CFR 47 FCC Part 15.249

TEST REPORT

Product： **RF 2.4G Wireless Keyboard**

Trade Name： N/A

Model Number： PSK-3971; ASK-3971; KSK-5210RF

FCC ID： RAC3971A01

Prepared for

PRECISION SQUARED TECHNOLOGY CORPORATION
5F-7, NO.2 JIAN BA ROAD, CHUNG HO CITY, TAIPEI HSIENG,
TAIWAN, R.O.C.
TEL.： +886 2 8228 0125
FAX.： +886 2 8228 0105

Prepared by

Interocean EMC Technology Corp.
244 No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei County, Taiwan, R.O.C.
TEL.: +886 2 2600 6861
FAX.: +886 2 2600 6859

Remark：

The test report consists of ***27*** pages in total. It shall not be reproduced except in full, without the written approval of IETC. This document may be altered or revised by IETC only, and shall be noted in the revision section of the document.
The test results in the report only to the tested sample.

Table of Contents

Statement of Compliance

Applicant:	PRECISION SQUARED TECHNOLOGY CORPORATION
Manufacturer:	JING MOLD ELECTRONIC TECHNOLOGY (SHEN ZHEN) CO., LTD.
Product:	RF 2.4G Wireless Keyboard
Model No.:	PSK-3971; ASK-3971; KSK-5210RF
Tested Power Supply:	DC 3V
Date of Final Test:	Feb. 25, 2011
Revision of Report:	Rev. 01

Configuration of Measurements and Standards Used：

FCC Rules and Regulations Part 15 Subpart C

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of IETC

Report Issued: 2011/04/01

Project Engineer: Elli Chang

Approved: Jerry Liu

1 General Information

1.1 Description of Equipment Under Test

Product	:	RF 2.4G Wireless Keyboard
Model Number	:	PSK-3971; ASK-3971; KSK-5210RF
Applicant	:	**PRECISION SQUARED TECHNOLOGY CORPORATION** 5F-7, NO.2 JIAN BA ROAD, CHUNG HO CITY, TAIPEI HSIENG, TAIWAN, R.O.C.
Manufacturer	:	**JING MOLD ELECTRONIC TECHNOLOGY (SHEN ZHEN) CO., LTD.** Xinqiao, 3rd Industral Zone, Shajing Town, Paoan District, Shenzhen City, Guangdong Province. China, Shenzhen, GuangDong, China.
Operating Frequency	:	2405MHz ~ 2477MHz
Channel Number	:	Refer to section 1.2
Type of Modulation	:	GFSK
Antenna description	:	This device uses PCB Print antenna. The antenna is integral to the device, thereby meeting the requirement of FCC 15.203.
Sample Receive date	:	Feb. 23, 2011
Date of Test	:	Feb. 23 ~ 25, 2011
Additional Description	:	1. The model **PSK-3971** is representative selected in the test and included in this report. 2. All model included in this report, the difference is for different market; the rest parts are identical. 3. For more detail specification about EUT, please refer to the user's manual.

1.2 Table for Carrier Frequencies

CH No.	1	2	3	4	5	6	7	8	9	10	11
CF (MHz)	2405	2409	2413	2417	2421	2425	2429	2433	2437	2441	2445

CH No.	12	13	14	15	16	17	18	19
CF (MHz)	2449	2453	2457	2461	2465	2469	2473	2477

1.3 Test Facility

Site Description : ☒Conduction 2 ☒OATS 2

Name of Firm : Interocean EMC Technology Corp.

Company web : http://www.ietc.com.tw

Site 1, 2, 3 Location : No.5-2, Lin 1, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei County, Taiwan, R.O.C.

