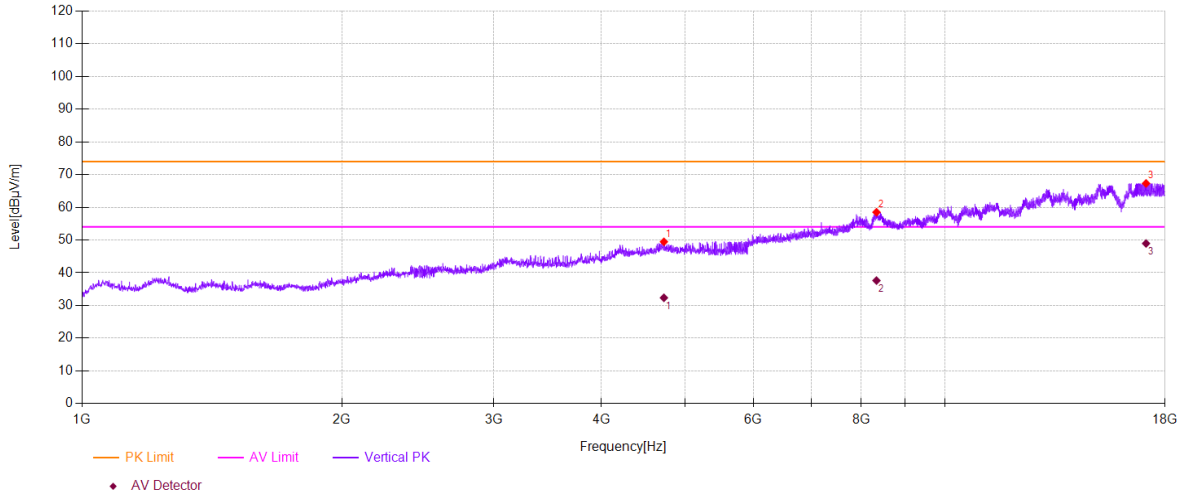


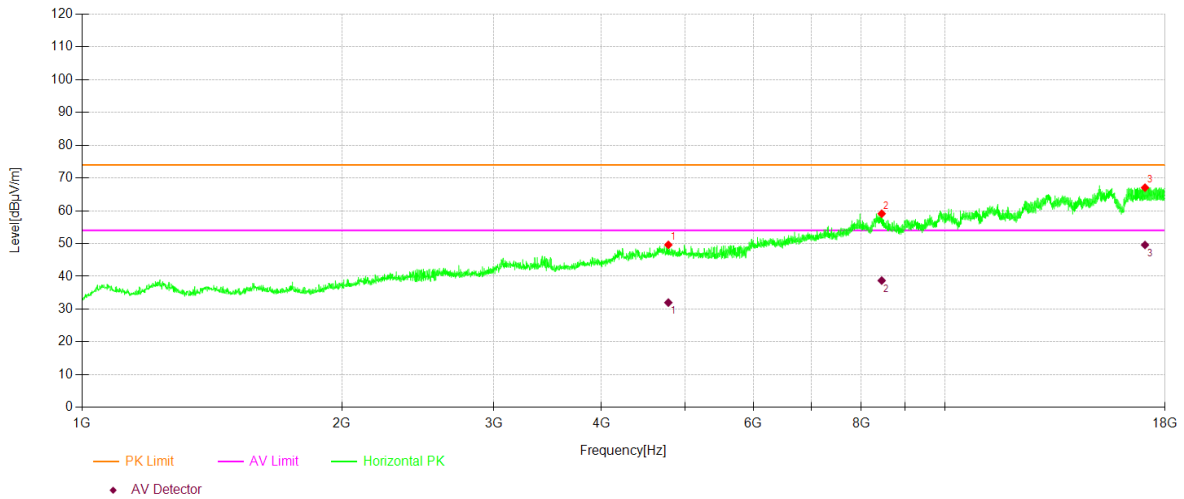
■ Spurious Emission above 1GHz (1GHz to 18GHz)

All modes have been tested, and the worst result recorded was report as below:

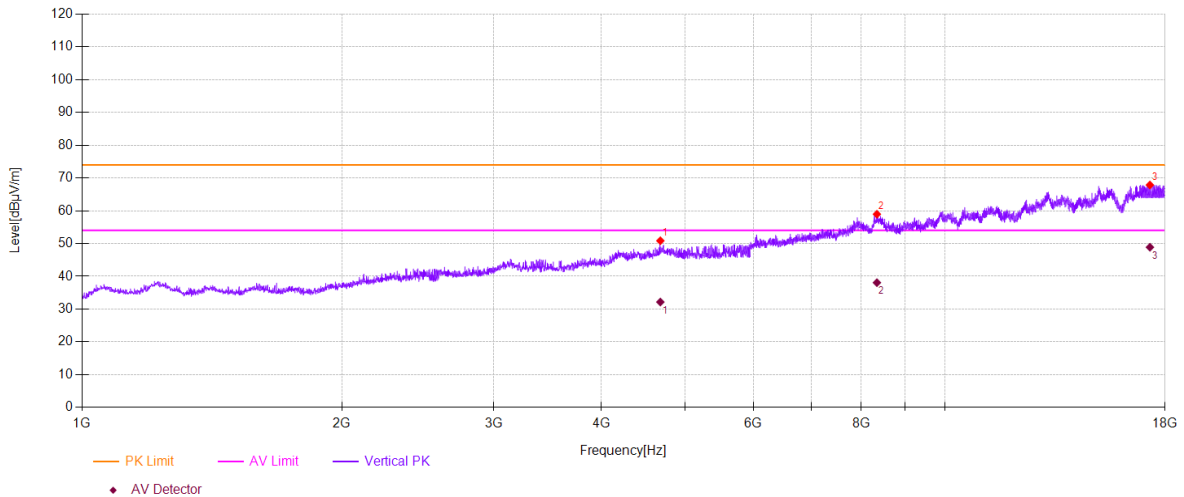
Test mode: GFSK Frequency: Channel 0: 2402MHz V



