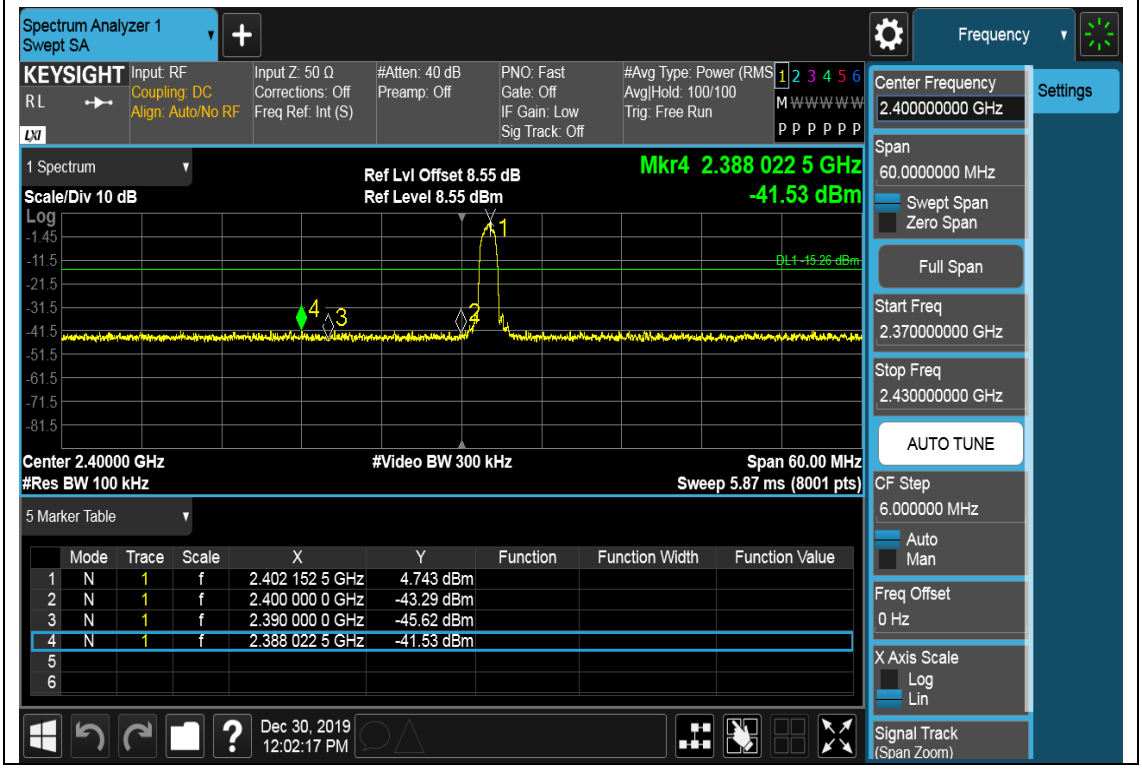
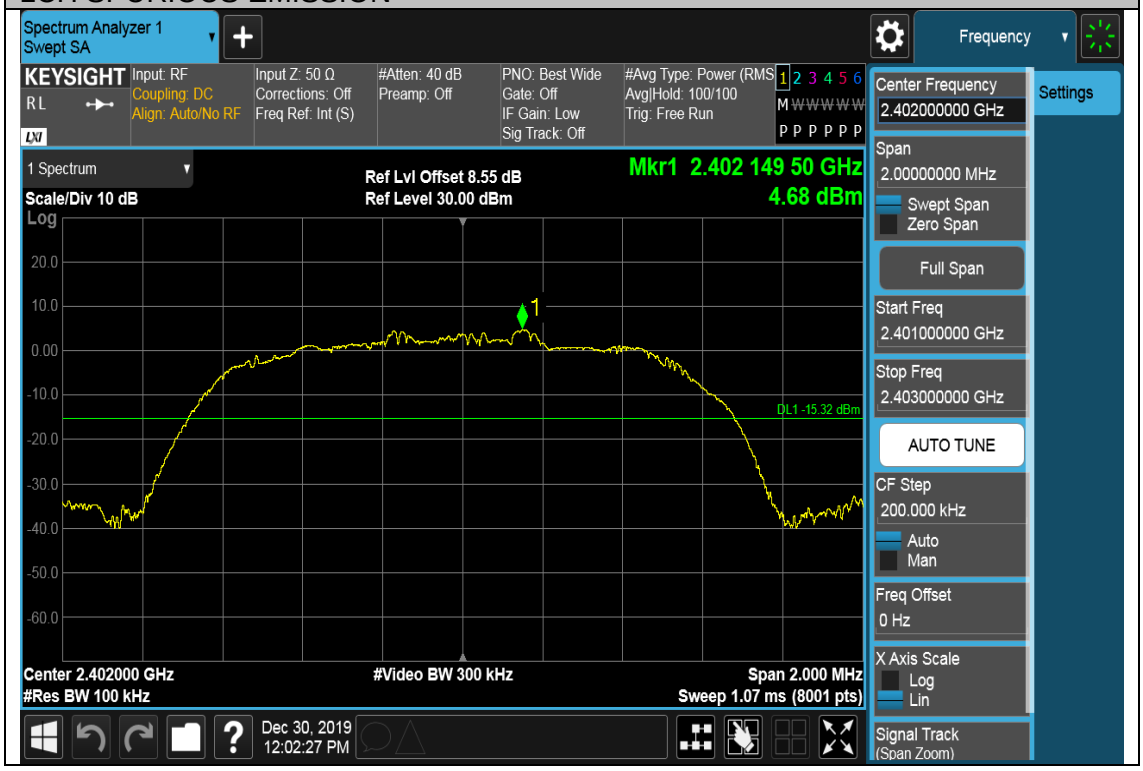
6.7.2. 8DPSK MODE

