

■ Spurious Emission Above 1GHz(1GHz to 25GHz)

All the antenna(Antenna 1) and modes(GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst(Antenna 1,GFSK) result recorded 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)	
	H/V	PK	AV	PK	AV	PK	AV
4801.334	V	43.67	25.77	74.00	54.00	-30.33	-28.23
10548.06	V	55.53	38.92	74.00	54.00	-18.47	-15.08
17867.82	V	63.66	45.87	74.00	54.00	-10.34	-8.13
6334.025	H	45.87	28.94	74.00	54.00	-28.13	-25.06
9951.278	H	55.31	38.55	74.00	54.00	-18.69	-15.45
17872.98	H	64.34	46.92	74.00	54.00	-9.66	-7.08

Test mode: GFSK Frequency: Channel 39: 2441MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4801.334	V	43.58	25.62	74.00	54.00	-30.42	-28.38
11315.55	V	56.11	38.14	74.00	54.00	-17.89	-15.86
17852.33	V	63.81	45.77	74.00	54.00	-10.19	-8.23
5475.377	H	44.71	26.77	74.00	54.00	-29.29	-27.23
9797.165	H	54.12	36.52	74.00	54.00	-19.88	-17.48
17842.01	H	63.42	45.79	74.00	54.00	-10.58	-8.21

Test mode: GFSK Frequency: Channel 78: 2480MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
4801.334	V	44.97	26.87	74.00	54.00	-29.03	-27.13
11166.09	V	56.34	38.52	74.00	54.00	-17.66	-15.48
17862.65	V	63.52	45.33	74.00	54.00	-10.48	-8.67
5631.874	H	44.56	26.33	74.00	54.00	-29.44	-27.67
12367.31	H	56.72	38.59	74.00	54.00	-17.28	-15.41
17909.18	H	64.81	46.78	74.00	54.00	-9.19	-7.22

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor.
 - (3) Correct Factor= Ant_F + Cab_L - Preamp
 - (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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

All the antenna(Antenna 1) and modes(GFSK, $\pi/4$ -DQPSK, 8DPSK, Hopping) mode have been tested, and the worst(Antenna 1,GFSK, Hopping) result recorded was report as below:

Test mode: GFSK Frequency: Channel 0: 2402MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2383.104	H	52.19	74.00	34.23	54.00
2387.576	V	49.37	74.00	31.27	54.00

Test mode: GFSK Frequency: Channel 78: 2480MHz

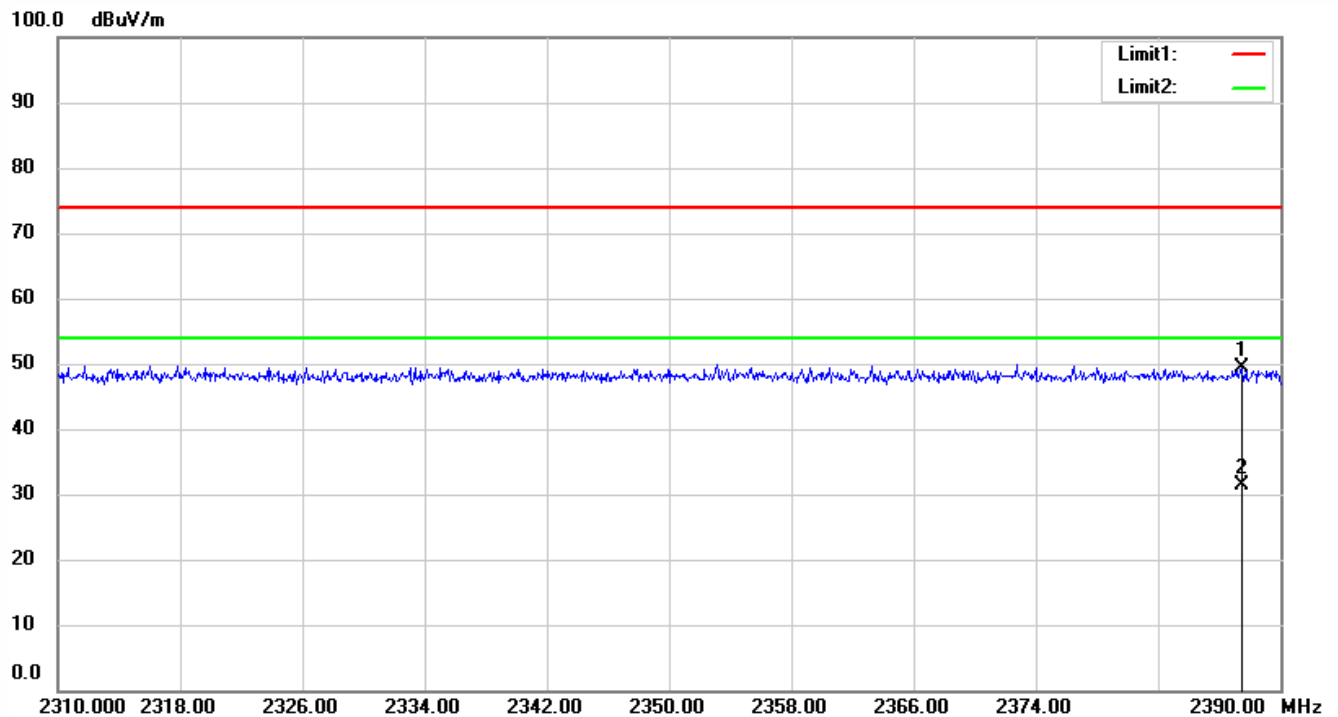
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2484.384	H	52.26	74.00	34.33	54.00
2484.481	V	49.41	74.00	31.43	54.00