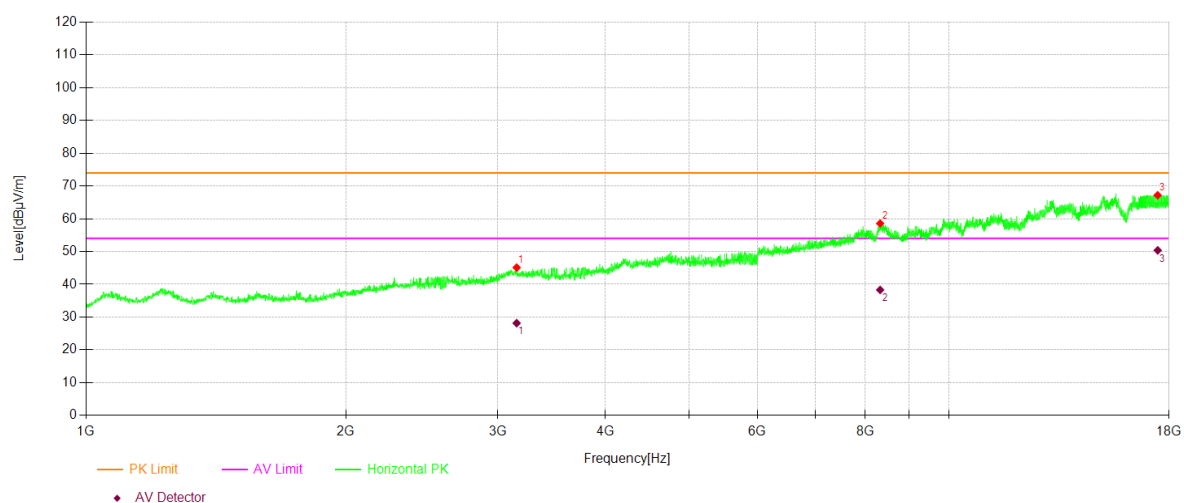
Test mode: GFSK Frequency: Channel 0: 2402MHz H



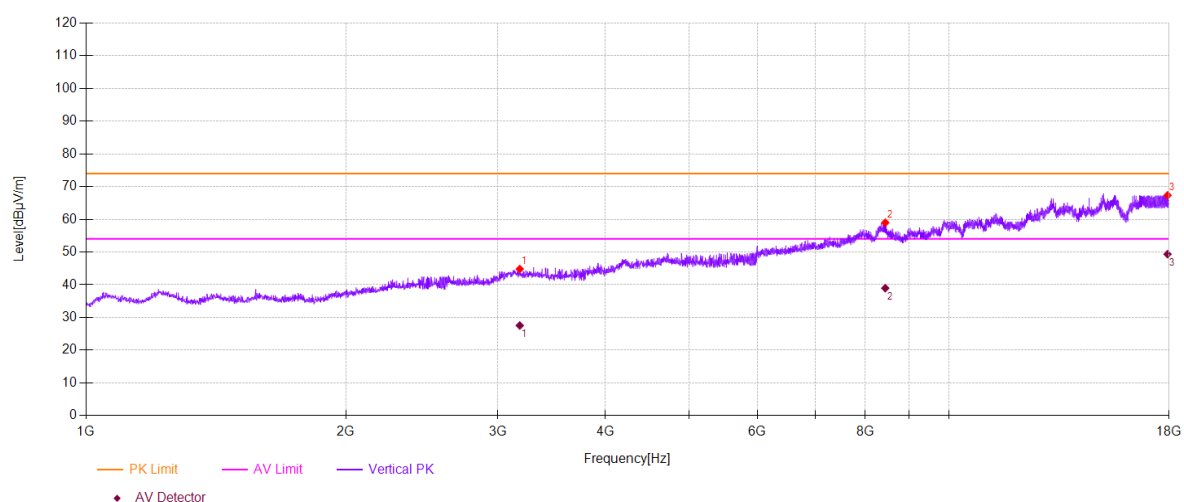
Test mode: GFSK Frequency: Channel 39: 2441MHz V



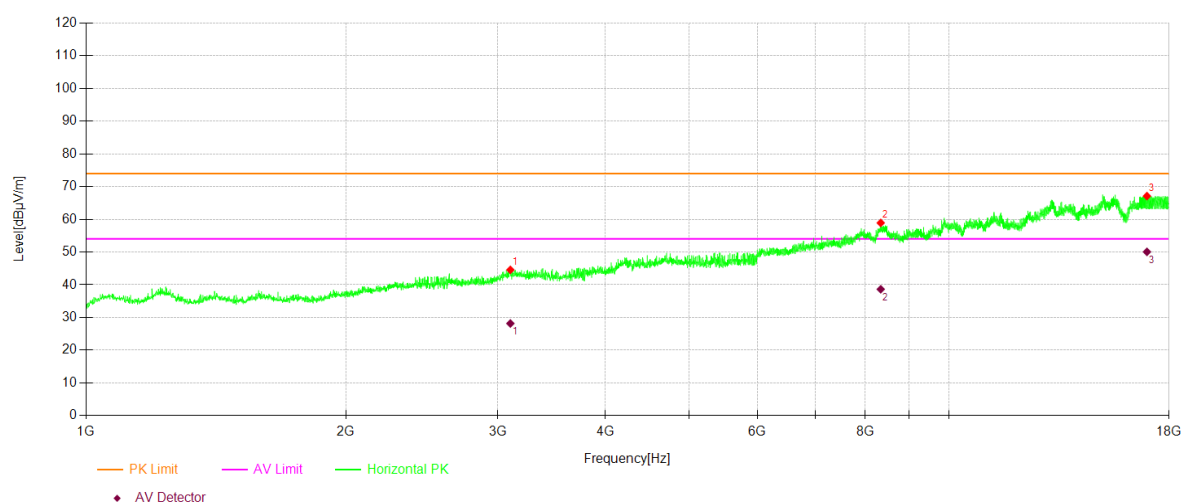
Test mode: GFSK Frequency: Channel 39: 2441MHz H



Test mode: GFSK Frequency: Channel 78: 2480MHz V



Test mode: GFSK Frequency: Channel 78: 2480MHz H



■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

Bluetooth (GFSK, $\pi/4$ -DQPSK, 8DPSK, Hopping) mode have been tested, and the worst result(GFSK, Hopping) was report as below:

Test mode: GFSK Frequency: Channel 0: 2402MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2388.71	V	45.61	74.00	28.39	peak
2388.71	V	38.05	54.00	15.95	AVG
2386.82	H	45.90	74.00	28.10	peak
2386.82	H	38.26	54.00	15.74	AVG

