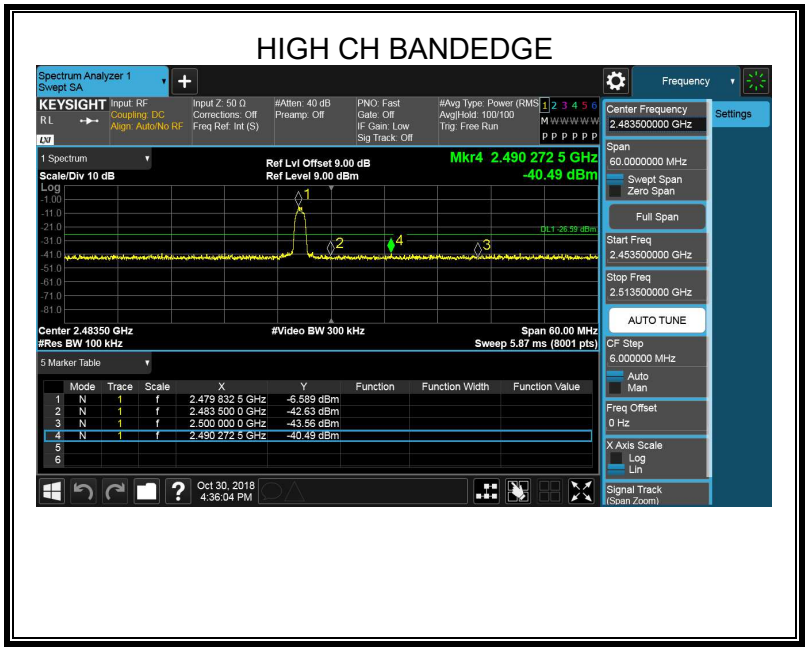
SPURIOUS EMISSIONS, HIGH CHANNEL



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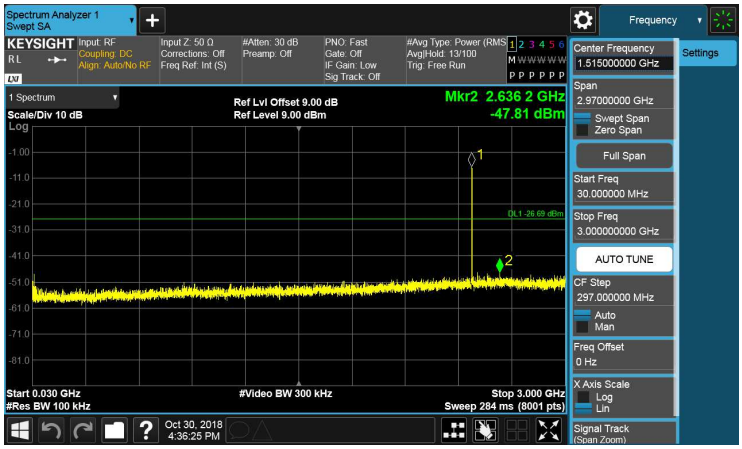
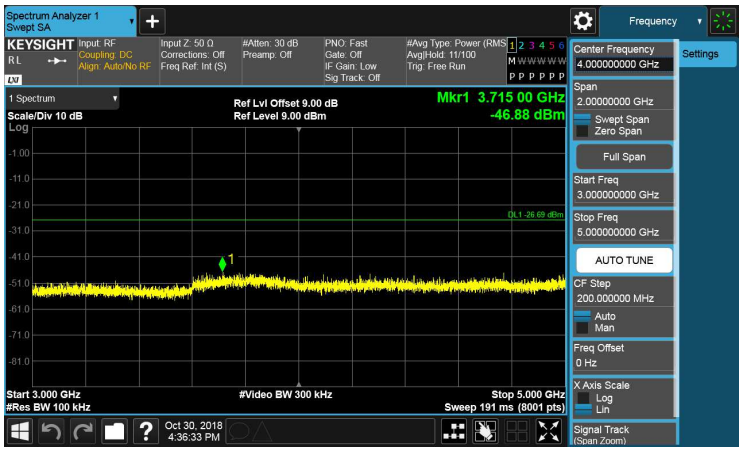
HIGH CH SPURIOUS

30MHz - 3GHz



3GHz - 5GHz



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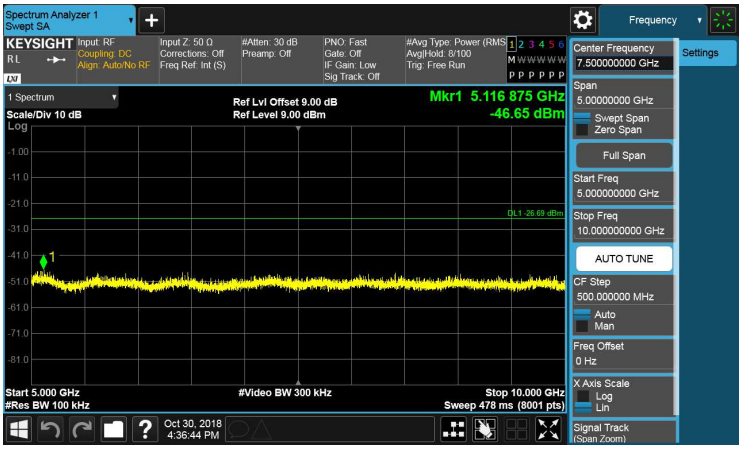
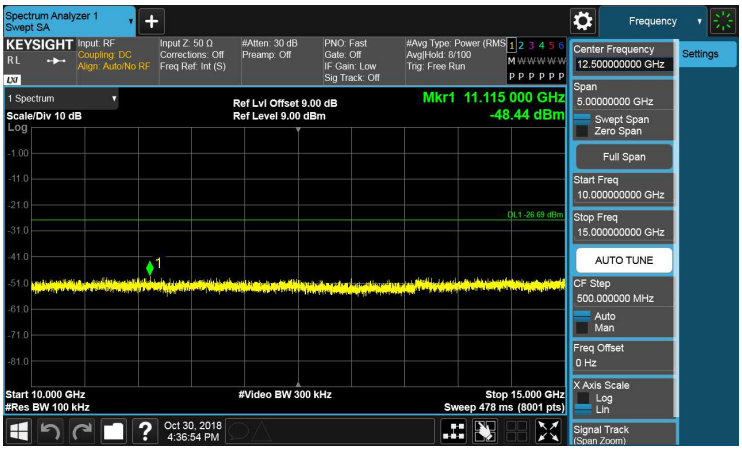
HIGH CH SPURIOUS

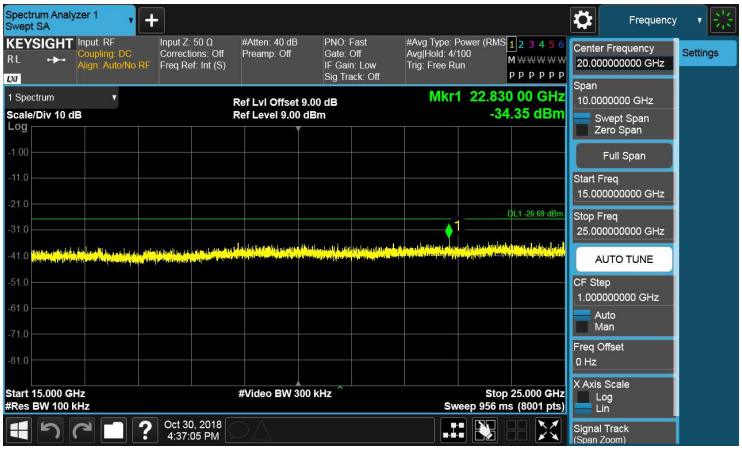
5GHz - 10GHz



10GHz - 15GHz



15GHz - 25GHz



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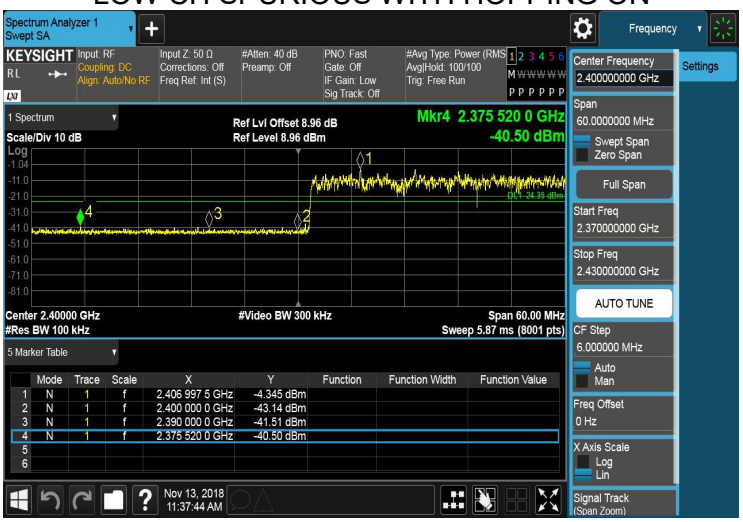
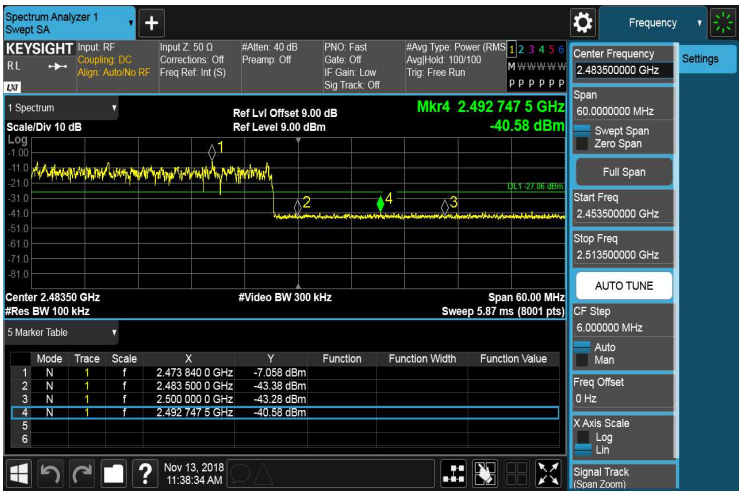
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW CH SPURIOUS WITH HOPPING ON



HIGH CH SPURIOUS WITH HOPPING ON



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7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to SS-GEN Clause 8.9 and Clause 8.10

