CFR 47 FCC Part 15.249

TEST REPORT

Product： **RF 2.4G Wireless Keyboard**

Trade Name： N/A

Model Number： PSK-4251; ASK-4251; KSK-3200RF

FCC ID： RAC4251A01

Prepared for

PRECISION SQUARED TECHNOLOGY CORPORATION
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Prepared by

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Remark：

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The test results in the report only to the tested sample.

Table of Contents

Statement of Compliance

Applicant: PRECISION SQUARED TECHNOLOGY CORPORATION

Manufacturer: Global Link Digital Technology Co., Ltd.

Product: RF 2.4G Wireless Keyboard

Model No.: PSK-4251; ASK-4251; KSK-3200RF

Tested Power Supply: DC 3V

Date of Final Test: Apr. 14, 2009

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: 2009/05/11

Project Engineer: Anya Lee Approved: Jerry Liu

1 General Information

1.1 Description of Equipment Under Test

Product	:	RF 2.4G Wireless Keyboard
Model Number	:	PSK-4251; ASK-4251; KSK-3200RF
Applicant	:	**PRECISION SQUARED TECHNOLOGY CORPORATION** 5F-7, NO.2 JIAN BA ROAD, CHUNG HO CITY, TAIPEI HSIENG, TAIWAN, R.O.C.
Manufacturer	:	**Global Link Digital Technology Co., Ltd.** Qibaoyiding Industrial District, Liuyongwei Wan Jiang Town, Dongguan City, Guangdong Province, P.R.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	:	Apr. 08, 2009
Date of Test	:	Apr. 08 ~ 14, 2009
Additional Description	:	1. The EUT is “**RF 2.4G Wireless Keyboard**”. 2. The model **PSK-4251** is representative selected in the test and included in this report. 3. All model included in this report, the difference is for different market; the rest parts are identical. 4. For more detail specification about EUT, please refer to the user’s manual.

1.2 Table for Carrier Frequencies

802.11b/ 802.11g

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 1 ☒ OATS 2

Name of Firm : Interocean EMC Technology Corp.

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

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

Site 3, 4 Location : No. 12, Ruei-Shu Valley, Ruei-Ping 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 & 4)
  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-271
  Registration No. (OATS 1): R-1040
  Registration No. (OATS 2): R-1041
- Industry Canada (IC)
  OUR FILE: 46405-4437 Submission: 130946
  Registration No. (OATS 1): 4437A-1
  Registration No. (OATS 2): 4437A-2
  Registration No. (OATS 3): 4437A-3
  Registration No. (OATS 4): 4437A-4
- Japan Electrical Safety & Environment Technology Laboratories (JET)
  Registration No.: 04S03-01

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
- Taiwan Accreditation Foundation (TAF)
  Accreditation No.: 1113
- TüV NORD
  Certificate No: TNTW0801R-01

1.4 Test Equipment

Instrument	Manufacturer	Model	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSP30	100002	2009/12/10
Preamplifier	Agilent	8449B	3008A01434	2010/04/01
Preamplifier	Agilent	83050A	3950A00225	2009/08/10
Preamplifier	SCHAFFNER	CA30100	2	2009/10/20
Horn Antenna	COM-POWER	AH-118	10081	2010/05/12
Horn Antenna	Schwarzbeck	BBHA 9170	213	2010/06/08
Wide Bandwidth Sensor	Anritsu	MA2491A	728133	2009/10/16
Power Meter	Anritsu	ML2495A	736010	2009/10/16
Temp & Humidity chamber	GIAN FORCE	GTH-150-40-2P-U	MAA0305-012	2009/05/14
Signal Generator	Agilent	E8254A	US41140164	2009/05/21
MULTI UE TESTER	JRC	NJZ-2000	ET00184	2009/12/22

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
4	AC Power Line Conducted Emission test	§15.207	Pass

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 RF Radiated spurious emission test