Test mode: GFSK Frequency: Channel 78: 2480MHz

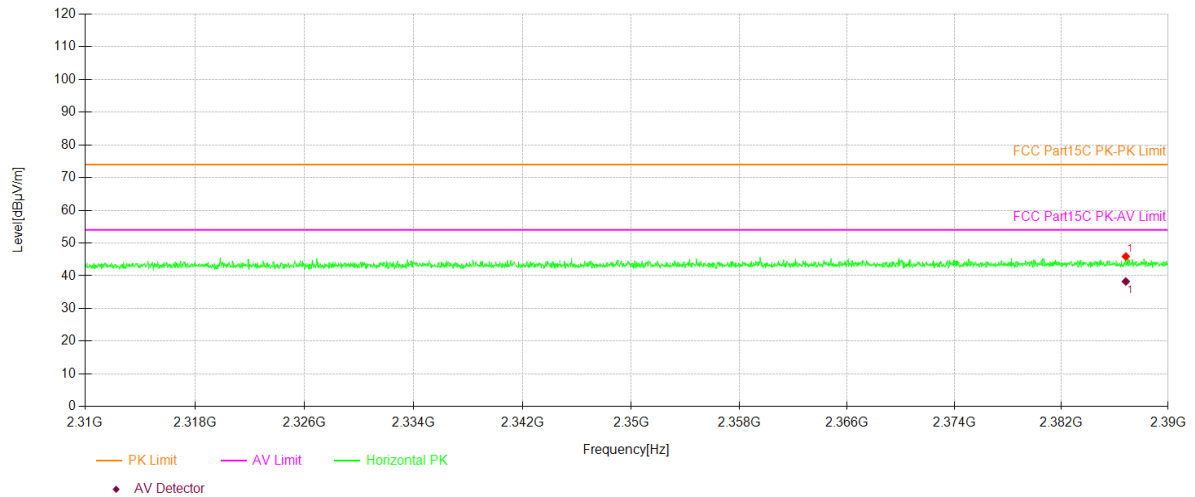
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2484.42	V	46.05	74.00	27.95	peak
2484.42	V	38.93	54.00	15.07	AVG
2484.58	H	46.52	74.00	27.48	peak
2484.58	H	38.33	54.00	15.67	AVG

Test mode: GFSK Frequency: Hopping

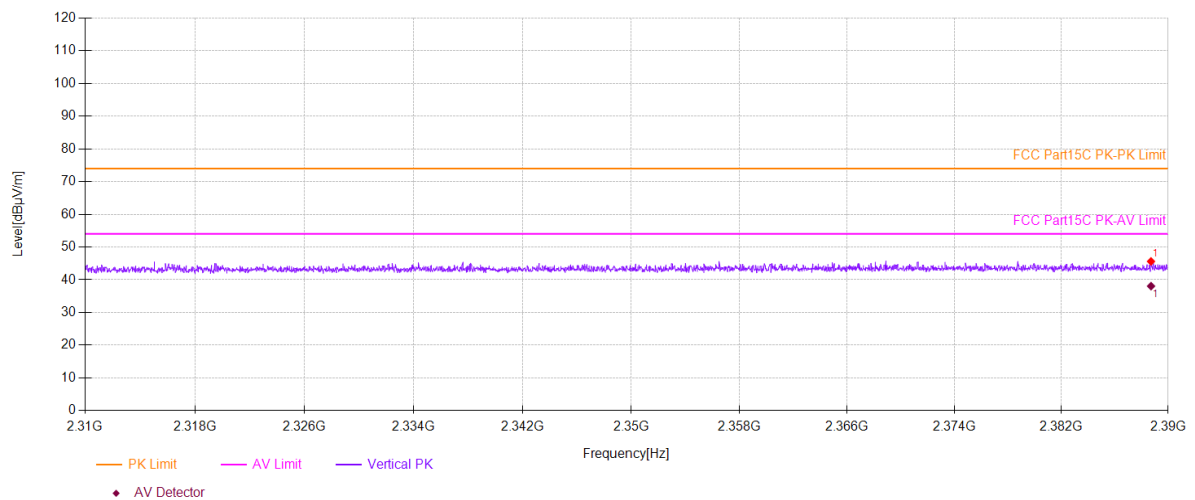
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2390.00	V	43.27	74.00	30.73	peak
2483.50	V	44.25	74.00	29.75	peak
2390.00	V	37.93	54.00	16.07	AVG
2483.50	V	38.14	54.00	15.86	AVG
2390.00	H	42.76	74.00	31.24	peak
2483.50	H	43.67	74.00	30.33	peak
2390.00	H	38.08	54.00	15.92	AVG
2483.50	H	38.60	54.00	15.40	AVG

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	BT		
	Channel 0: 2402MHz	GFSK	H
		Test By: HYD	



Test Model	Spurious Emission in Restricted Band 2310-2390MHz		
	BT		
	Channel 0: 2402MHz	GFSK	V
		Test By: HYD	