Site Filing :

- Federal Communication Commissions – USA
  Registration No.: 96399 (OATS 1 & 2)
  Registration No.: 518958 (OATS 3)
  Designation No.: TW1020
- Voluntary Control Council for Interference by Information Technology Equipment (VCCI) – Japan
  Member No.: 1349
  Registration No. (Conducted Room): C-1094
  Registration No. (Conducted Room): T-1562
  Registration No. (OATS 1): R-1040; G-274
  Registration No. (OATS 2): R-1041
- Industry Canada (IC)
  OUR FILE: 46405-4437 Submission: 145171
  Registration No. (OATS 1): Site# 4437A-1
  Registration No. (OATS 2): Site# 4437A-2
  Registration No. (OATS 3): Site# 4437A-3

Site Accreditation :

- Bureau of Standards and Metrology and Inspection (BSMI) – Taiwan, R.O.C.
  Accreditation No.:
  SL2-IN-E-0026 for CNS13438 / CISPR22
  SL2-R1-E-0026 for CNS13439 / CISPR13
  SL2-R2-E-0026 for CNS13439 / CISPR13
  SL2-A1-E-0026 for CNS13783-1 / CISPR14-1
  SL2-L1-E-0026 for CNS 14115 / CISPR 15
- Taiwan Accreditation Foundation (TAF)
  Accrditation No.: 1113
- TüV NORD
  Certificate No: TNTW0801R-03

1.4 Test Equipment

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSP40	100478	2011/04/20
Biconical Antenna	Schwarzbeck	VHA 9103	2484	2011/10/08
Log Antenna	Schwarzbeck	UHALP 9108	A 0765	2011/10/08
Preamplifier	Agilent	8449B	3008A01434	2011/04/20
Preamplifier	Agilent	83050A	3950A00225	2012/09/07
Preamplifier	SCHAFFNER	CA30100	2	2011/10/28
Horn Antenna	COM-POWER	AH-118	10081	2012/05/19
Horn Antenna	Schwarzbeck	BBHA 9170	213	2012/07/19
Wide Bandwidth Sensor	Anritsu	MA2491A	728133	2011/11/13
Power Meter	Anritsu	ML2495A	736010	2011/11/13
Temp & Humidity chamber	GIAN FORCE	GTH-150-40-2P-U	MAA0305-012	2011/05/07

Note: The above equipments are within the valid calibration period.

1.5 Summary of Measurement

Report Clause	Test Parameter	Reference Document CFR47 Part15	Results
2	RF Radiated spurious emission test	§15.249(a)(c)(d)	Pass
3	Emission on the Band Edge	§15.249(d)	Pass
	AC Power Line Conducted Emission test	§15.207	N/A

1.6 Justification

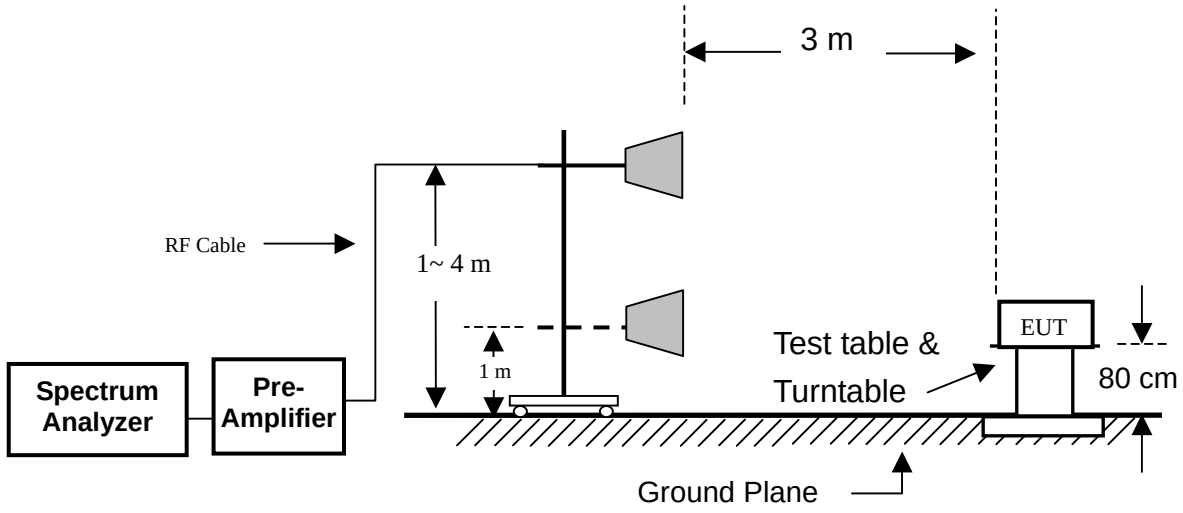
The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of the frequency band were all arrive limit requirement, thus we evaluate the EUT pass the specified test.