2.1 Limit

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

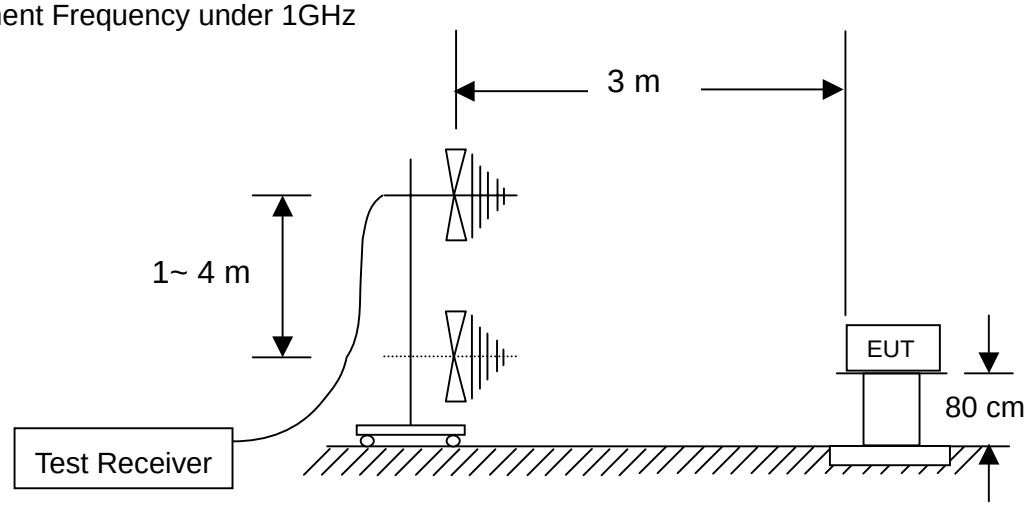
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

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

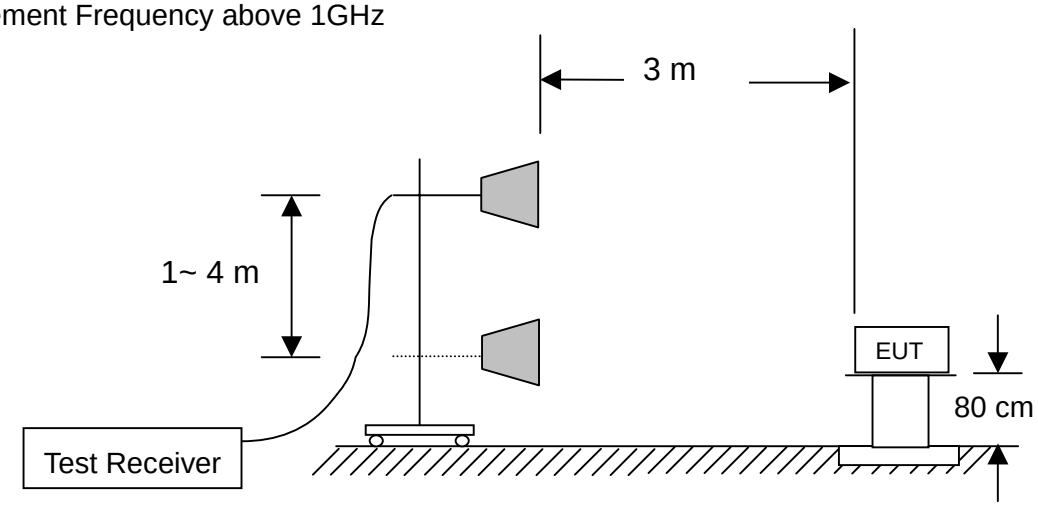
Frequency (MHz)	Field strength dB(μV/m)	Measurement distance (meters)
1.705~30.0	29.5	30
30 ~ 88	40	3
88~216	43.5	3
216~960	46	3
Above 960	54	3

2.2 Configuration of Measurement

Measurement Frequency under 1GHz



Measurement Frequency above 1GHz



2.3 Test Procedure

The EUT was setup to ANSI C63.4, 2003.
Radiated emission measurements were performed from 30MHz to 40GHz. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz for frequencies above 1GHz.
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.