Test Model

Spurious Emission in Restricted Band 2483.5-2500MHz

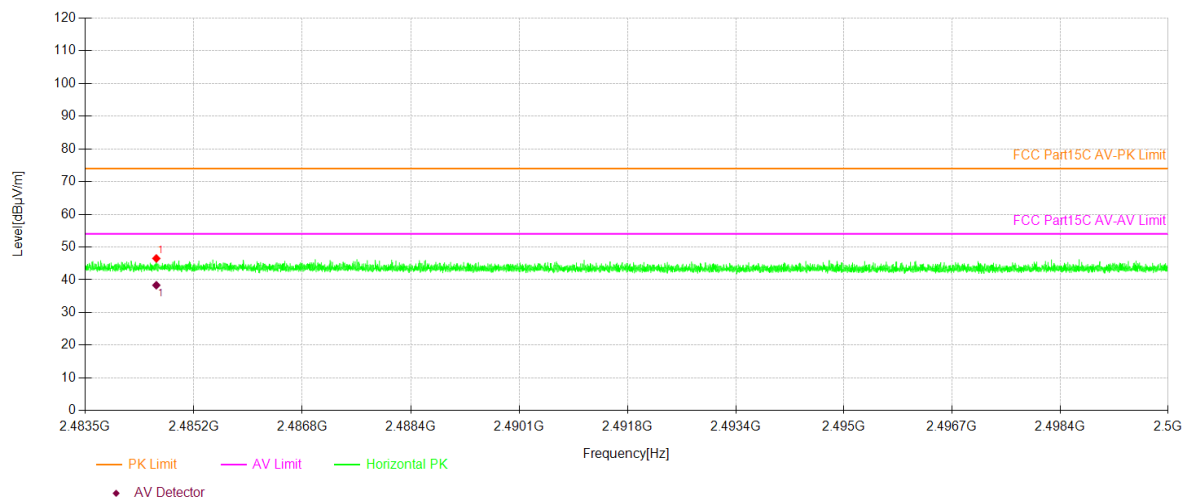
BT

Channel 78: 2480MHz

GFSK

H

Test By: HYD



Test Model

Spurious Emission in Restricted Band 2483.5-2500MHz

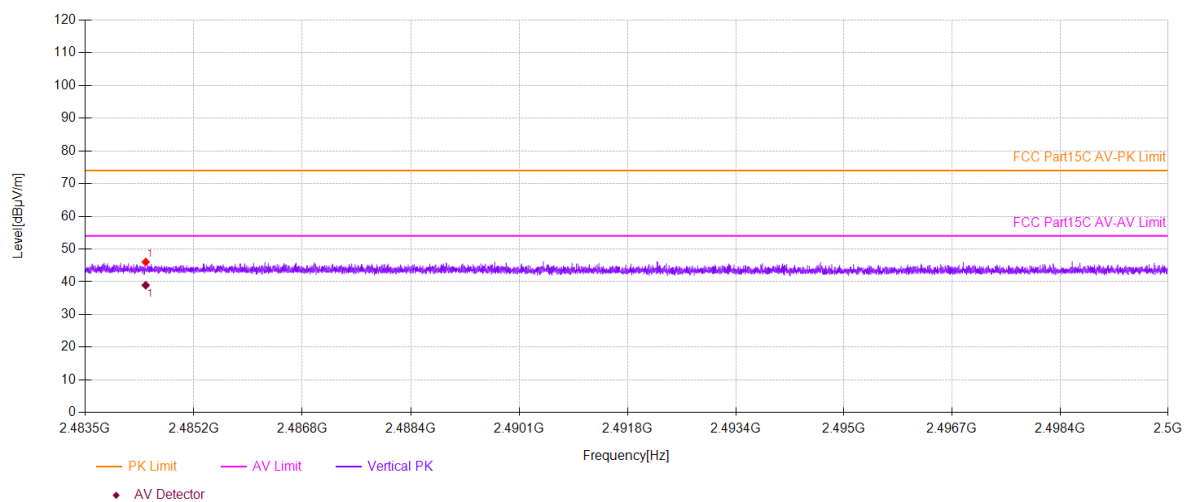
BT

Channel 78: 2480MHz

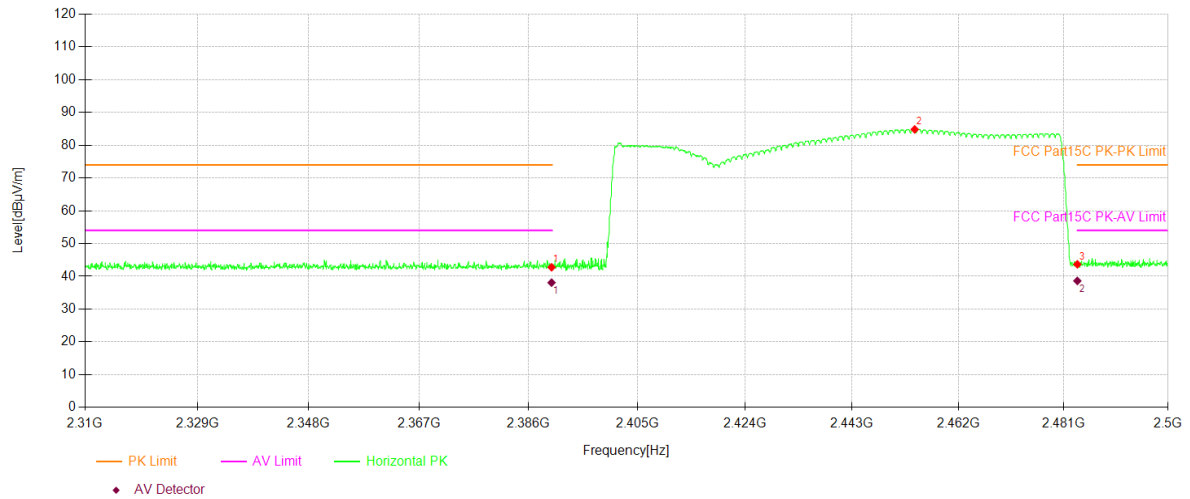
GFSK

V

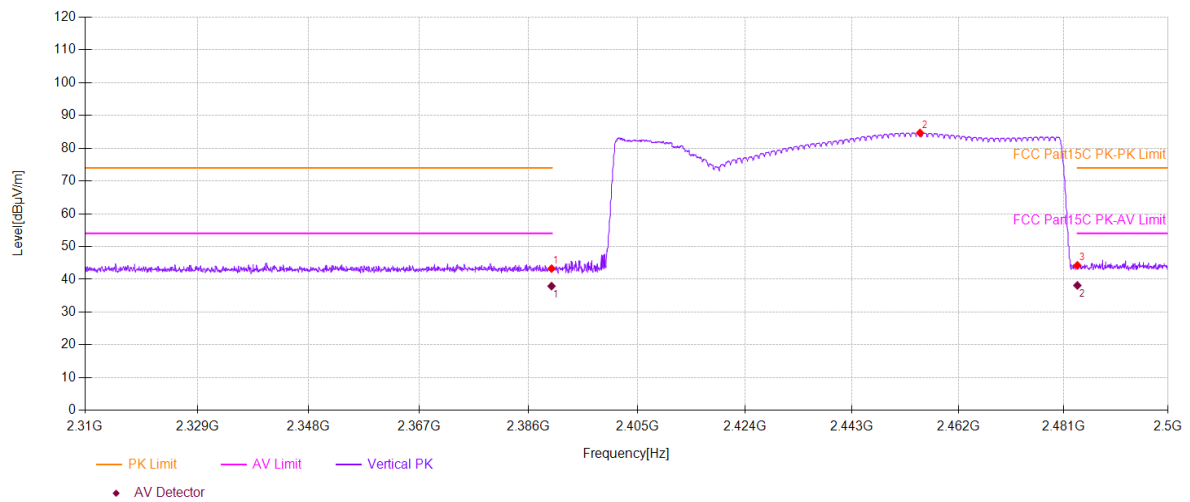
Test By: HYD



Test Model	Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz		
	BT Hopping		
	GFSK	H	
	Test By: HYD		