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

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Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

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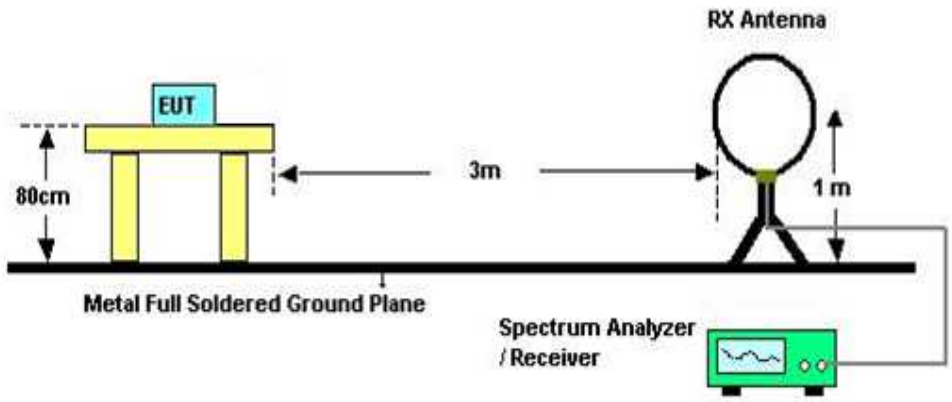
TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum Analyzer

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80cm meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

8. Result level = Read level + Antenna Factor + Cable loss

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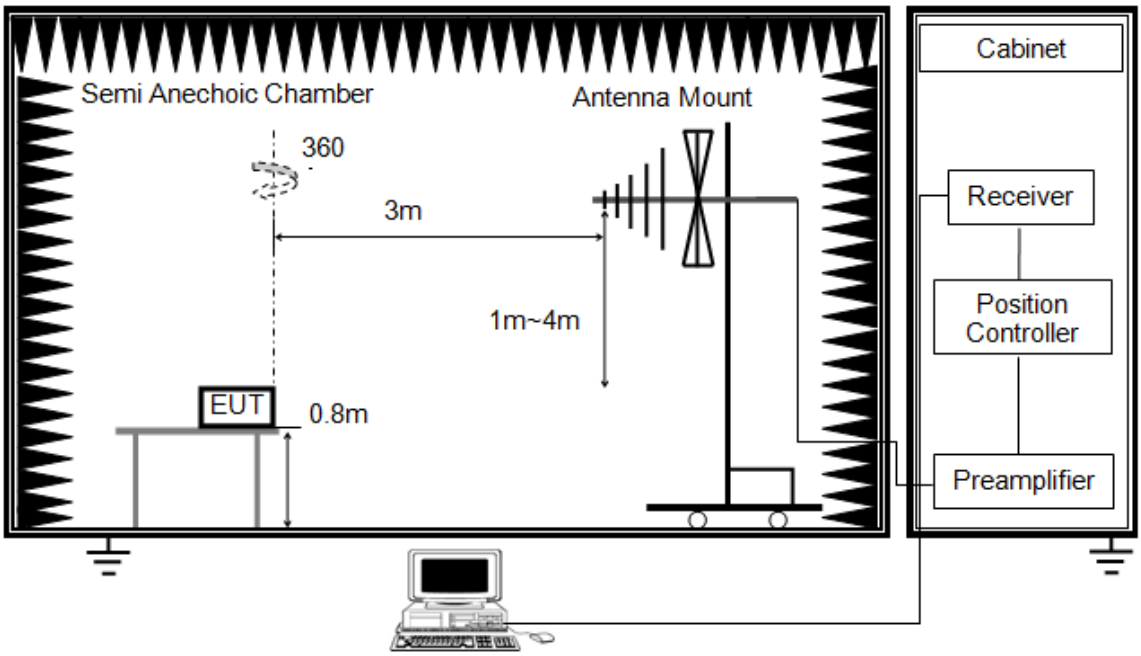

The setting of the spectrum Analyzer

RBW	120K
VBW	300K
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

6. For the actual test configuration, please refer to the related item in this test report.

7. Result level = Read level + Antenna Factor + Cable loss

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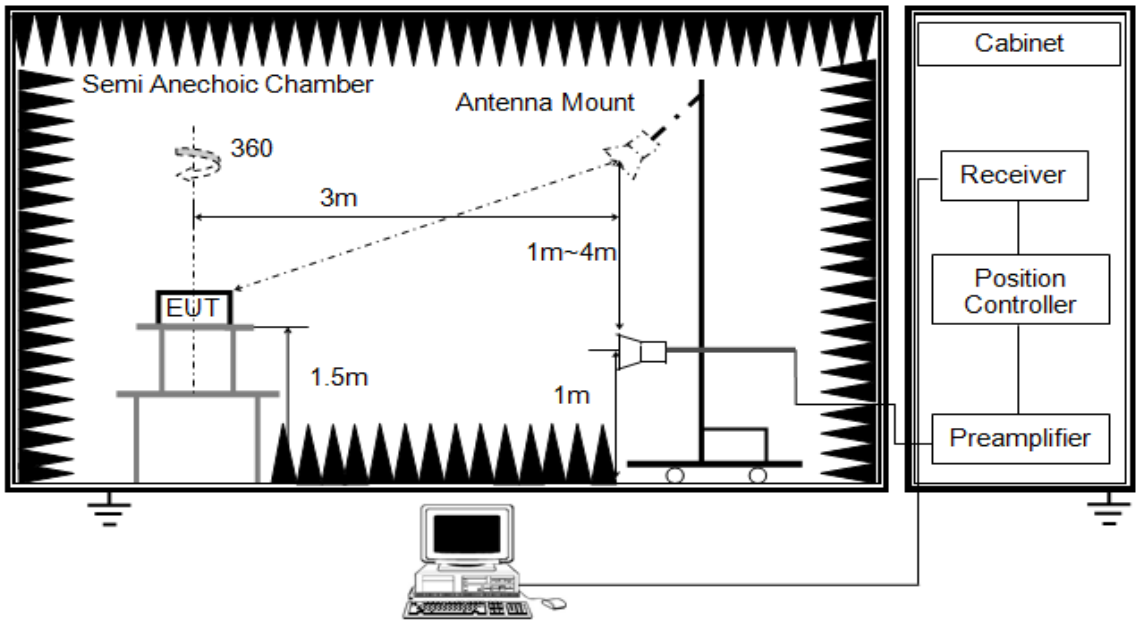

RBW	1M
VBW	PEAK: 3M AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector. For the Duty Cycle please refer to clause 6.1.ON TIME AND DUTY CYCLE.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

8. Result level = Read level + Antenna Factor + Cable loss

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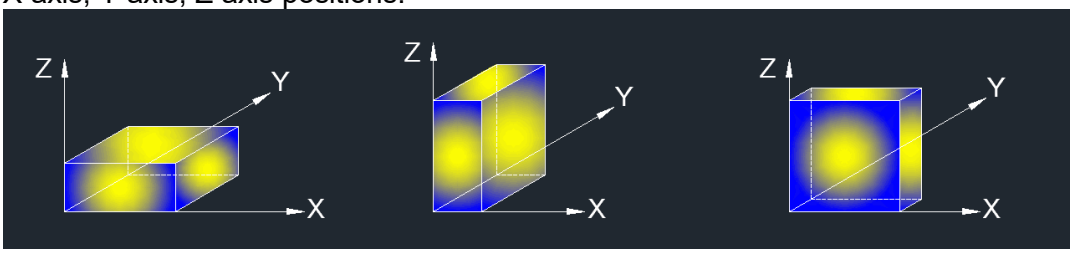
X axis, Y axis, Z axis positions:

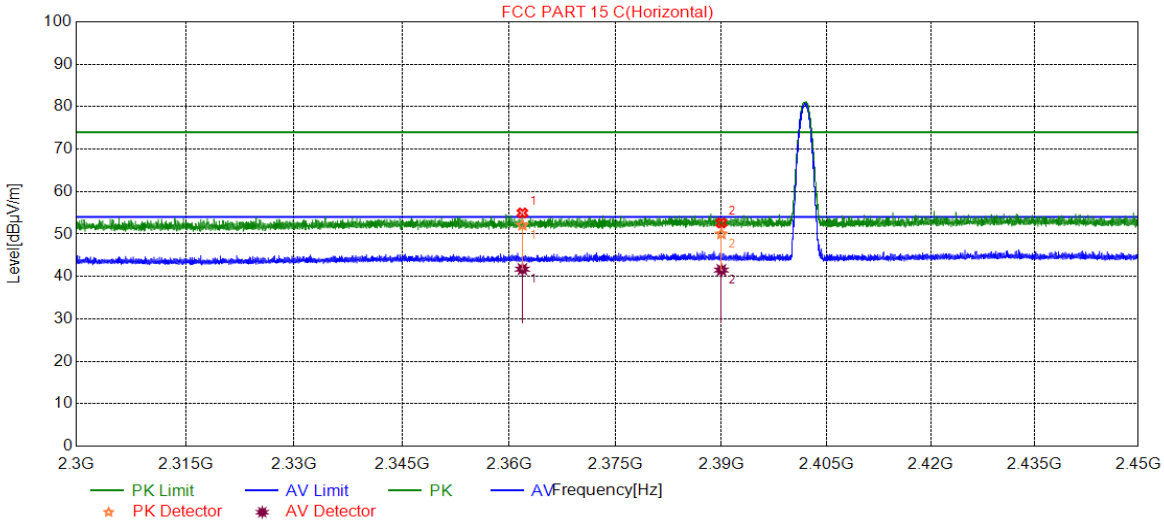


Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

7.2. RESTRICTED BANDEDGE

7.2.1. GFSK MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2361.8662	52.05	74.00	-21.95	Peak
	2361.8662	41.72	54.00	-12.28	Average
2	2390.0000	50.00	74.00	-24.00	Peak
	2390.0000	41.50	54.00	-12.50	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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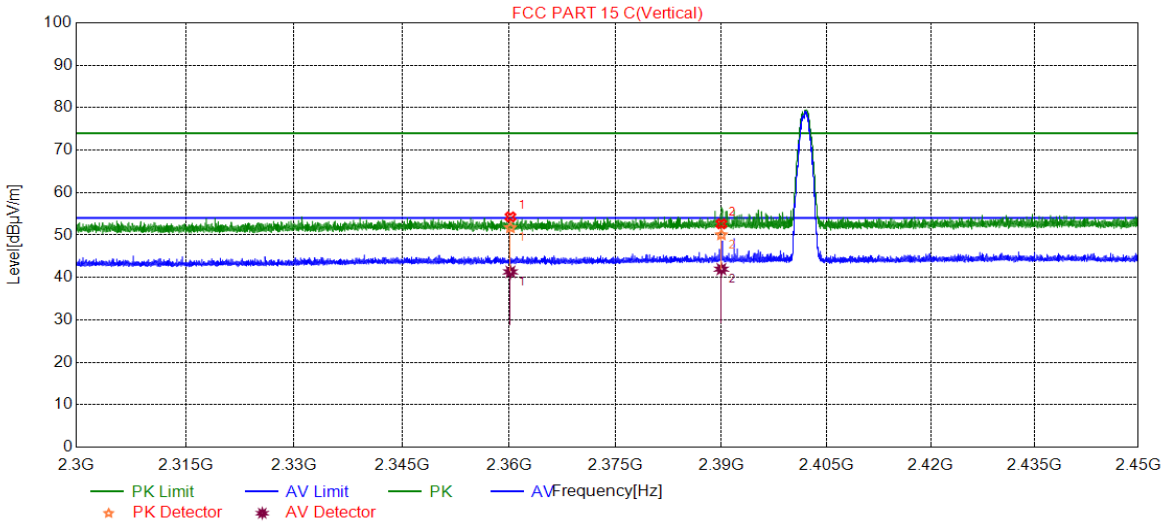
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2360.1860	51.71	74.00	-22.29	Peak
	2360.1860	41.31	54.00	-12.69	Average
2	2390.0000	50.03	74.00	-23.97	Peak
	2390.0000	41.95	54.00	-12.05	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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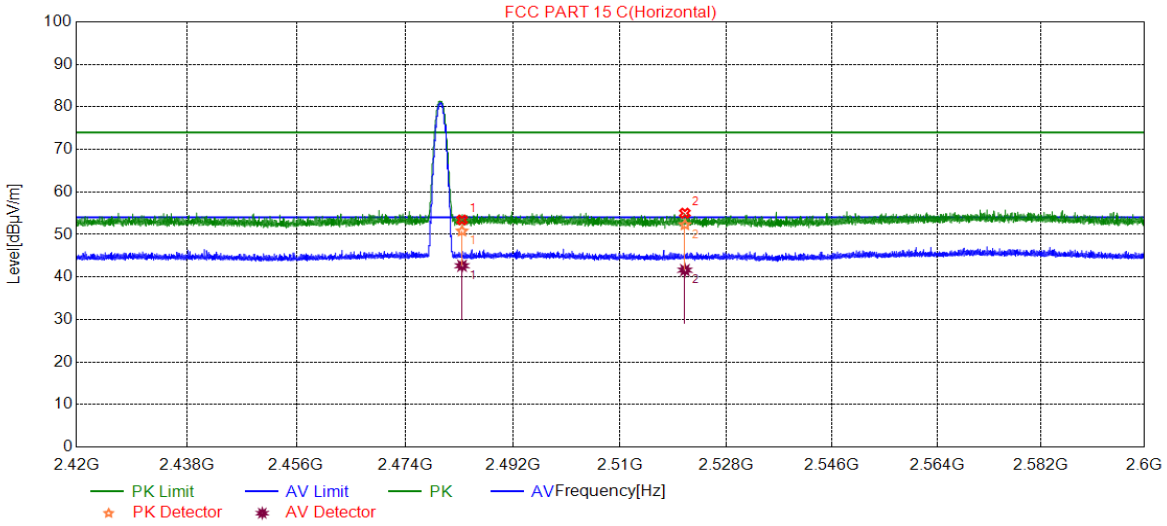
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.5000	50.79	74.00	-23.21	Peak
	2483.5000	42.63	54.00	-11.37	Average
2	2520.9541	52.26	74.00	-21.74	Peak
	2520.9541	41.60	54.00	-12.40	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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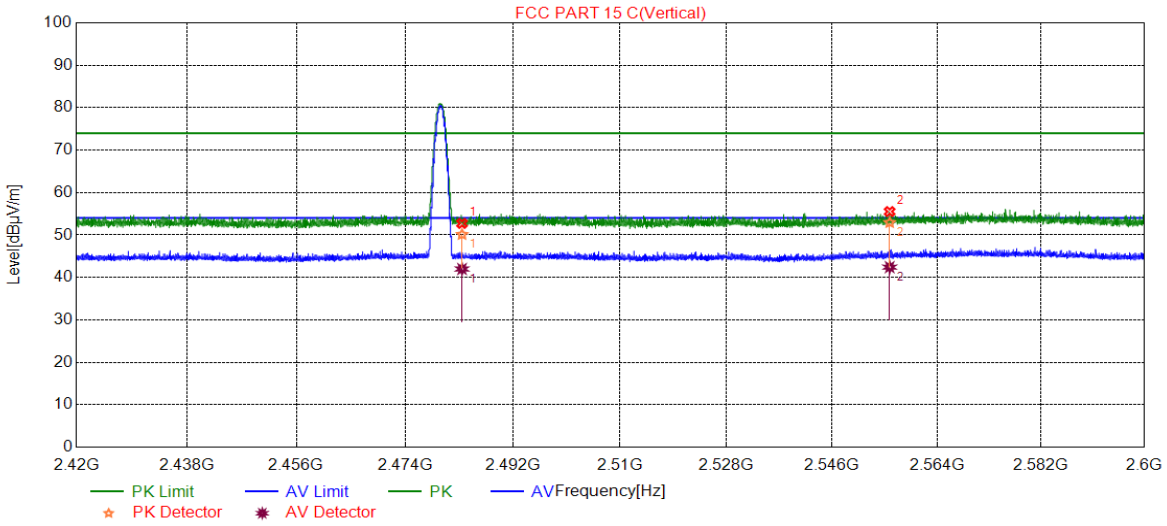
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.5000	50.12	74.00	-23.88	Peak
	2483.5000	41.99	54.00	-12.01	Average
2	2555.8596	52.92	74.00	-21.08	Peak
	2555.8596	42.42	54.00	-11.58	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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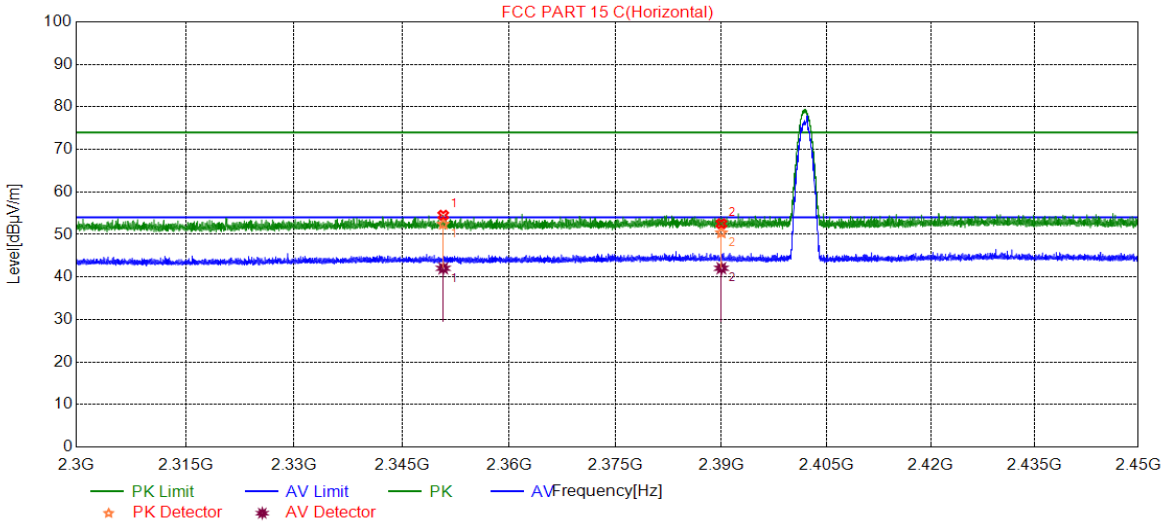