2.4 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	94.88	36.18	31.35	90.05	94	-3.95	PK
2405	V	93.40	36.18	31.35	88.57	94	-5.43	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	92.29	36.19	31.49	87.59	94	-6.41	PK
2441	V	91.50	36.19	31.49	86.80	94	-7.20	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	91.70	36.20	31.62	87.12	94	-6.88	PK
2477	V	89.70	36.20	31.62	85.12	94	-8.88	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: low channel								
Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Det. Mode
247.280	H	44.74	32.85	18.70	30.59	46.00	-15.41	QP
270.560	H	47.68	32.80	19.43	34.31	46.00	-11.69	QP
443.970	H	53.58	34.24	18.36	37.70	46.00	-8.30	QP
504.770	H	50.60	34.35	19.34	35.59	46.00	-10.41	QP
856.440	H	40.43	31.34	24.03	33.12	46.00	-12.88	QP
213.360	V	45.74	33.10	17.86	30.50	46.00	-15.50	QP
274.440	V	46.30	32.80	19.55	33.05	46.00	-12.95	QP
400.540	V	51.74	33.81	17.59	35.52	46.00	-10.48	QP
554.147	V	49.17	34.14	20.23	35.26	46.00	-10.74	QP
881.656	V	38.17	32.28	24.27	30.16	46.00	-15.84	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 μV)	Preamp (dB)	Correction Factor (dB/m)	Corrected Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Det. Mode
4810	H	66.48	36.50	37.48	67.46	74	-6.54	PK
4810	H	34.57	36.50	37.48	35.55	54	-18.45	AV
*7215	H	44.31	36.69	42.89	50.51	54	-3.49	PK
*9620	H	43.61	37.10	46.01	52.52	54	-1.48	PK
4810	V	65.49	36.50	37.48	66.47	74	-7.53	PK
4810	V	34.38	36.50	37.48	35.36	54	-18.64	AV
*7215	V	44.81	36.69	42.89	51.01	54	-2.99	PK
*9620	V	44.05	37.10	46.01	52.96	54	-1.04	PK

Middle 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
4882	H	66.20	36.50	37.59	67.29	74	-6.71	PK
4882	H	34.73	36.50	37.59	35.82	54	-18.18	AV
*7323	H	44.17	36.73	43.14	50.58	54	-3.42	PK
*9764	H	41.36	37.10	46.17	50.43	54	-3.57	PK
4882	V	66.96	36.50	37.59	68.05	74	-5.95	PK
4882	V	34.69	36.50	37.59	35.78	54	-18.22	AV
*7323	V	45.30	36.73	43.14	51.71	54	-2.29	PK
*9764	V	42.54	37.10	46.17	51.61	54	-2.39	PK

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

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	67.60	36.50	37.72	68.82	74	-5.18	PK
4954	H	34.92	36.50	37.72	36.14	54	-17.86	AV
*7431	H	44.70	36.77	43.40	51.33	54	-2.67	PK
*9908	H	42.36	37.10	46.33	51.59	54	-2.41	PK
4954	V	63.44	36.50	37.72	64.66	74	-9.34	PK
4954	V	34.46	36.50	37.72	35.68	54	-18.32	AV
*7431	V	44.82	36.77	43.40	51.45	54	-2.55	PK
*9908	V	42.04	37.10	46.33	51.27	54	-2.73	PK

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

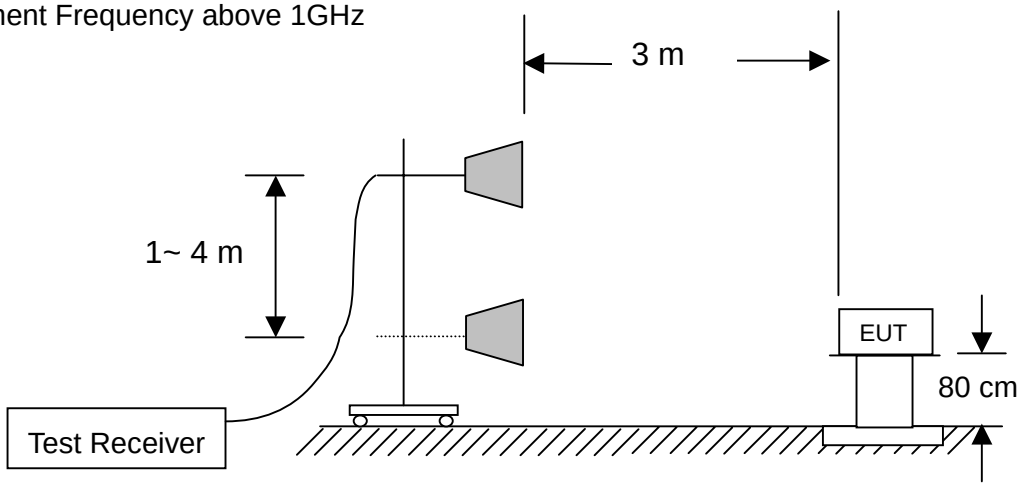
3 Emission on the Band Edge test

3.1 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.

3.2 Configuration of Measurement

Measurement Frequency above 1GHz



3.3 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.