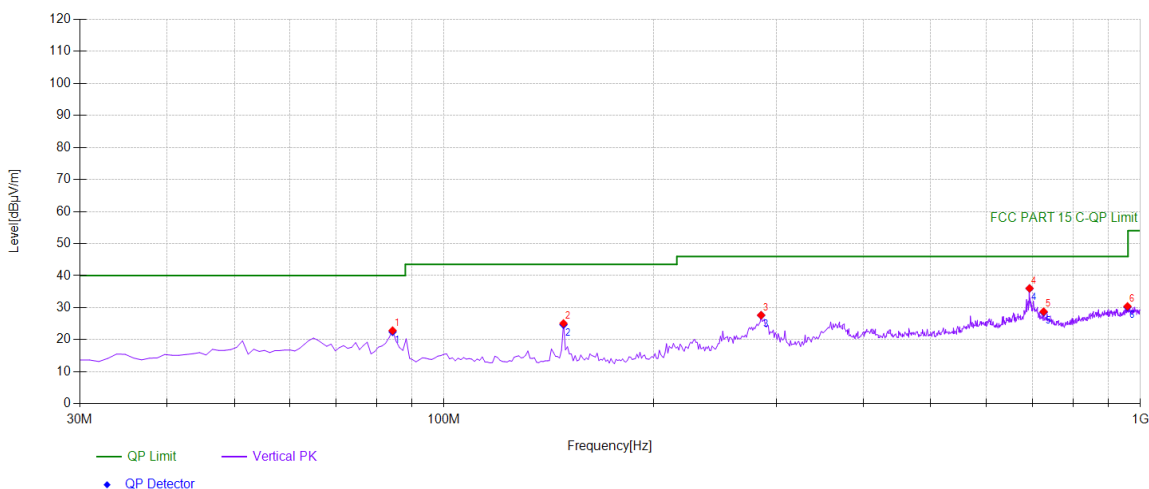
Test Model	Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz		
	BT Hopping		
	GFSK	V	
	Test By: HYD		



■ Spurious Emission below 1GHz (30MHz to 1GHz)

Bluetooth (GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst result(GFSK) was report as below:

Test mode: GFSK Frequency: Channel 0: 2402MHz

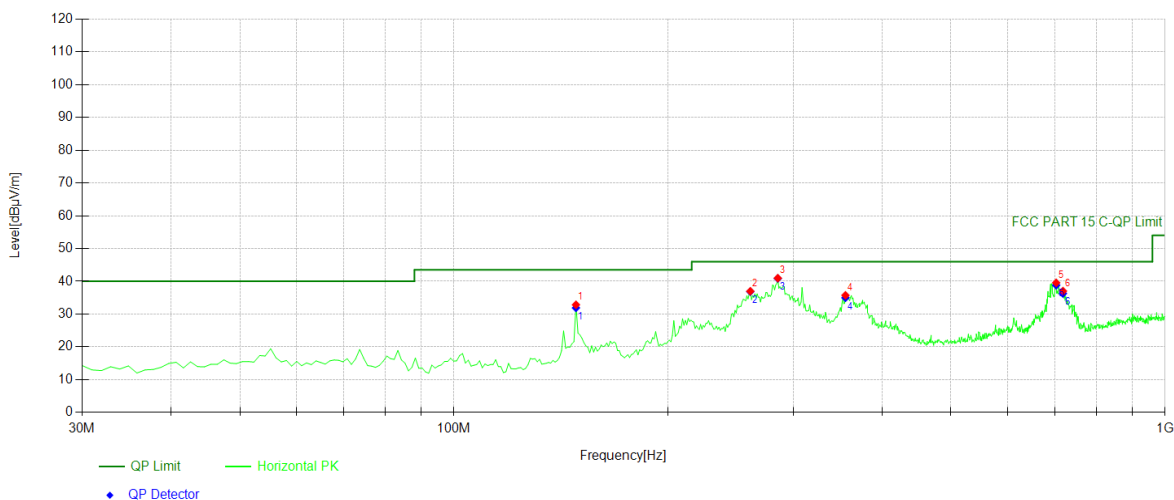


Suspected Data List

NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	84.3744	34.84	-11.97	22.87	PK	40.00	17.13	Vertical
2	148.4585	37.03	-11.92	25.11	PK	43.50	18.39	Vertical
3	285.3654	34.66	-6.99	27.67	PK	46.00	18.33	Vertical
4	693.1732	35.42	0.62	36.04	PK	46.00	9.96	Vertical
5	726.1862	27.65	1.12	28.77	PK	46.00	17.23	Vertical
6	958.2482	26.61	3.81	30.42	PK	46.00	15.58	Vertical

Final Data List

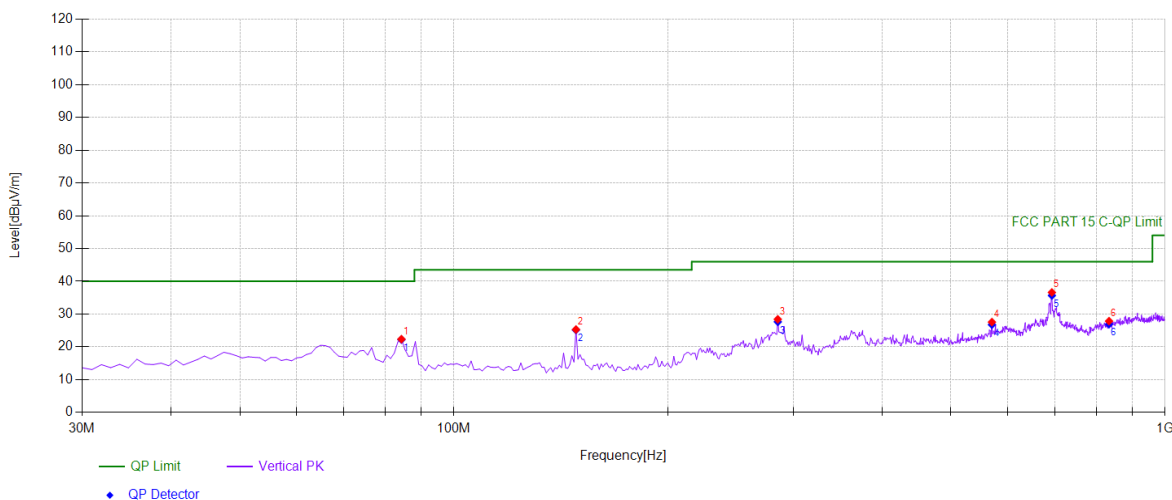
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	84.3744	-11.97	22.47	40.00	17.53
2	148.4585	-11.92	24.71	43.50	18.79
3	285.3654	-6.99	27.62	46.00	18.38
4	693.1732	0.62	35.99	46.00	10.01
5	726.1862	1.12	28.56	46.00	17.44
6	958.2482	3.81	30.21	46.00	15.79