2 20dB Bandwidth test

2.1 Limit

No regulation limit, for reference purpose.

2.2 Configuration of Measurement



2.3 Test Procedure

The 20dB bandwidth per FCC §15.215 was measured using spectrum analyzer with the resolutions bandwidth set at 100 kHz, the video bandwidth≧RBW, and the SPAN may equal to approximately 2 to 3 time the 20dB bandwidth.

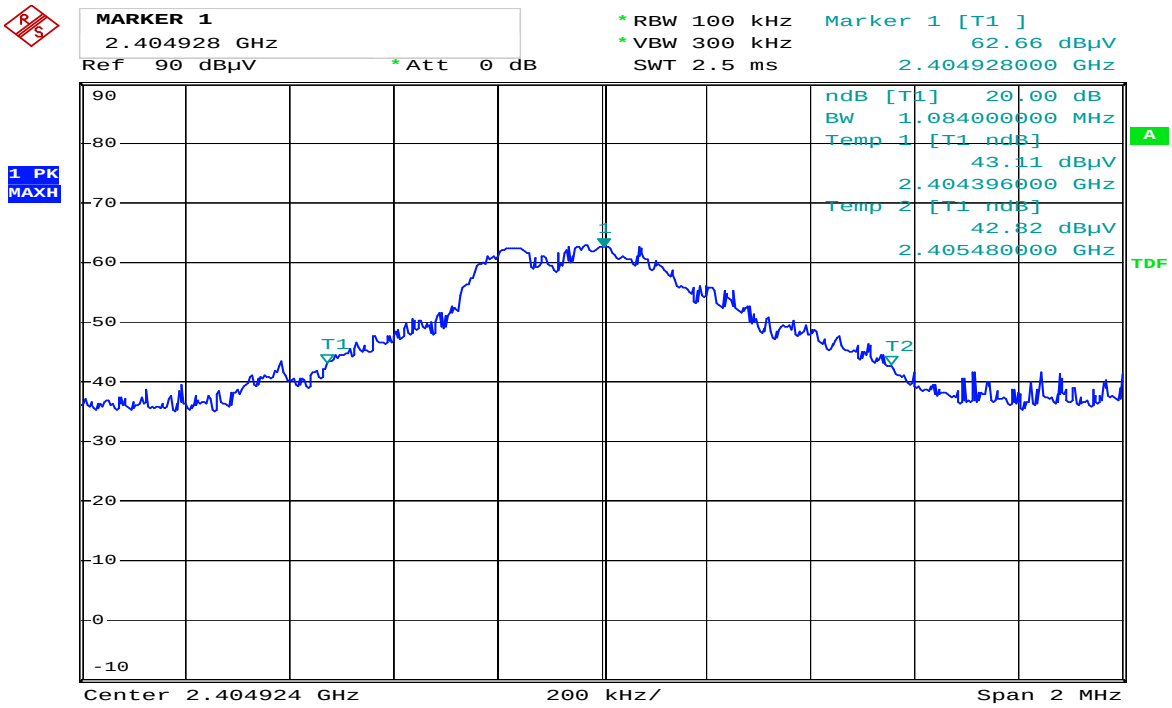
2.4 Test Result

PASS.