7.2.2. 8DPSK MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2350.7651	52.40	74.00	-21.60	Peak
	2350.7651	42.03	54.00	-11.97	Average
2	2390.0000	50.36	74.00	-23.64	Peak
	2390.0000	42.05	54.00	-11.95	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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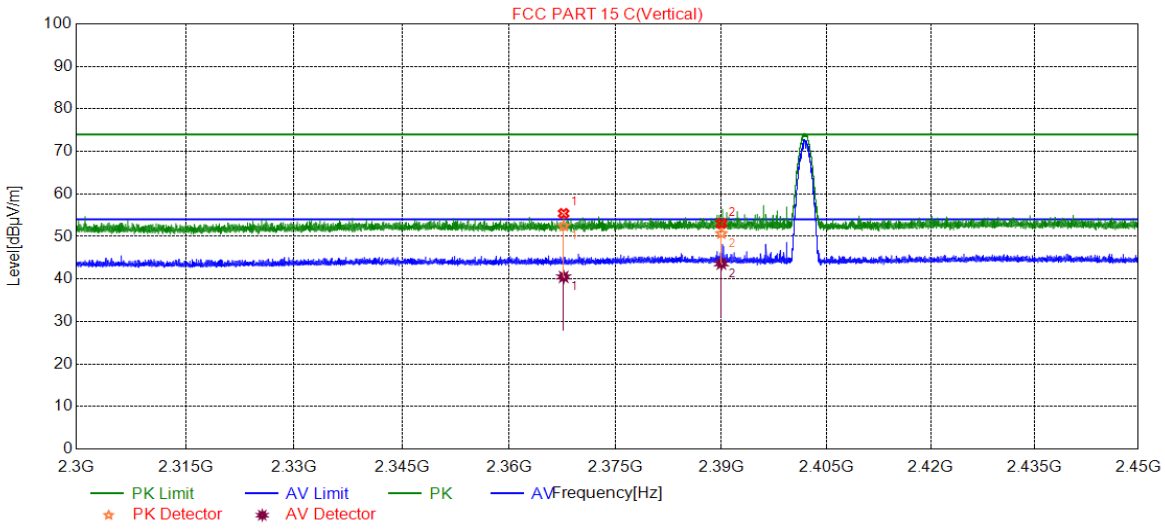
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2367.6718	52.45	74.00	-21.55	Peak
	2367.6718	40.48	54.00	-13.52	Average
2	2390.0000	50.67	74.00	-23.33	Peak
	2390.0000	43.59	54.00	-10.41	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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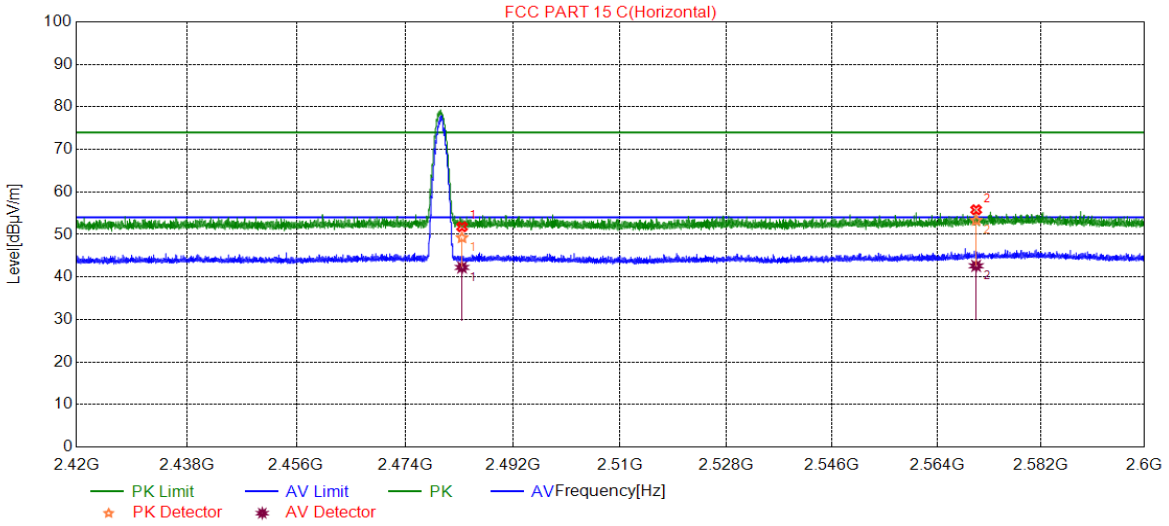
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.5000	49.22	74.00	-24.78	Peak
	2483.5000	42.24	54.00	-11.76	Average
2	2570.7471	53.29	74.00	-20.71	Peak
	2570.7471	42.60	54.00	-11.40	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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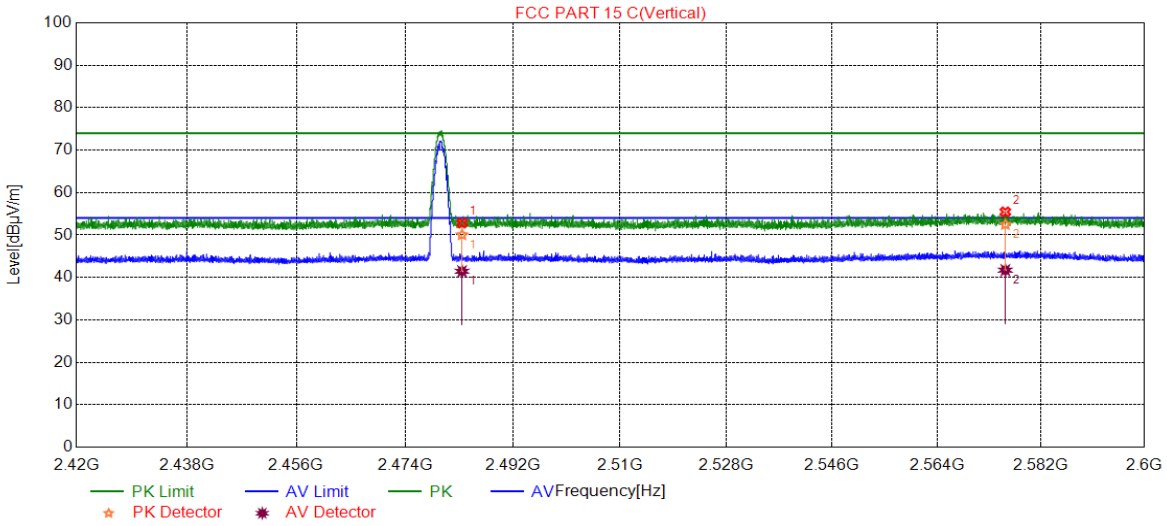
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.5000	50.03	74.00	-23.97	Peak
	2483.5000	41.45	54.00	-12.55	Average
2	2575.7876	52.46	74.00	-21.54	Peak
	2575.7876	41.71	54.00	-12.29	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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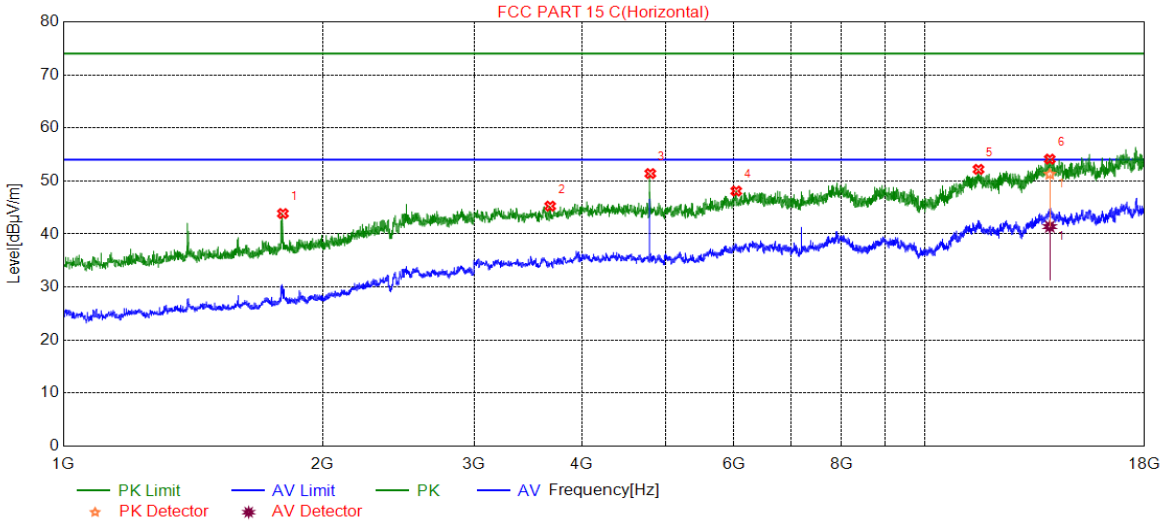
7.3. SPURIOUS EMISSIONS (1~18GHz)