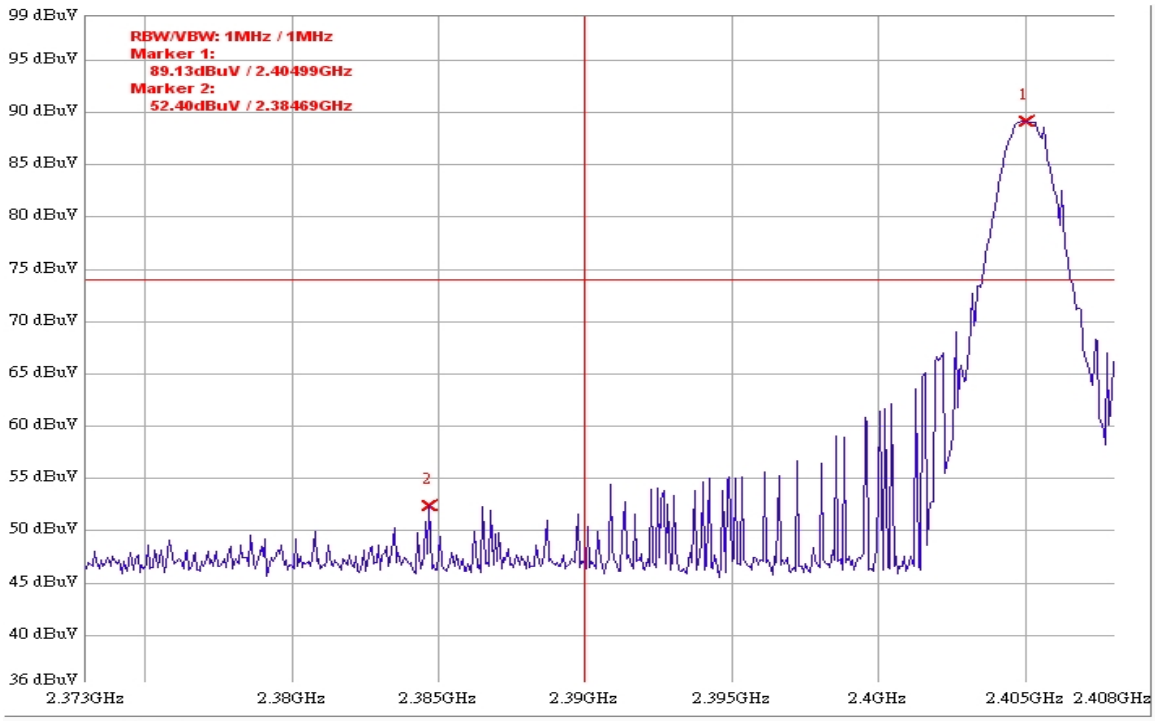
3.4 Test Result

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

Band edge

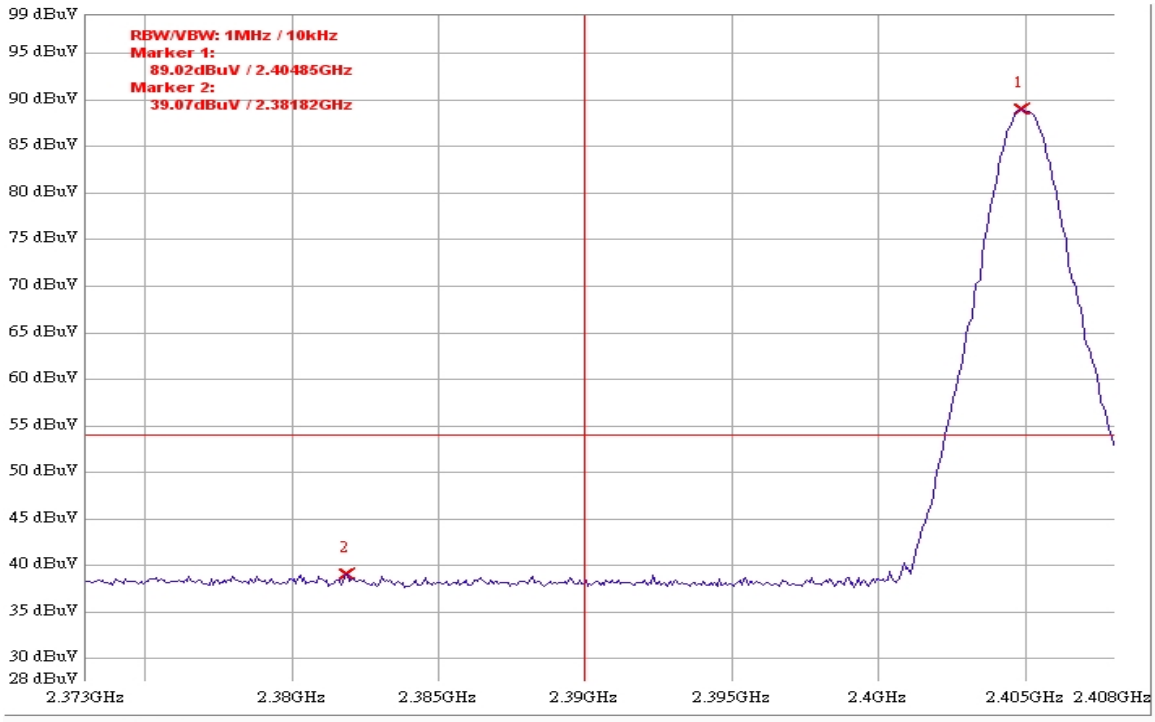
Frequency	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBm)	Margin (dB)
2405	2310~2390	PK	52.40	74	-21.6
		AV	39.07	54	-14.93
2477	2483.5~2500	PK	56.30	74	-17.7
		AV	39.23	54	-14.77

