

Temperature: 18℃
Humidity: 42 %
Test mode: GFSK

Test Date: March 13, 2020
Test By: KK
Frequency: Channel 39: 2441MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1153.43	V	52.63	33.53	74.00	54.00	-21.37	-20.47
1266.53	V	51.12	32.17	74.00	54.00	-22.88	-21.83
1801.38	V	57.44	38.68	74.00	54.00	-16.56	-15.32
2117.72	V	59.31	40.65	74.00	54.00	-14.69	-13.35
2545.65	V	60.06	41.39	74.00	54.00	-13.94	-12.61
2831.09	V	55.89	37.11	74.00	54.00	-18.11	-16.89
1557.45	H	53.33	34.12	74.00	54.00	-20.67	-19.88
1780.36	H	55.21	36.57	74.00	54.00	-18.79	-17.43
2053.67	H	51.63	30.85	74.00	54.00	-22.37	-23.15
2268.39	H	58.19	39.93	74.00	54.00	-15.81	-14.07
2639.71	H	55.27	35.62	74.00	54.00	-18.73	-18.38
2775.61	H	57.06	36.95	74.00	54.00	-16.94	-17.05

Temperature: 18℃
Humidity: 42 %
Test mode: GFSK

Test Date: March 13, 2020
Test By: KK
Frequency: Channel 78: 2480MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
1376.98	V	55.27	37.12	74.00	54.00	-18.73	-16.88
1406.35	V	51.86	30.93	74.00	54.00	-22.14	-23.07
1850.47	V	53.79	35.65	74.00	54.00	-20.21	-18.35
1993.72	V	56.48	38.17	74.00	54.00	-17.52	-15.83
2215.69	V	52.33	31.95	74.00	54.00	-21.67	-22.05
2493.08	V	55.61	35.46	74.00	54.00	-18.39	-18.54
1225.61	H	53.16	33.54	74.00	54.00	-20.84	-20.46
1535.83	H	50.83	32.05	74.00	54.00	-23.17	-21.95
1758.92	H	55.92	37.13	74.00	54.00	-18.08	-16.87
1995.36	H	52.63	33.58	74.00	54.00	-21.37	-20.42
2082.34	H	53.74	34.62	74.00	54.00	-20.26	-19.38
2357.11	H	54.71	36.61	74.00	54.00	-19.29	-17.39

- Note:**
- (1) All Readings are Peak Value (VBW=3MHz) and Average 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.

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

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

Temperature:	24℃	Test Date:	Jan 08, 2020
Humidity:	55%	Test By:	XW
Test mode:	GFSK	Frequency:	Channel 0: 2402MHz

Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2376.880	H	53.49	74	-20.51	36.26	54	-17.74
2384.240	V	56.74	74	-17.26	36.75	54	-17.25

Temperature:	24℃	Test Date:	Jan 08, 2020
Humidity:	55%	Test By:	XW
Test mode:	GFSK	Frequency:	Channel 78: 2480MHz

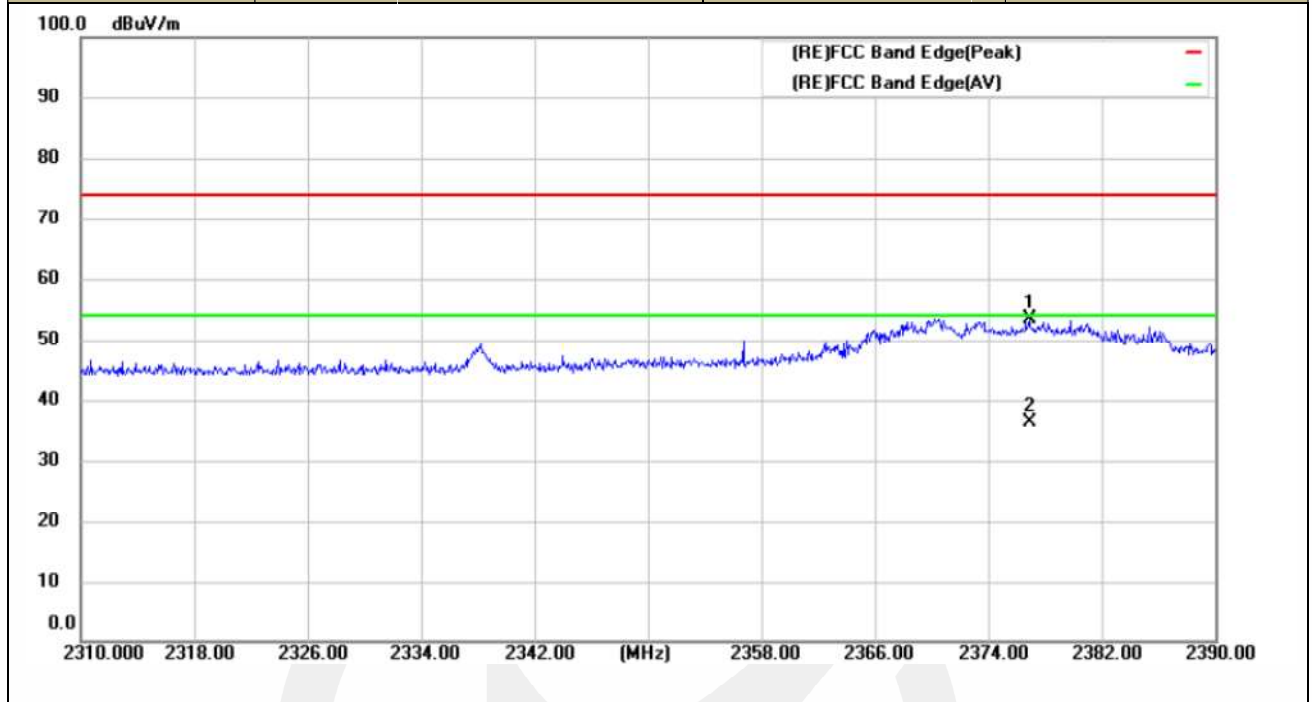
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2483.533	H	53.66	74	-20.34	37.84	54	-16.16
2483.517	V	57.31	74	-16.69	40.23	54	-13.77