SPURIOUS EMISSIONS, LOW CHANNEL

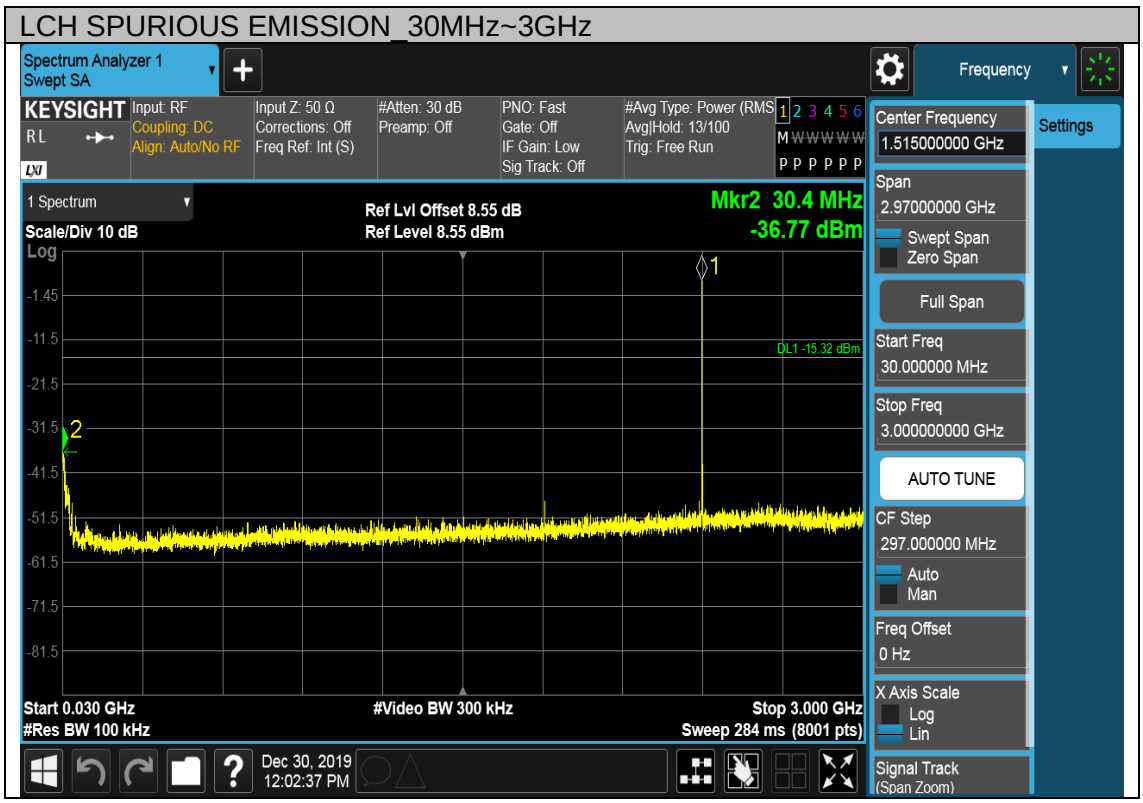
LOW CH BANDEDGE



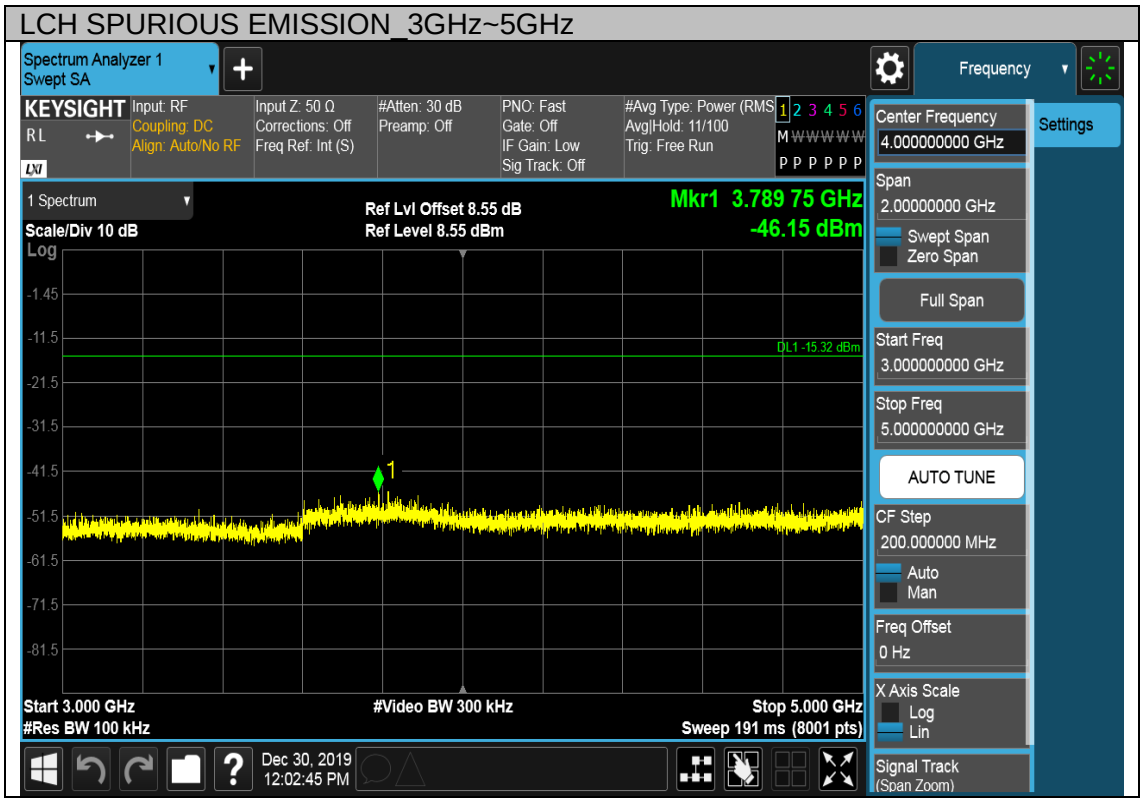
LCH SPURIOUS EMISSION



LCH SPURIOUS EMISSION_30MHz~3GHz

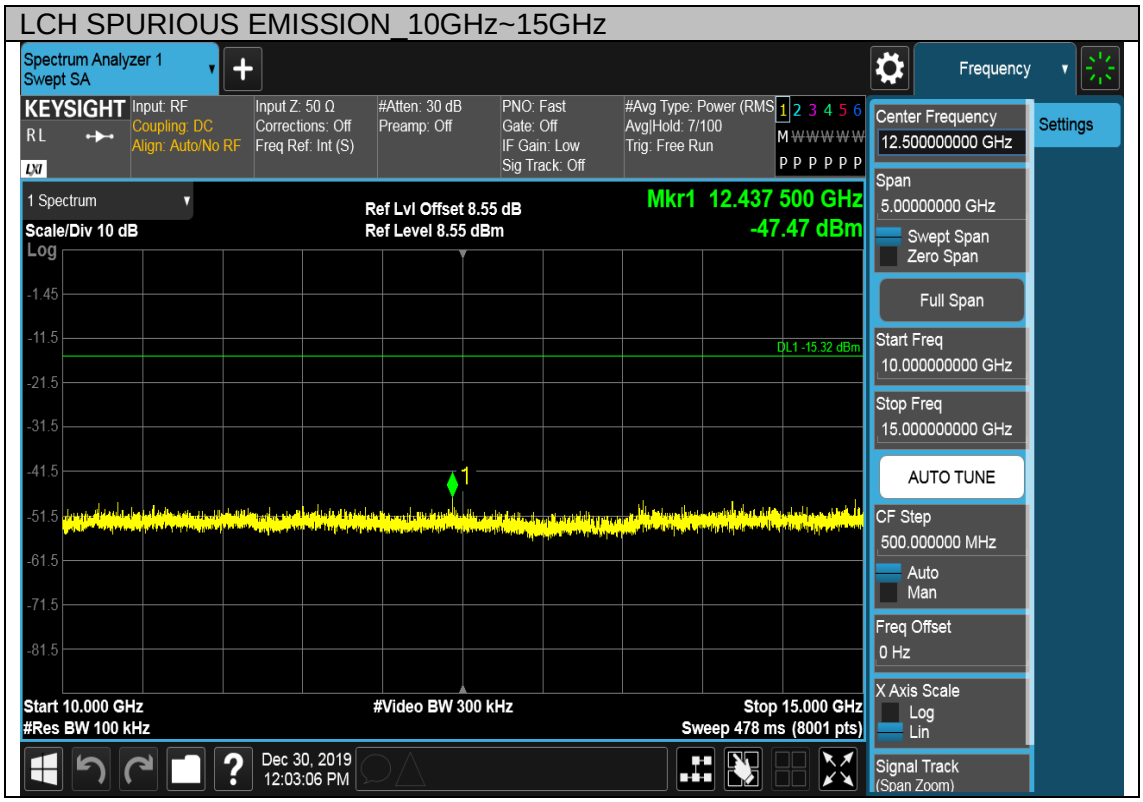


LCH SPURIOUS EMISSION_3GHz~5GHz



LCH SPURIOUS EMISSION_5GHz~10GHz

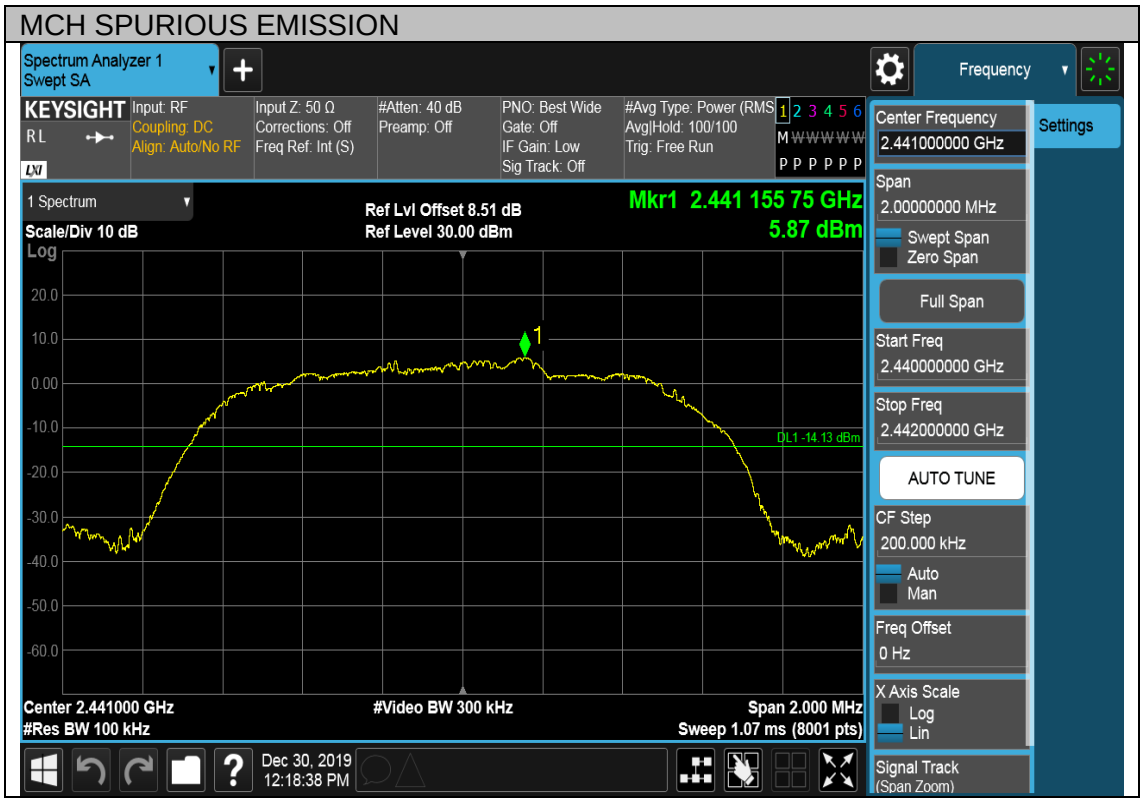
LCH SPURIOUS EMISSION_10GHz~15GHz



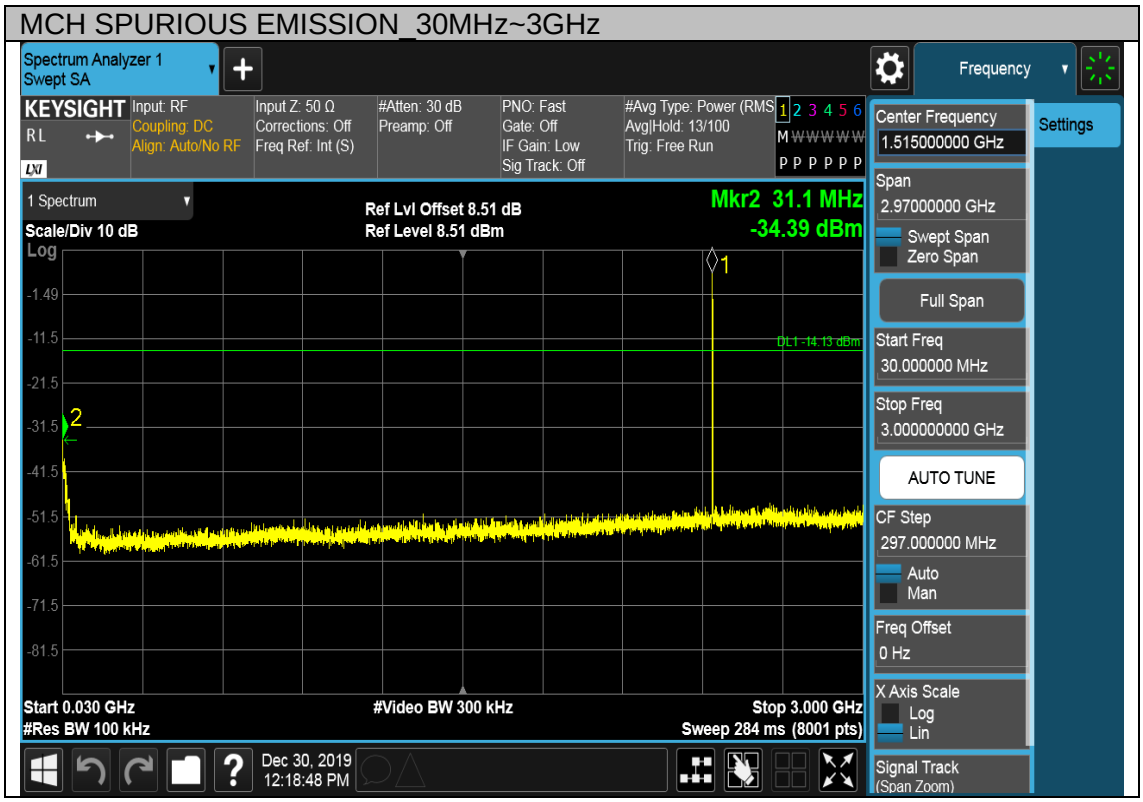
LCH SPURIOUS EMISSION_15GHz~25GHz

SPURIOUS EMISSIONS, MID CHANNEL

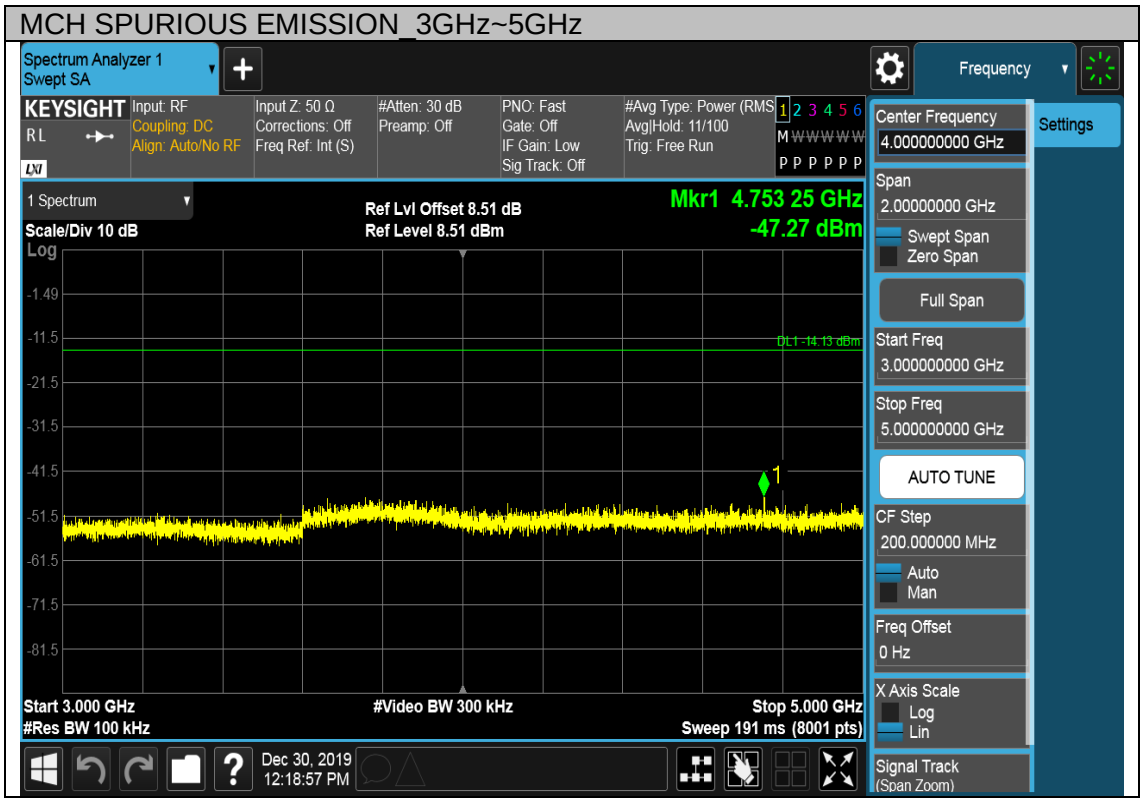
MCH SPURIOUS EMISSION



MCH SPURIOUS EMISSION_30MHz~3GHz

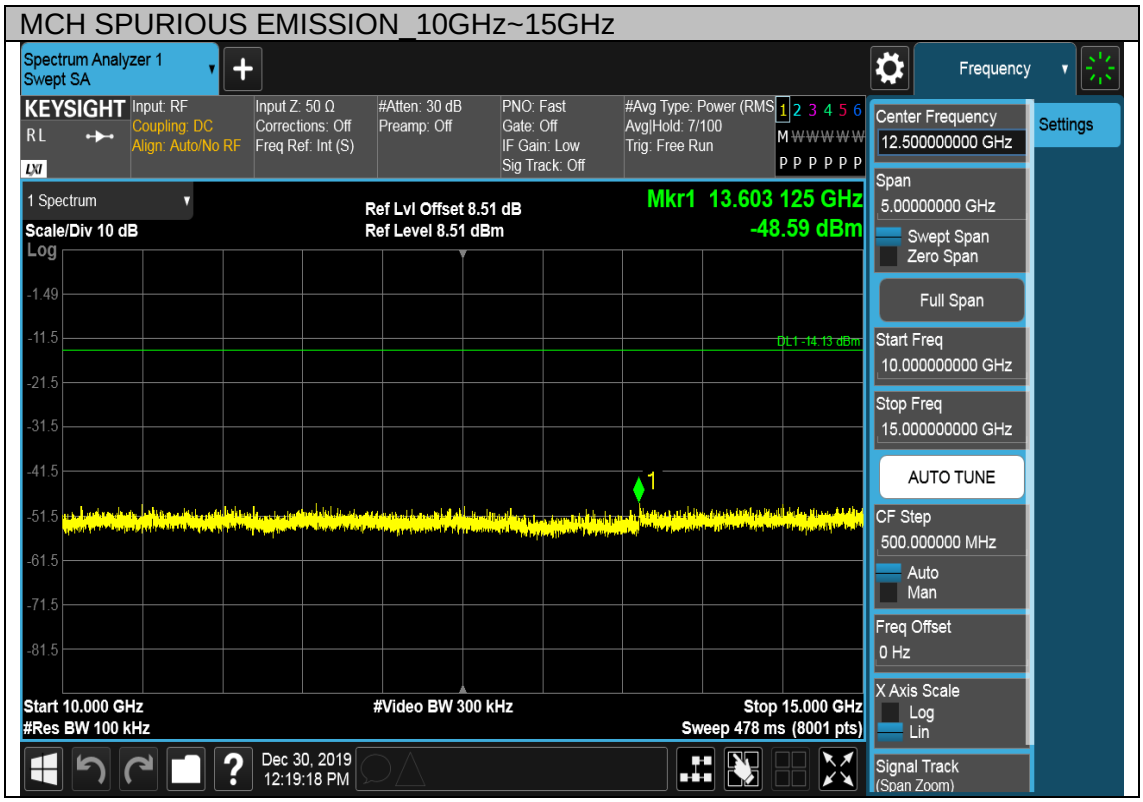


MCH SPURIOUS EMISSION_3GHz~5GHz

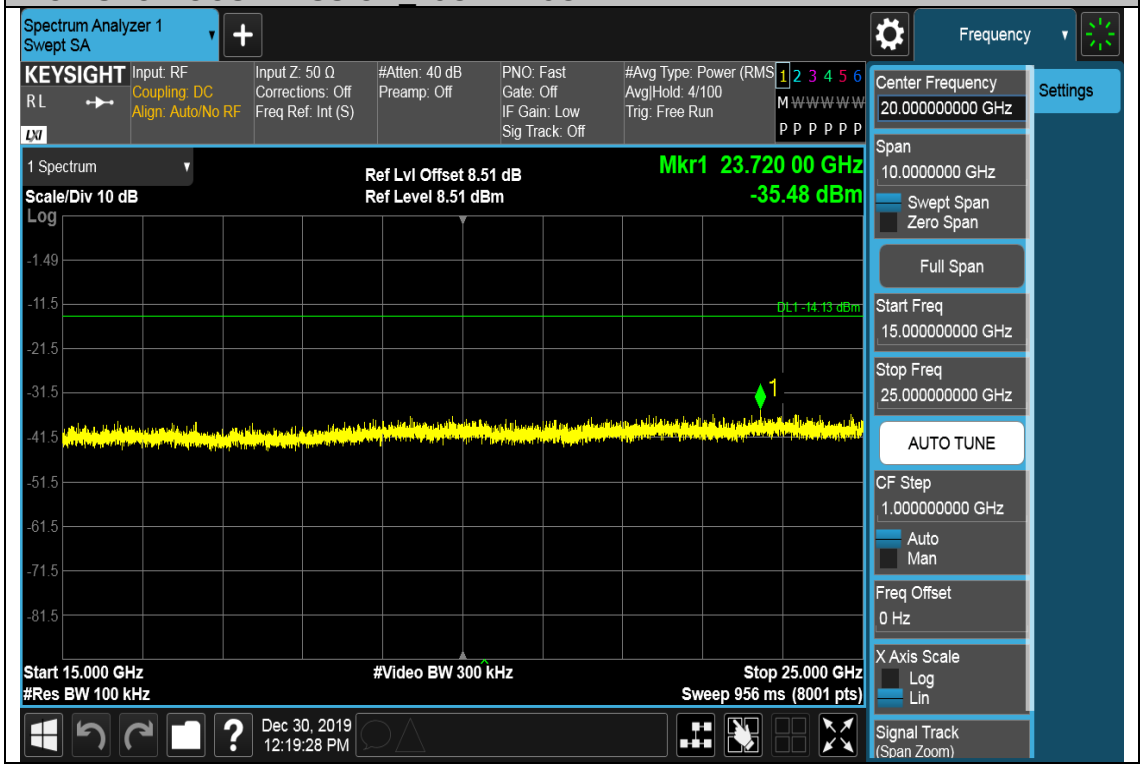


MCH SPURIOUS EMISSION_5GHz~10GHz

MCH SPURIOUS EMISSION_10GHz~15GHz