Suspected Data List								
NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	148.4585	44.78	-11.92	32.86	PK	43.50	10.64	Horizontal
2	261.0911	45.05	-8.07	36.98	PK	46.00	9.02	Horizontal
3	285.3654	47.97	-6.99	40.98	PK	46.00	5.02	Horizontal
4	355.2753	40.70	-4.96	35.74	PK	46.00	10.26	Horizontal
5	702.8829	38.61	0.95	39.56	PK	46.00	6.44	Horizontal
6	718.4184	36.01	1.02	37.03	PK	46.00	8.97	Horizontal

Final Data List					
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	148.4585	-11.92	31.91	43.50	11.59
2	261.0911	-8.07	36.87	46.00	9.13
3	285.3654	-6.99	40.87	46.00	5.13
4	355.2753	-4.96	34.99	46.00	11.01
5	702.8829	0.95	38.81	46.00	7.19
6	718.4184	1.02	36.28	46.00	9.72

Test mode: GFSK Frequency: Channel 39: 2441MHz

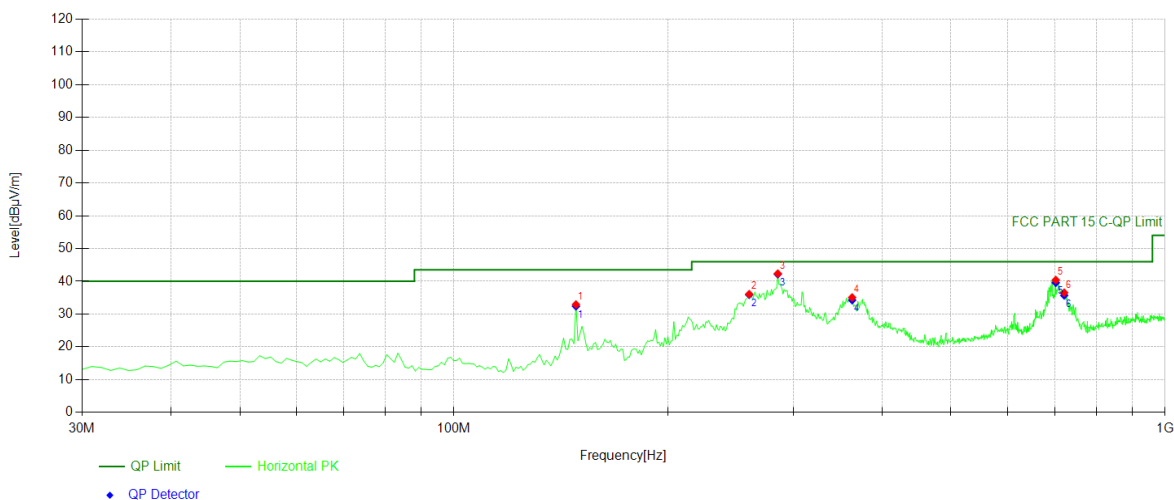


Suspected Data List

NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	84.3744	34.34	-11.97	22.37	PK	40.00	17.63	Vertical
2	148.4585	37.23	-11.92	25.31	PK	43.50	18.19	Vertical
3	285.3654	35.42	-6.99	28.43	PK	46.00	17.57	Vertical
4	570.8308	28.43	-0.86	27.57	PK	46.00	18.43	Vertical
5	693.1732	36.00	0.62	36.62	PK	46.00	9.38	Vertical
6	833.964	25.84	2.03	27.87	PK	46.00	18.13	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	84.3744	-11.97	22.22	40.00	17.78
2	148.4585	-11.92	25.16	43.50	18.34
3	285.3654	-6.99	27.64	46.00	18.36
4	570.8308	-0.86	26.78	46.00	19.22
5	693.1732	0.62	35.67	46.00	10.33
6	833.964	2.03	26.92	46.00	19.08



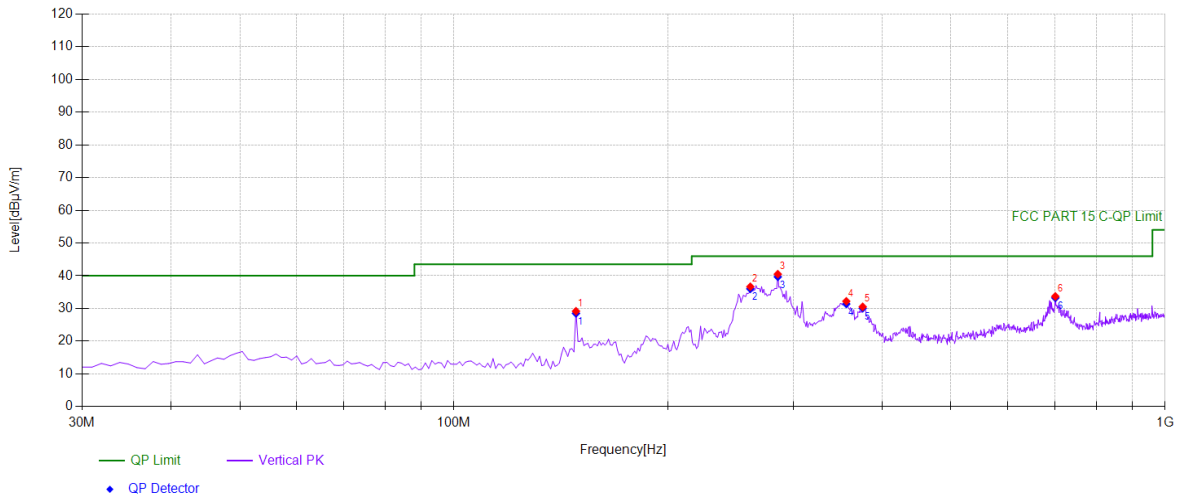
Suspected Data List

NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	148.4585	44.85	-11.92	32.93	PK	43.50	10.57	Horizontal
2	260.1201	44.19	-8.10	36.09	PK	46.00	9.91	Horizontal
3	285.3654	49.34	-6.99	42.35	PK	46.00	3.65	Horizontal
4	363.043	39.93	-4.85	35.08	PK	46.00	10.92	Horizontal
5	701.9119	39.47	0.93	40.40	PK	46.00	5.60	Horizontal
6	721.3313	35.51	1.03	36.54	PK	46.00	9.46	Horizontal