Test mode: GFSK Frequency: Hopping

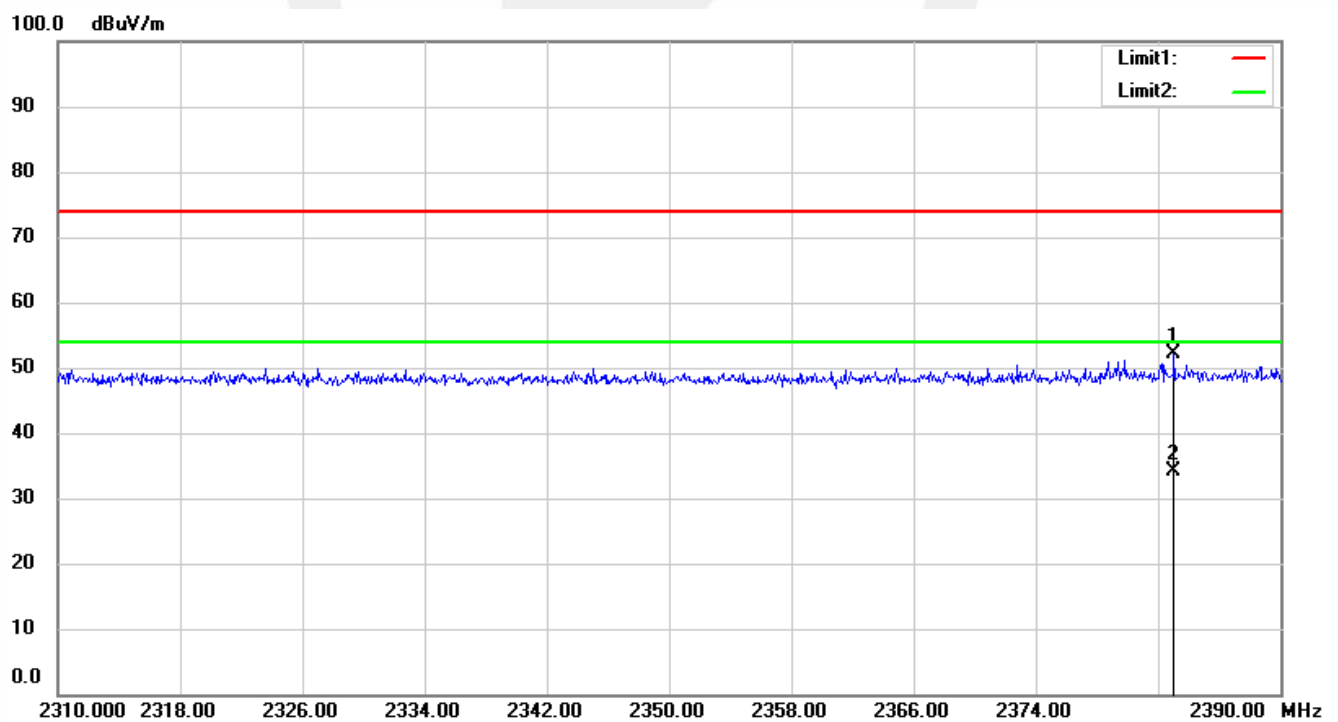
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2400.0	H	49.82	74.00	31.55	54.00
2483.5	H	50.36	74.00	32.33	54.00
2400.0	V	47.88	74.00	29.99	54.00
2483.5	V	48.12	74.00	30.24	54.00

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
 - (2) Emission Level= Reading Level+Correct Factor.
 - (3) Correct Factor= Ant_F + Cab_L - Preamp
 - (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