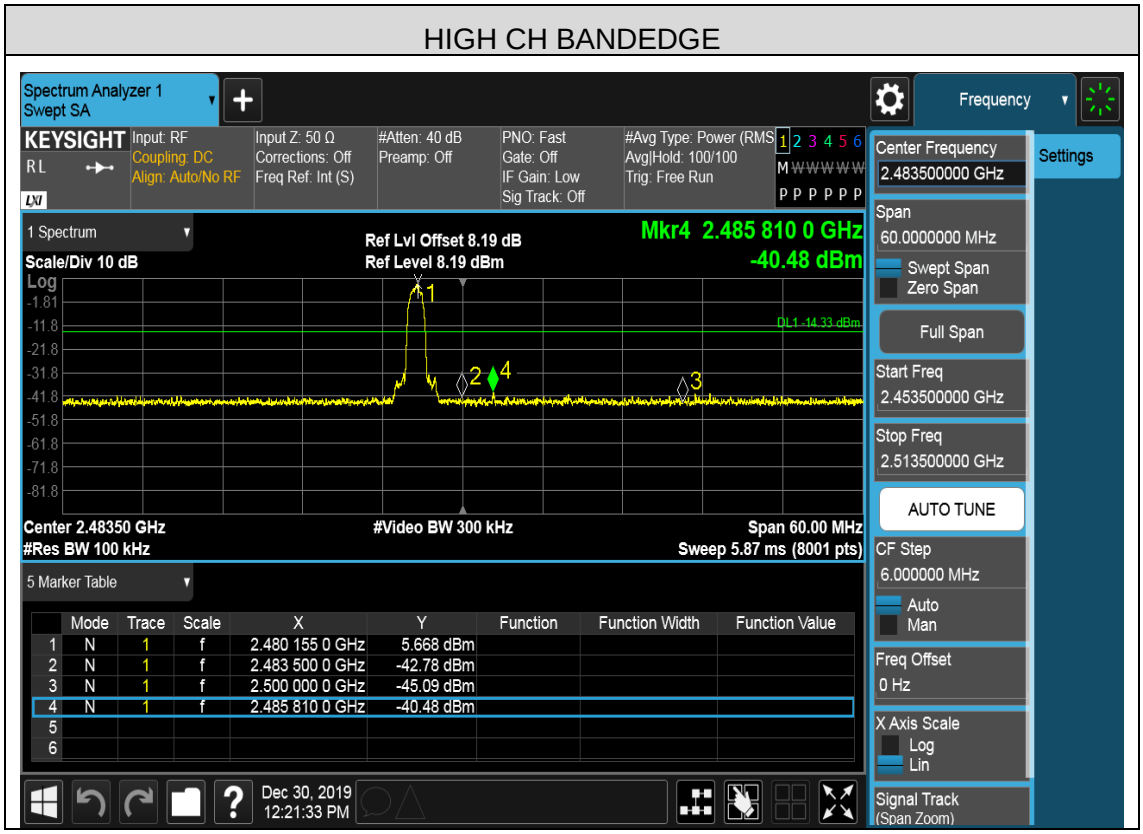


MCH SPURIOUS EMISSION_15GHz~25GHz

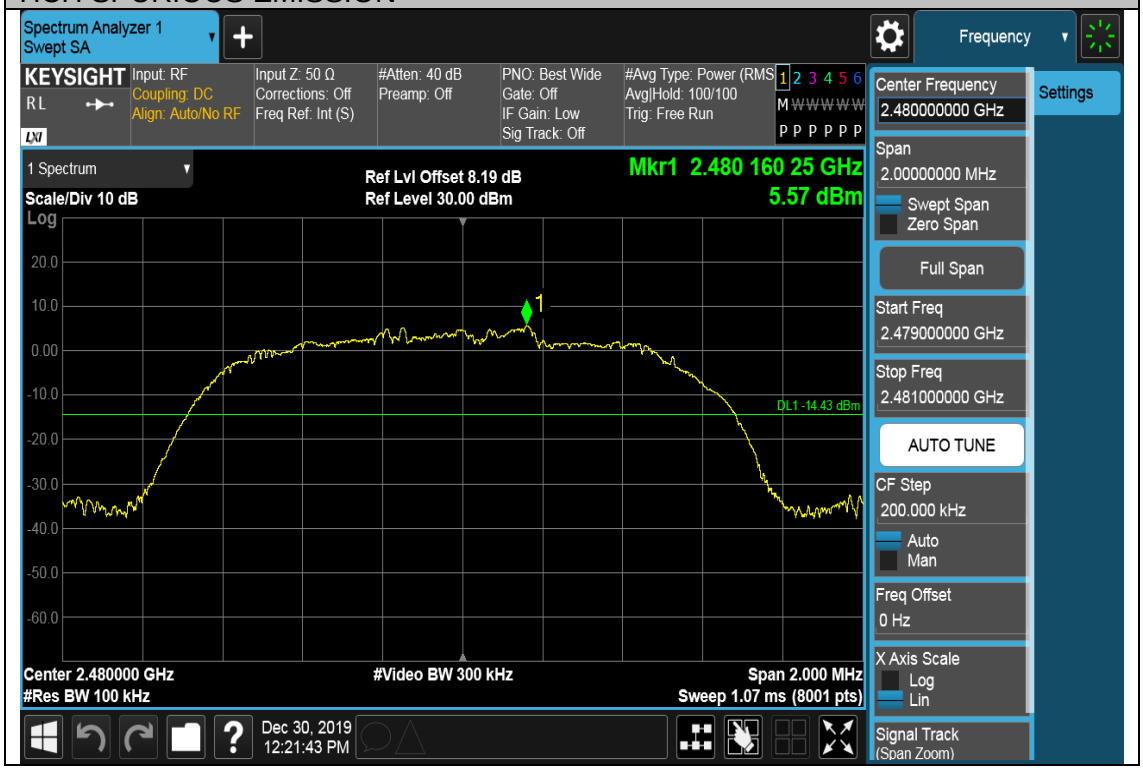


SPURIOUS EMISSIONS, HIGH CHANNEL

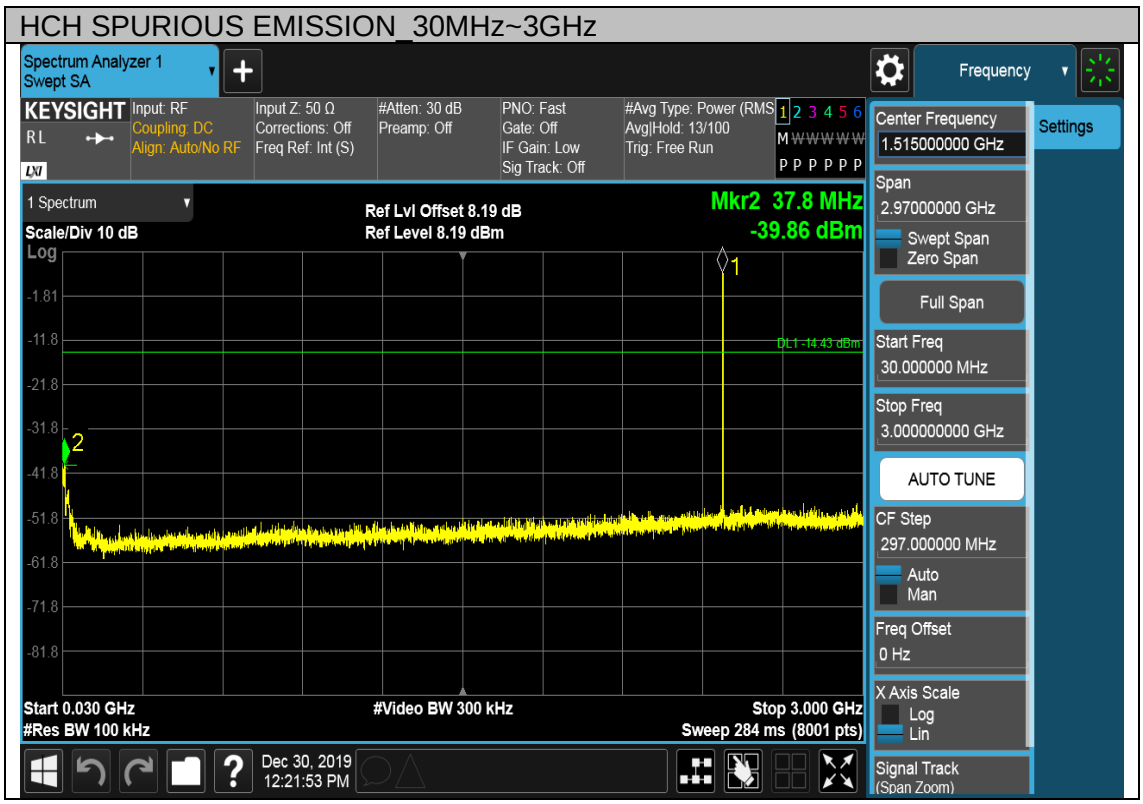
HIGH CH BANDEDGE



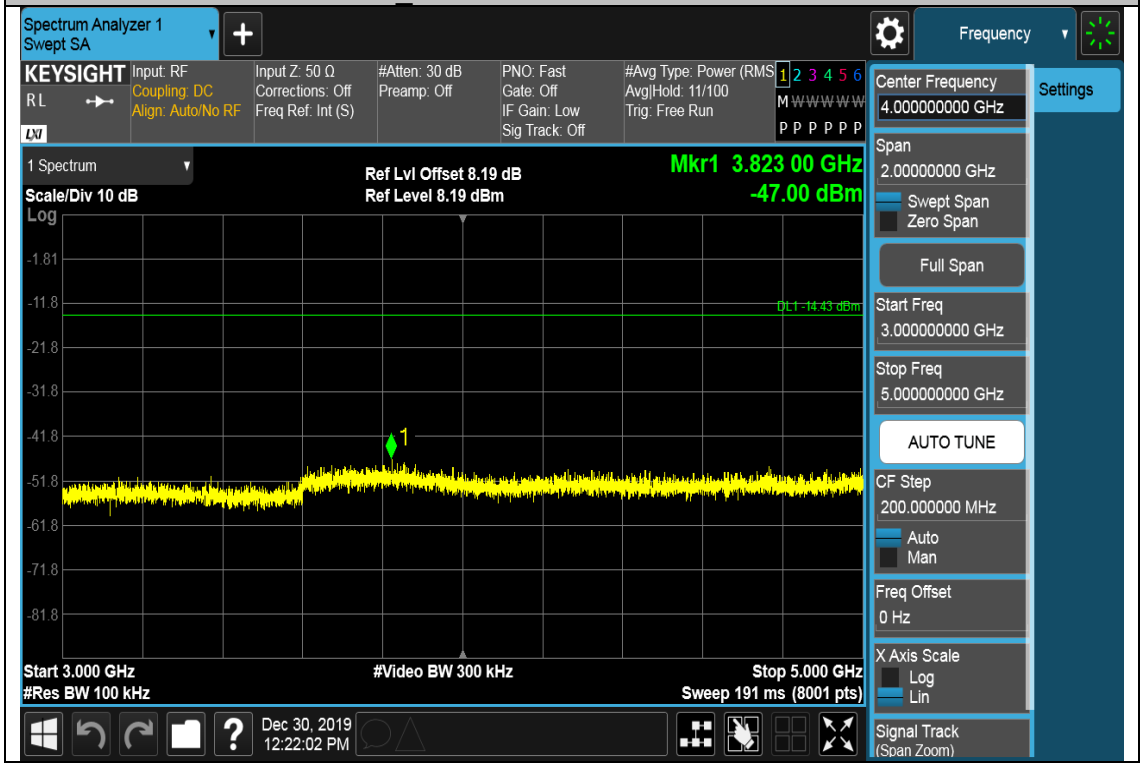
HCH SPURIOUS EMISSION



HCH SPURIOUS EMISSION_30MHz~3GHz

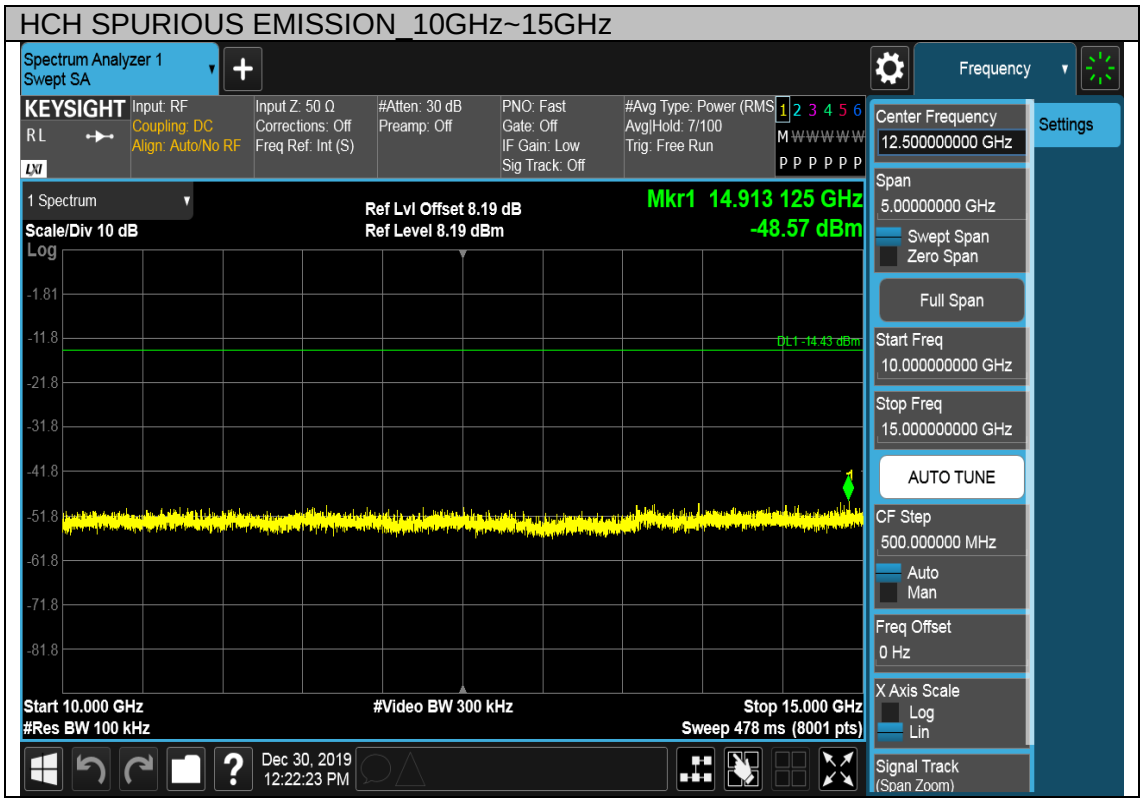


HCH SPURIOUS EMISSION_3GHz~5GHz

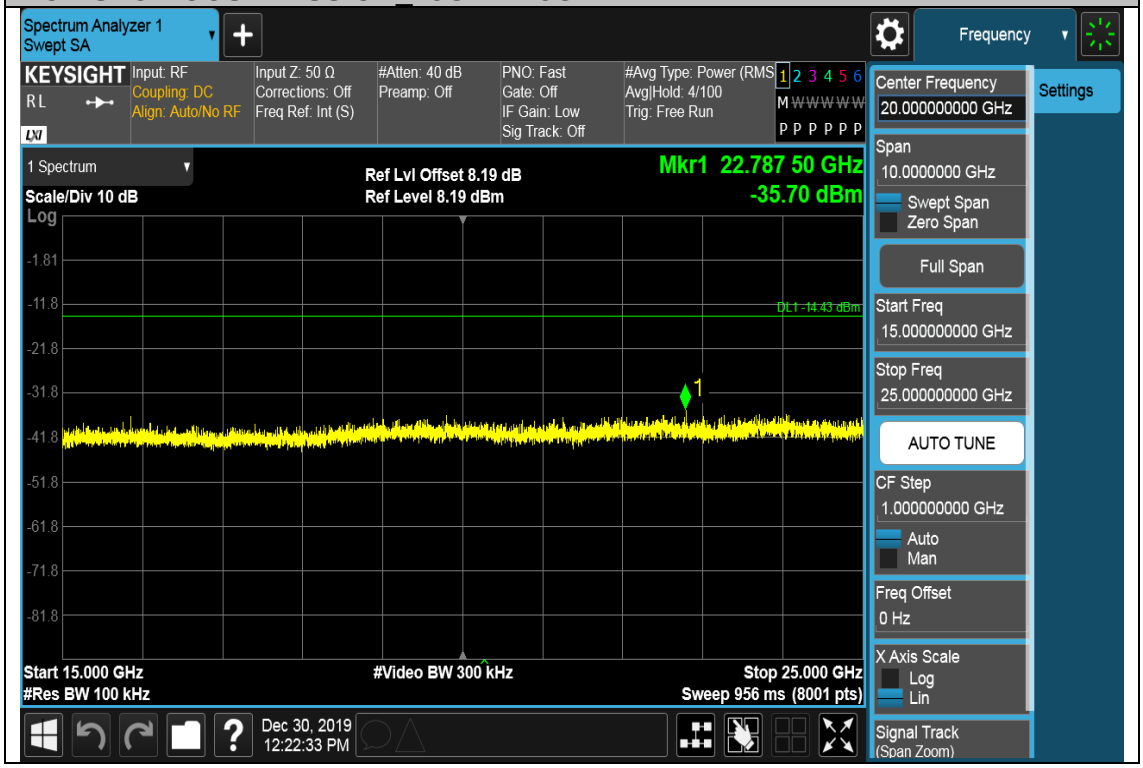


HCH SPURIOUS EMISSION_5GHz~10GHz

HCH SPURIOUS EMISSION_10GHz~15GHz

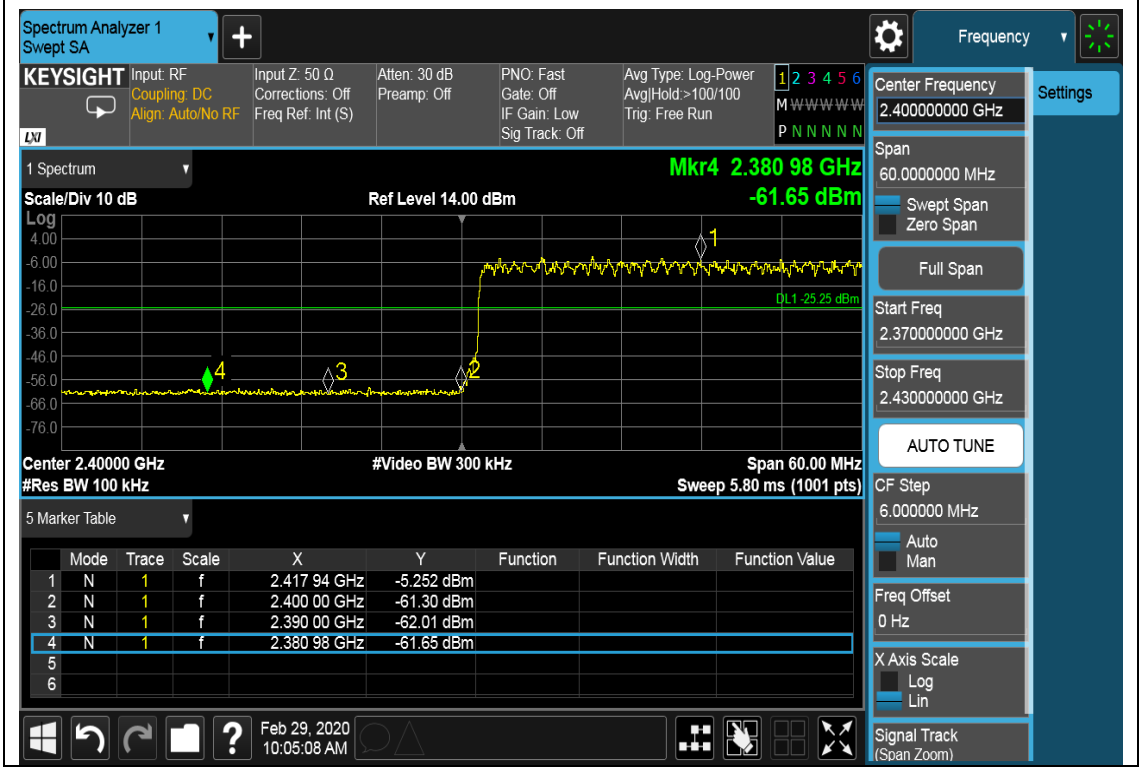


HCH SPURIOUS EMISSION_15GHz~25GHz

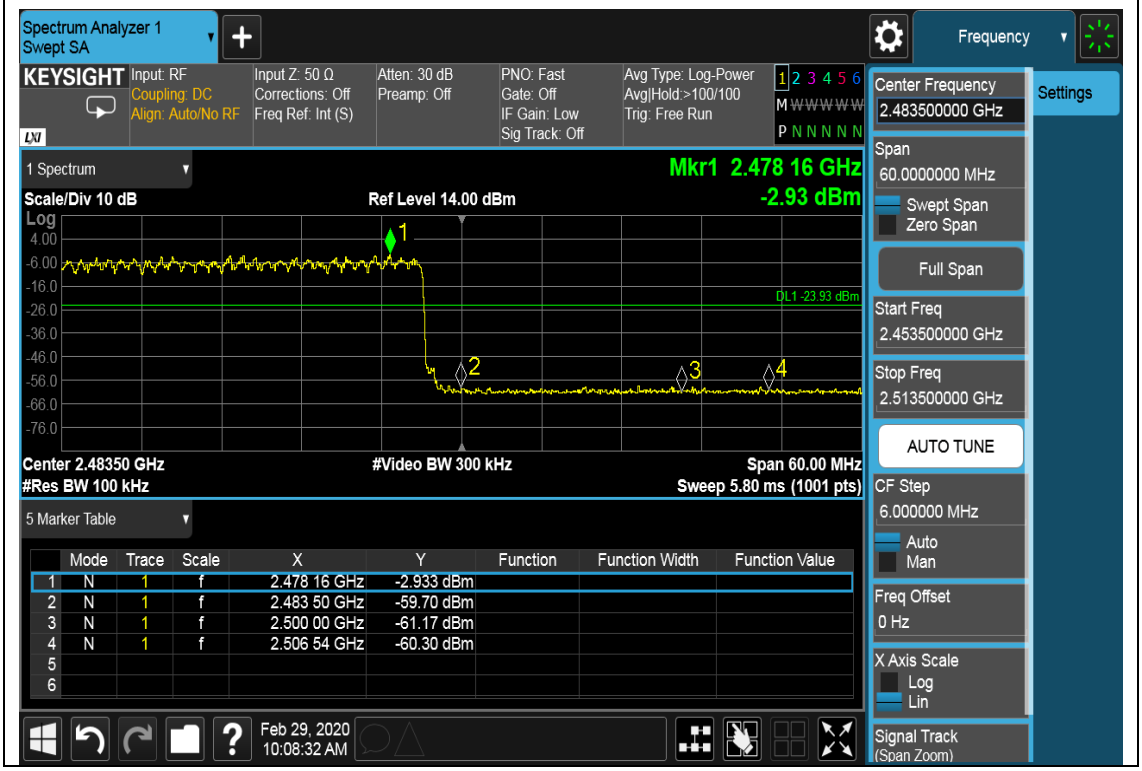


SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW CH BANDEDGE WITH HOPPING ON



HIGH CH BANDEDGE WITH HOPPING ON



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.