2405MHz PK



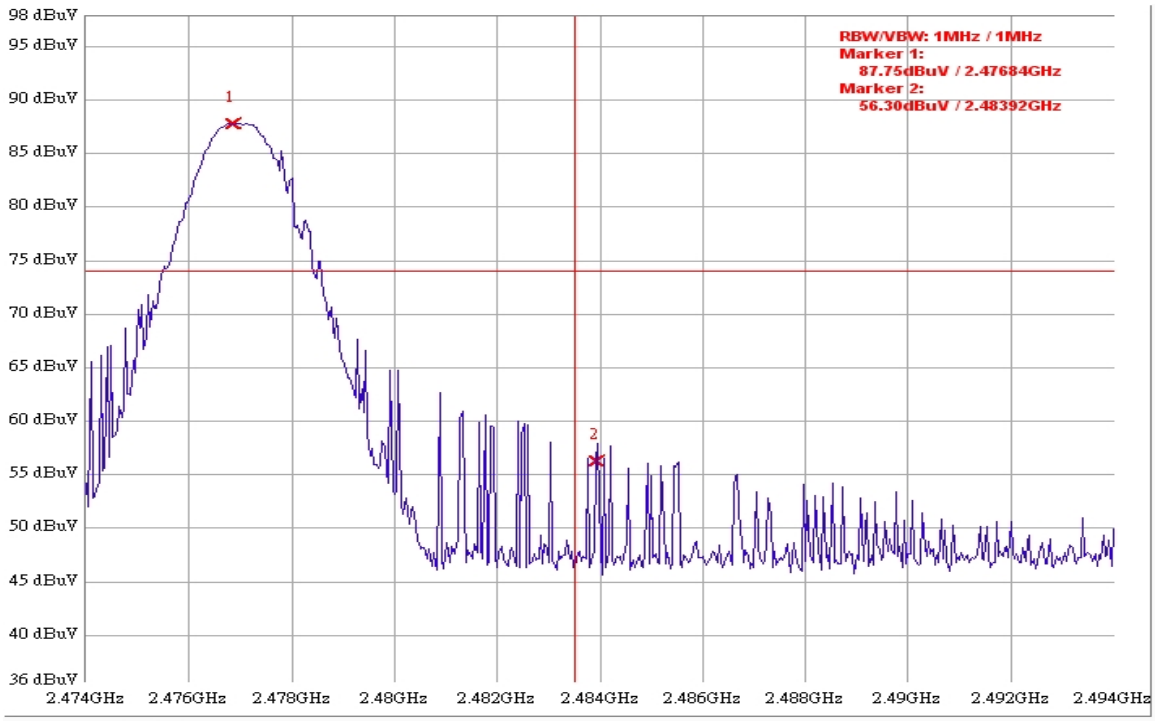
Band edge 2405MHz PK

2405MHz AV



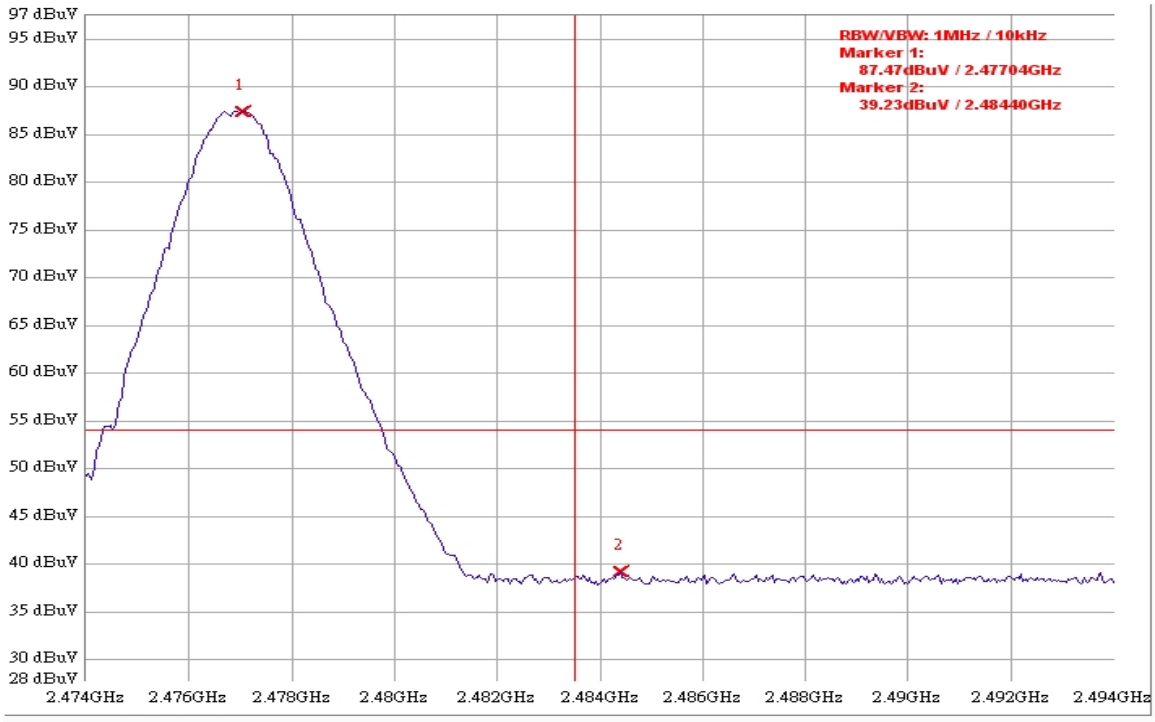
Band edge 2405MHz AV

2477MHz PK



Band edge 2477MHz PK

2477MHz AV



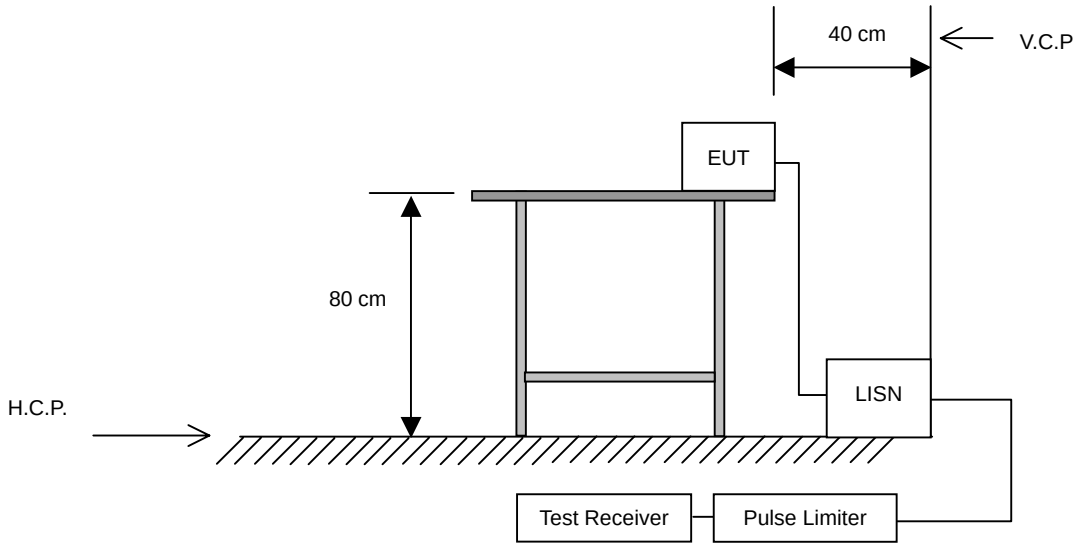
Band edge 2477MHz AV

4 AC Power Line Conducted Emission test

4.1 Limit

Frequency (MHz)	Quasi-Peak (dB μV)	Average (dB μV)
0.15 to 0.5	66 to 56	56 to 46
> 0.5 to 5	56	46
> 5 to 30	60	50
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

4.2 Configuration of Measurement



4.3 Test Procedures

The EUT was setup to ANSI C63.4, 2003.