Temperature:	24℃	Test Date:	Jan 08, 2020
Humidity:	55%	Test By:	XW
Test mode:	GFSK	Frequency:	Hopping

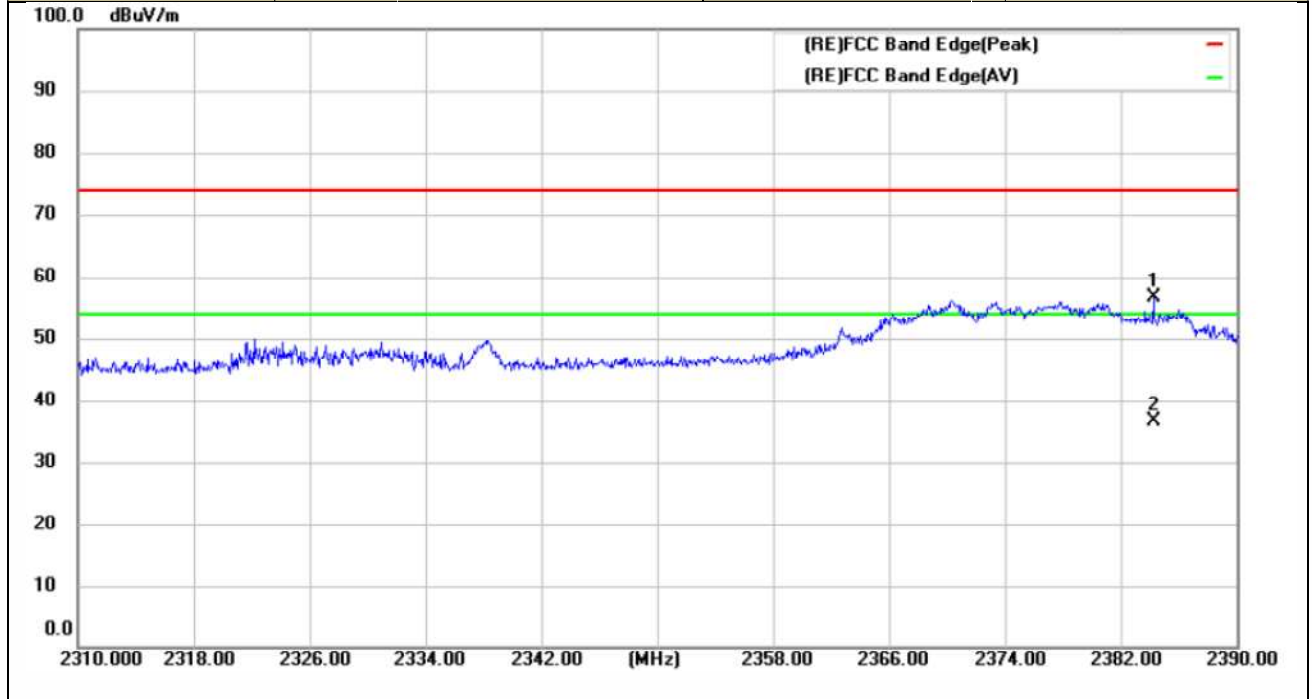
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2390.000	H	50.11	74.00	-23.89	34.08	54.00	-19.92
2483.50	H	53.02	74.00	-20.98	32.20	54.00	-21.80
2390.00	V	54.10	74.00	-19.90	34.05	54.00	-19.95
2483.50	V	54.79	74.00	-19.21	32.19	54.00	-21.81

