

FCC 15B Test Report

FCC ID: UUD-IMTC01RX

Computing Device Peripheral

Report No. : TB-FCC138913
Applicant : i-Money Technology Co., Ltd.
Equipment Under Test (EUT)
EUT Name : 2.4Ghz Wireless Mouse USB dongle
Model No. : iM-LM-036
Serial No. : N/A
Brand Name : N/A
Receipt Date : 2013-11-20
Test Date : 2013-11-21 to 2013-12-05
Issue Date : 2013-12-06
Standards : FCC Part 15: 2012, Subpart B, Class B
Test Method : ANSI C63.4-2003
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,

The EUT technically complies with the FCC requirements

Test/Witness Engineer : *Wan Su*

Approved& Authorized : *Ray Lai*

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1. General Information about EUT

1.1 Client Information

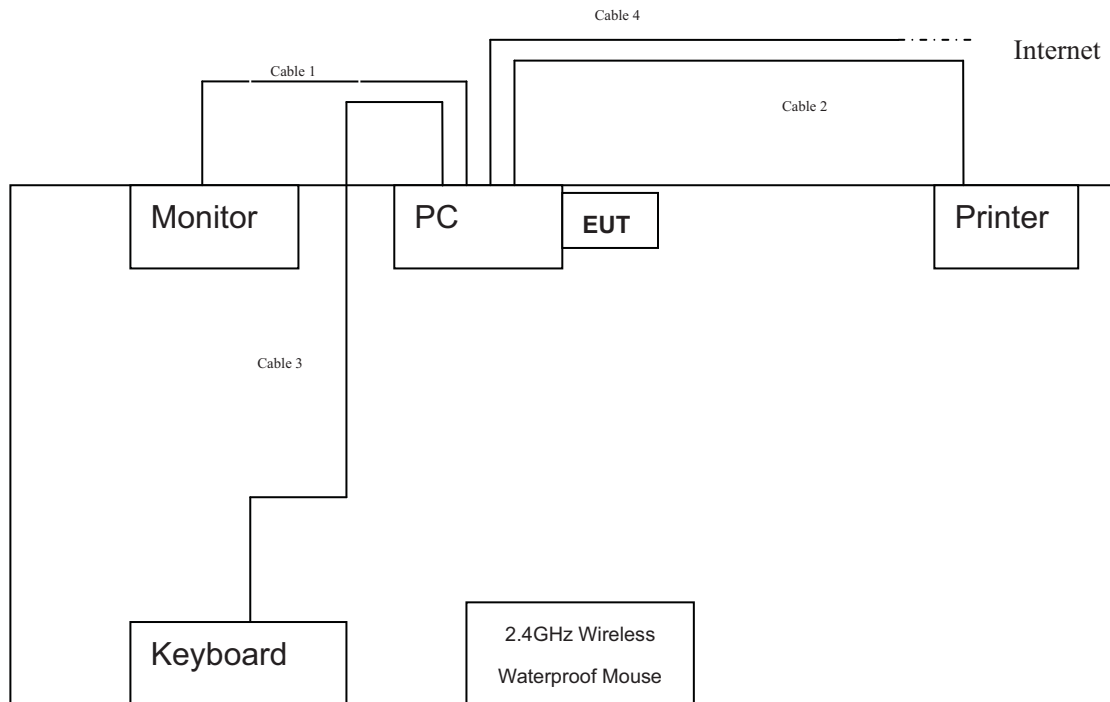
Applicant	:	i-Money Technology Co., Ltd.
Address	:	5C07-5C08 No.5, Sec. 5, Xinyi Rd., Taipei City 110, Taiwan (R.O.C.)
Applicant	:	i-Money Technology Co., Ltd.
Address	:	5C07-5C08 No.5, Sec. 5, Xinyi Rd., Taipei City 110, Taiwan (R.O.C.)

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	2.4Ghz Wireless Mouse USB dongle
Model No.	:	N/A
Model difference	:	N/A
Power Supply	:	USB DC power from PC System
Power Rating	:	DC 5.0V by USB port from PC.
Connecting I/O Port(s)	:	The equipment have USB port for link with PC, so the equipment is considered as a Computing Device Peripheral.
Note: For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		

1.3 Block Diagram Showing the Configuration of System Tested

Mode 1: Normal Link



Note: During Testing the EUT was in receiving mode.