Radiation Disturbance Test Limit for FCC (Above 1G)

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

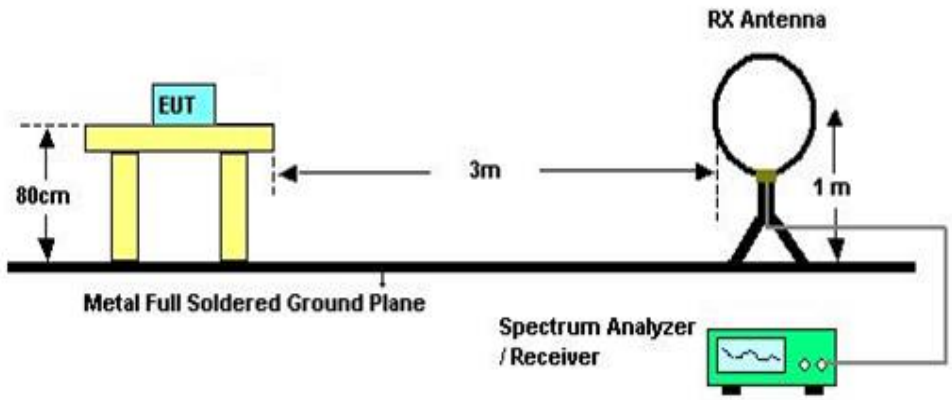
Restricted bands of operation

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

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.

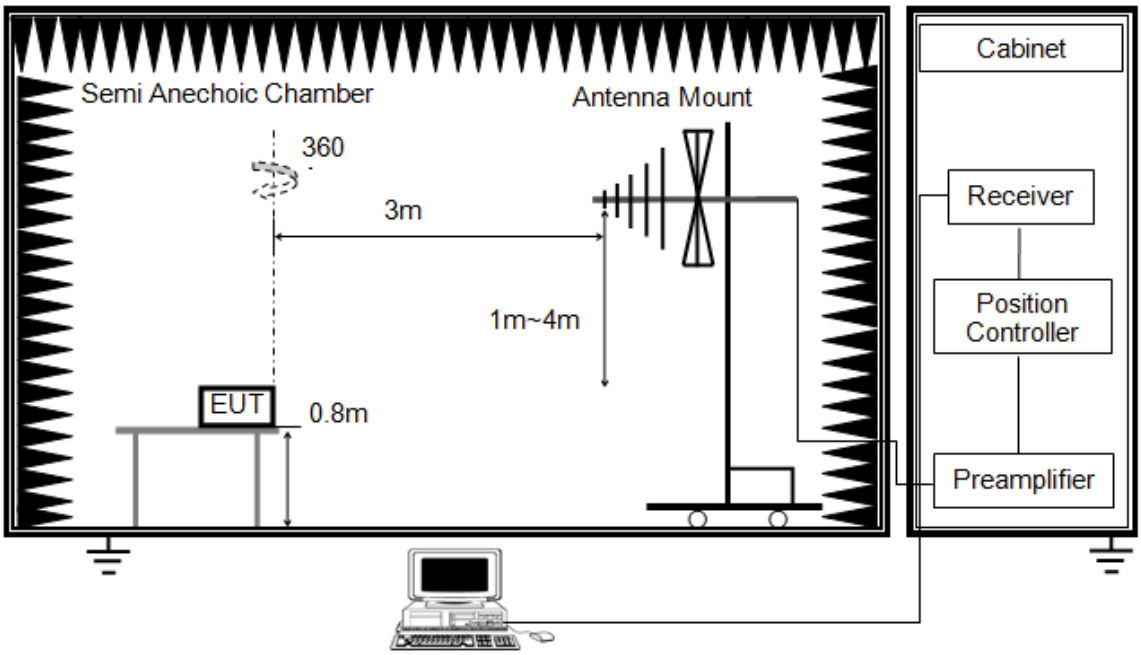
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

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)

Below 1G and above 30MHz



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.

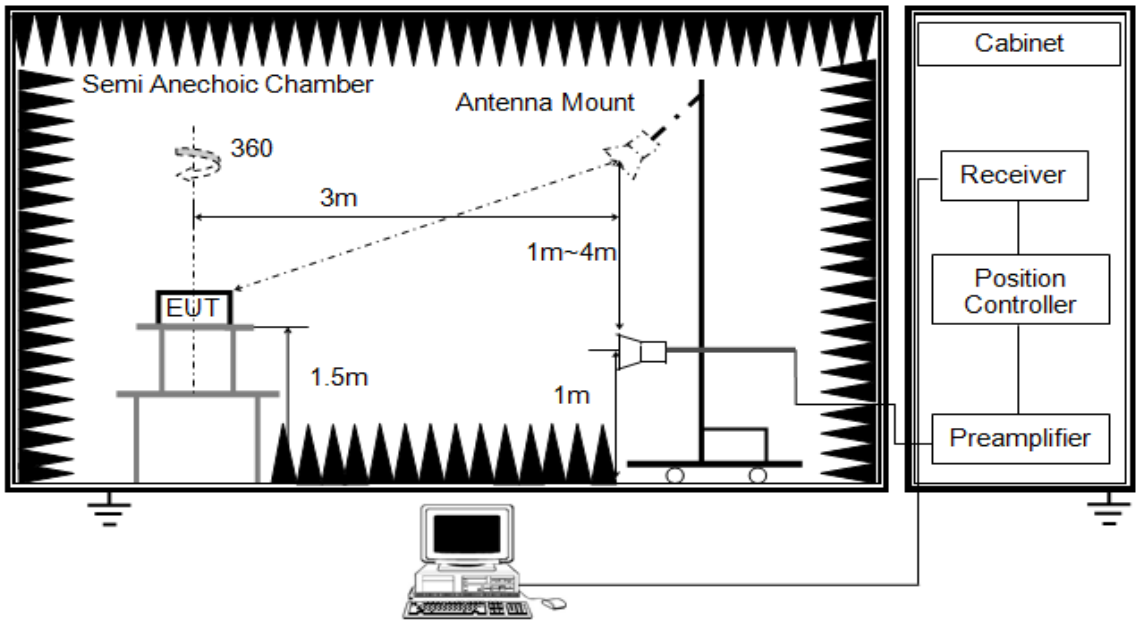
3. The EUT was placed on a turntable with 80cm above ground.

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.

Above 1G



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.

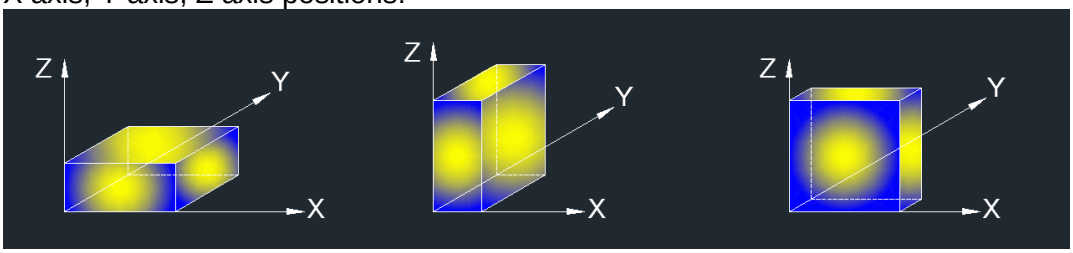
3. The EUT was placed on a turntable with 1.5m above ground.

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 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, max hold to be run for at least 50 x (1/duty cycle) traces for average measurements.

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

X axis, Y axis, Z axis positions:

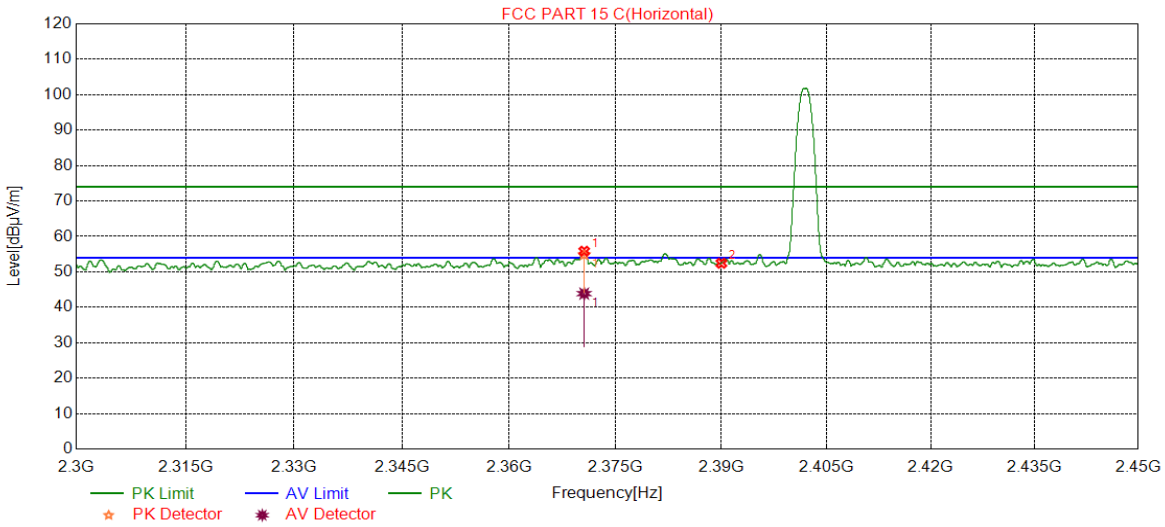


Note: For all radiated test, EUT can only work in one axis(Z axis), so only this case (Z axis) data recorded in the report.

7.2. RESTRICTED BANDEDGE

7.2.1. GFSK MODE

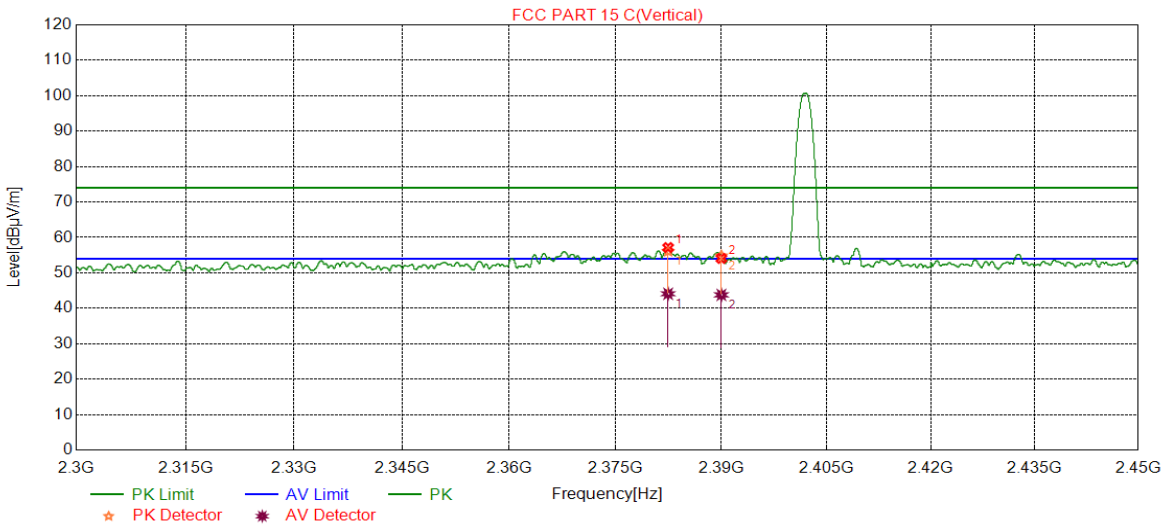
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2370.5651	41	13.86	54.86	74.00	-19.14	peak
		30.00	13.86	43.86	54.00	-10.14	average
2	2390.0000	38.34	14.09	52.43	74.00	-21.57	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

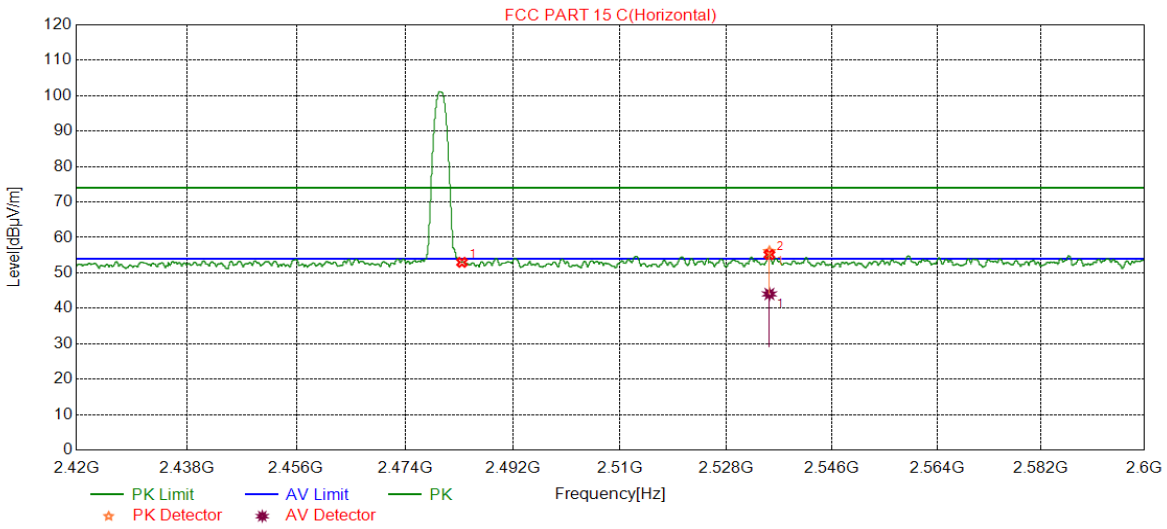
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2382.4353	42.03	14.07	56.10	74.00	-17.90	peak
		30.03	14.07	44.10	54.00	-9.90	average
2	2390.0000	40.7	14.09	54.79	74.00	-19.21	peak
		29.70	14.09	43.79	54.00	-10.21	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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