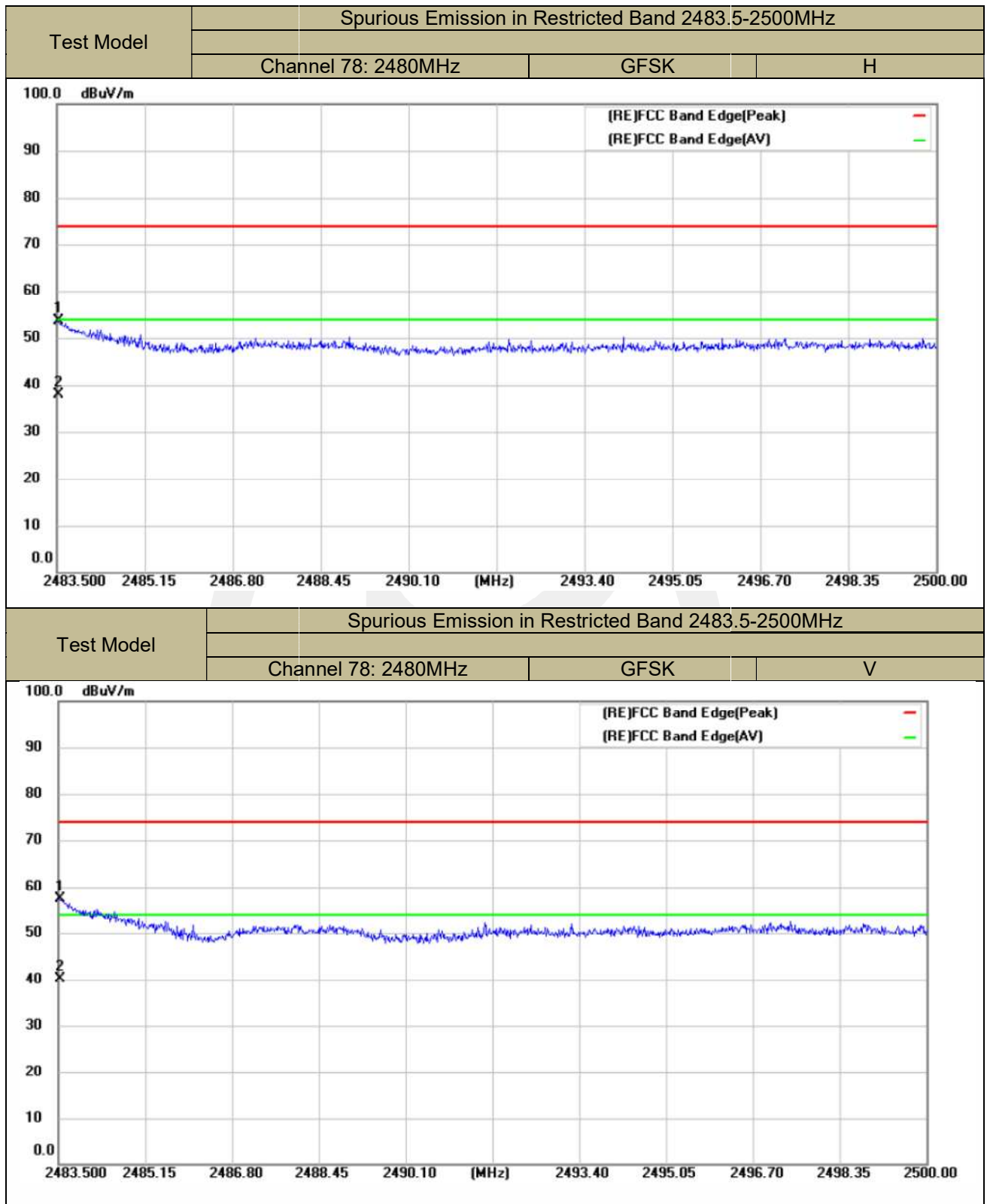
- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible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

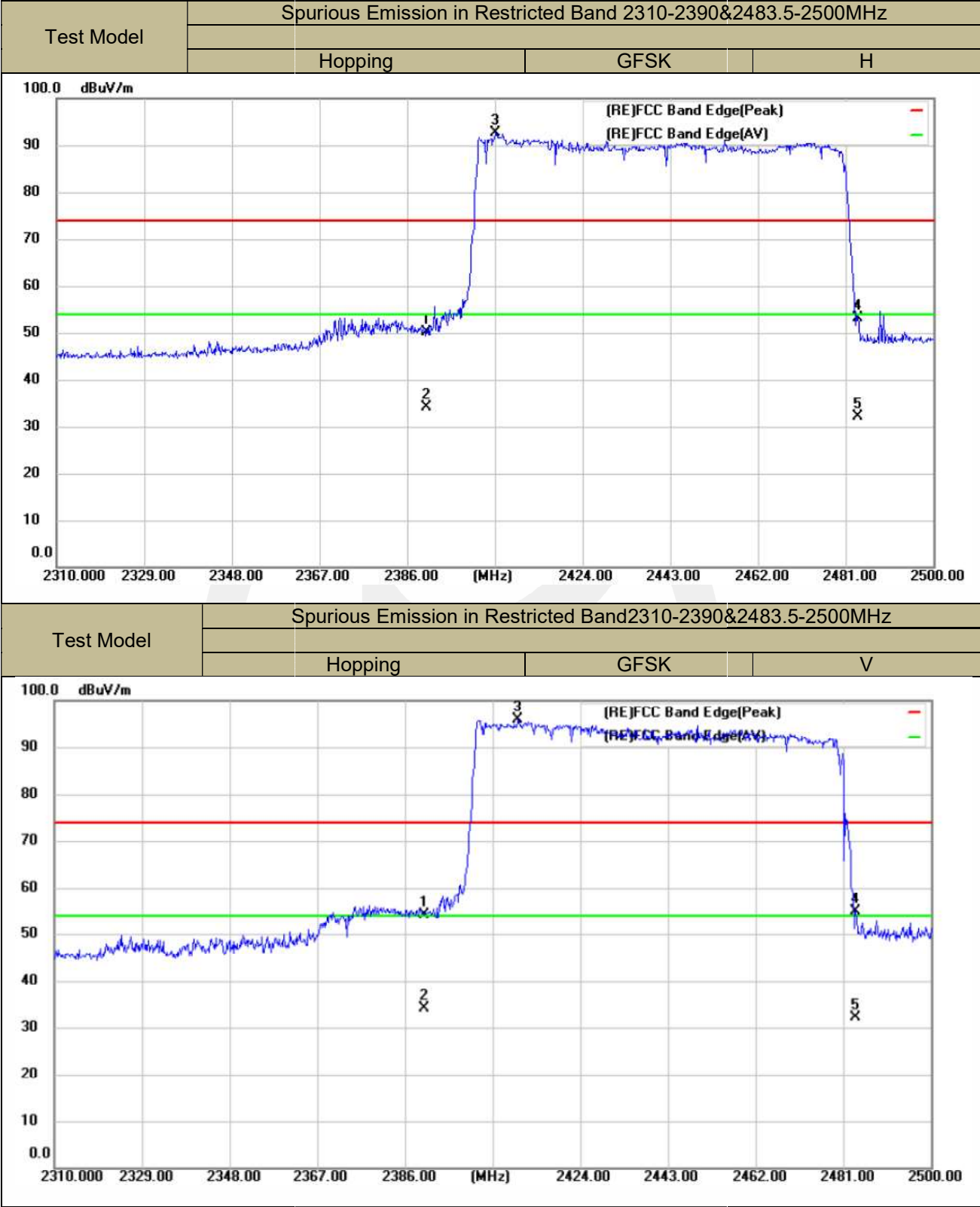
Test Model	Spurious Emission in Restricted Band 2310-2390MHz			
	Channel 0: 2402MHz	GFSK		H