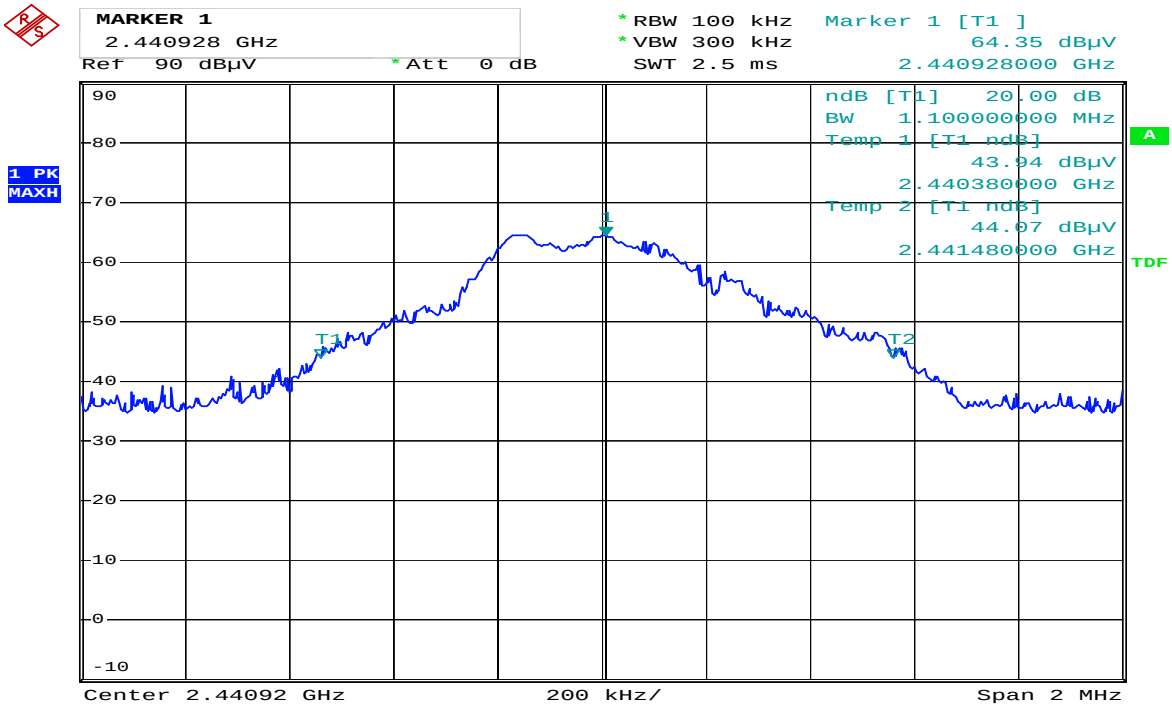
The final test data is shown as following pages.

Test CH		20dB Bandwidth (MHz)
Modulation	Frq. (MHz)	
GFSK	2405	1.084
	2441	1.100
	2477	1.088