7.3.1. GFSK MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1798.9330	43.85	74.00	-30.15	Peak
2	3675.1125	45.25	74.00	-28.75	Peak
3	4802.8005	51.39	74.00	-22.61	Peak
4	6043.0072	48.09	74.00	-25.91	Peak
5	11546.4244	52.18	74.00	-21.82	Peak
6	13969.3282	51.26	74.00	-22.74	Peak
	13969.3282	41.39	54.00	-12.61	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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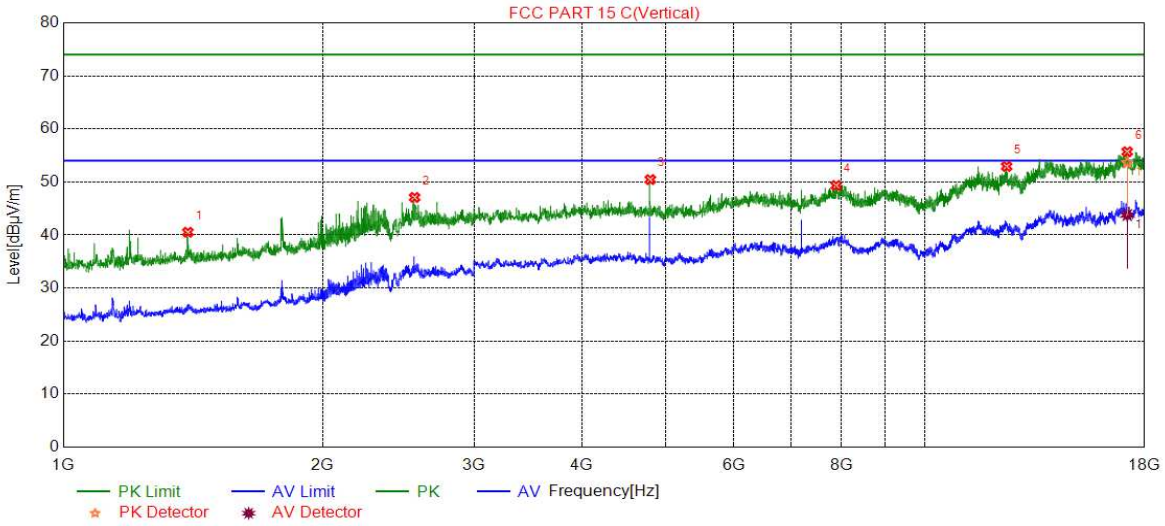
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1395.4652	40.52	74.00	-33.48	Peak
2	2557.8526	47.08	74.00	-26.92	Peak
3	4802.8005	50.44	74.00	-23.56	Peak
4	7893.3156	49.33	74.00	-24.67	Peak
5	12449.0748	52.92	74.00	-21.08	Peak
6	17182.3637	53.65	74.00	-20.35	Peak
	17182.3637	43.75	54.00	-10.25	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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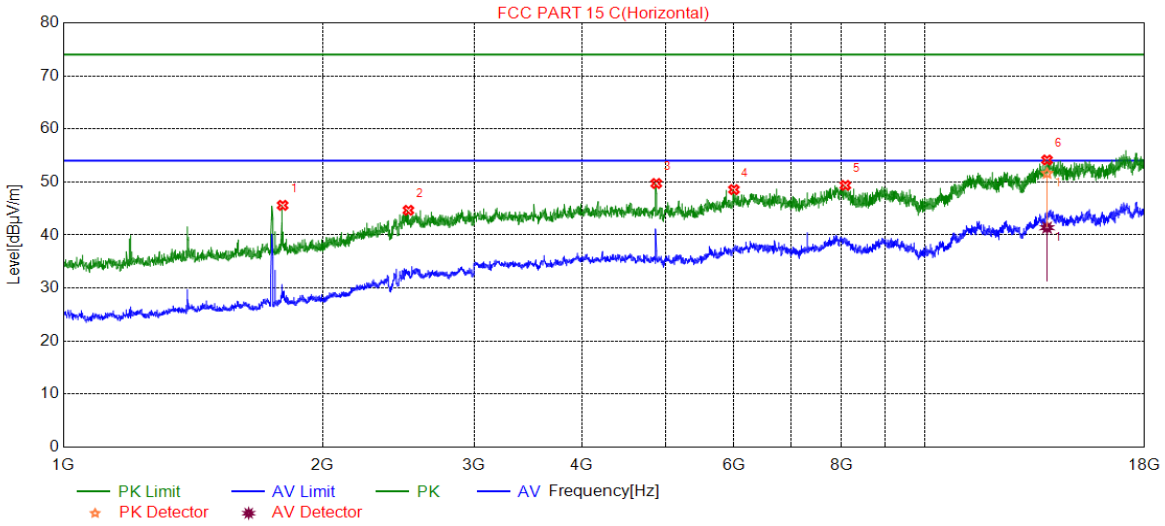
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1797.5992	45.59	74.00	-28.41	Peak
2	2515.8386	44.65	74.00	-29.35	Peak
3	4880.3134	49.71	74.00	-24.29	Peak
4	6005.5009	48.55	74.00	-25.45	Peak
5	8088.3481	49.35	74.00	-24.65	Peak
6	13866.8111	51.60	74.00	-22.40	Peak
	13866.8111	41.38	54.00	-12.62	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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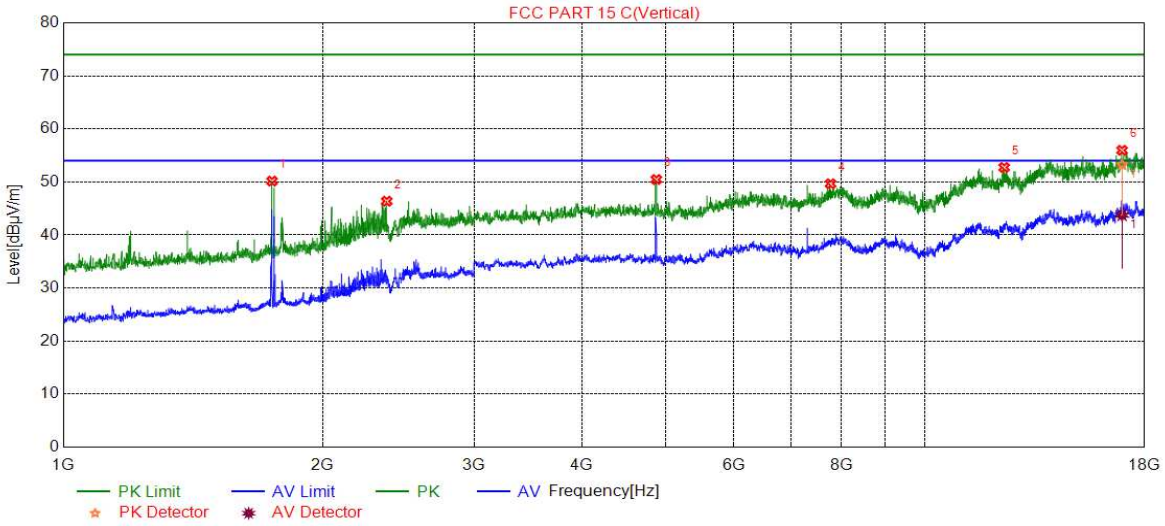
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1747.5825	50.16	74.00	-23.84	Peak
2	2374.4582	46.37	74.00	-27.63	Peak
3	4880.3134	50.46	74.00	-23.54	Peak
4	7775.7960	49.66	74.00	-24.34	Peak
5	12366.5611	52.73	74.00	-21.27	Peak
6	16947.3246	53.23	74.00	-20.77	Peak
	16947.3246	43.74	54.00	-10.26	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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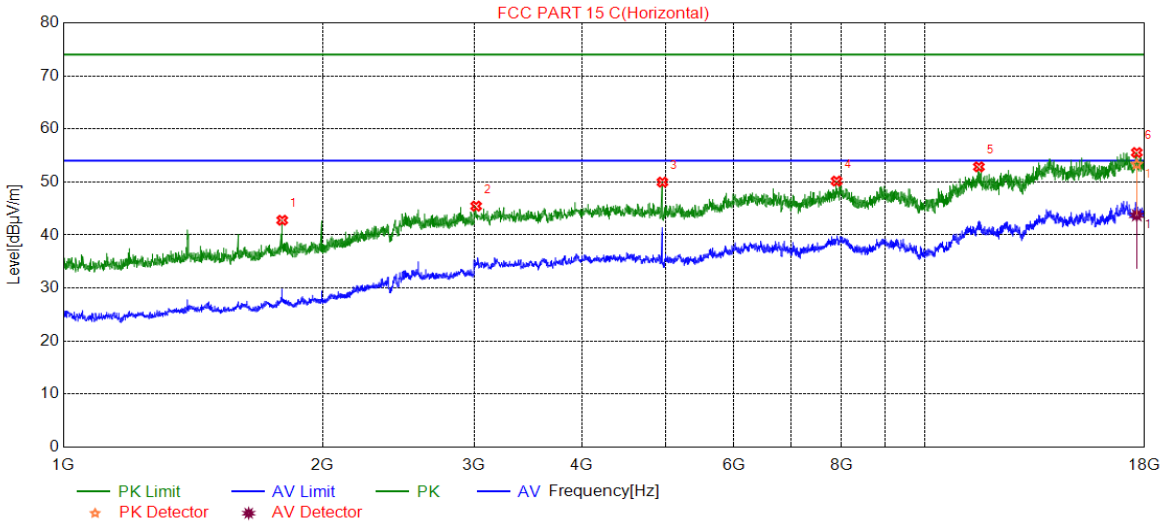
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1795.5985	42.78	74.00	-31.22	Peak
2	3015.0025	45.44	74.00	-28.56	Peak
3	4960.3267	49.96	74.00	-24.04	Peak
4	7900.8168	50.16	74.00	-23.84	Peak
5	11558.9265	52.84	74.00	-21.16	Peak
6	17627.4379	53.33	74.00	-20.67	Peak
	17627.4379	43.71	54.00	-10.29	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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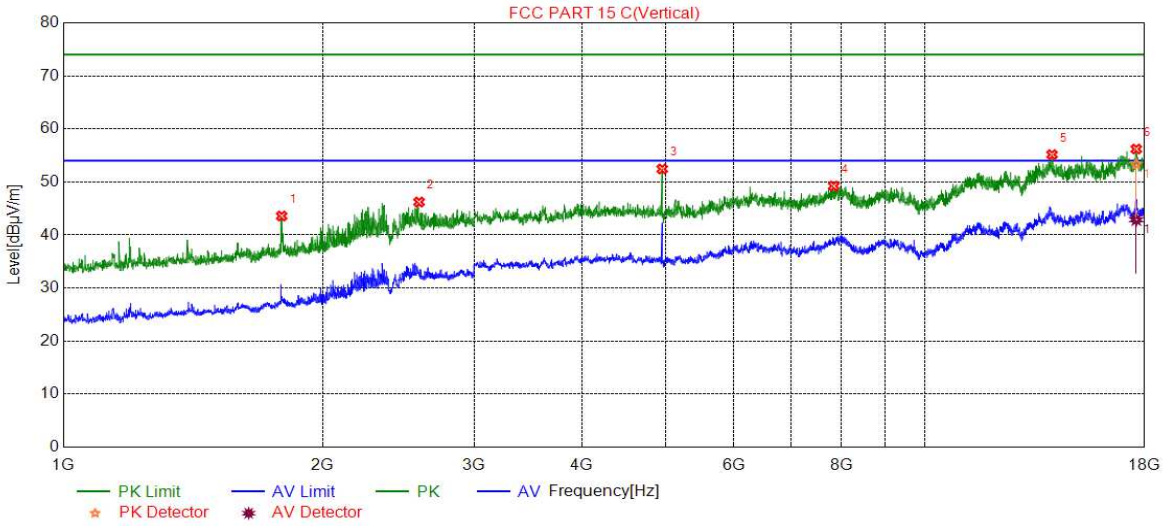
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1792.9310	43.57	74.00	-30.43	Peak
2	2588.5295	46.21	74.00	-27.79	Peak
3	4957.8263	52.44	74.00	-21.56	Peak
4	7840.8068	49.23	74.00	-24.77	Peak
5	14054.3424	55.15	74.00	-18.85	Peak
6	17602.4337	53.37	74.00	-20.63	Peak
	17602.4337	42.86	54.00	-11.14	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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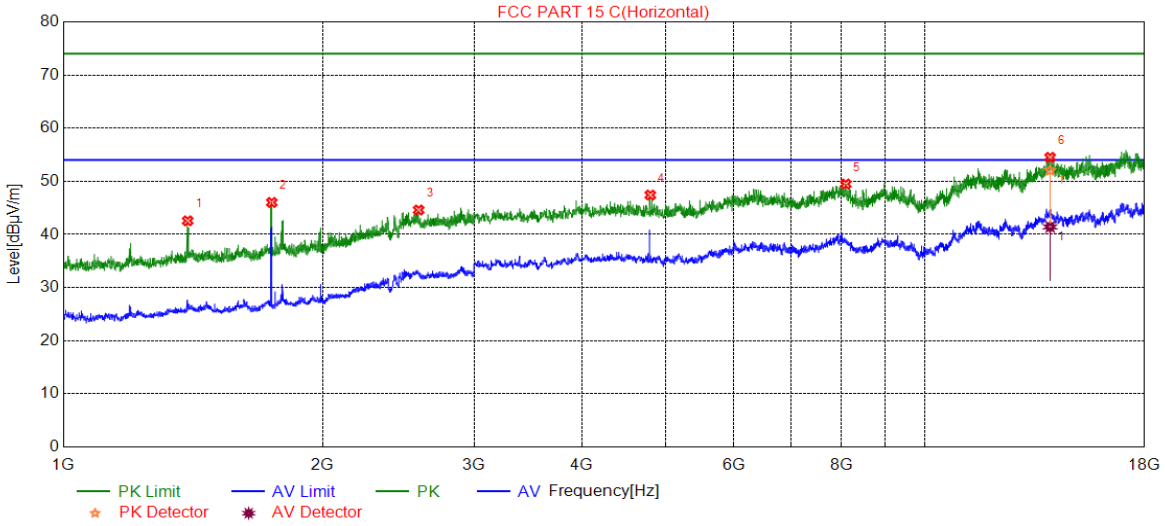
7.3.2. 8DPSK MODE