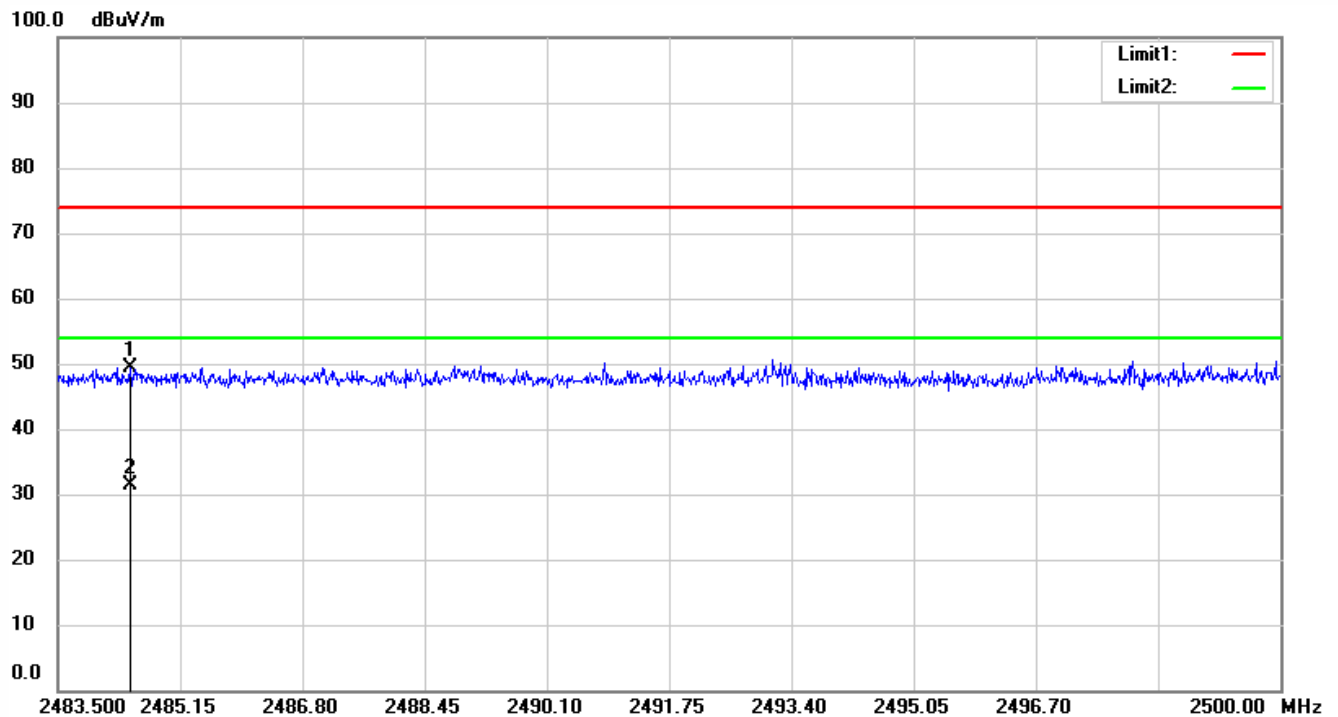
Test Model	Spurious Emission in Restricted Band 2310-2390MHz Channel 0: 2402MHz	GFSK	V
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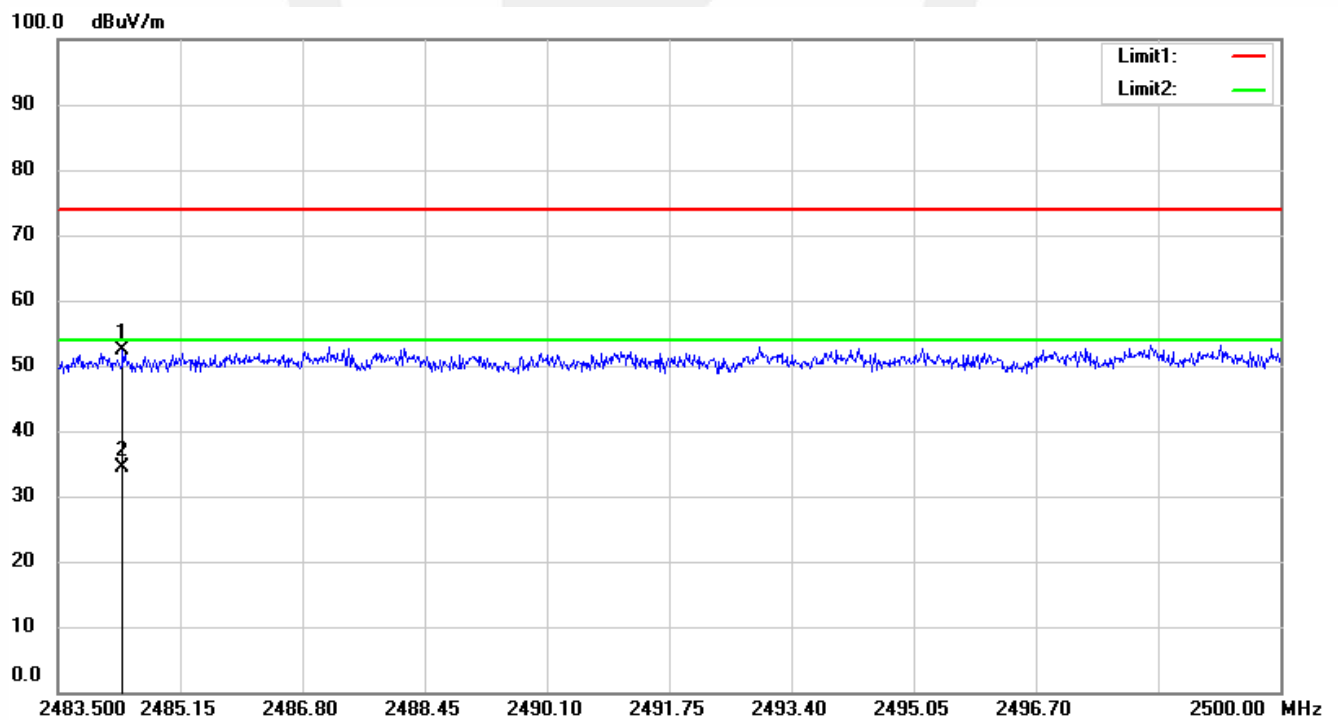
Test Model	Spurious Emission in Restricted Band 2310-2390MHz Channel 0: 2402MHz	GFSK	H
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Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz Channel 78: 2480MHz	GFSK	V
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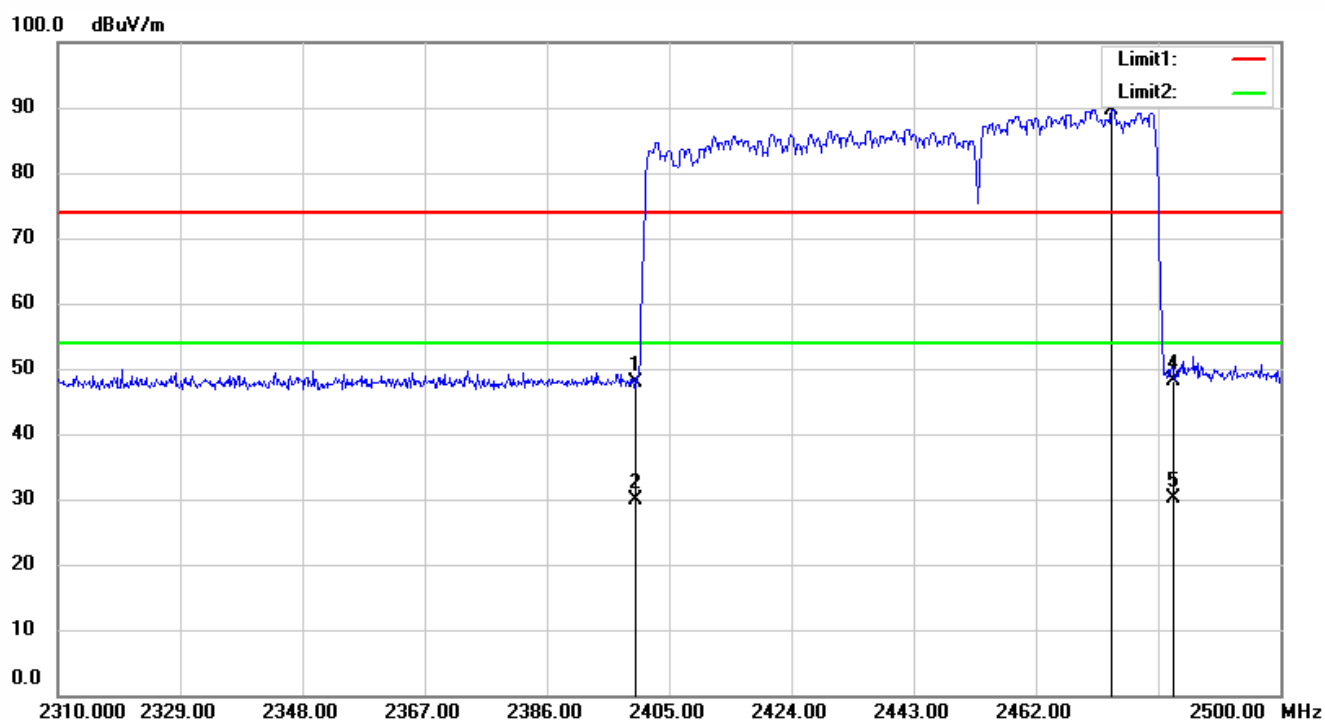


Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz Channel 78: 2480MHz	GFSK	H
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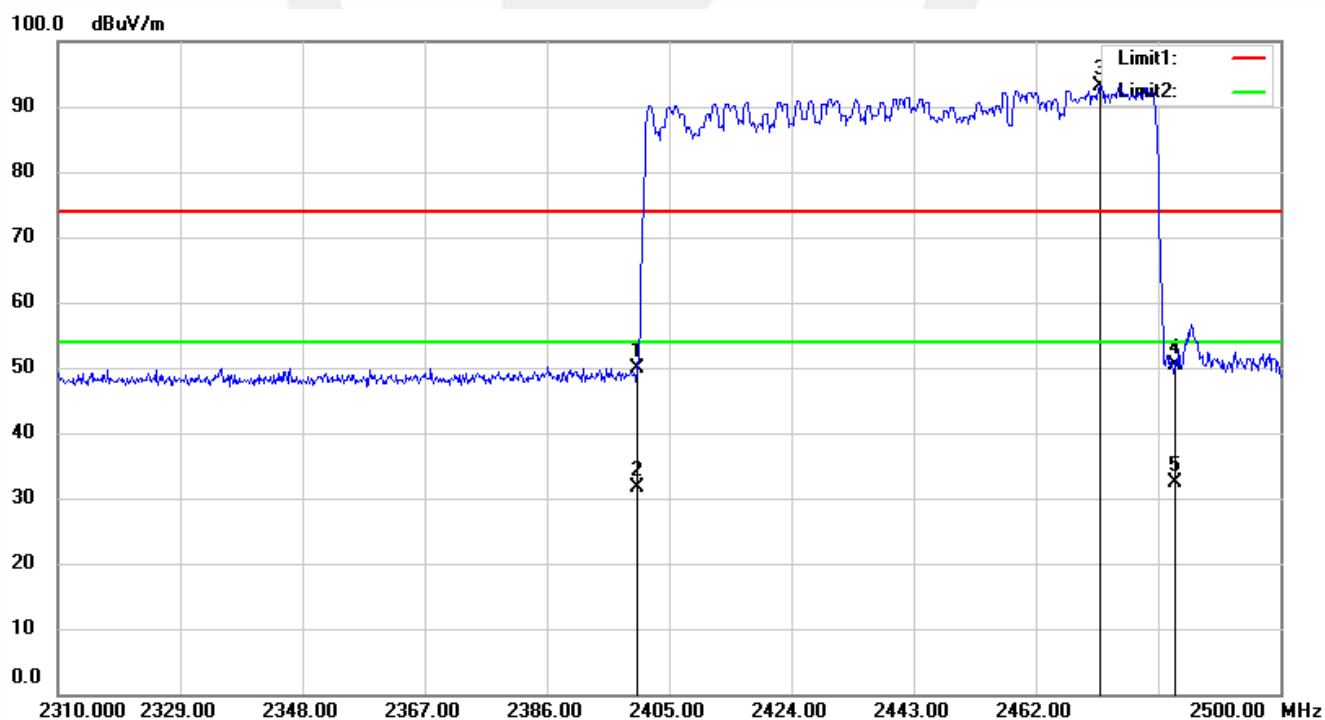
Test Model

Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz
Hopping GFSK V

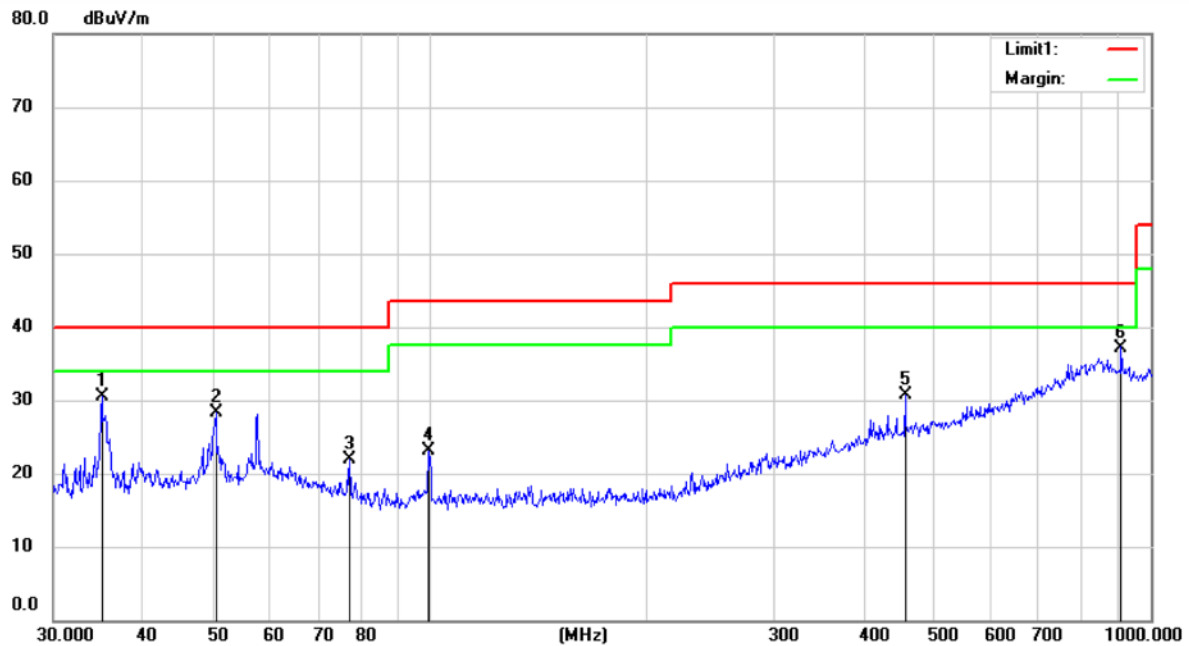


Test Model

Spurious Emission in Restricted Band 2310-2390MHz and 2400-2483.5MHz
Hopping GFSK H