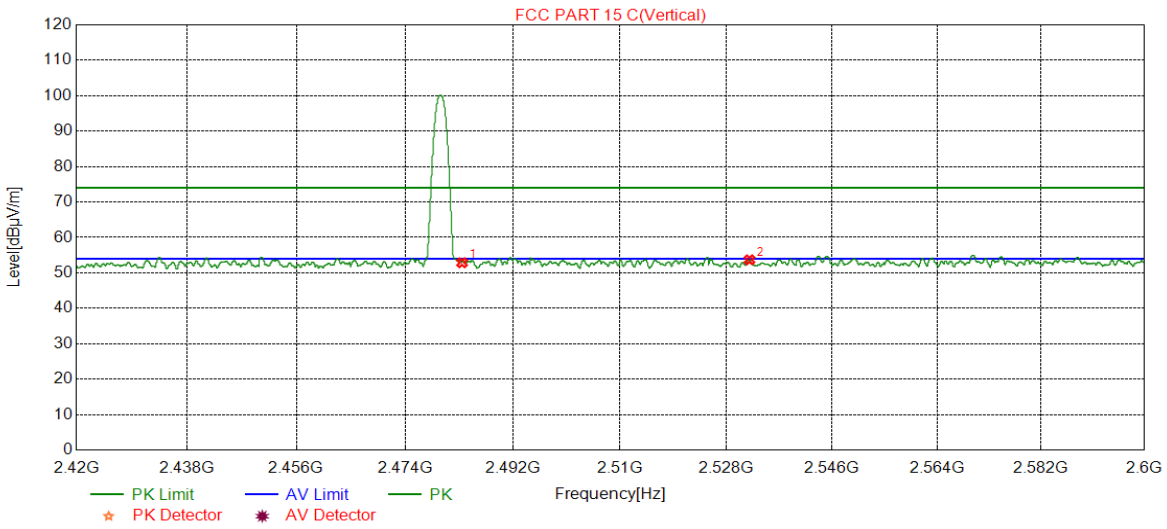
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.5000	39.09	13.88	52.97	74.00	-21.03	peak
2	2535.3015	41.74	14.30	56.04	74.00	-17.96	peak
		29.74	14.30	44.04	54.00	-9.96	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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

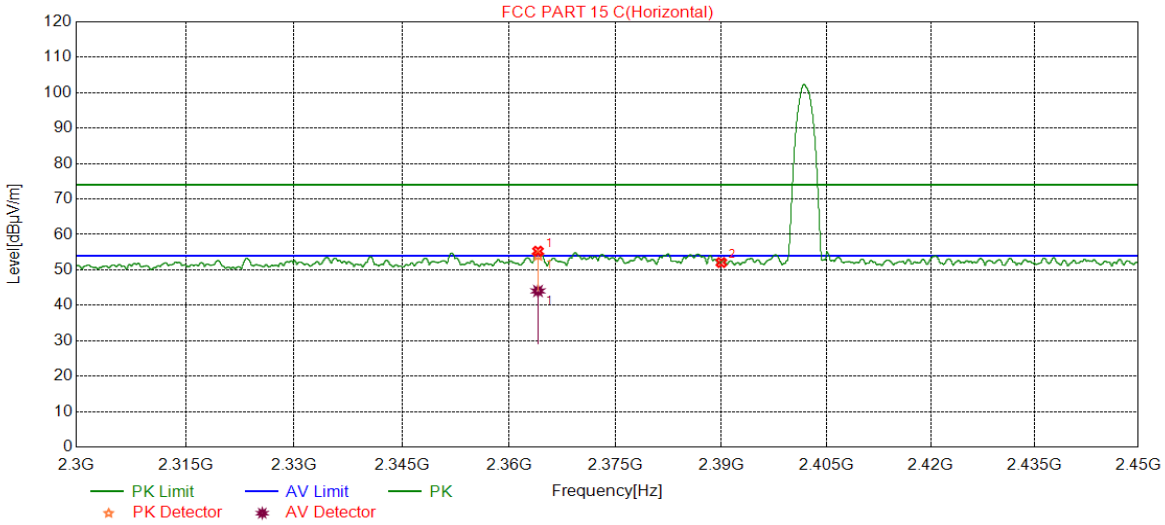


No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.5000	38.98	13.88	52.86	74.00	-21.14	peak
2	2531.9172	39.43	14.25	53.68	74.00	-20.32	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

7.2.2. 8DPSK MODE

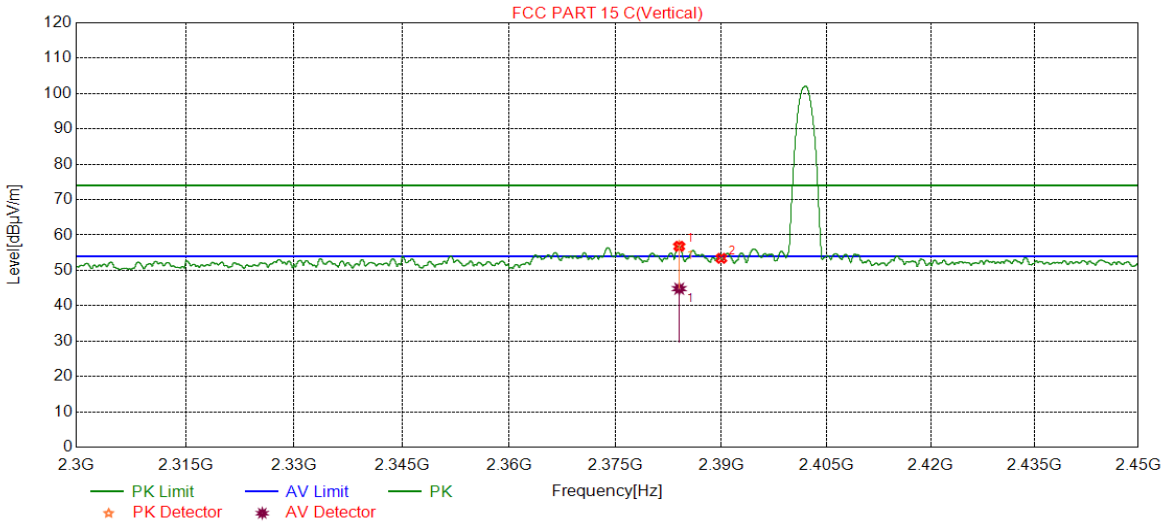
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2364.0580	40.25	13.79	54.04	74.00	-19.96	peak
		30.25	13.79	44.04	54.00	-9.96	averge
2	2390.0000	37.97	14.09	52.06	74.00	-21.94	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

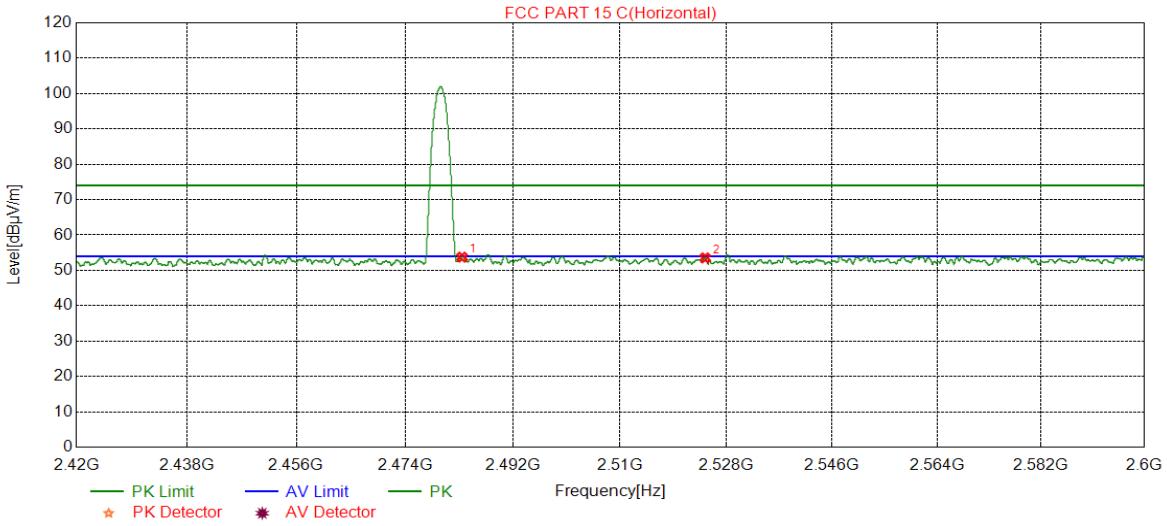
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2384.0105	42.78	14.04	56.82	74.00	-17.18	peak
		30.78	14.04	44.82	54.00	-9.18	average
2	2390.0000	39.31	14.09	53.40	74.00	-20.60	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

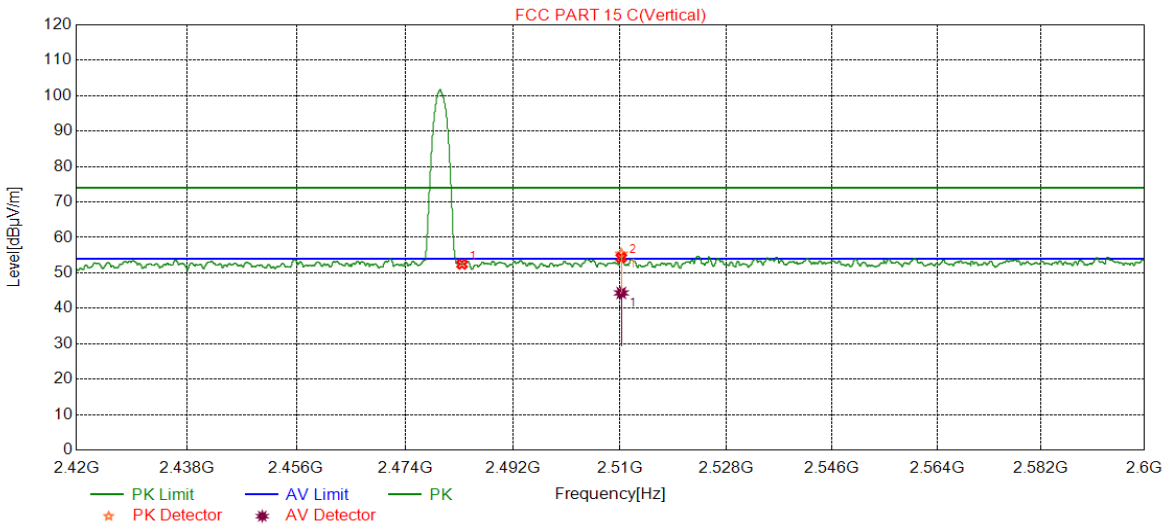
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.5000	39.85	13.88	53.73	74.00	-20.27	peak
2	2524.3744	39.28	14.25	53.53	74.00	-20.47	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



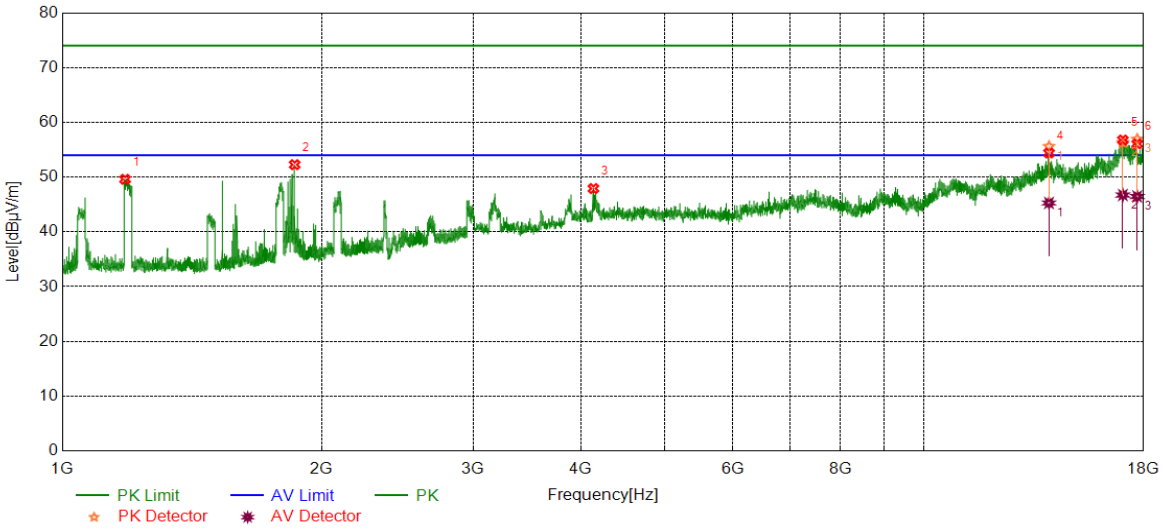
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.5000	38.56	13.88	52.44	74.00	-21.56	peak
2	2510.2070	41.11	14.23	55.34	74.00	-18.66	peak
		30.11	14.23	44.34	54.00	-9.66	average

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

7.3. SPURIOUS EMISSIONS (1~18GHz)

7.3.1. GFSK MODE

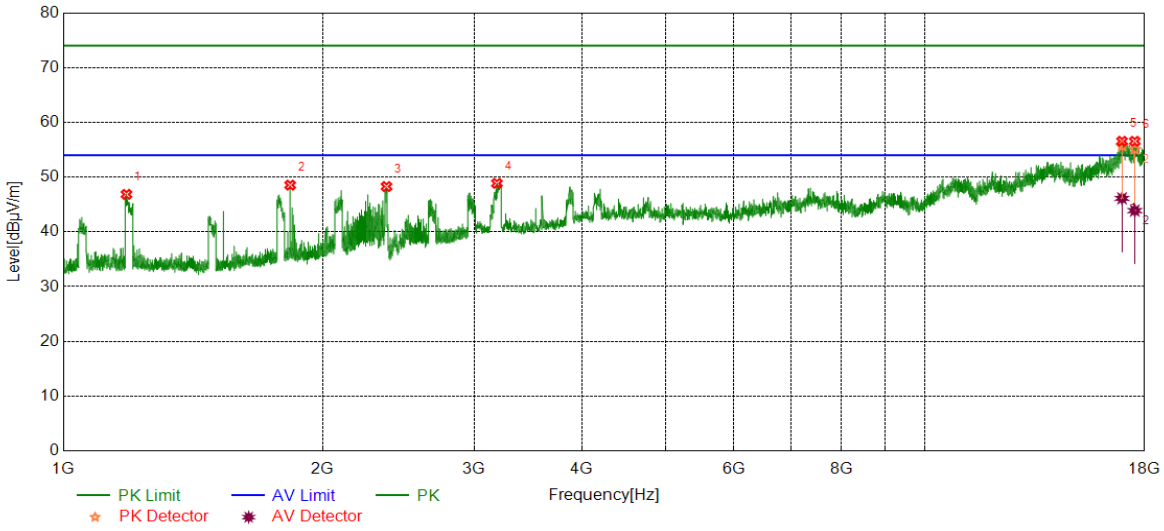
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1183.0229	55.21	-5.61	49.60	74.00	-24.40	peak
2	1861.6077	55.89	-3.62	52.27	74.00	-21.73	peak
3	4136.3920	43.27	4.64	47.91	74.00	-26.09	peak
4	13977.6222	39.21	16.40	55.61	74.00	-18.39	peak
		28.88	16.40	45.28	54.00	-8.72	
5	17028.6286	36.11	20.21	56.32	74.00	-17.68	peak
		26.52	20.21	46.73	54.00	-7.27	average
6	17694.3368	38.5	18.43	56.93	74.00	-17.07	peak
		28.03	18.43	46.46	54.00	-7.54	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

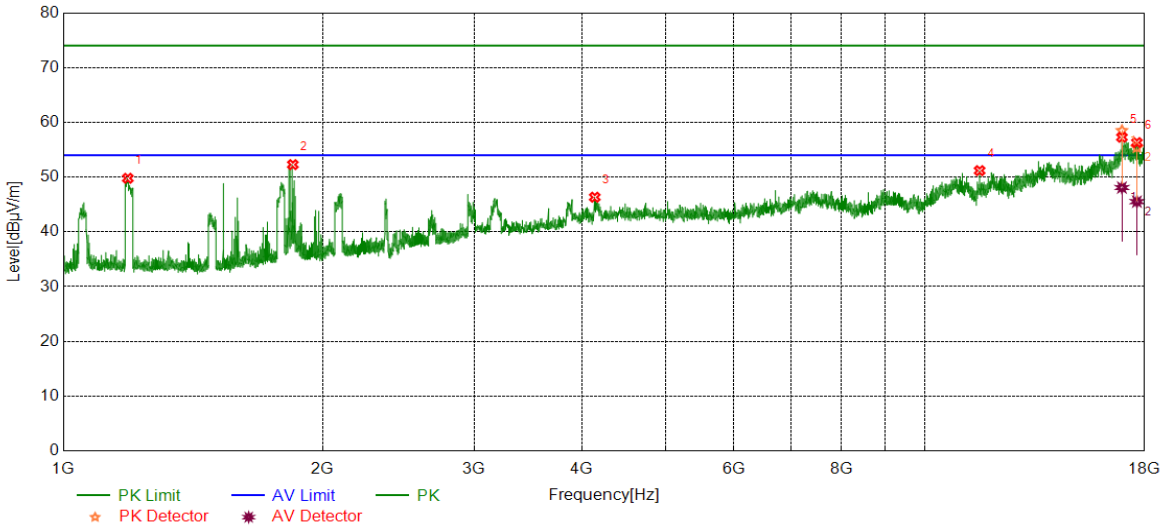
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1184.2730	52.45	-5.60	46.85	74.00	-27.15	peak
2	1834.1043	52.43	-3.89	48.54	74.00	-25.46	peak
3	2372.9216	49.83	-1.55	48.28	74.00	-25.72	peak
4	3187.5234	46.79	2.07	48.86	74.00	-25.14	peak
5	16944.2430	35.67	19.99	55.66	74.00	-18.34	peak
		26.13	19.99	46.12	54.00	-7.88	average
6	17533.0666	36.72	18.34	55.06	74.00	-18.94	peak
		25.54	18.34	43.88	54.00	-10.12	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