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1394.7983	42.56	74.00	-31.44	Peak
2	1746.2488	46.02	74.00	-27.98	Peak
3	2585.8620	44.60	74.00	-29.40	Peak
4	4802.8005	47.41	74.00	-26.59	Peak
5	8098.3497	49.48	74.00	-24.52	Peak
6	13981.8303	52.05	74.00	-21.95	Peak
	13981.8303	41.42	54.00	-12.58	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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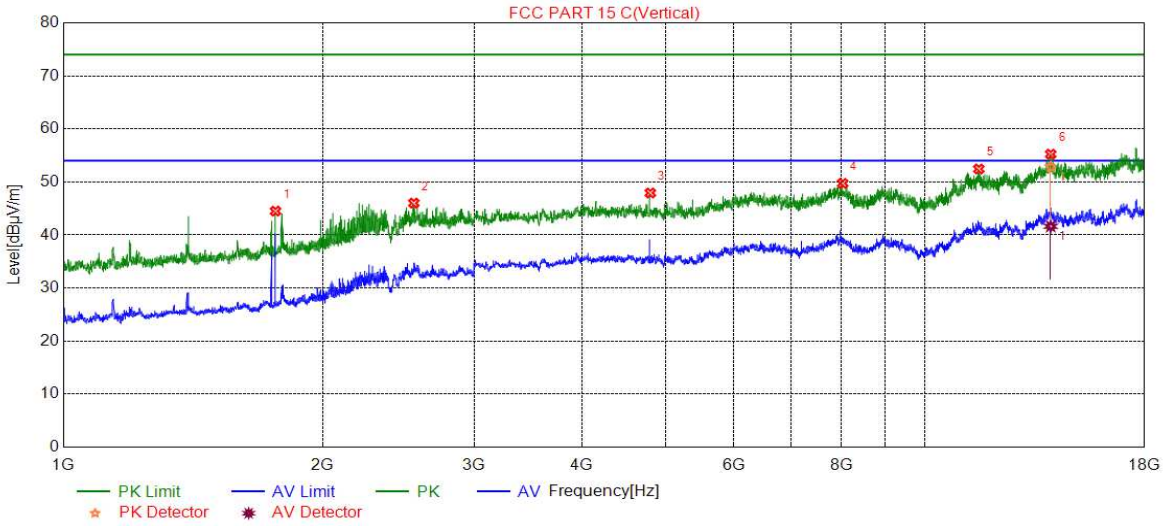
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1763.5879	44.50	74.00	-29.50	Peak
2	2552.5175	46.01	74.00	-27.99	Peak
3	4802.8005	47.92	74.00	-26.08	Peak
4	8030.8385	49.73	74.00	-24.27	Peak
5	11556.4261	52.44	74.00	-21.56	Peak
6	14004.3341	52.84	74.00	-21.16	Peak
	14004.3341	41.63	54.00	-12.37	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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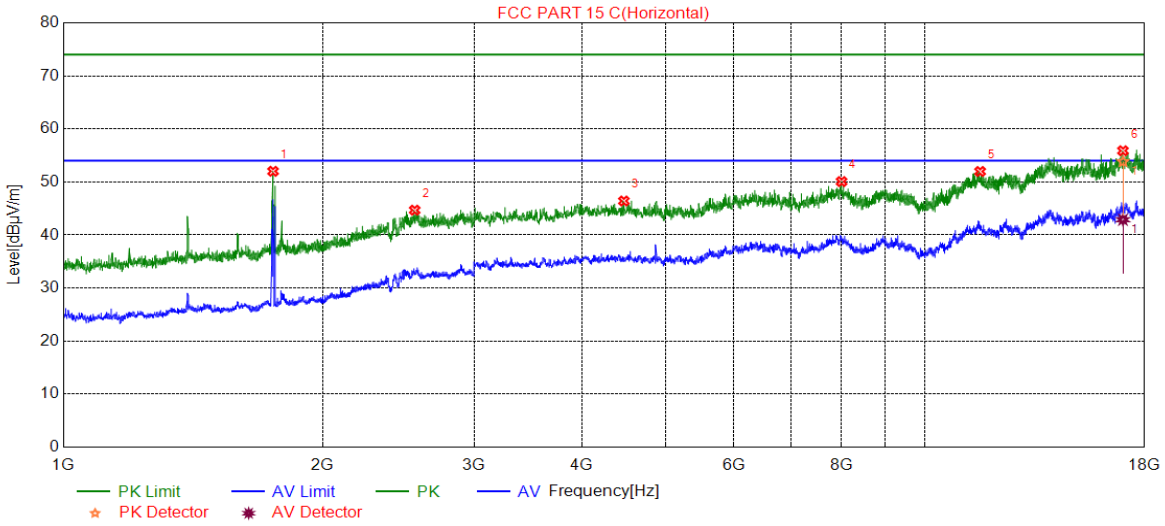
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1752.2508	52.01	74.00	-21.99	Peak
2	2558.5195	44.68	74.00	-29.32	Peak
3	4475.2459	46.41	74.00	-27.59	Peak
4	8008.3347	50.07	74.00	-23.93	Peak
5	11596.4327	51.97	74.00	-22.03	Peak
6	16987.3312	53.81	74.00	-20.19	Peak
	16987.3312	42.88	54.00	-11.12	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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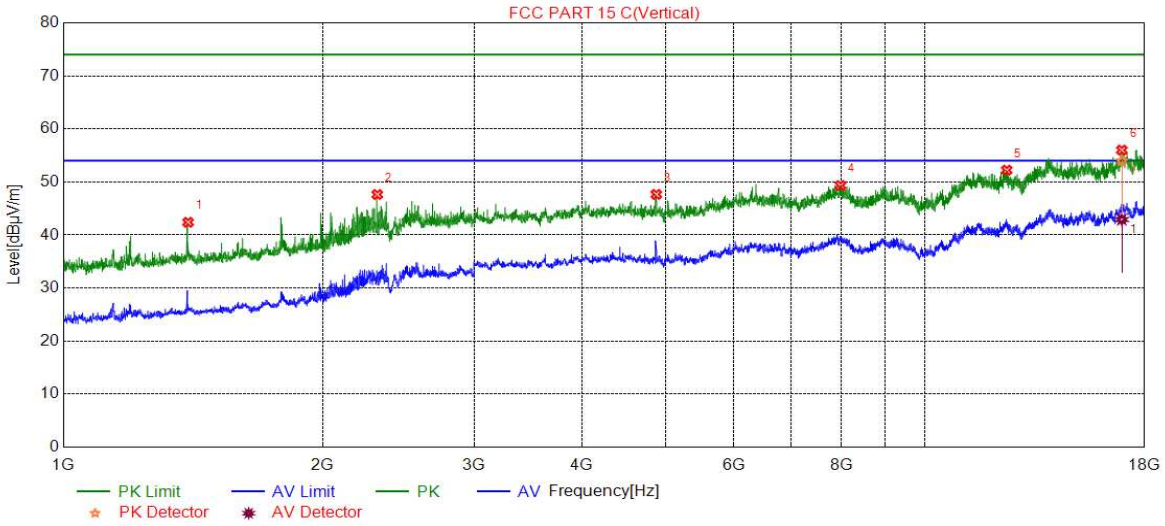
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1396.1320	42.39	74.00	-31.61	Peak
2	2315.1050	47.63	74.00	-26.37	Peak
3	4880.3134	47.65	74.00	-26.35	Peak
4	7983.3306	49.33	74.00	-24.67	Peak
5	12451.5753	52.22	74.00	-21.78	Peak
6	16937.3229	53.96	74.00	-20.04	Peak
	16937.3229	42.91	54.00	-11.09	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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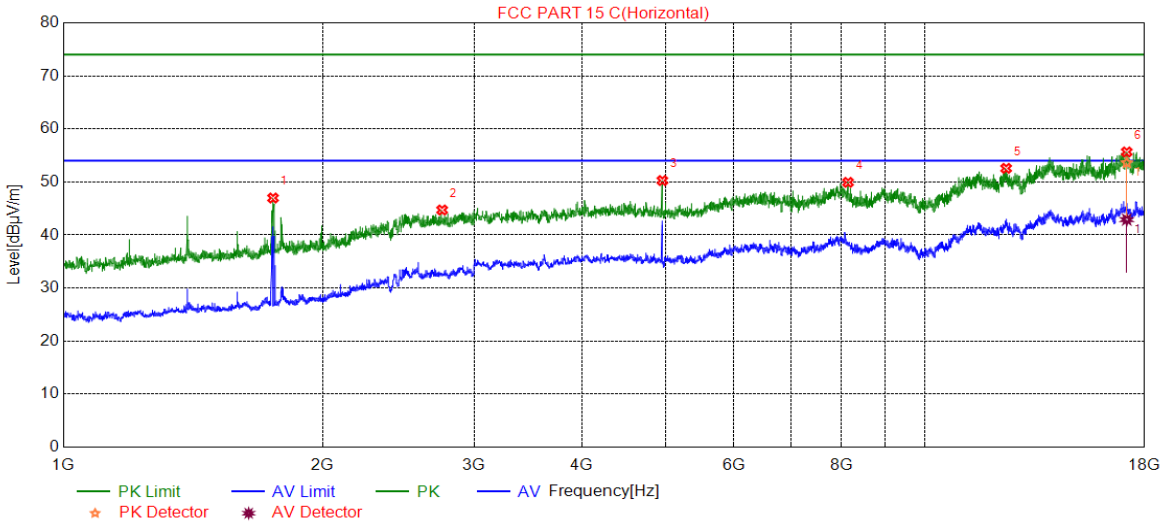
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1752.2508	46.97	74.00	-27.03	Peak
2	2753.2511	44.71	74.00	-29.29	Peak
3	4960.3267	50.26	74.00	-23.74	Peak
4	8148.3581	49.92	74.00	-24.08	Peak
5	12431.5719	52.56	74.00	-21.44	Peak
6	17159.8600	53.61	74.00	-20.39	Peak
	17159.8600	42.90	54.00	-11.10	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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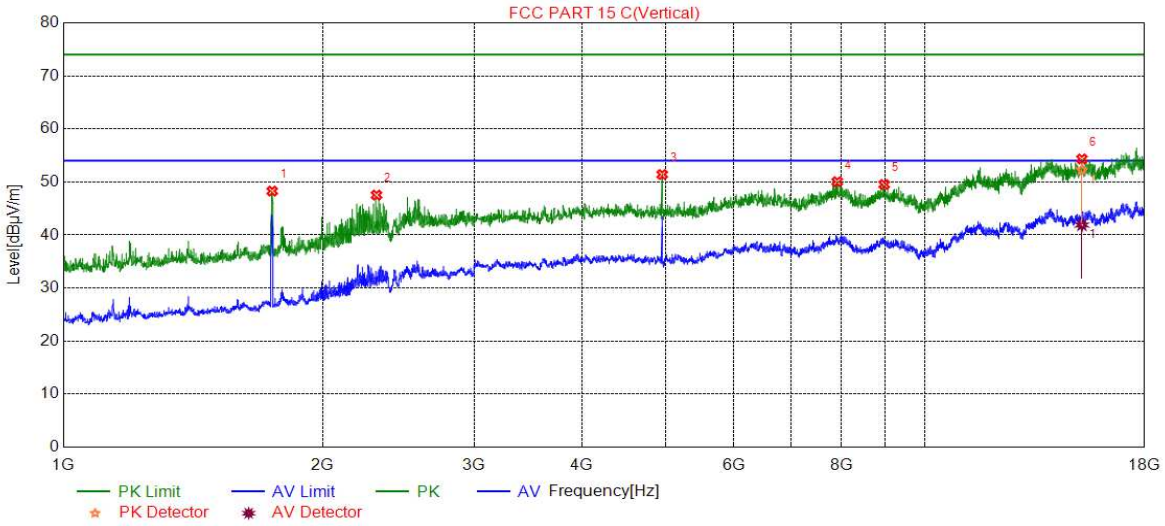
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1748.2494	48.27	74.00	-25.73	Peak
2	2310.4368	47.52	74.00	-26.48	Peak
3	4957.8263	51.40	74.00	-22.60	Peak
4	7915.8193	50.04	74.00	-23.96	Peak
5	8973.4956	49.52	74.00	-24.48	Peak
6	15222.0370	52.26	74.00	-21.74	Peak
	15222.0370	41.88	54.00	-12.12	Average