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







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

Bluetooth (GFSK, pi/4-DQPSK)modehave been tested, and the worst result recorded was report as below:



Site Radiated Emission 3m #1

Polarization: **Vertical**

Temperature: 24

Limit: FCC Part15 Class B 3M Radiation

Power: AC 120V/60Hz

Humidity: 55 %

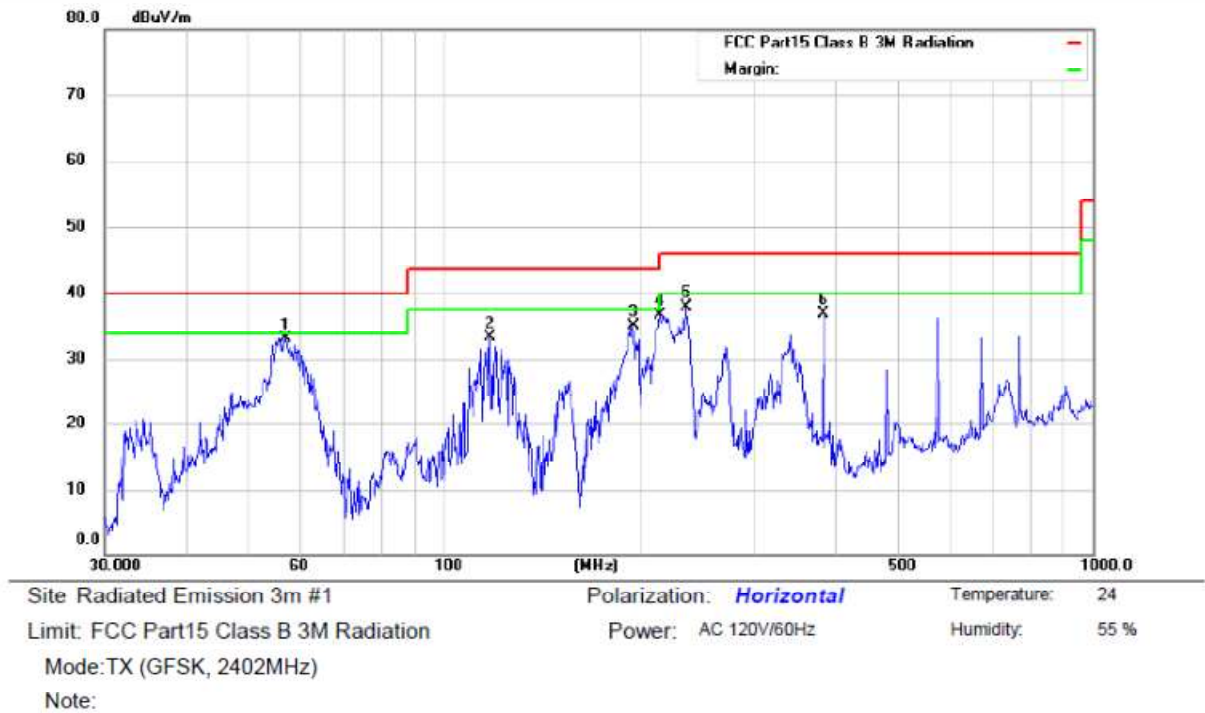
Mode:TX (GFSK, 2402MHz)

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		56.7916	53.94	-20.59	33.35	40.00	-6.65	QP		
2	*	61.1315	55.96	-22.04	33.92	40.00	-6.08	QP		
3		115.7256	57.12	-22.77	34.35	43.50	-9.15	QP		
4		122.4038	58.48	-23.78	34.70	43.50	-8.80	QP		
5		164.9071	58.53	-25.54	32.99	43.50	-10.51	QP		
6		219.8446	59.37	-22.03	37.34	46.00	-8.66	QP		