1) The EUT was placed 80cm height above ground on a non-conductive table and vertical conducting plane located 40cm to the rear of the EUT.
2) The EUT was connected to the main power through Line Impedance Stabilization Networks (LISN). This setup provided a 50ohm/50mH coupling impedance for the measuring equipment. The auxiliary equipment will place in secondary LISN.
3) Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement.

4.4 Test Result

PASS.

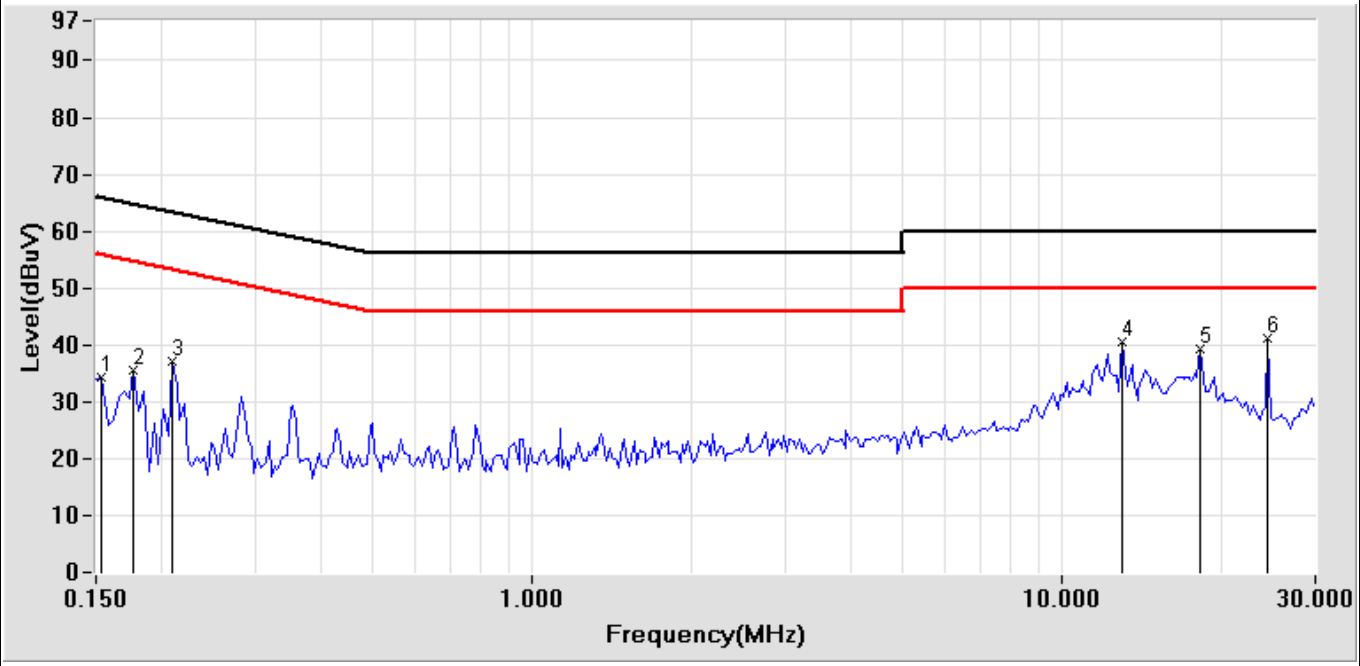
The final test data is shown on as following pages.

Power Line Conducted Test Data

EUT: RF 2.4G Wireless Keyboard	POLARITY: Line
CLIENT: PRECISION	DISTANCE:
MODEL: PSK-4251	Serial No.:
RATING: DC 3V	FILE/DATA#: PRECISION.emi/11
Temperature: 21.0 ℃	OPERATOR: Terry
Humidity: 68 %	TEST SITE: Conduction1

Frequency	Factor	Meter Reading (dBµV)		Emission Level (dBµV)		Limits (dBµV)		Margin (dB)	
(MHz)	(dB)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.154	0.13	38.01	26.37	38.14	26.50	65.78	55.78	-27.64	-29.28
0.177	0.13	33.41	27.55	33.54	27.68	64.63	54.63	-31.09	-26.95
0.209	0.13	34.17	26.01	34.30	26.14	63.24	53.24	-28.94	-27.10
13.002	0.67	40.70	35.78	41.37	36.45	60.00	50.00	-18.63	-13.55
18.220	0.83	38.46	37.41	39.29	38.24	60.00	50.00	-20.71	-11.76
24.291	1.16	39.24	39.18	40.40	40.34	60.00	50.00	-19.60	-9.66