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. AVG: VBW=1/T where: T is transmit duration.
5. For transmit duration, please refer to clause 6.1.

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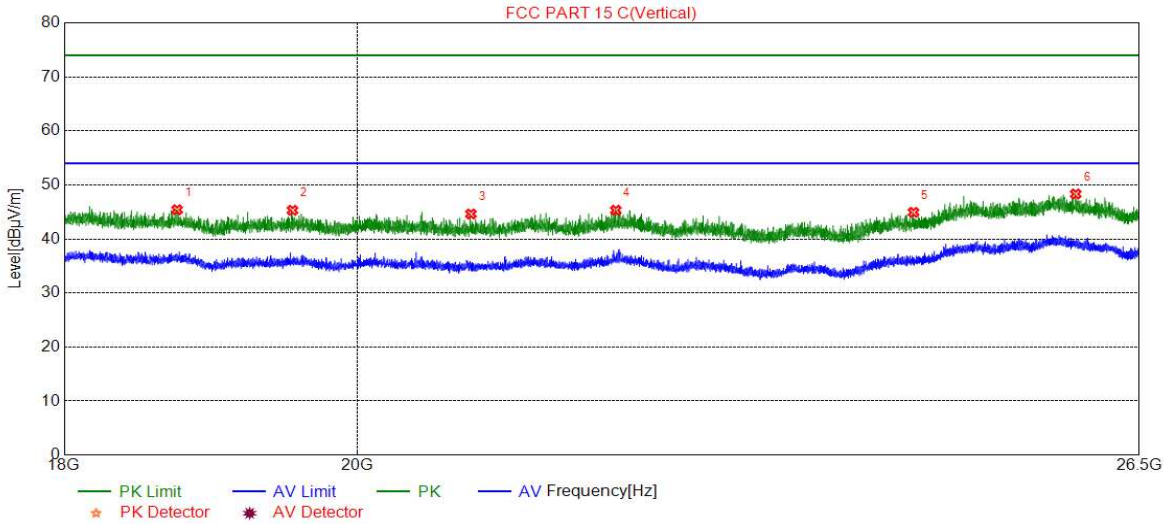
7.4. SPURIOUS EMISSIONS 18G ~ 26GHz

7.4.1. GFSK MODE

SPURIOUS EMISSIONS (GFSK MODE_MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18746.3746	45.40	74.00	-28.60	Peak
2	19541.2041	45.30	74.00	-28.70	Peak
3	20836.7337	44.62	74.00	-29.38	Peak
4	21952.0452	45.31	74.00	-28.69	Peak
5	24434.2934	44.93	74.00	-29.07	Peak
6	25903.2403	48.32	74.00	-25.68	Peak

Note: 1. Peak Result= Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. All the modes and channels have been tested, but only the data of the worst case is recorded in the report.

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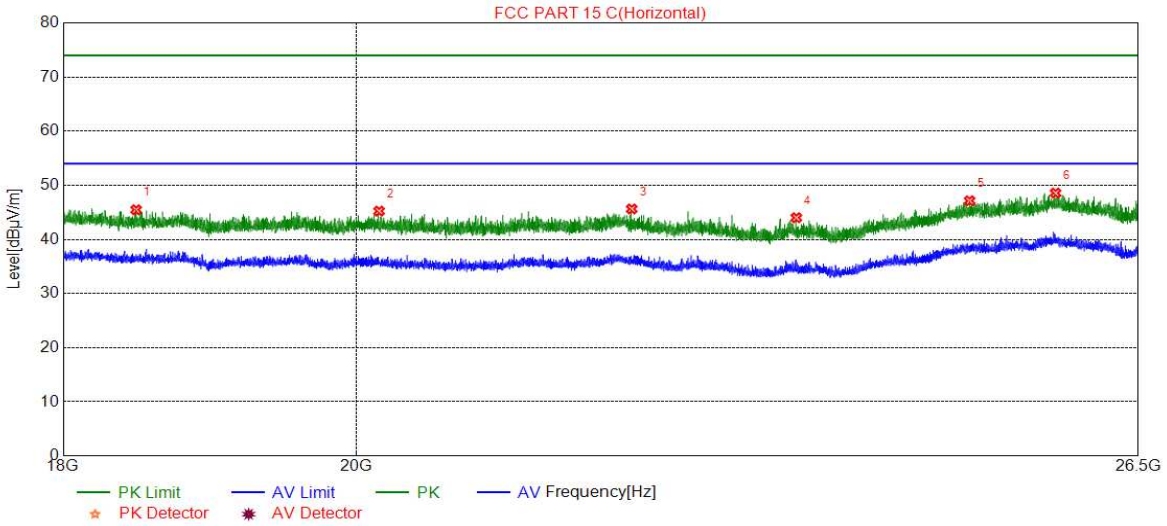
SPURIOUS EMISSIONS (GFSK MODE_MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18478.5979	45.47	74.00	-28.53	Peak
2	20166.8667	45.22	74.00	-28.78	Peak
3	22086.3586	45.62	74.00	-28.38	Peak
4	23433.7434	44.00	74.00	-30.00	Peak
5	24941.7942	47.13	74.00	-26.87	Peak
6	25724.7225	48.56	74.00	-25.44	Peak

Note: 1. Peak Result = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. All the modes and channels have been tested, but only the data of the worst case is recorded in the report.

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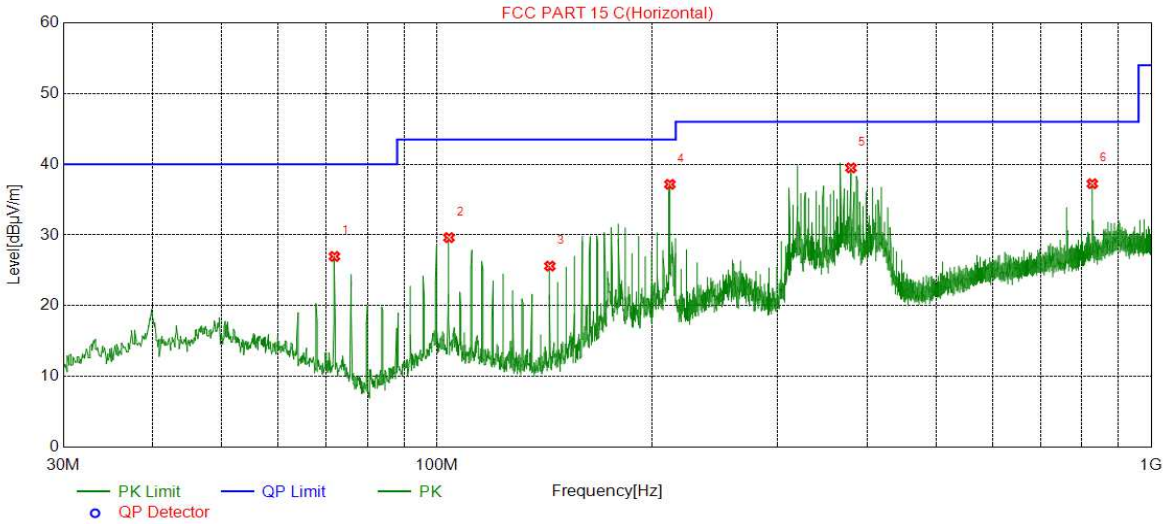
7.5. SPURIOUS EMISSIONS 30M ~ 1 GHz

7.5.1. GFSK MODE

SPURIOUS EMISSIONS (GFSK MODE MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	71.9082	26.97	40.00	-13.03	QP
2	104.0184	29.63	43.50	-13.87	QP
3	143.9864	25.60	43.50	-17.90	QP
4	211.9902	37.16	43.50	-6.34	QP
5	380.0110	39.48	46.00	-6.52	QP
6	827.0317	37.25	46.00	-8.75	QP

Note:
1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
3. All the modes and channels have been tested, but only the data of the worst case is recorded in the report.