*:Maximum data x:Over limit !:over margin

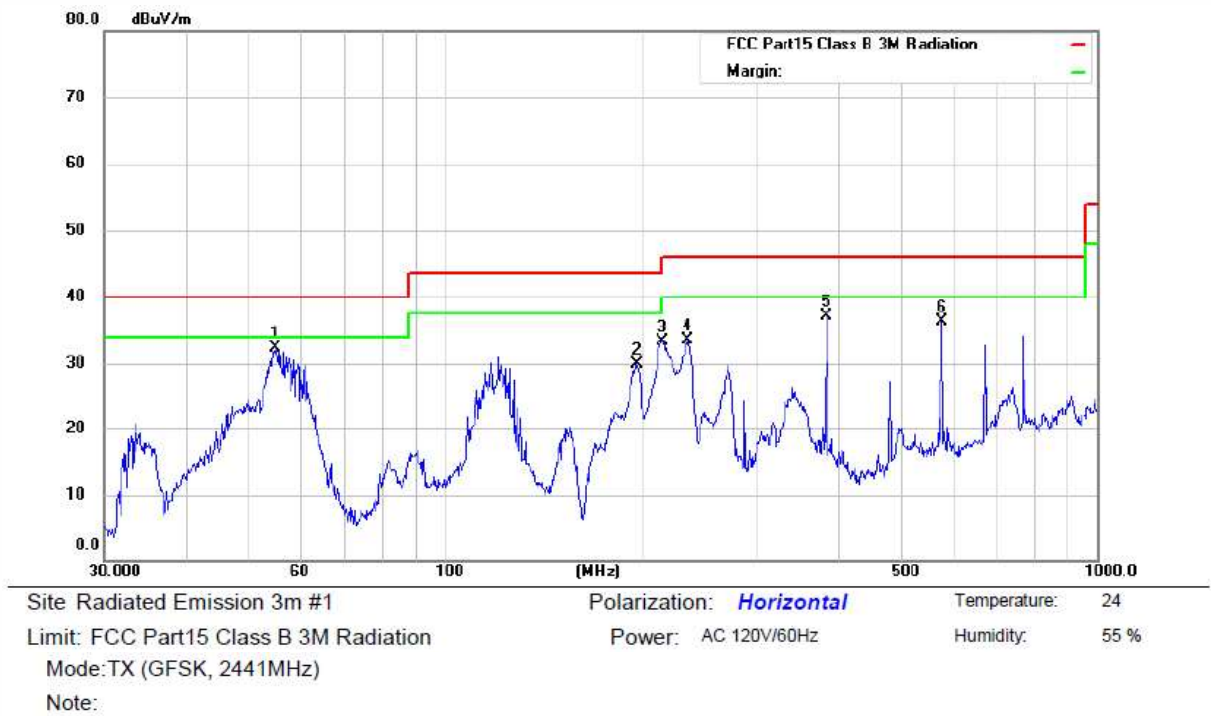
Operator: ZW



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		56.9912	53.89	-20.73	33.16	40.00	-6.84	QP		
2		117.7725	56.45	-23.16	33.29	43.50	-10.21	QP		
3		195.1365	56.90	-21.70	35.20	43.50	-8.30	QP		
4	*	215.2678	59.32	-22.59	36.73	43.50	-6.77	QP		
5		235.8164	59.22	-21.32	37.90	46.00	-8.10	QP		
6		383.9318	53.65	-16.82	36.83	46.00	-9.17	QP		