- Spurious Emission below 1GHz(30MHz to 1GHz)
- All the antenna(Antenna 1) and modes(GFSK, $\pi/4$ -DQPSK, 8DPSK) mode have been tested, and the worst(Antenna 1,GFSK) result recorded was report as below:



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

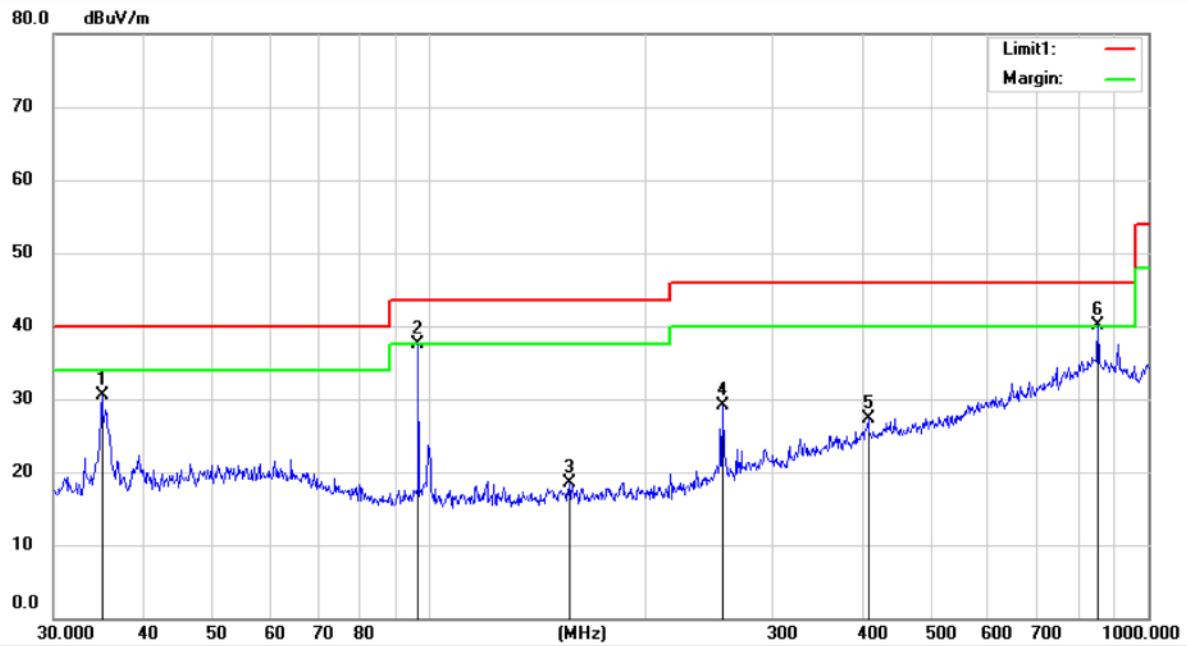
Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2402

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		35.0355	39.73	-9.19	30.54	40.00	-9.46	QP		
2		50.4310	35.70	-7.49	28.21	40.00	-11.79	QP		
3		77.4230	32.03	-10.05	21.98	40.00	-18.02	QP		
4		99.7902	33.46	-10.42	23.04	43.50	-20.46	QP		
5		456.1057	32.75	-2.00	30.75	46.00	-15.25	QP		
6	*	910.8636	31.85	5.35	37.20	46.00	-8.80	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

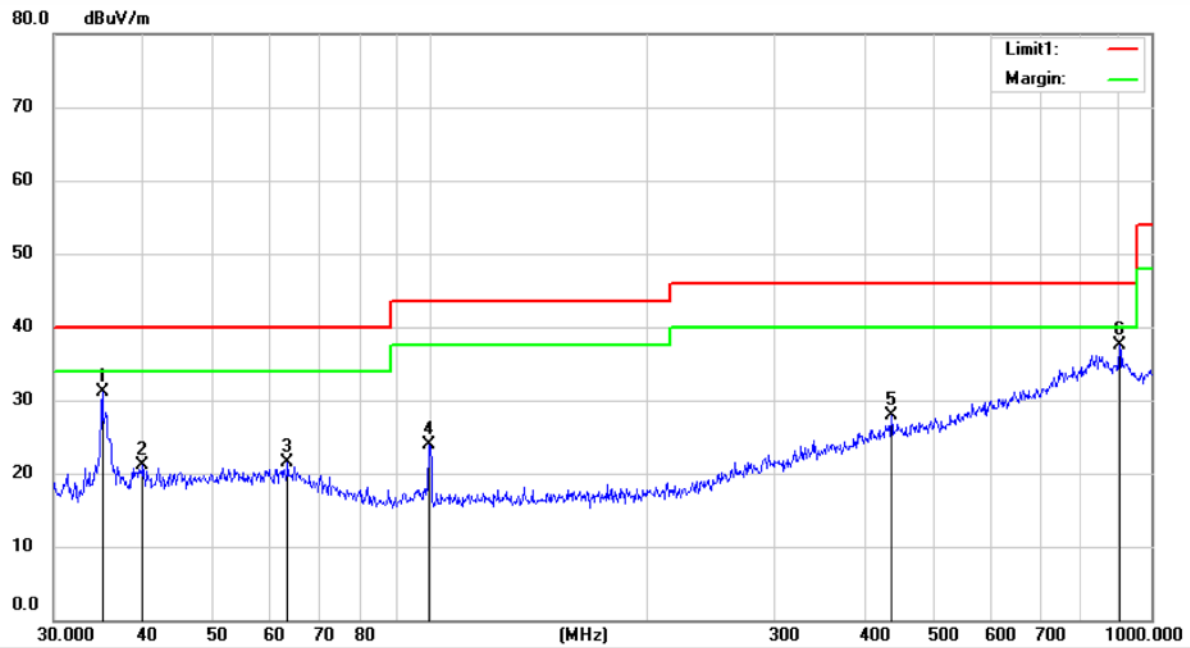
Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2402