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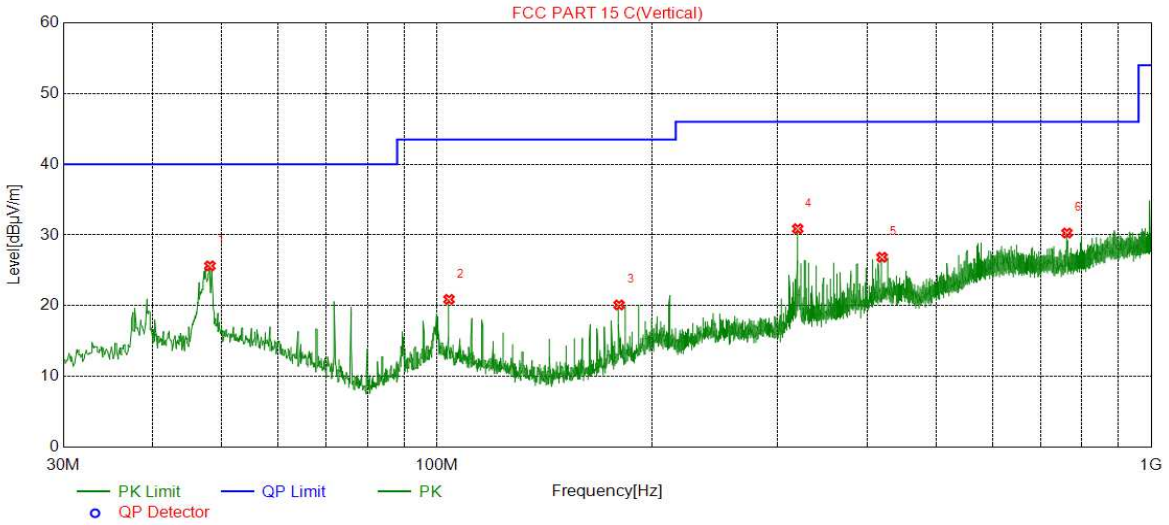
SPURIOUS EMISSIONS (GFSK MODE_MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	48.1408	25.63	40.00	-14.37	QP
2	104.0184	20.90	43.50	-22.60	QP
3	179.9770	20.11	43.50	-23.39	QP
4	320.0590	30.88	46.00	-15.12	QP
5	419.9790	26.85	46.00	-19.15	QP
6	762.2292	30.28	46.00	-15.72	QP

Note:
1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto
3. All the modes and channels have been tested, but only the data of the worst case is recorded in the report.

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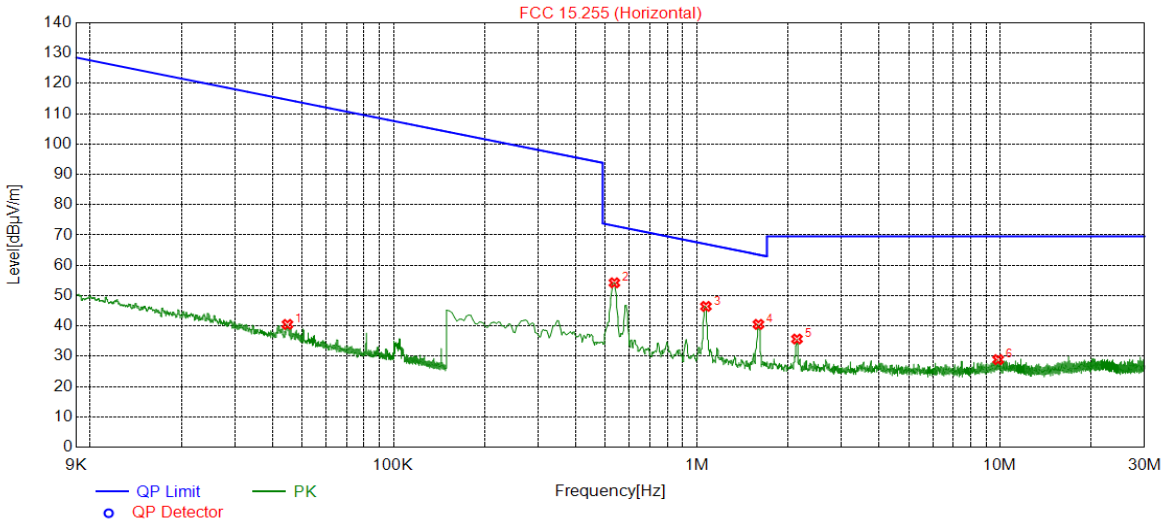
7.6. SPURIOUS EMISSIONS BELOW 30M

SPURIOUS EMISSIONS (GFSK MODE_MID CHANNEL, WORST-CASE CONFIGURATION)

9KHz~ 30MHz



No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0447	40.51	114.59	-74.08	Peak
2	0.5351	54.23	73.04	-18.81	Peak
3	1.0725	46.44	67.00	-20.56	Peak
4	1.5979	40.51	63.53	-23.02	Peak
5	2.1412	35.68	69.54	-33.86	Peak
6	9.8671	28.88	69.54	-40.66	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. All the modes had been tested, but only the worst data were recorded in the report.
3. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
4. All the modes and channels have been tested, but only the data of the worst case is recorded in the report.

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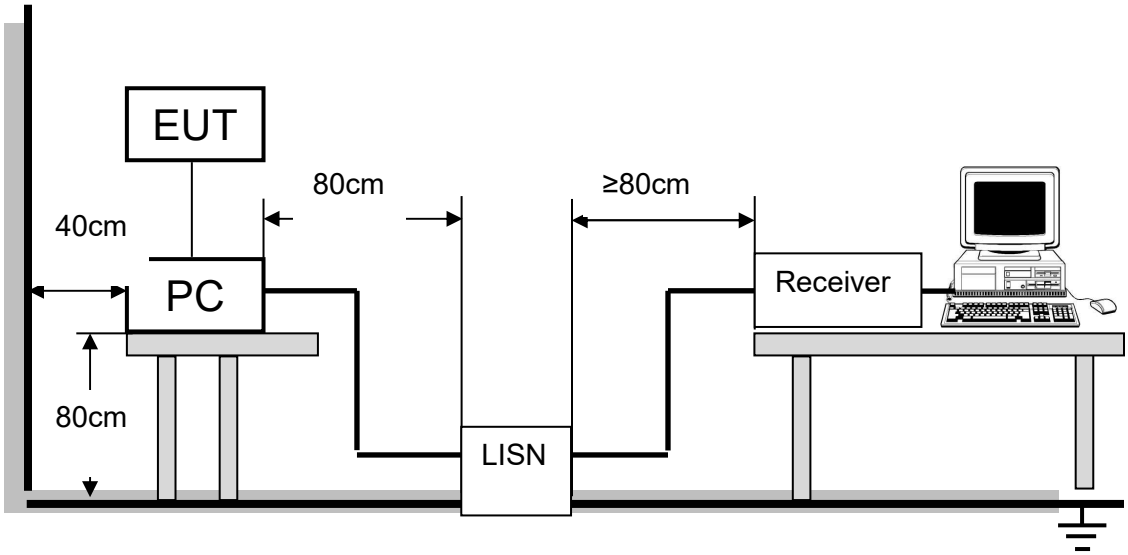
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

TEST SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

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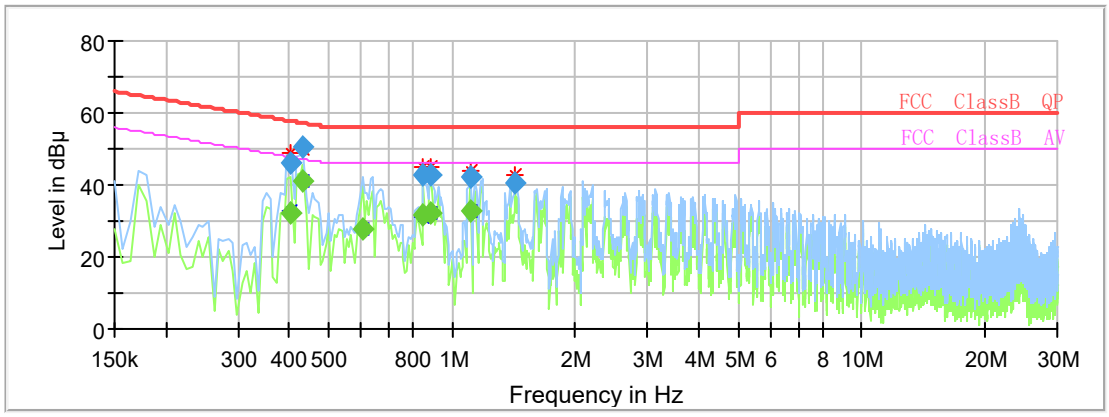
RESULTS (WORST-CASE CONFIGURATION)



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.403725	---	32.30	47.78	15.48	1000.	9.000	L1	OFF	9.6
0.403725	46.19	---	57.78	11.58	1000.	9.000	L1	OFF	9.6
0.433575	---	41.21	47.18	5.97	1000.	9.000	N	OFF	9.6
0.433575	50.47	---	57.18	6.72	1000.	9.000	L1	OFF	9.6
0.605213	---	27.67	46.00	18.33	1000.	9.000	L1	OFF	9.6
0.851475	42.64	---	56.00	13.36	1000.	9.000	N	OFF	9.6
0.851475	---	31.43	46.00	14.57	1000.	9.000	N	OFF	9.6
0.888788	42.96	---	56.00	13.04	1000.	9.000	L1	OFF	9.6
0.888788	---	32.39	46.00	13.61	1000.	9.000	L1	OFF	9.6
1.105200	42.22	---	56.00	13.78	1000.	9.000	N	OFF	9.6
1.105200	---	33.00	46.00	13.00	1000.	9.000	L1	OFF	9.6
1.426088	40.80	---	56.00	15.20	1000.	9.000	L1	OFF	9.7

Note: 1. Result = Reading +Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

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9. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ANTENNA CONNECTOR

EUT has one Dipole Antenna with a chip Antenna, which supports BT mode and BLE mode.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.

END OF REPORT

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