*:Maximum data x:Over limit !:over margin

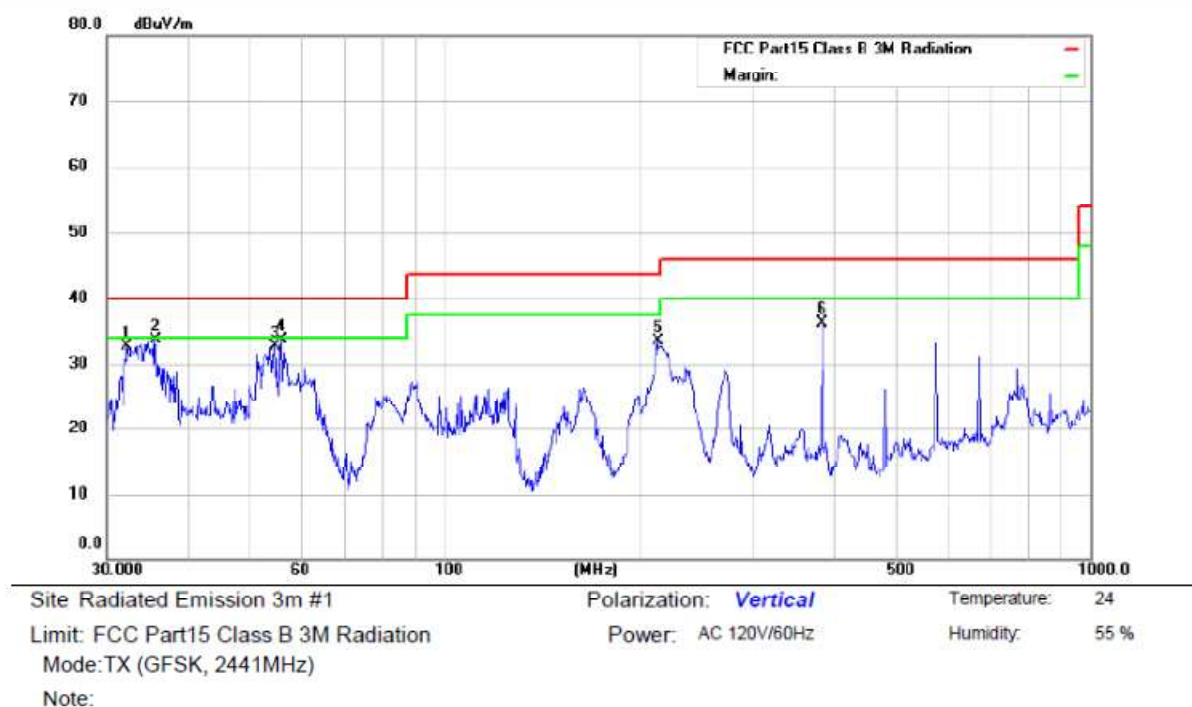
Operator: ZW



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	*	54.8348	52.03	-19.76	32.27	40.00	-7.73	QP		
2		195.8220	51.72	-21.83	29.89	43.50	-13.61	QP		
3		214.5143	55.88	-22.62	33.26	43.50	-10.24	QP		
4		234.1684	54.73	-21.26	33.47	46.00	-12.53	QP		
5		383.9318	53.88	-16.82	37.06	46.00	-8.94	QP		
6		576.6443	47.96	-11.68	36.28	46.00	-9.72	QP		

*:Maximum data x:Over limit !:over margin

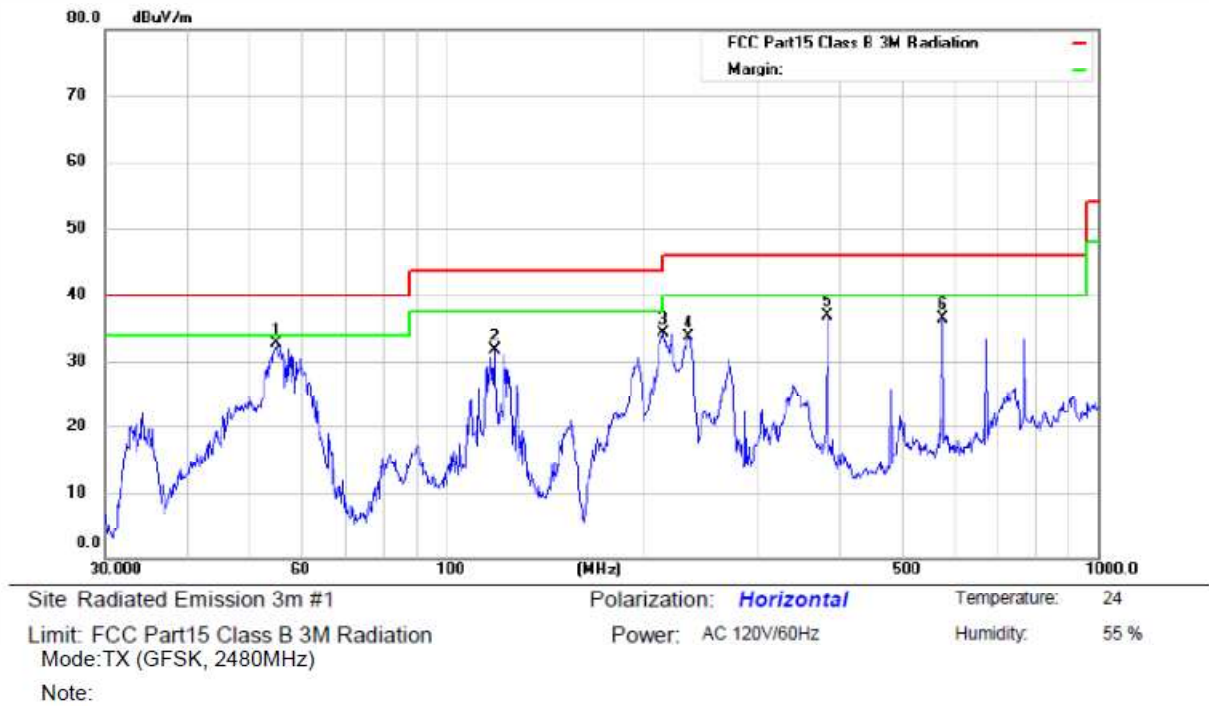
Operator: ZW



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		32.2925	55.89	-23.13	32.76	40.00	-7.24	QP		
2		35.6240	56.18	-22.57	33.61	40.00	-6.39	QP		
3		54.4516	52.42	-19.66	32.76	40.00	-7.24	QP		
4	*	56.0007	53.68	-20.04	33.64	40.00	-6.36	QP		
5		213.7634	56.17	-22.63	33.54	43.50	-9.96	QP		
6		383.9318	53.05	-16.82	36.23	46.00	-9.77	QP		