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		35.0048	39.70	-9.20	30.50	40.00	-9.50	QP		
2		96.5630	47.74	-10.31	37.43	43.50	-6.07	QP		
3		156.4578	28.27	-9.69	18.58	43.50	-24.92	QP		
4		256.0717	36.00	-6.95	29.05	46.00	-16.95	QP		
5		408.0507	29.72	-2.34	27.38	46.00	-18.62	QP		
6	*	852.1551	33.46	6.57	40.03	46.00	-5.97	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

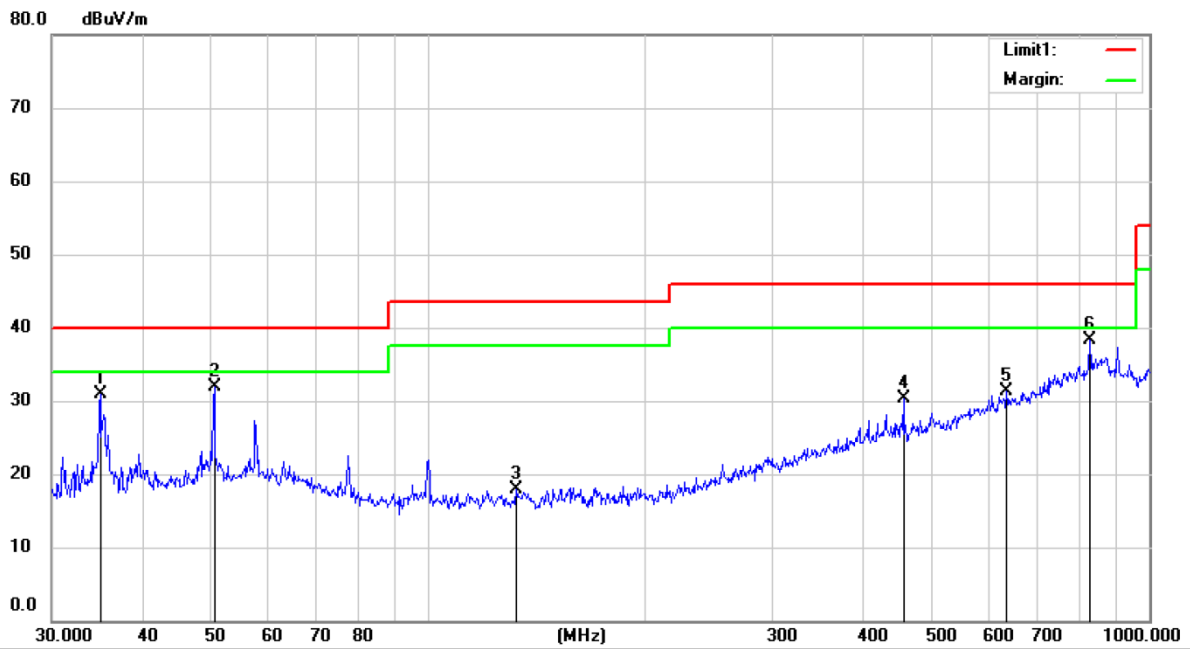
Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2441

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		35.0202	40.22	-9.19	31.03	40.00	-8.97	QP		
2		39.8542	29.28	-8.25	21.03	40.00	-18.97	QP		
3		63.3410	28.94	-7.52	21.42	40.00	-18.58	QP		
4		99.7902	34.39	-10.42	23.97	43.50	-19.53	QP		
5		436.9284	29.91	-1.93	27.98	46.00	-18.02	QP		
6	*	904.8945	32.09	5.45	37.54	46.00	-8.46	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

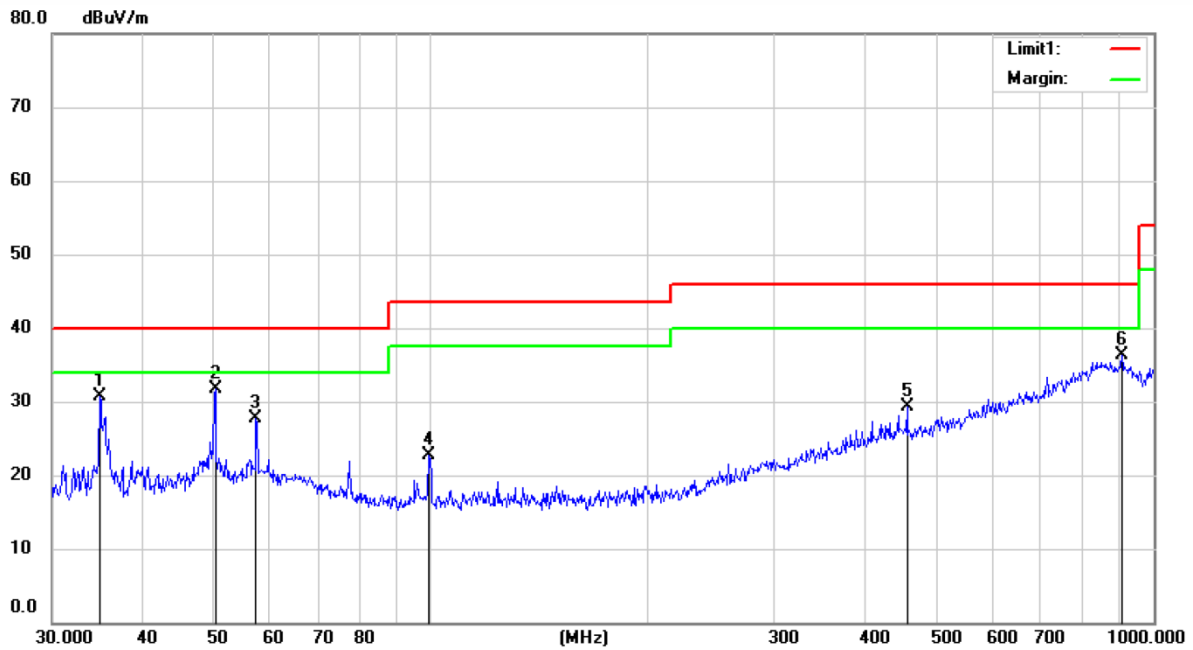
Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2441