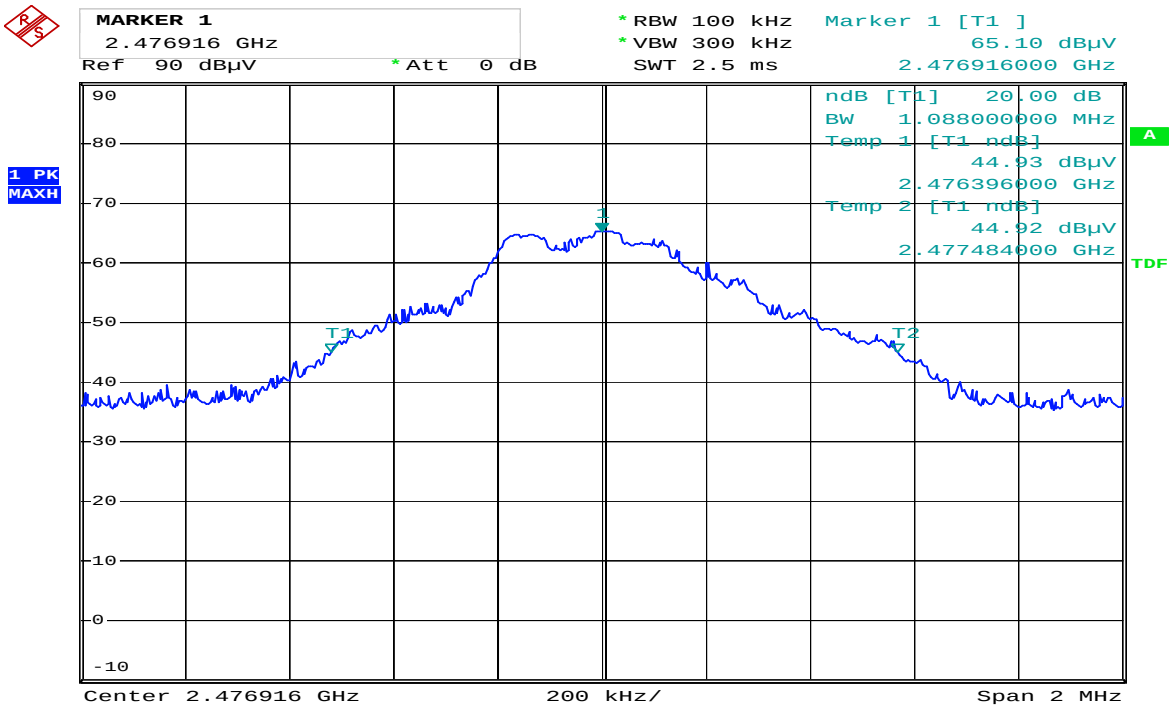
2405MHz 20dB BW



2441MHz 20dB BW



2477MHz 20dB BW



3 RF Radiated spurious emission test

3.1 Limit

According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

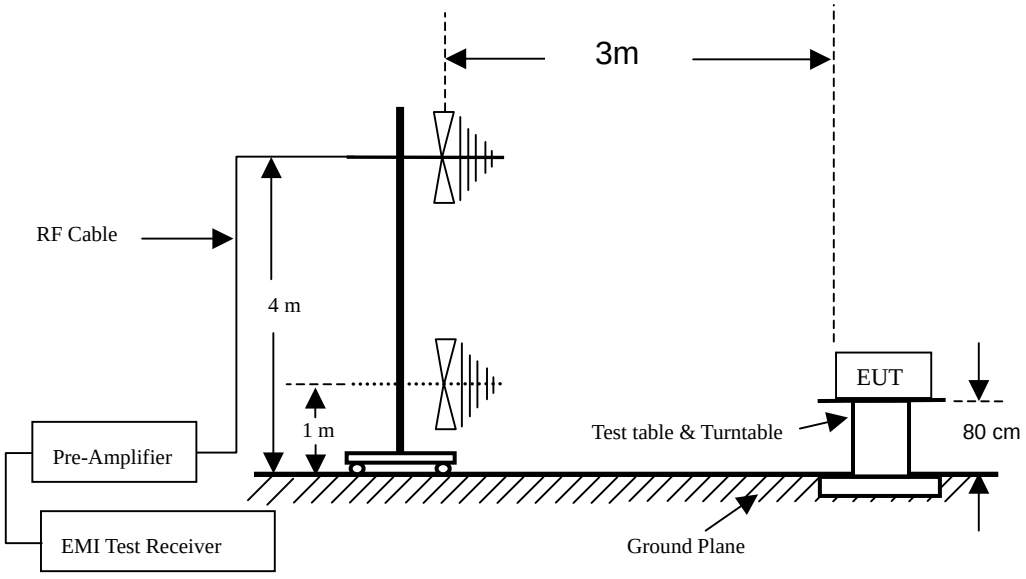
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

For intentional radiator, the radiated emission shall comply with §15.209(a).

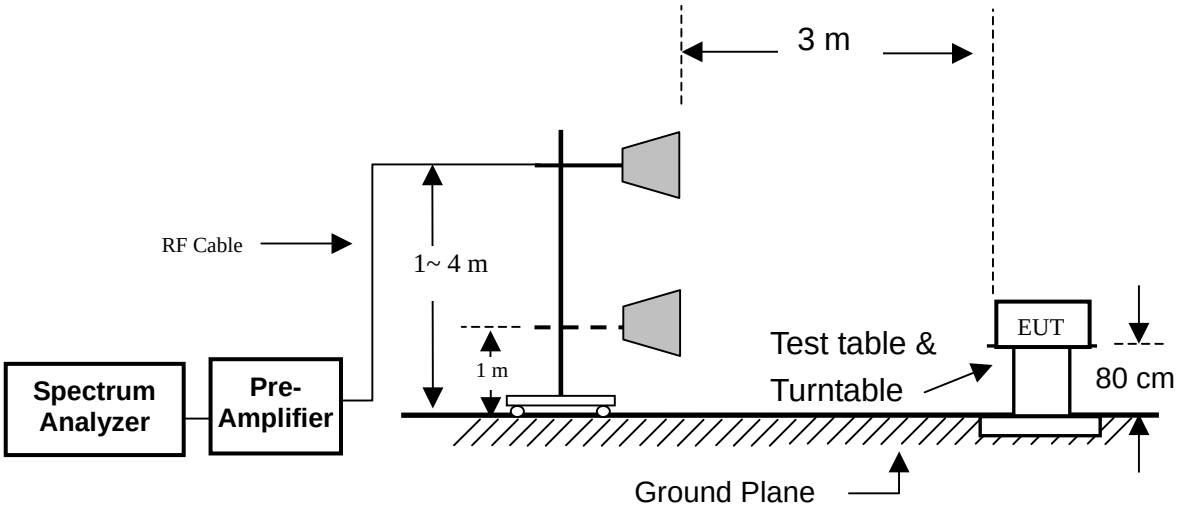
Frequency (MHz)	Field strength dB(μV/m)	Measurement distance (meters)
1.705~30.0	29.5	30
30 ~ 88	40	3
88~216	43.5	3
216~960	46	3
Above 960	54	3