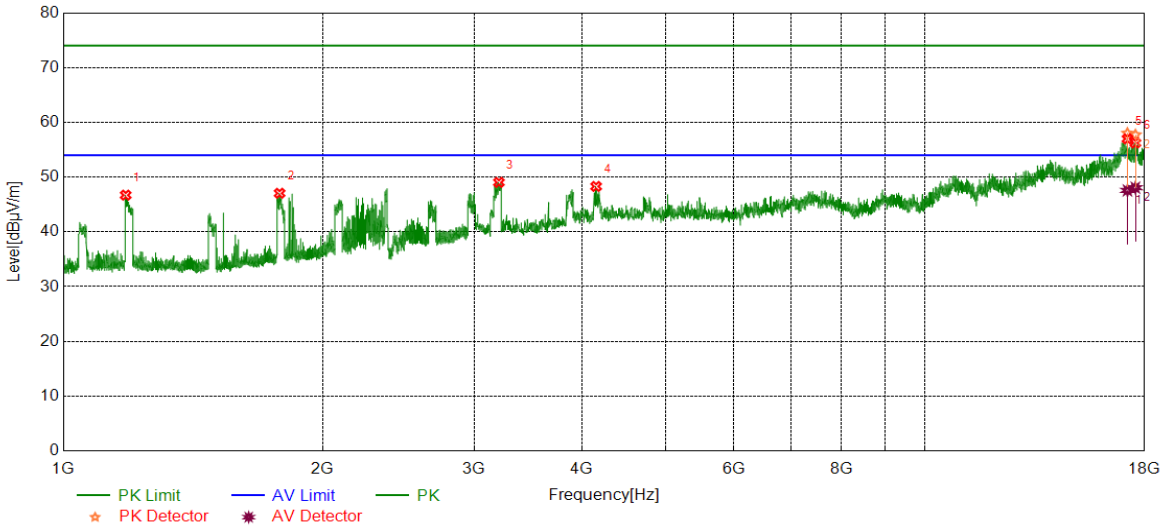
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1188.5236	55.35	-5.56	49.79	74.00	-24.21	peak
2	1847.3559	56.00	-3.72	52.28	74.00	-21.72	peak
3	4140.1425	41.61	4.72	46.33	74.00	-27.67	peak
4	11581.0726	39.12	12.06	51.18	74.00	-22.82	peak
5	16940.4926	38.43	20.08	58.51	74.00	-15.49	peak
		28.01	20.08	48.09	54.00	-5.91	average
6	17632.4541	36.05	19.33	55.38	74.00	-18.62	peak
		26.19	19.33	45.52	54.00	-8.48	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

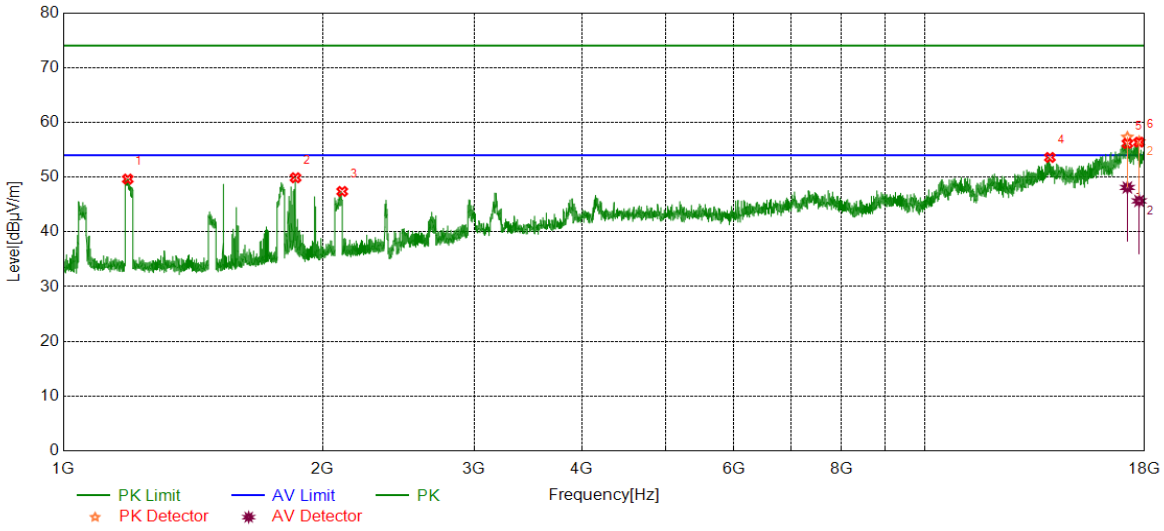
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1181.7727	52.33	-5.62	46.71	74.00	-27.29	peak
2	1783.0979	50.99	-3.94	47.05	74.00	-26.95	peak
3	3204.4006	47.18	1.85	49.03	74.00	-24.97	peak
4	4155.1444	43.55	4.75	48.30	74.00	-25.70	peak
5	17191.7740	38.58	19.43	58.01	74.00	-15.99	peak
		28.14	19.43	47.57	54.00	-6.43	average
6	17561.1951	38.29	19.44	57.73	74.00	-16.27	peak
		28.63	19.44	48.07	54.00	-5.93	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

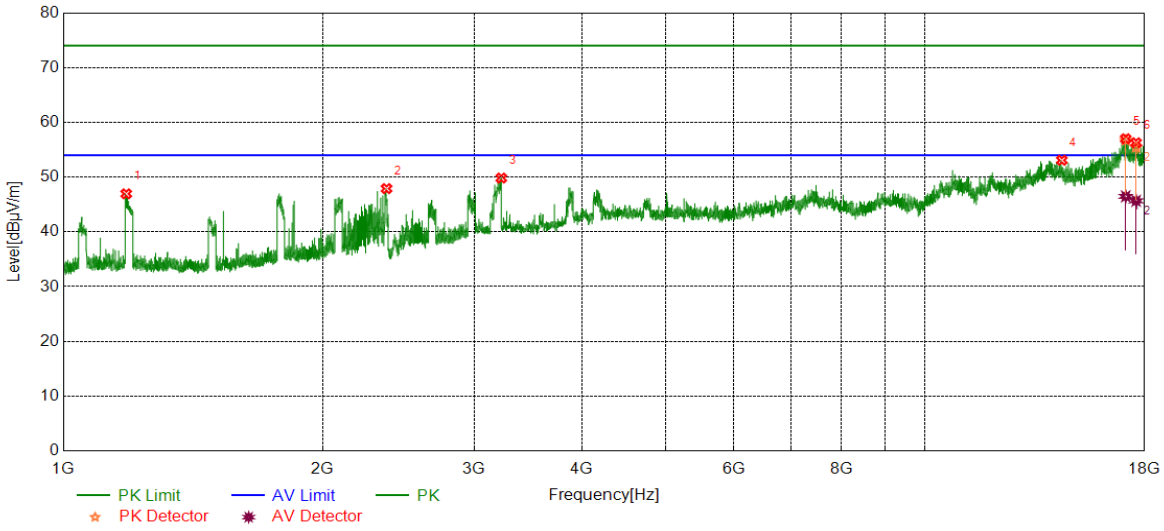
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1188.5236	55.20	-5.56	49.64	74.00	-24.36	peak
2	1860.8576	53.49	-3.61	49.88	74.00	-24.12	peak
3	2107.8885	49.93	-2.55	47.38	74.00	-26.62	peak
4	13975.7470	37.31	16.28	53.59	74.00	-20.41	peak
5	17188.0235	37.76	19.55	57.31	74.00	-16.69	peak
		28.55	19.55	48.10	54.00	-5.90	average
6	17737.4672	37.62	18.86	56.48	74.00	-17.52	peak
		26.79	18.86	45.65	54.00	-8.35	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

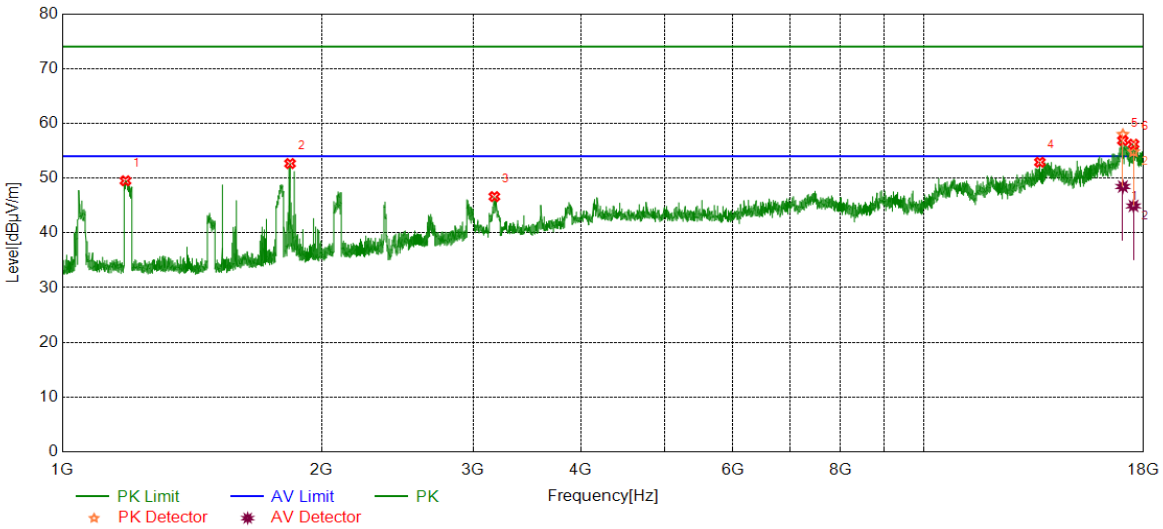


No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1183.5229	52.55	-5.60	46.95	74.00	-27.05	peak
2	2373.1716	49.45	-1.55	47.90	74.00	-26.10	peak
3	3225.0281	48.07	1.76	49.83	74.00	-24.17	peak
4	14427.6785	37.44	15.64	53.08	74.00	-20.92	peak
5	17113.0141	37.35	19.38	56.73	74.00	-17.27	peak
		27.10	19.38	46.48	54.00	-7.52	average
6	17594.9494	35.84	19.58	55.42	74.00	-18.58	peak
		26.09	19.58	45.67	54.00	-8.33	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

7.3.2. 8DPSK MODE

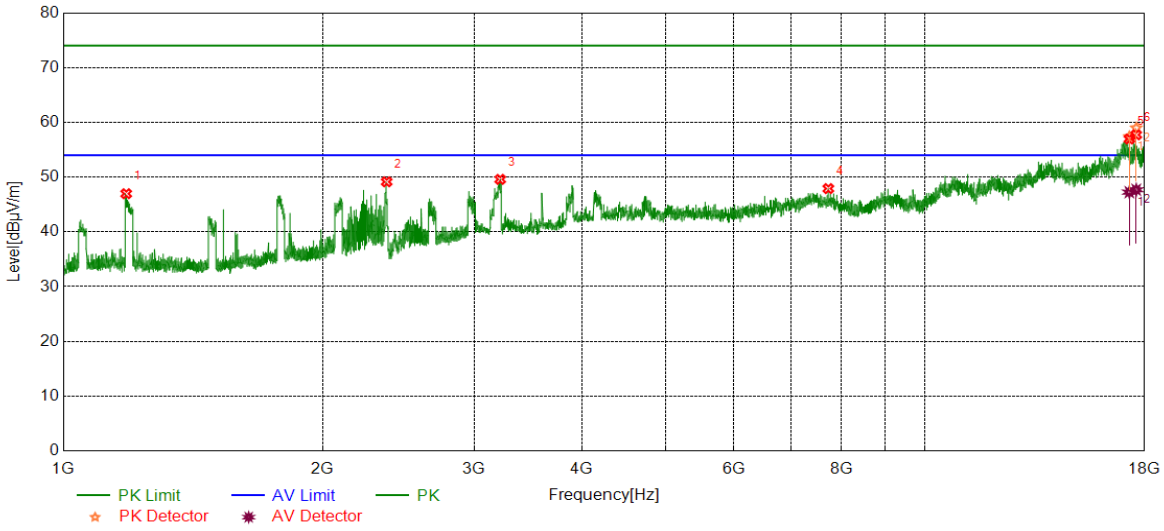
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1184.2730	55.11	-5.60	49.51	74.00	-24.49	peak
2	1838.6048	56.56	-3.90	52.66	74.00	-21.34	peak
3	3174.3968	44.39	2.23	46.62	74.00	-27.38	peak
4	13643.8305	37.88	15.02	52.90	74.00	-21.10	peak
5	17028.6286	37.77	20.21	57.98	74.00	-16.02	peak
		28.25	20.21	48.46	54.00	-5.54	average
6	17519.9400	34.91	19.89	54.80	74.00	-19.20	peak
		25.03	19.89	44.92	54.00	-9.08	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

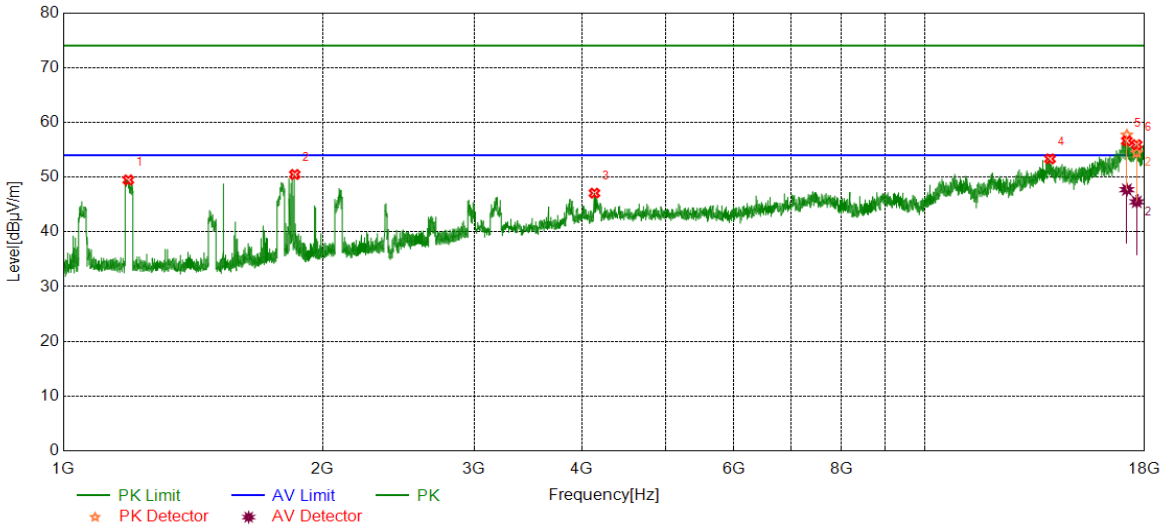
HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1183.5229	52.57	-5.60	46.97	74.00	-27.03	peak
2	2373.9217	50.68	-1.54	49.14	74.00	-24.86	peak
3	3215.6520	47.78	1.81	49.59	74.00	-24.41	peak
4	7729.3412	38.95	8.95	47.90	74.00	-26.10	peak
5	17279.9100	38.82	18.57	57.39	74.00	-16.61	peak
		28.68	18.57	47.25	54.00	-6.75	average
6	17600.5751	39.56	19.43	58.99	74.00	-15.01	peak
		28.26	19.43	47.69	54.00	-6.31	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