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	44.8220	48.96	-12.57	36.39	40.00	-3.61	QP		
2		59.2065	38.17	-12.03	26.14	40.00	-13.86	QP		
3		109.7960	50.74	-14.65	36.09	43.50	-7.41	QP		
4		252.0627	31.70	-11.19	20.51	46.00	-25.49	QP		
5		457.1064	30.14	-5.87	24.27	46.00	-21.73	QP		
6		828.2191	29.09	2.35	31.44	46.00	-14.56	QP		



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

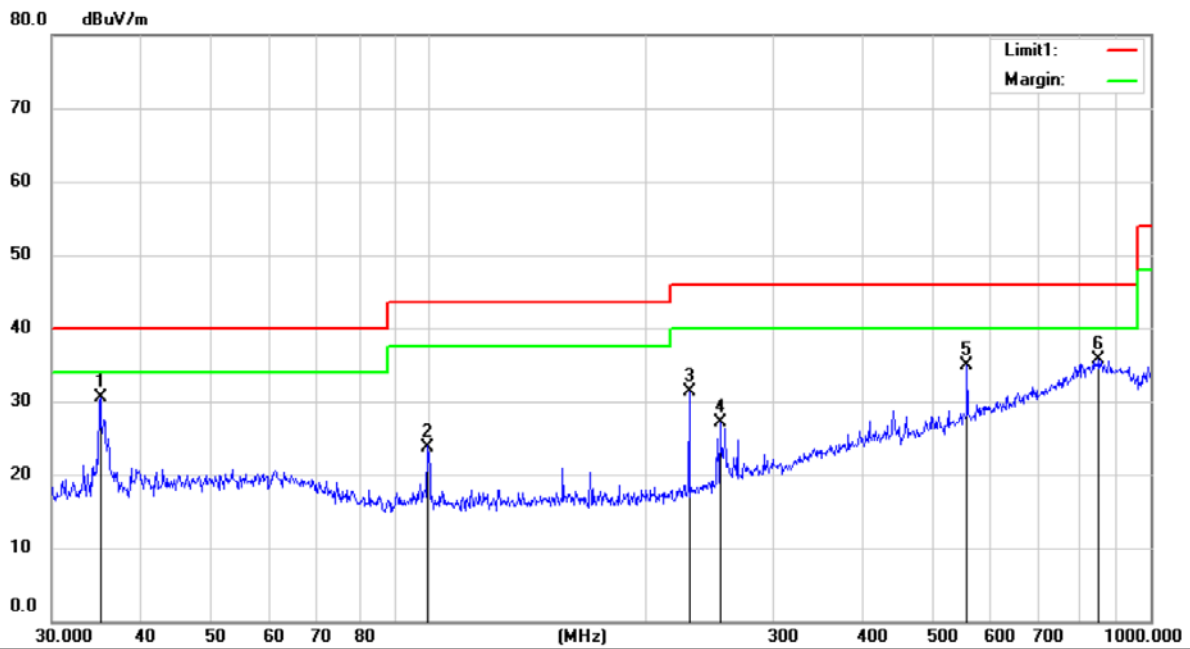
Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2480

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		34.9895	39.80	-9.19	30.61	40.00	-9.39	QP		
2	*	50.4090	39.23	-7.49	31.74	40.00	-8.26	QP		
3		57.5687	35.30	-7.58	27.72	40.00	-12.28	QP		
4		99.8340	33.09	-10.42	22.67	43.50	-20.83	QP		
5		456.1057	31.27	-2.00	29.27	46.00	-16.73	QP		
6		905.2912	30.79	5.44	36.23	46.00	-9.77	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 120V/60Hz

Humidity: 43 %

Mode: BT 2480

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	35.0355	39.63	-9.19	30.44	40.00	-9.56	QP		
2		99.8340	34.22	-10.42	23.80	43.50	-19.70	QP		
3		229.4942	39.76	-8.54	31.22	46.00	-14.78	QP		
4		253.5031	34.20	-7.01	27.19	46.00	-18.81	QP		
5		558.2406	34.93	0.01	34.94	46.00	-11.06	QP		
6		850.6624	29.12	6.68	35.80	46.00	-10.20	QP		

9.8 CONDUCTED EMISSION TEST

9.8.1 Applicable Standard

According to FCC Part 15.207

According to IC RSS-Gen 8.8

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.

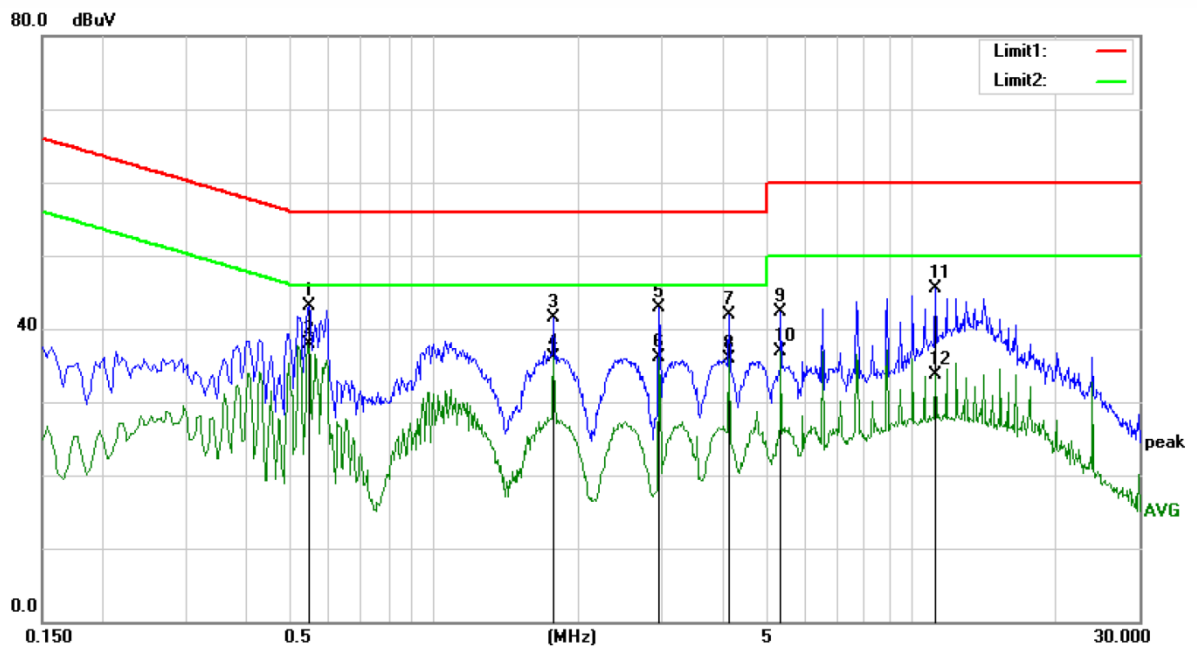
Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