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	148.4585	-11.92	32.39	43.50	11.11
2	260.1201	-8.10	35.91	46.00	10.09
3	285.3654	-6.99	42.17	46.00	3.83
4	363.043	-4.85	34.26	46.00	11.74
5	701.9119	0.93	39.58	46.00	6.42
6	721.3313	1.03	35.72	46.00	10.28

Test mode: GFSK Frequency: Channel 78: 2480MHz

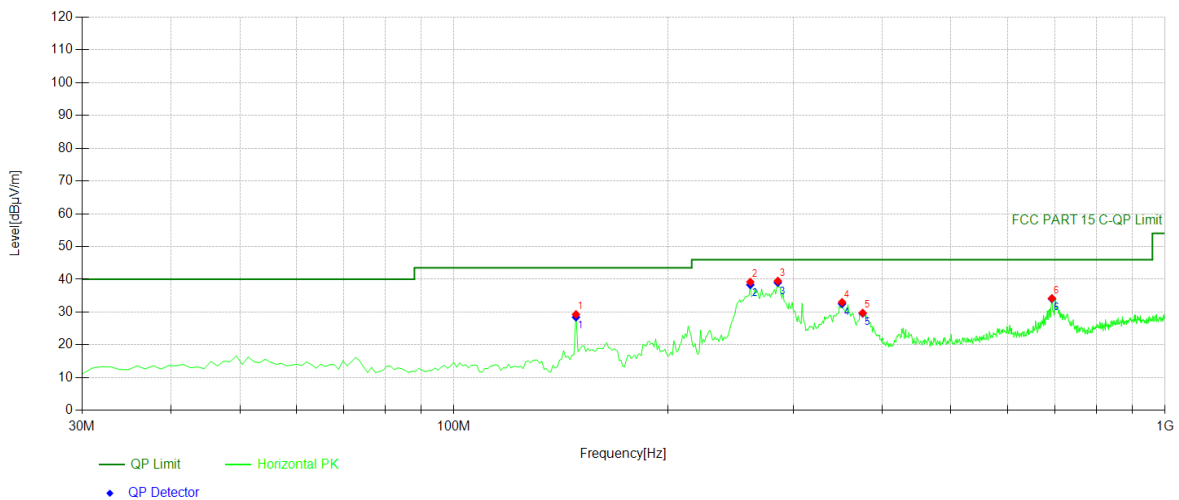


Suspected Data List

NO	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	148.4585	41.09	-11.92	29.17	PK	43.50	14.33	Vertical
2	261.0911	44.74	-8.07	36.67	PK	46.00	9.33	Vertical
3	285.3654	47.49	-6.99	40.50	PK	46.00	5.50	Vertical
4	356.2462	37.17	-4.96	32.21	PK	46.00	13.79	Vertical
5	375.6657	34.92	-4.40	30.52	PK	46.00	15.48	Vertical
6	700.9409	32.78	0.92	33.70	PK	46.00	12.30	Vertical

Final Data List

NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	148.4585	-11.92	28.51	43.50	14.99
2	261.0911	-8.07	36.01	46.00	9.99
3	285.3654	-6.99	39.68	46.00	6.32
4	356.2462	-4.96	31.39	46.00	14.61
5	375.6657	-4.40	30.06	46.00	15.94
6	700.9409	0.92	33.24	46.00	12.76



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	148.4585	41.23	-11.92	29.31	PK	43.50	14.19	Horizontal
2	261.0911	47.26	-8.07	39.19	PK	46.00	6.81	Horizontal
3	285.3654	46.49	-6.99	39.50	PK	46.00	6.50	Horizontal
4	351.3914	37.96	-4.94	33.02	PK	46.00	12.98	Horizontal
5	375.6657	34.15	-4.40	29.75	PK	46.00	16.25	Horizontal
6	693.1732	33.58	0.62	34.20	PK	46.00	11.80	Horizontal

Final Data List					
NO.	Freq. [MHz]	Factor [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]
1	148.4585	-11.92	28.45	43.50	15.05
2	261.0911	-8.07	38.33	46.00	7.67
3	285.3654	-6.99	39.00	46.00	7.00
4	351.3914	-4.94	32.52	46.00	13.48
5	375.6657	-4.40	29.61	46.00	16.39
6	693.1732	0.62	34.06	46.00	11.94

9.8 CONDUCTED EMISSION TEST

9.8.1 Applicable Standard

According to FCC Part 15.207(a)