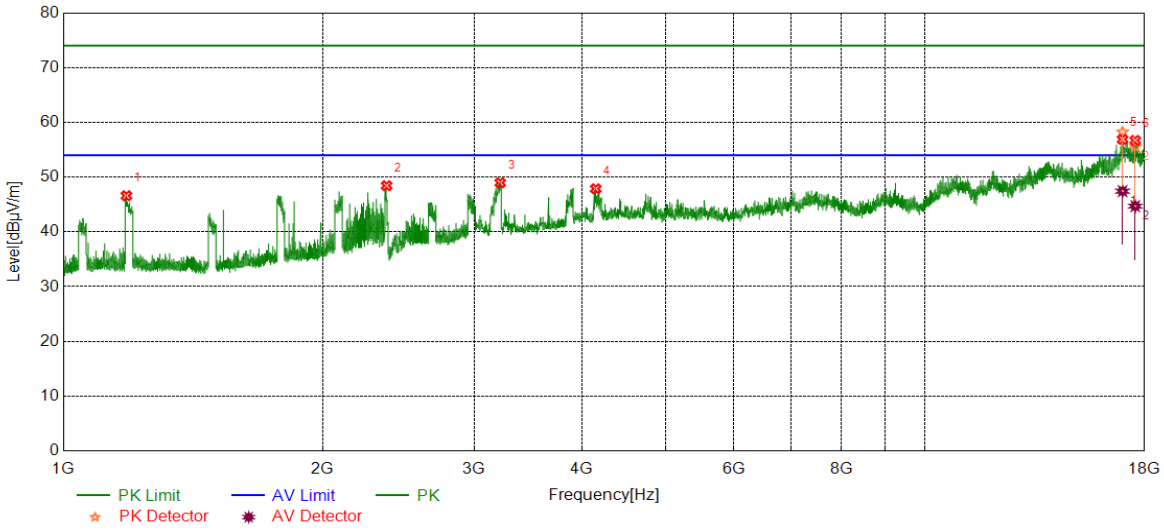
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1190.0238	55.03	-5.55	49.48	74.00	-24.52	peak
2	1857.1071	54.09	-3.61	50.48	74.00	-23.52	peak
3	4136.3920	42.43	4.64	47.07	74.00	-26.93	peak
4	13979.4974	36.81	16.52	53.33	74.00	-20.67	peak
5	17165.5207	38.11	19.57	57.68	74.00	-16.32	peak
		28.14	19.57	47.71	54.00	-6.29	average
6	17624.9531	35.49	18.97	54.46	74.00	-19.54	peak
		26.51	18.97	45.48	54.00	-8.52	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

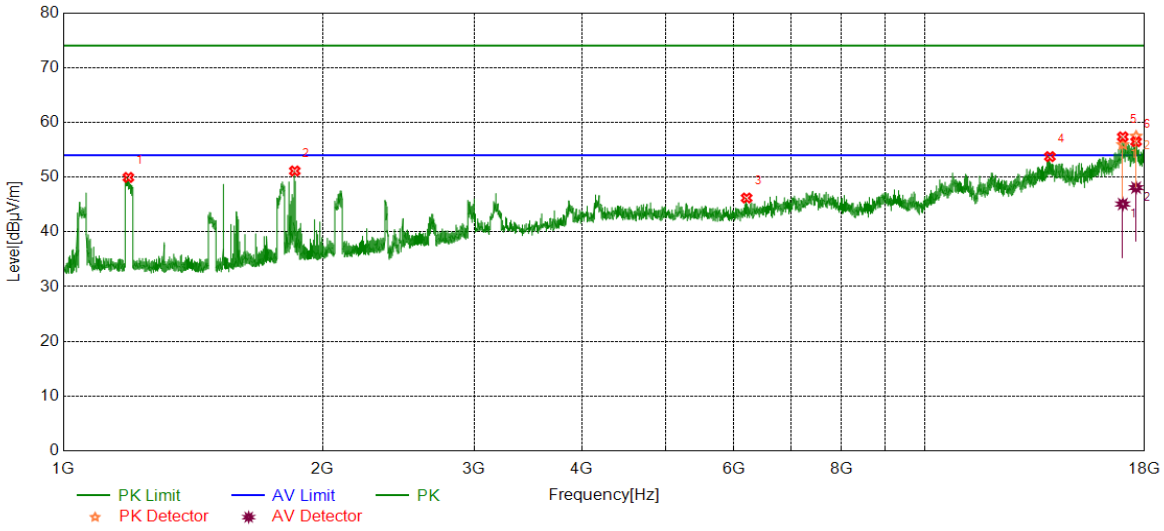
HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1184.0230	52.20	-5.60	46.60	74.00	-27.40	peak
2	2373.4217	49.98	-1.55	48.43	74.00	-25.57	peak
3	3215.6520	47.15	1.81	48.96	74.00	-25.04	peak
4	4151.3939	43.11	4.76	47.87	74.00	-26.13	peak
5	16968.6211	38.24	20.00	58.24	74.00	-15.76	peak
		27.43	20.00	47.43	54.00	-6.57	average
6	17553.6942	36.70	18.84	55.54	74.00	-18.46	peak
		25.86	18.84	44.70	54.00	-9.30	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

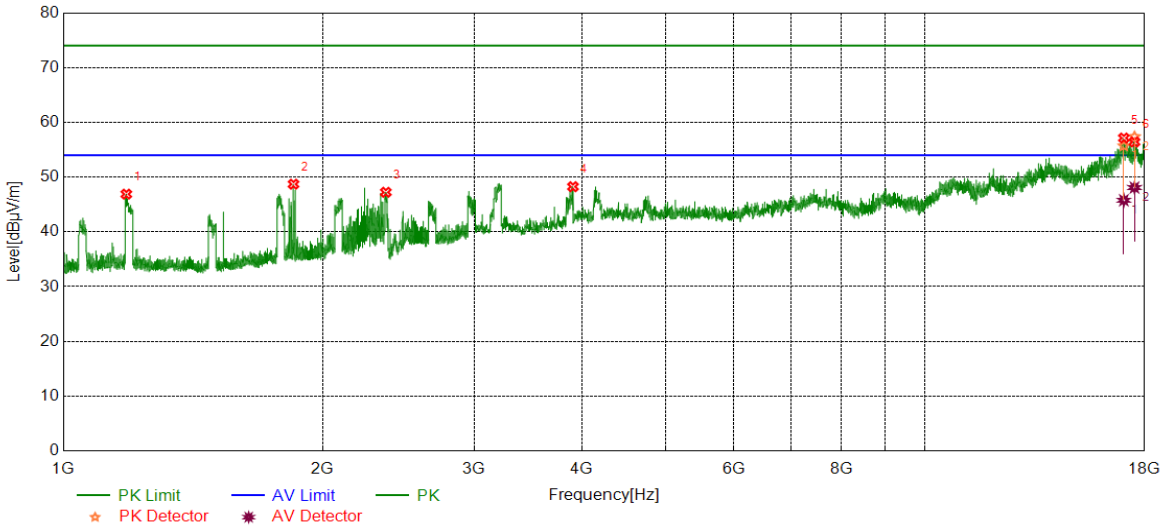
HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1190.2738	55.49	-5.55	49.94	74.00	-24.06	peak
2	1856.8571	54.73	-3.61	51.12	74.00	-22.88	peak
3	6212.2765	39.79	6.39	46.18	74.00	-27.82	peak
4	13975.7470	37.46	16.28	53.74	74.00	-20.26	peak
5	16977.9973	35.42	20.52	55.94	74.00	-18.06	peak
		24.56	20.52	45.08	54.00	-8.92	average
6	17594.9494	37.89	19.58	57.47	74.00	-16.53	peak
		28.50	19.58	48.08	54.00	-5.92	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)



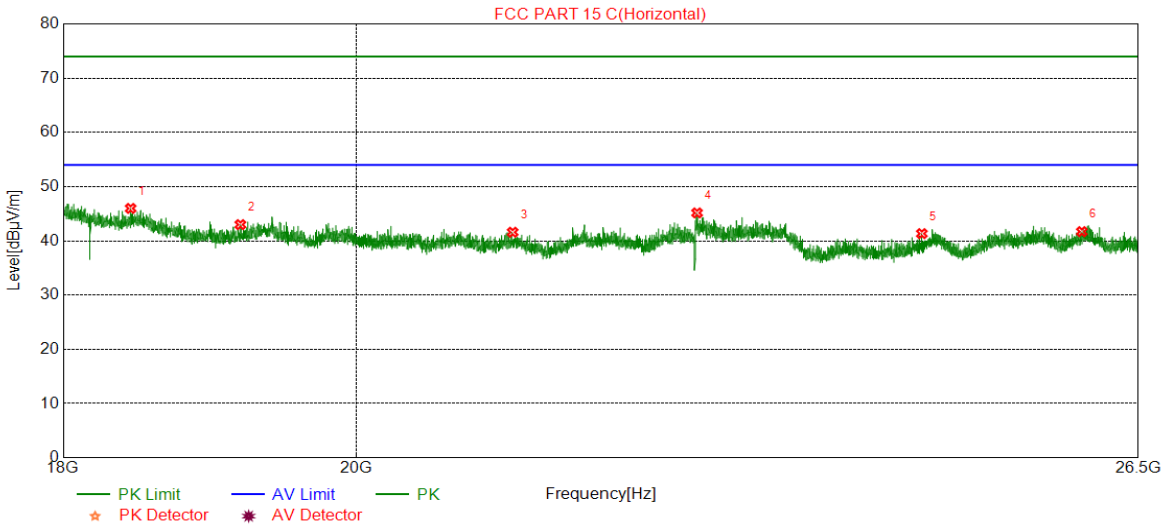
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	1183.7730	52.49	-5.60	46.89	74.00	-27.11	peak
2	1850.6063	52.35	-3.64	48.71	74.00	-25.29	peak
3	2368.6711	48.81	-1.58	47.23	74.00	-26.77	peak
4	3905.7382	44.44	3.81	48.25	74.00	-25.75	peak
5	17026.7533	35.49	20.20	55.69	74.00	-18.31	peak
		25.57	20.20	45.77	54.00	-8.23	average
6	17519.9400	37.49	19.89	57.38	74.00	-16.62	peak
		28.20	19.89	48.09	54.00	-5.91	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. For below 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for BPF losses.
5. For above 3GHz part, Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Proper operation of the transmitter prior to adding the filter to the measurement chain.
7. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

7.4. SPURIOUS EMISSIONS 18G ~ 26GHz

7.4.1. 8DPSK MODE

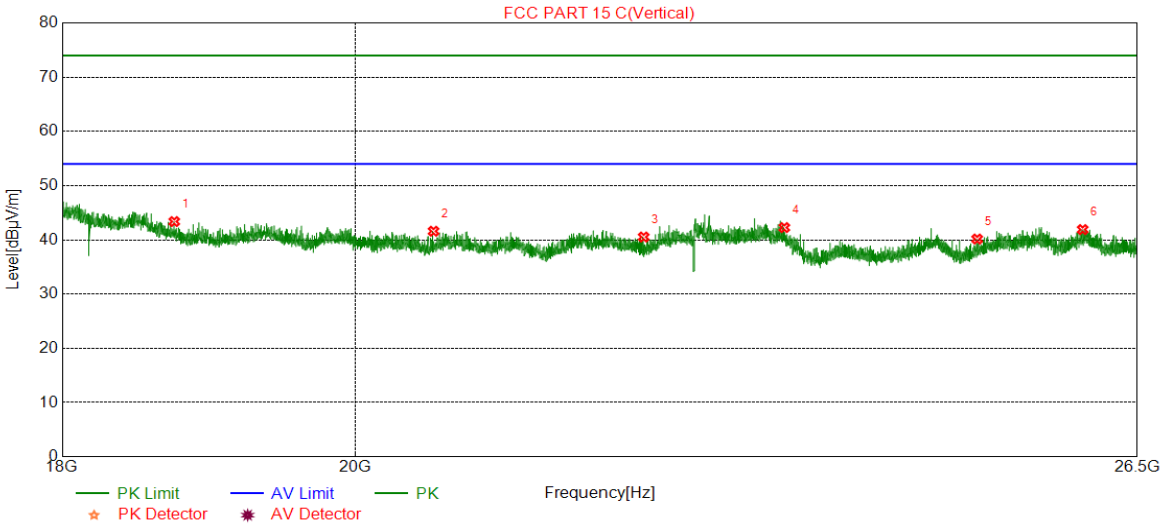
SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	18442.0442	46.94	-0.96	45.98	74.00	-28.02	peak
2	19185.0185	43.96	-0.97	42.99	74.00	-31.01	peak
3	21159.7660	42.44	-0.85	41.59	74.00	-32.41	peak
4	22611.7112	44.23	0.92	45.15	74.00	-28.85	peak
5	24516.7517	41.89	-0.56	41.33	74.00	-32.67	peak
6	25969.5470	40.09	1.61	41.70	74.00	-32.30	peak

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. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	18740.4240	44.39	-1.02	43.37	74.00	-30.63	peak
2	20573.2073	42.35	-0.76	41.59	74.00	-32.41	peak
3	22189.2189	40.12	0.40	40.52	74.00	-33.48	peak
4	23341.0841	41.93	0.33	42.26	74.00	-31.74	peak
5	25018.3018	40.10	0.05	40.15	74.00	-33.85	peak
6	25986.5487	40.25	1.64	41.89	74.00	-32.11	peak

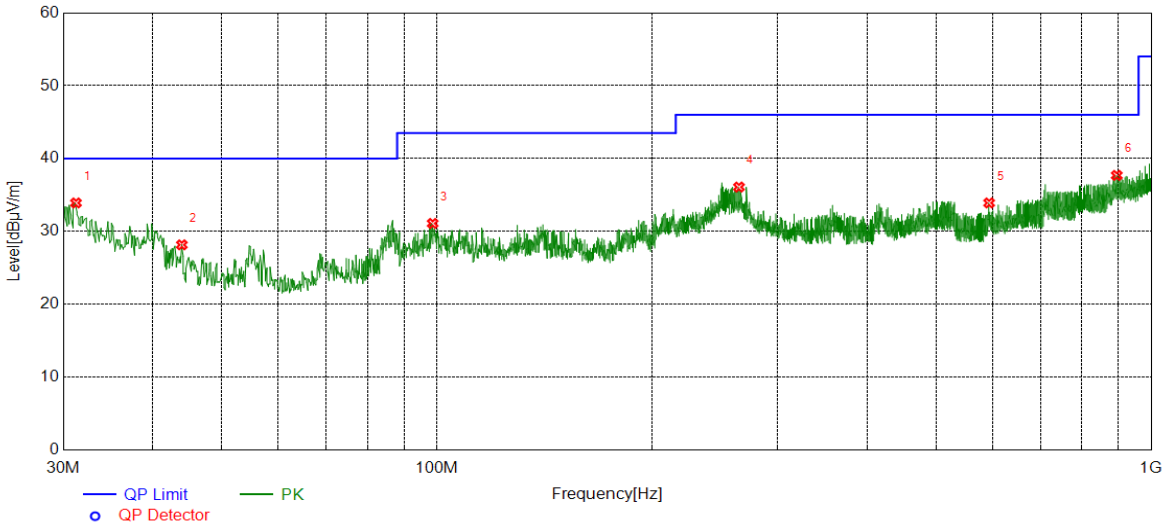
Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak: Peak detector.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Note: All constructions and test modes have been tested, only the worst data record in the report

7.5. SPURIOUS EMISSIONS 30M ~ 1 GHz

7.5.1. 8DPSK MODE

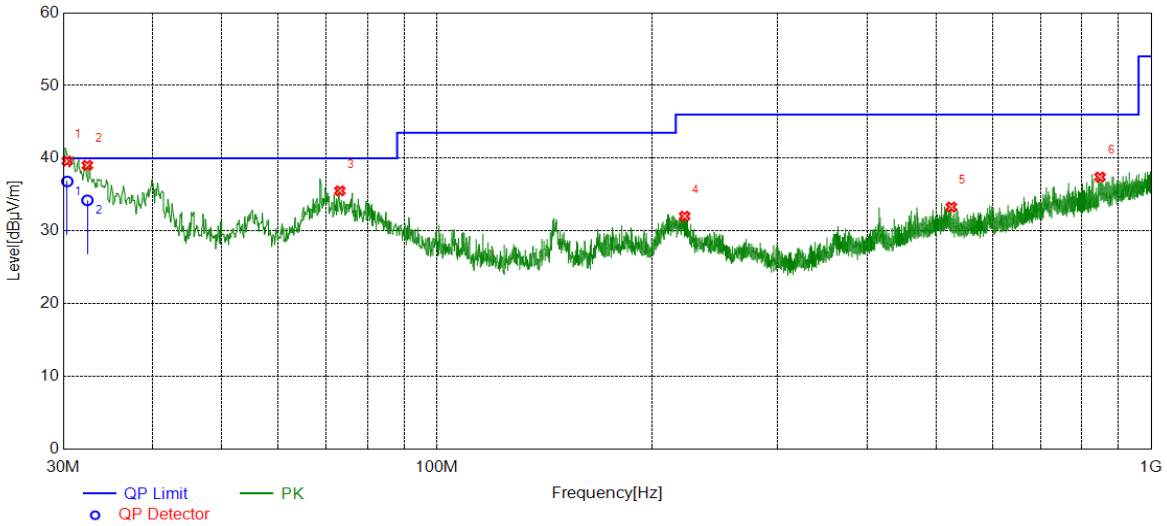
SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	31.2611	7.56	26.35	33.91	40.00	-6.09	peak
2	43.9694	9.86	18.30	28.16	40.00	-11.84	peak
3	98.6829	14.59	16.51	31.10	43.50	-12.40	peak
4	264.8605	16.68	19.41	36.09	46.00	-9.91	peak
5	593.0443	7.44	26.47	33.91	46.00	-12.09	peak
6	894.9385	6.70	30.99	37.69	46.00	-8.31	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.3880	9.91	26.90	36.81	40.00	-3.19	QP
2	32.4252	8.62	25.60	34.22	40.00	-5.78	QP
3	73.1693	20.92	14.61	35.53	40.00	-4.47	peak
4	222.2732	14.29	17.74	32.03	46.00	-13.97	peak
5	525.1375	7.37	25.93	33.30	46.00	-12.70	peak
6	847.8888	7.02	30.40	37.42	46.00	-8.58	peak