3.2 Configuration of Measurement

Measurement Frequency under 1GHz



Measurement Frequency above 1GHz



3.3 Test Procedure

The EUT was setup to ANSI C63.4, 2003.
Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer set as below: For frequency range from 30MHz to 1GHz: RBW=100kHz or greater. For frequencies above 1GHz: set RBW=VBW=1MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meter and down to 1 meter.

3.4 The description of operation mode

Setup EUT to continuously transmit signal with 100% duty cycle during the test period.

3.5 Test Result

PASS.
The final test data is shown on as following pages.

Radiated spurious emission

Fundamental Emissions

Low channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
2405	H	67.79	26.26	31.03	72.56	94	-21.44	PK
2405	V	62.89	26.26	31.03	67.66	94	-26.34	PK

Middle channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
2441	H	70.86	26.26	31.09	75.69	94	-18.31	PK
2441	V	67.85	26.26	31.09	72.68	94	-21.32	PK

High channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
2477	H	71.00	26.27	31.16	75.89	94	-18.11	PK
2477	V	66.93	26.27	31.16	71.82	94	-22.18	PK

Remark ：

1. Corrected Level = Reading – Preamp + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

Radiated spurious emission

Test Environment

Ambient temperature ： 24.0℃

Relative humidity ： 68%

Radiated Emission below 1GHz

After verifying low, middle and high channel (2405MHz, 2441MHz and 2477MHz), the worse case was found at low channel, the data will present on report.

Worst case: High channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
72.000	H	49.32	33.30	6.81	22.83	40.00	-17.17	QP
120.000	H	45.26	33.00	13.83	26.09	43.52	-17.43	QP
180.000	H	47.23	33.40	17.65	31.48	43.52	-12.04	QP
240.000	H	43.58	33.40	19.65	29.83	46.02	-16.19	QP
273.650	H	44.26	33.54	21.10	31.82	46.02	-14.20	QP
360.000	H	43.52	33.60	18.10	28.02	46.02	-18.00	QP
56.000	V	50.23	33.30	9.44	26.37	40.00	-13.63	QP
120.000	V	46.63	33.00	14.53	28.16	43.52	-15.36	QP
166.360	V	43.62	33.36	17.72	27.98	43.52	-15.54	QP
240.000	V	43.00	33.40	21.05	30.65	46.02	-15.37	QP
280.000	V	42.56	33.60	21.64	30.60	46.02	-15.42	QP
356.000	V	45.66	33.60	17.69	29.75	46.02	-16.27	QP

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Factor = Antenna Factor + Cable Loss
The present spurious only show those points are above noise level and the frequency range test from 30MHz to 1GHz.

Radiated spurious emission

Radiated Emission above 1GHz

Low Channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
4810	H	38.56	26.01	36.83	49.38	54	-4.62	PK
*7215	H	33.56	25.70	42.20	50.06	54	-3.94	PK
4810	V	36.02	26.01	36.83	46.84	54	-7.16	PK
*7215	V	33.36	25.70	42.20	49.86	54	-4.14	PK

Middle Channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
4882	H	35.15	25.99	37.04	46.20	54	-7.80	PK
*7323	H	33.49	25.71	42.51	50.29	54	-3.71	PK
4882	V	34.85	25.99	37.04	45.90	54	-8.10	PK
*7323	V	32.92	25.71	42.51	49.72	54	-4.28	PK

High Channel								
Frequency (MHz)	Antenna Polarization	Reading (dB μ V)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Det. Mode
4954	H	35.85	25.97	37.26	47.14	54	-6.86	PK
*7431	H	33.35	25.72	42.80	50.43	54	-3.57	PK
4954	V	34.75	25.97	37.26	46.04	54	-7.96	PK
*7431	V	32.18	25.72	42.80	49.26	54	-4.74	PK

Remark ： Corrected Level = Reading + Correction Factor – Preamp
Correction Factor = Antenna Factor + Cable Loss
* Mark indicated background noise level.