9.8.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

9.8.3 Test Configuration

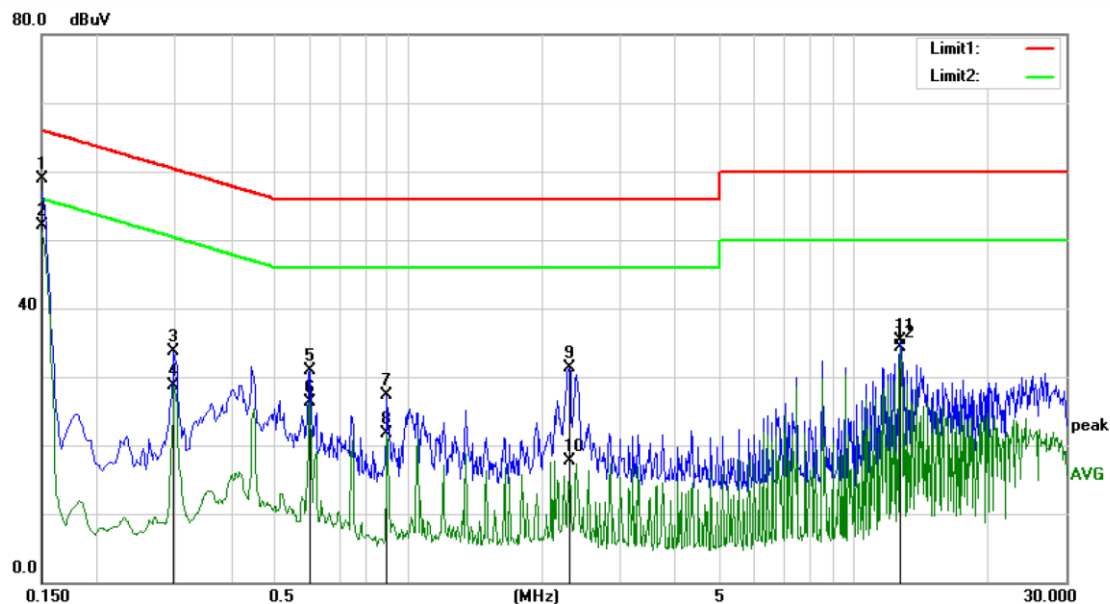
Test according to clause 7.3 conducted emission test setup

9.8.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

9.8.5 Test Results

Pass



Site Conduction #1

Phase: **N**

Temperature: 22.5

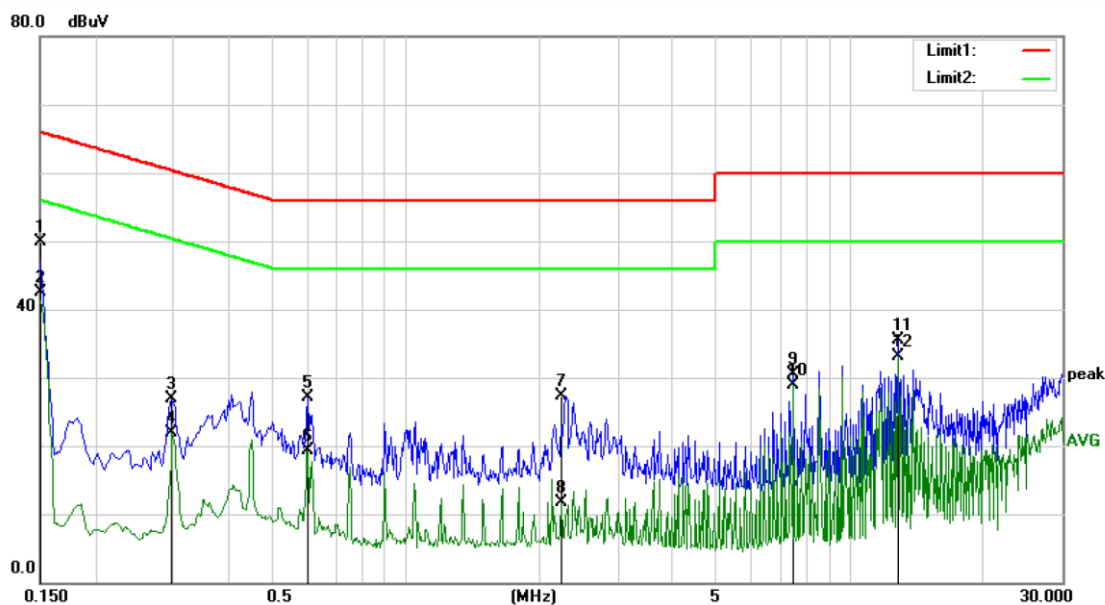
Limit: (CE)FCC PART 15 class B_QP

Power: DC 48V

Humidity: 47 %

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	49.15	9.71	58.86	66.00	-7.14	QP	
2	*	0.1500	42.46	9.71	52.17	56.00	-3.83	AVG	
3		0.2980	24.04	9.73	33.77	60.30	-26.53	QP	
4		0.2980	18.92	9.73	28.65	50.30	-21.65	AVG	
5		0.6020	21.18	9.72	30.90	56.00	-25.10	QP	
6		0.6020	16.60	9.72	26.32	46.00	-19.68	AVG	
7		0.8980	17.55	9.70	27.25	56.00	-28.75	QP	
8		0.8980	12.10	9.70	21.80	46.00	-24.20	AVG	
9		2.3060	21.50	9.76	31.26	56.00	-24.74	QP	
10		2.3060	7.99	9.76	17.75	46.00	-28.25	AVG	
11		12.7820	25.37	9.93	35.30	60.00	-24.70	QP	
12		12.7820	24.31	9.93	34.24	50.00	-15.76	AVG	



Site Conduction #1

Phase: **L1**

Temperature: 22.5

Limit: (CE)FCC PART 15 class B_QP

Power: DC 48V

Humidity: 47 %

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	40.17	9.71	49.88	66.00	-16.12	QP	
2	*	0.1500	32.73	9.71	42.44	56.00	-13.56	AVG	
3		0.2980	17.26	9.73	26.99	60.30	-33.31	QP	
4		0.2980	12.20	9.73	21.93	50.30	-28.37	AVG	
5		0.6020	17.35	9.72	27.07	56.00	-28.93	QP	
6		0.6020	9.52	9.72	19.24	46.00	-26.76	AVG	
7		2.2420	17.56	9.76	27.32	56.00	-28.68	QP	
8		2.2420	1.86	9.76	11.62	46.00	-34.38	AVG	
9		7.4620	20.59	9.83	30.42	60.00	-29.58	QP	
10		7.4620	19.07	9.83	28.90	50.00	-21.10	AVG	
11		12.7900	25.67	9.93	35.60	60.00	-24.40	QP	
12		12.7900	23.21	9.93	33.14	50.00	-16.86	AVG	

9.9 ANTENNA APPLICATION

9.9.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.9.2 Result

PASS

- ☒ Antenna use a permanently attached antenna which is not replaceable.
- ☐ Not using a standard antenna jack or electrical connector for antenna replacement
- ☐ The antenna has to be professionally installed (please provide method of installation)

Note: Please refer to the attached document Internal Photos to show the antenna connector.

Detail of factor for radiated emission

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---

10 APPENDIX PHOTOGRAPHS OF EUT

Please refer to the file of External Photo and Internal Photo.



11 APPENDIX PHOTOGRAPHS OF TEST SETUP

Please refer to the file of Test Setup Photo.