*:Maximum data x:Over limit !:over margin

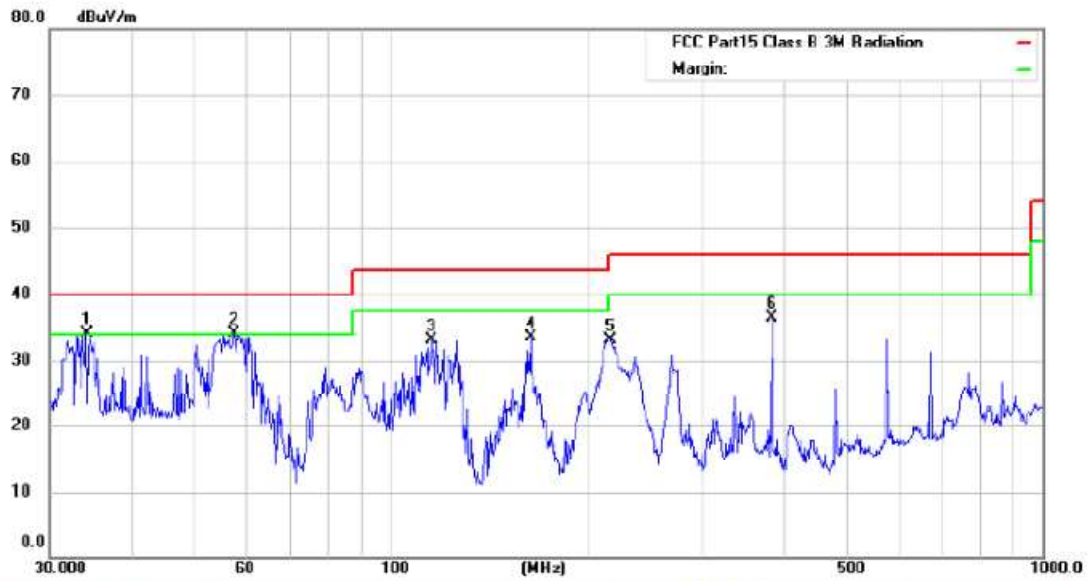
Operator: ZW



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	55.0274	52.56	-19.80	32.76	40.00	-7.24	QP		
2		118.6014	55.02	-23.33	31.69	43.50	-11.81	QP		
3		215.2678	56.81	-22.59	34.22	43.50	-9.28	QP		
4		234.9909	54.93	-21.26	33.67	46.00	-12.33	QP		
5		383.9318	53.75	-16.82	36.93	46.00	-9.07	QP		
6		576.6443	48.23	-11.68	36.55	46.00	-9.45	QP		

*:Maximum data x:Over limit !:over margin

Operator: ZW



Site Radiated Emission 3m #1 Polarization: **Vertical** Temperature: 24
 Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 55 %
 Mode:TX (GFSK, 2480MHz)
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	34.1561	56.51	-22.36	34.15	40.00	-5.85	QP		
2	I	57.5939	55.16	-21.15	34.01	40.00	-5.99	QP		
3		115.7256	55.96	-22.77	33.19	43.50	-10.31	QP		
4		163.7550	59.02	-25.55	33.47	43.50	-10.03	QP		
5		216.0240	55.70	-22.50	33.20	46.00	-12.80	QP		
6		383.9318	53.26	-16.82	36.44	46.00	-9.56	QP		

*:Maximum data x:Over limit !:over margin

Operator: ZW

9.8 CONDUCTED EMISSION TEST

9.8.1 Applicable Standard

According to FCC Part 15.207(a)

9.8.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	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

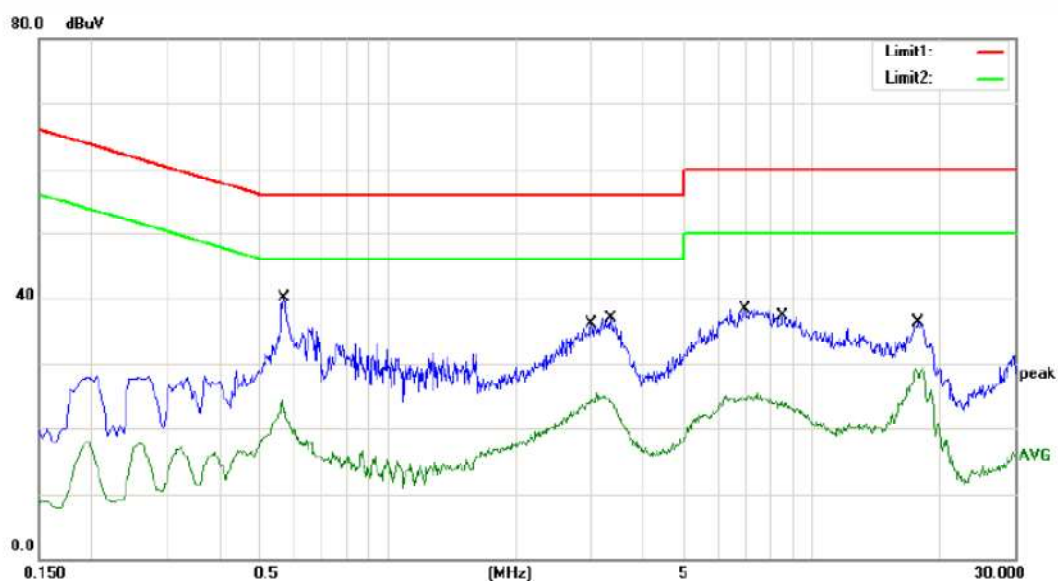
Test according to clause 7.3 conducted emission test setup

9.8.4 Test Procedure

The EUT was placed on a table which is 0.1m 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