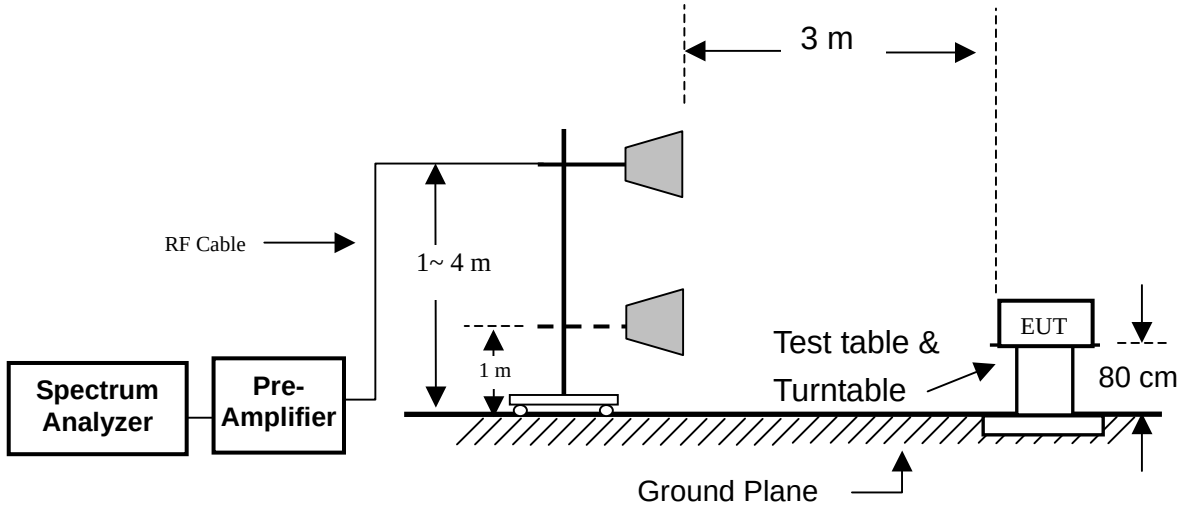
4 Emission on the Band Edge test

4.1 Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

4.2 Configuration of Measurement

Measurement Frequency above 1GHz



4.3 Test Procedure

The EUT was setup to ANSI C63.4, 2003.
Set RBW =1M, VBW= RBW for peak, and VBW=10Hz for average.
The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meter and down to 1 meter.