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



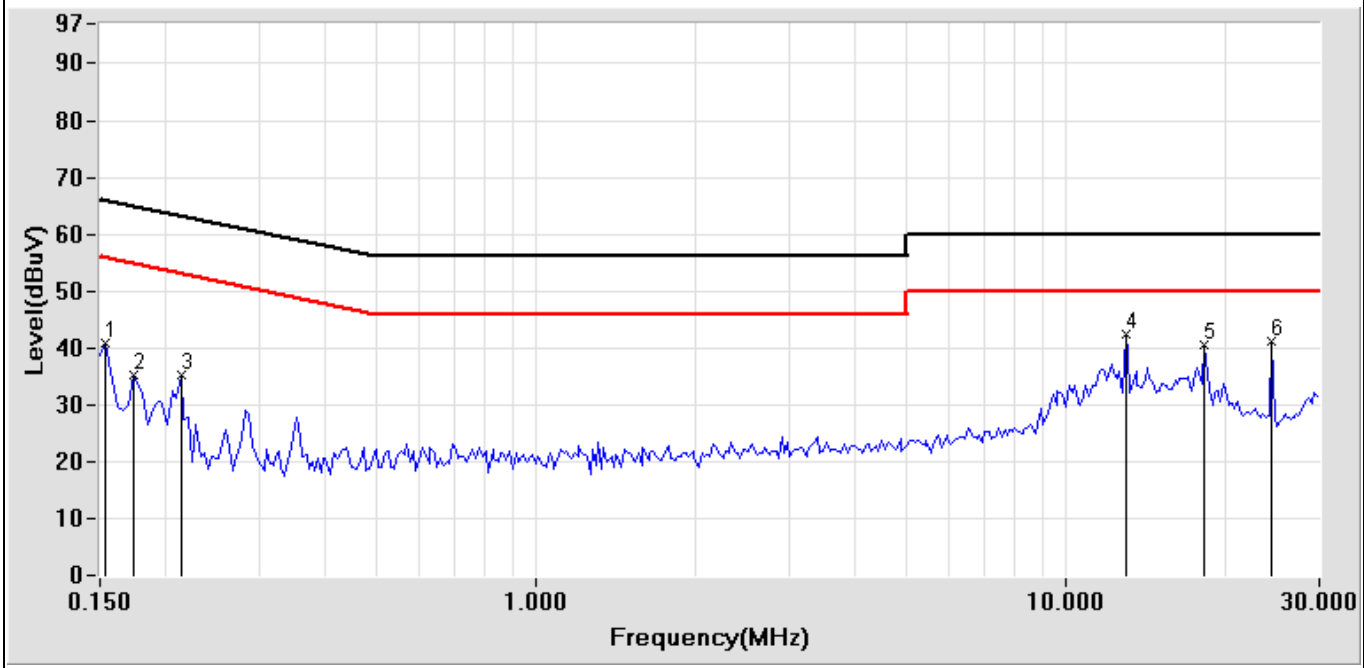
Test Mode: Mode 1: Charge Mode (USB Cable)

Power Line Conducted Test Data

EUT: RF 2.4G Wireless Keyboard	POLARITY: Neutral
CLIENT: PRECISION	DISTANCE:
MODEL: PSK-4251	Serial No.:
RATING: DC 3V	FILE/DATA#: PRECISION.emi/10
Temperature: 21.0 ℃	OPERATOR: Terry
Humidity: 68 %	TEST SITE: Conduction1

Frequency	Factor	Meter Reading (dBµV)		Emission Level (dBµV)		Limits (dBµV)		Margin (dB)	
(MHz)	(dB)	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.154	0.13	38.11	26.46	38.24	26.59	65.78	55.78	-27.54	-29.19
0.173	0.13	34.97	31.07	35.10	31.20	64.82	54.82	-29.72	-23.62
0.213	0.13	35.27	27.77	35.40	27.90	63.09	53.09	-27.69	-25.19
13.002	0.57	40.58	35.61	41.15	36.18	60.00	50.00	-18.85	-13.82
18.220	0.73	38.50	37.50	39.23	38.23	60.00	50.00	-20.77	-11.77
24.291	0.97	39.46	39.36	40.43	40.33	60.00	50.00	-19.57	-9.67

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



Test Mode: Mode 1: Charge Mode (USB Cable)