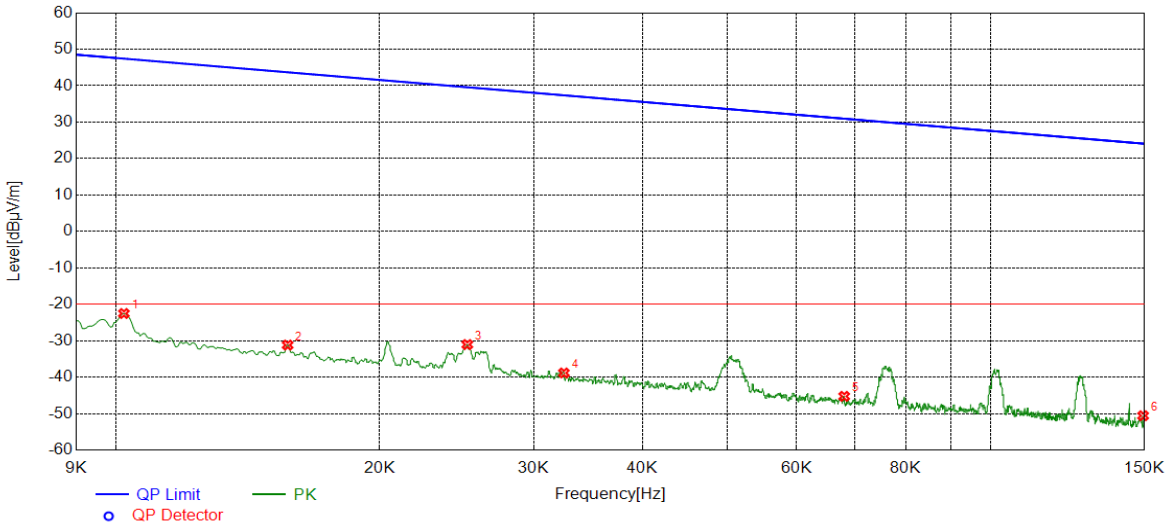
Note: 1. Result Level = Read Level + Correct Factor.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

7.6. SPURIOUS EMISSIONS BELOW 30M

7.6.1. 8DPSK MODE

SPURIOUS EMISSIONS (MID CHANNEL, WORST-CASE CONFIGURATION, Face-on)

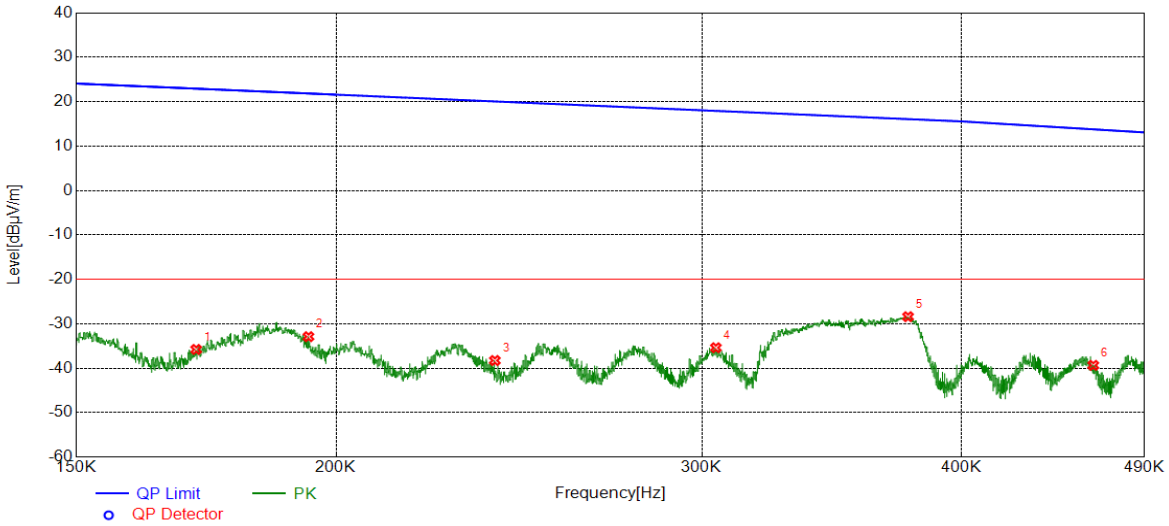
9KHz ~ 150kHz



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0102	38.73	-61.25	-22.52	47.45	-69.97	peak
2	0.0157	29.90	-61.09	-31.19	43.70	-74.89	peak
3	0.0252	29.94	-60.99	-31.05	39.57	-70.62	peak
4	0.0325	22.19	-61.04	-38.85	37.36	-76.21	peak
5	0.0680	16.18	-61.44	-45.26	30.96	-76.22	peak
6	0.1494	10.86	-61.44	-50.58	24.11	-74.69	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report

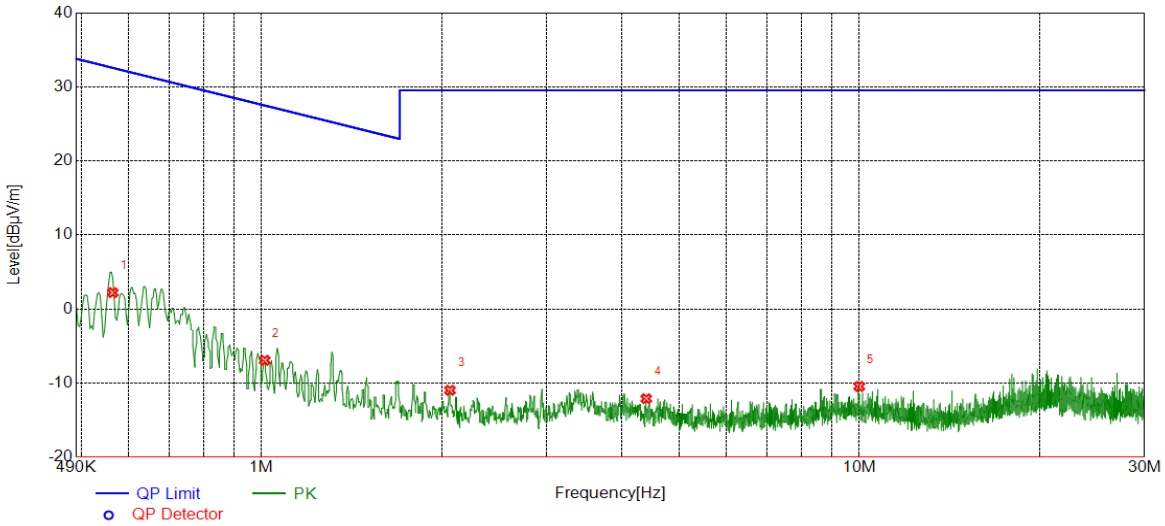
150kHz ~ 490kHz



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.1713	25.57	-61.34	-35.77	22.93	-58.70	peak
2	0.1940	28.34	-61.23	-32.89	21.85	-54.74	peak
3	0.2385	22.74	-61.00	-38.26	20.05	-58.31	peak
4	0.3047	25.52	-60.90	-35.38	17.93	-53.31	peak
5	0.3770	32.44	-60.83	-28.39	16.08	-44.47	peak
6	0.4629	21.41	-60.76	-39.35	13.78	-53.13	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report

490kHz ~ 30MHz



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.5638	22.97	-20.75	2.22	32.58	-30.36	peak
2	1.0124	13.56	-20.49	-6.93	27.49	-34.42	peak
3	2.0660	9.38	-20.35	-10.97	29.54	-40.51	peak
4	4.4005	8.14	-20.25	-12.11	29.54	-41.65	peak
5	9.9932	8.52	-18.98	-10.46	29.54	-40.00	peak
6	0.5638	22.97	-20.75	2.22	32.58	-30.36	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report

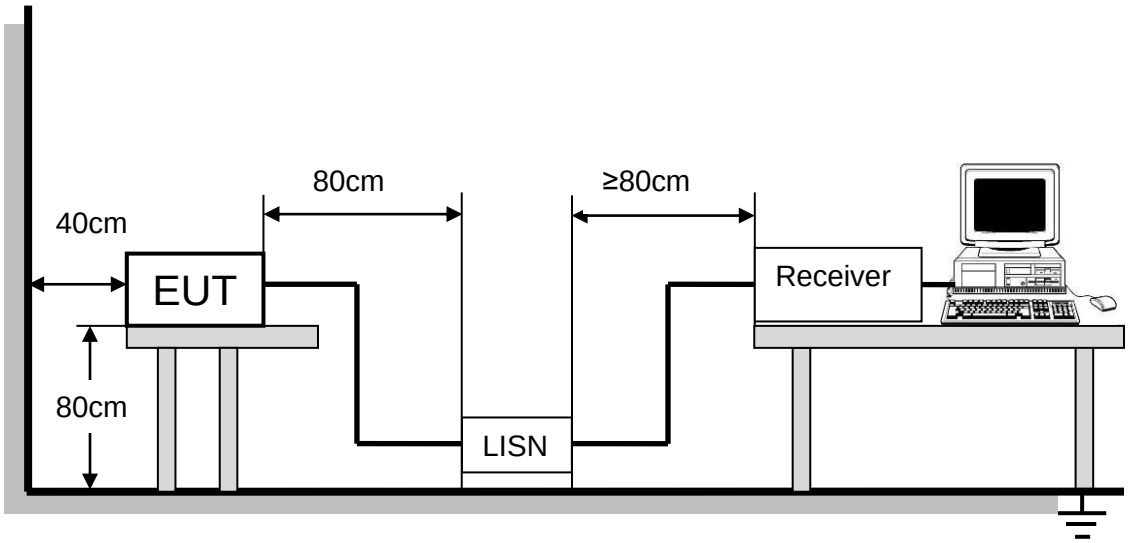
8. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to CFR 47 FCC §15.207 (a)

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	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 7 and 13 of ANSI C63.10-2013.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.

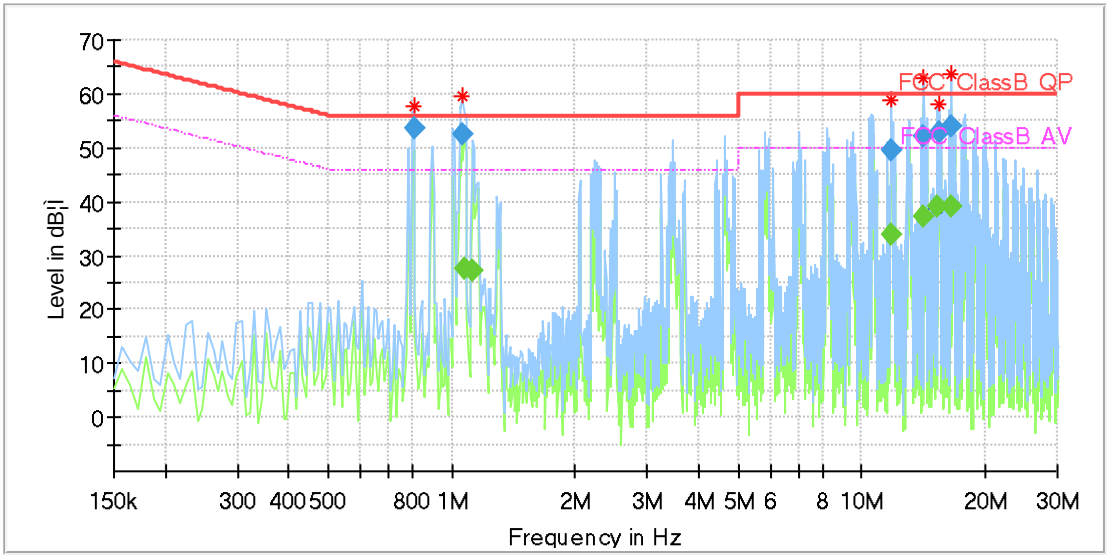
TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

TEST RESULTS

8.1. 8DPSK MODE

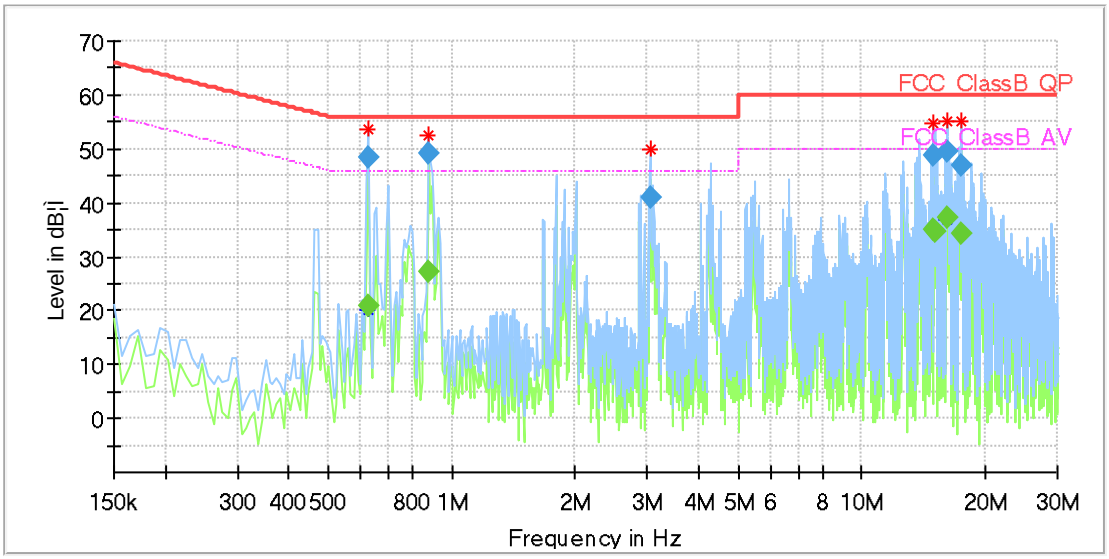
LINE N RESULTS (MID CHANNEL, WORST-CASE CONFIGURATION)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.806700	53.46	---	56.00	2.54	1000.0	9.000	N	OFF	9.5
1.060425	52.39	---	56.00	3.61	1000.0	9.000	N	OFF	9.7
1.075350	---	27.60	46.00	18.40	1000.0	9.000	N	OFF	9.7
1.127588	---	27.37	46.00	18.63	1000.0	9.000	N	OFF	9.7
11.806425	49.71	---	60.00	10.29	1000.0	9.000	N	OFF	9.8
11.806425	---	33.80	50.00	16.20	1000.0	9.000	N	OFF	9.8
14.194425	52.07	---	60.00	7.93	1000.0	9.000	N	OFF	9.8
14.194425	---	37.32	50.00	12.68	1000.0	9.000	N	OFF	9.8
15.209325	---	39.04	50.00	10.96	1000.0	9.000	N	OFF	9.7
15.403350	52.82	---	60.00	7.18	1000.0	9.000	N	OFF	9.7
16.582425	---	39.18	50.00	10.82	1000.0	9.000	N	OFF	9.8
16.582425	53.97	---	60.00	6.03	1000.0	9.000	N	OFF	9.8

LINE L RESULTS (MID CHANNEL, WORST-CASE CONFIGURATION)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.627600	---	21.06	46.00	24.94	1000.0	9.000	L1	OFF	9.7
0.627600	48.23	---	56.00	7.77	1000.0	9.000	L1	OFF	9.7
0.881325	---	27.18	46.00	18.82	1000.0	9.000	L1	OFF	9.7
0.881325	49.18	---	56.00	6.82	1000.0	9.000	L1	OFF	9.7
3.045450	41.04	---	56.00	14.96	1000.0	9.000	L1	OFF	9.9
15.007838	---	34.88	50.00	15.12	1000.0	9.000	L1	OFF	9.8
15.007838	48.88	---	60.00	11.12	1000.0	9.000	L1	OFF	9.8
15.052613	---	34.66	50.00	15.34	1000.0	9.000	L1	OFF	9.8
16.201838	49.63	---	60.00	10.37	1000.0	9.000	L1	OFF	9.8
16.201838	---	37.13	50.00	12.87	1000.0	9.000	L1	OFF	9.8
17.395838	---	34.10	50.00	15.90	1000.0	9.000	L1	OFF	9.8
17.395838	47.09	---	60.00	12.91	1000.0	9.000	L1	OFF	9.8

Note: All the test modes have been tested, only the worst data record in the report.

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.

RESULTS

Complies

END OF REPORT