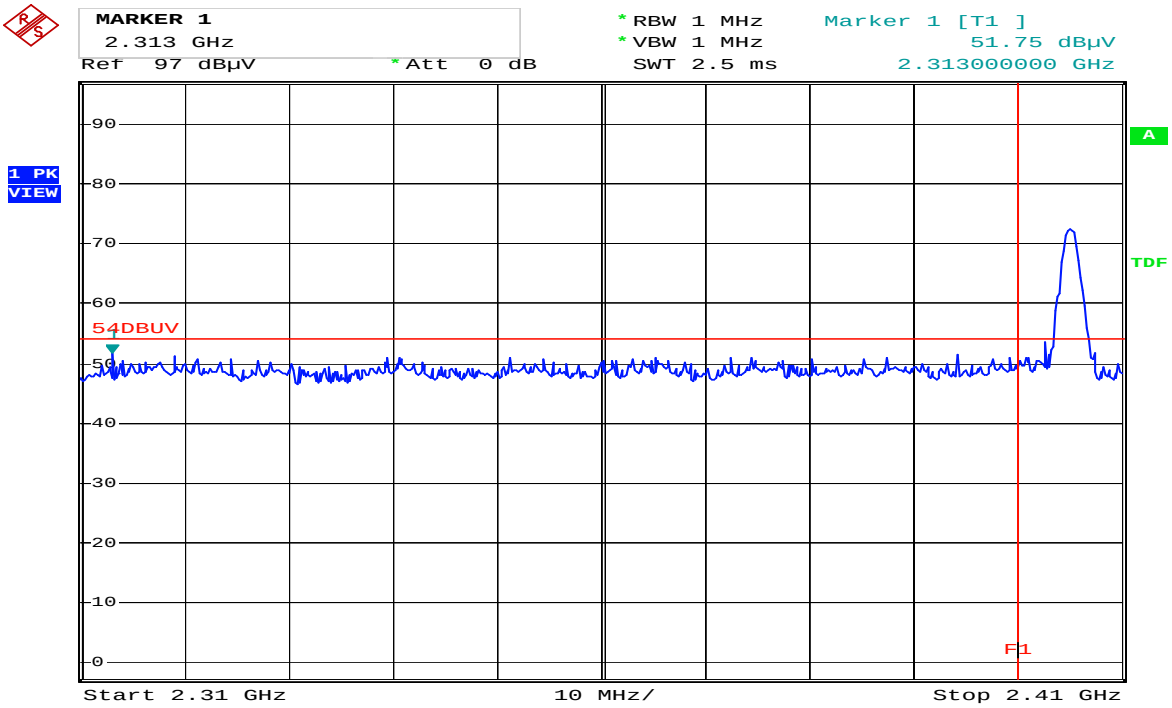
4.4 Test Result

PASS.
The final test data is shown on as following pages.

Band edge

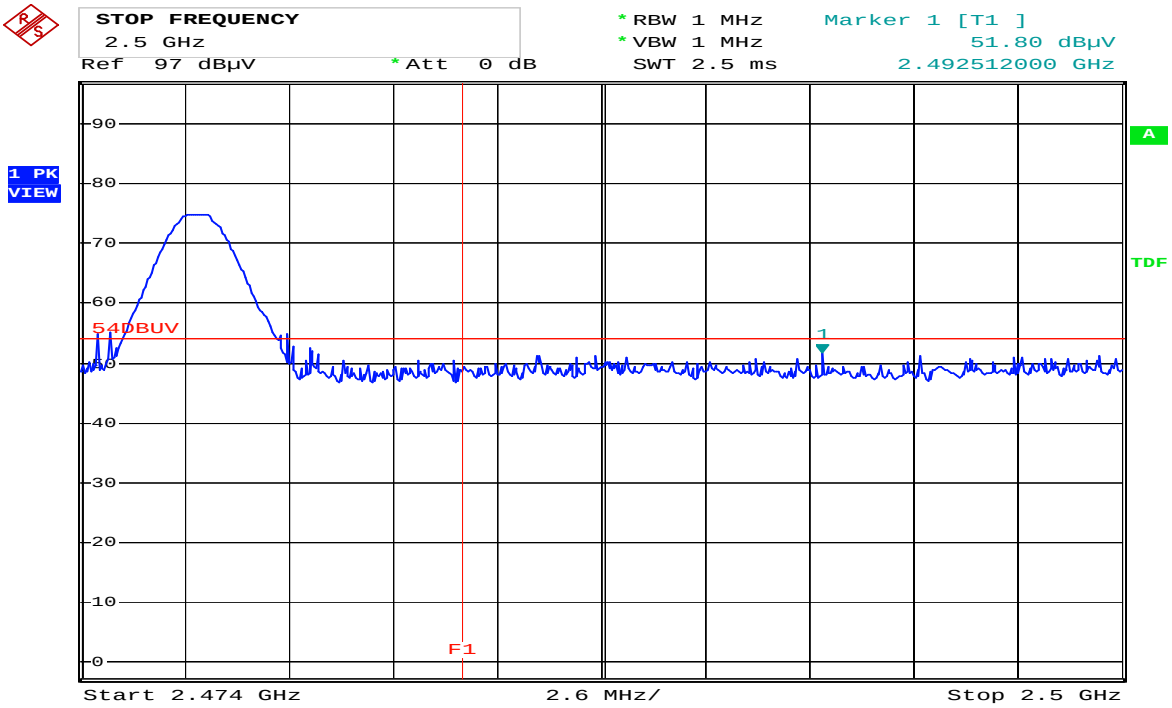
Frequency	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBm)	Margin (dB)
2405	2310~2400	PK	51.75	54	-2.25
2477	2483.5~2500	PK	51.80	54	-2.20

2405MHz PK



Comment: 2405MHz-PK
Date: 6.MAY.2011 14:57:37

2477MHz PK



Comment: 2477MHz-PK
Date: 6.MAY.2011 14:51:57