9.8.5 Test Results

Pass

The AC120V & 240V voltage have been tested, and the worst result recorded was report as below:



Site Conduction #2

Phase: **N**

Temperature: 25.3

Limit: (CE)FCC PART 15 class B_QP

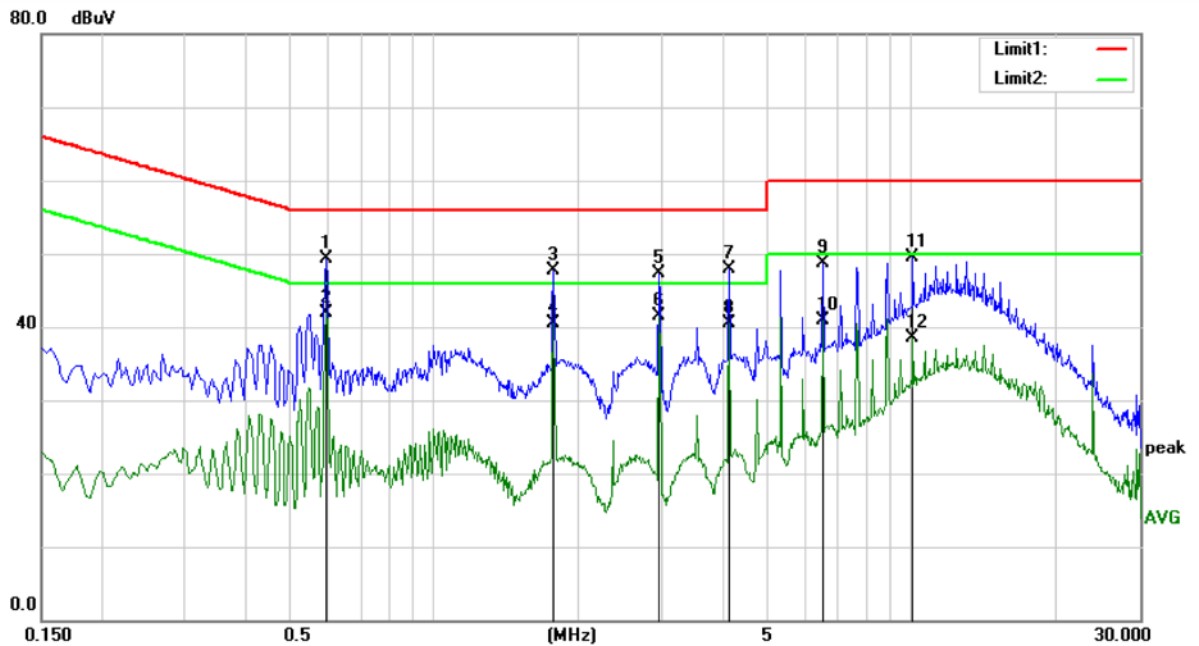
Power: AC 120V/60Hz

Humidity: 37 %

Mode: BT mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.5460	33.01	10.15	43.16	56.00	-12.84	QP	
2	*	0.5460	27.69	10.15	37.84	46.00	-8.16	AVG	
3		1.7740	31.35	10.18	41.53	56.00	-14.47	QP	
4		1.7740	25.99	10.18	36.17	46.00	-9.83	AVG	
5		2.9580	32.61	10.20	42.81	56.00	-13.19	QP	
6		2.9580	25.82	10.20	36.02	46.00	-9.98	AVG	
7		4.1420	31.62	10.24	41.86	56.00	-14.14	QP	
8		4.1420	25.72	10.24	35.96	46.00	-10.04	AVG	
9		5.3220	32.11	10.27	42.38	60.00	-17.62	QP	
10		5.3220	26.72	10.27	36.99	50.00	-13.01	AVG	
11		11.2340	35.00	10.46	45.46	60.00	-14.54	QP	
12		11.2340	23.26	10.46	33.72	50.00	-16.28	AVG	



Site Conduction #2

Phase: **L1**

Temperature: 25.3

Limit: (CE)FCC PART 15 class B_QP

Power: AC 120V/60Hz

Humidity: 37 %

Mode: BT mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.5940	39.14	10.16	49.30	56.00	-6.70	QP	
2	*	0.5940	31.81	10.16	41.97	46.00	-4.03	AVG	
3		1.7740	37.50	10.18	47.68	56.00	-8.32	QP	
4		1.7740	30.35	10.18	40.53	46.00	-5.47	AVG	
5		2.9580	37.18	10.20	47.38	56.00	-8.62	QP	
6		2.9580	31.26	10.20	41.46	46.00	-4.54	AVG	
7		4.1420	37.57	10.24	47.81	56.00	-8.19	QP	
8		4.1420	30.35	10.24	40.59	46.00	-5.41	AVG	
9		6.5060	38.43	10.32	48.75	60.00	-11.25	QP	
10		6.5060	30.53	10.32	40.85	50.00	-9.15	AVG	
11		10.0500	39.02	10.47	49.49	60.00	-10.51	QP	
12		10.0500	28.00	10.47	38.47	50.00	-11.53	AVG	

9.9 ANTENNA APPLICATION

9.9.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	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.
FCC 47 CFR Part 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.
RSS-Gen Section 6.8	The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.
RSS-247 Section 5.4	If the transmitter employs an antenna system that emits multiple directional beams, but does not emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device (i.e. the sum of the power supplied to all antennas, antenna elements, staves, etc., and summed across all carriers or frequency channels) shall not exceed the applicable output power limit. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

9.9.2 Result

PASS.

- Note:
- ☒ 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)

Please refer to the attached documentInternal 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 ***