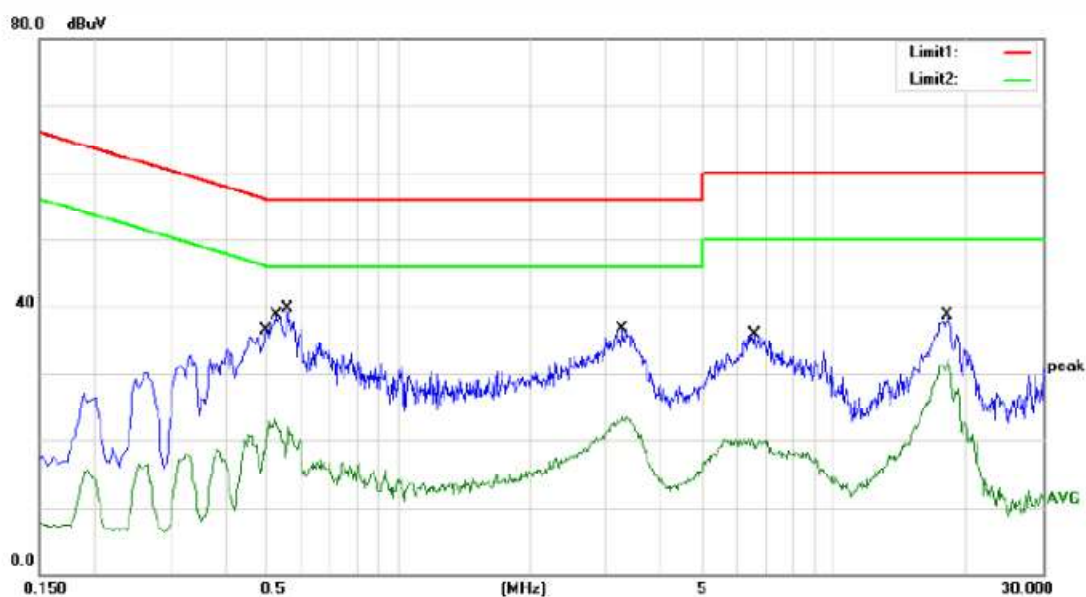
PASS



Site site #1 Phase: **L1** Temperature: 24
 Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 50 %
 Mode: Bluetooth Working
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1	*	0.5700	30.00	10.06	40.06	56.00	-15.94	QP	
2		0.5700	14.10	10.06	24.16	46.00	-21.84	AVG	
3		3.0220	25.90	10.19	36.09	56.00	-19.91	QP	
4		3.0220	13.90	10.19	24.09	46.00	-21.91	AVG	
5		3.3540	26.70	10.22	36.92	56.00	-19.08	QP	
6		3.3540	13.80	10.22	24.02	46.00	-21.98	AVG	
7		6.9480	27.80	10.40	38.20	60.00	-21.80	QP	
8		6.9480	14.20	10.40	24.60	50.00	-25.40	AVG	
9		8.5640	26.80	10.44	37.24	60.00	-22.76	QP	
10		8.5640	12.90	10.44	23.34	50.00	-26.66	AVG	
11		17.7200	25.70	10.58	36.28	60.00	-23.72	QP	
12		17.7200	17.40	10.58	27.98	50.00	-22.02	AVG	

*:Maximum data x:Over limit l:over margin Comment: Factor build in receiver. Operator: YYF



Site site #1

Phase: N

Temperature: 24

Limit: (CE)FCC PART 15 class B_QP

Power: AC 120V/60Hz

Humidity: 50 %

Mode: Bluetooth Working

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4980	26.40	10.11	36.51	56.03	-19.52	QP	
2		0.4980	9.40	10.11	19.51	46.03	-26.52	AVG	
3		0.5260	28.50	10.10	38.60	56.00	-17.40	QP	
4		0.5260	12.20	10.10	22.30	46.00	-23.70	AVG	
5	*	0.5580	29.60	10.08	39.68	56.00	-16.32	QP	
6		0.5580	9.40	10.08	19.48	46.00	-26.52	AVG	
7		3.2700	26.50	10.08	36.58	56.00	-19.42	QP	
8		3.2700	13.30	10.08	23.38	46.00	-22.62	AVG	
9		6.5560	25.50	10.38	35.88	60.00	-24.12	QP	
10		6.5560	8.90	10.38	19.28	50.00	-30.72	AVG	
11		18.2280	28.10	10.64	38.74	60.00	-21.26	QP	
12		18.2280	21.30	10.64	31.94	50.00	-18.06	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: YYF

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. 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

The EUT'S antenna is PCB antenna. The antenna's gain is 错误!未找到引用源。， and the antenna can't be replaced by the user which in accordance to section 15.203, please refer to the photos.

10 APPENDIX I

Model List				
F3650	F3200	F3210	F3220	F3230
F3500	F3510	F3520	F3530	F3550
F3560	F3600	F3610	F3620	F3630
F3660	F8000	F8010	F8020	F8030
F8050	F8060	F8070	F8080	F8090
F8200	F8220	F8230	F8250	F8260
F8270	F8280	F8290	F5200	F5210
F5220	F5230	F5250	F8500	F8500Y
F8510	F8520	F8210	F8530	F8550
F8560	F8570	F8580	F8590	F8800
F8810	F8820	F8830	F8850	F8860
F8870	F5000	F5010	F5020	F5030
F5050	F5060	F5070	F5500	F5510
F5520	F5530	F8200Y		
Note: All models have the same circuit principles and PCB layout and functions. The difference is just appearance.				

*** End of Report ***

声 明 Statement

1. 本报告无授权批准人签字及“检验报告专用章”无效;

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The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.

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The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.

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Objections shall be raised within 20 days from the date receiving the report.