1.4 Description of Support Units

Equipment Information				
Name	Model	DOC/FCC ID	Manufacturer	Used “√”
Printer	HP1505n	DOC	HP	√
LCD Monitor	E170Sc	DOC	DELL	√
PC	OPTIPLEX380	DOC	DELL	√
Keyboard	L100	DOC	DELL	√
Mouse	M-UARDEL7	DOC	DELL	
TF Card	1GB	DOC	Kingston	
U Disk	1GB	DOC	SSK	
TV	LC24F566DC	VOC	KONKA	
2.4GHz Wireless Waterproof Mouse	iM-LM-036	FCC ID: UUD-IMTC01TX	i-Money Technology Co., Ltd.	Provide by applicant.
Cable Information				

Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	YES	YES(2)	1.8M	
Cable 2	YES	YES(1)	2.0M	
Cable 3	YES	NO	1.5M	
Cable 4	YES	NO	10M	

1.5 Description of Test Mode

Mode	Description
Mode 1	USB data communication with PC mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of the EUT operation mode, and the maximum emission levels of the conducted and radiated emissions are compared to the FCC Part 15 Subpart B (Class B) limits.

1.6 Test Facility

The tests were performed at:

Shenzhen Certification Technology Service Co., Ltd

2F, Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road, Bao'an District, Shenzhen, 518126, China

Tel: 86-755-86375552 Fax: 86-755-26736857

At the time of testing, the Laboratory is accredited. It is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 197647.

The test report was fulfilled by Shenzhen Toby Technology Co., Ltd. Shenzhen Toby Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements results.

2. Test Summary

FCC Part15, Subpart B				
Section	Test Method	Test Item	Limit	Judgment
15.109	ANSI C63.4:2003	Radiated Emission (30MHz-18GHz)	Class B	PASS
15.107	ANSI C63.4:2003	Conducted Emission (150KHz to 30MHz)	Class B	PASS
Note: N/A is an abbreviation for Not Applicable.				

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard

FCC Part 15.107

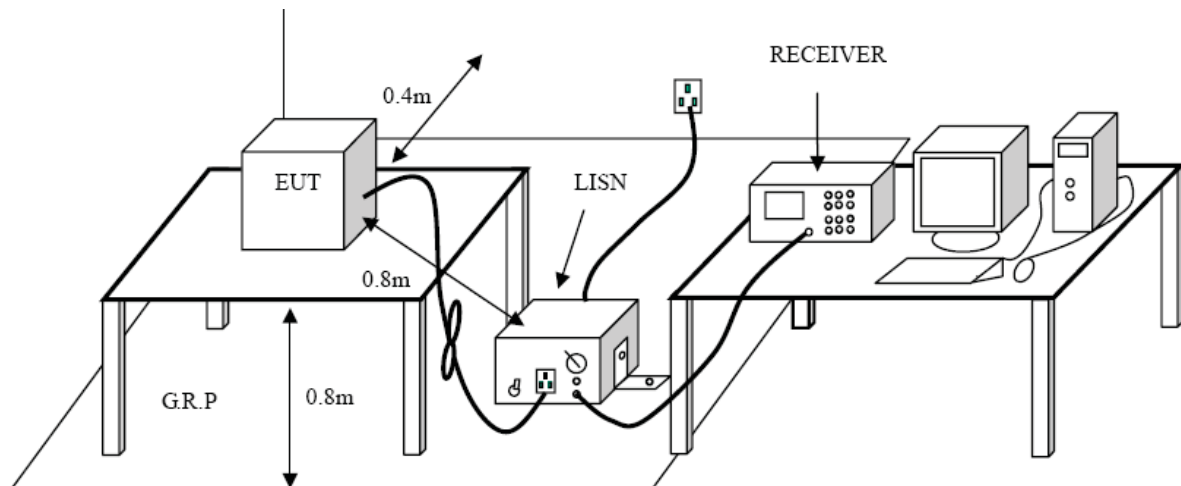
3.1.2 Test Limit

Conducted Emission Test Limit

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak Level	Average Level
0.15~0.5	66 ~ 56 *	56 ~ 46 *
0.5~5.0	56.00	46.00
5.0~30.0	60.00	50.00

Notes: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequencies.

3.2 Test Setup



3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance.

The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

For the actual test configuration, please refer to the EUT test Photos.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	2013-08-10	2014-08-09
50ΩCoaxial Switch	Anritsu	MP59B	X10321	2013-08-10	2014-08-09
L.I.S.N	Rohde & Schwarz	ENV216	101131	2013-08-10	2014-08-09
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	2013-08-10	2014-08-09

3.5 EUT Operating Mode

(1) Setup the EUT and peripherals refer to the description of test mode.

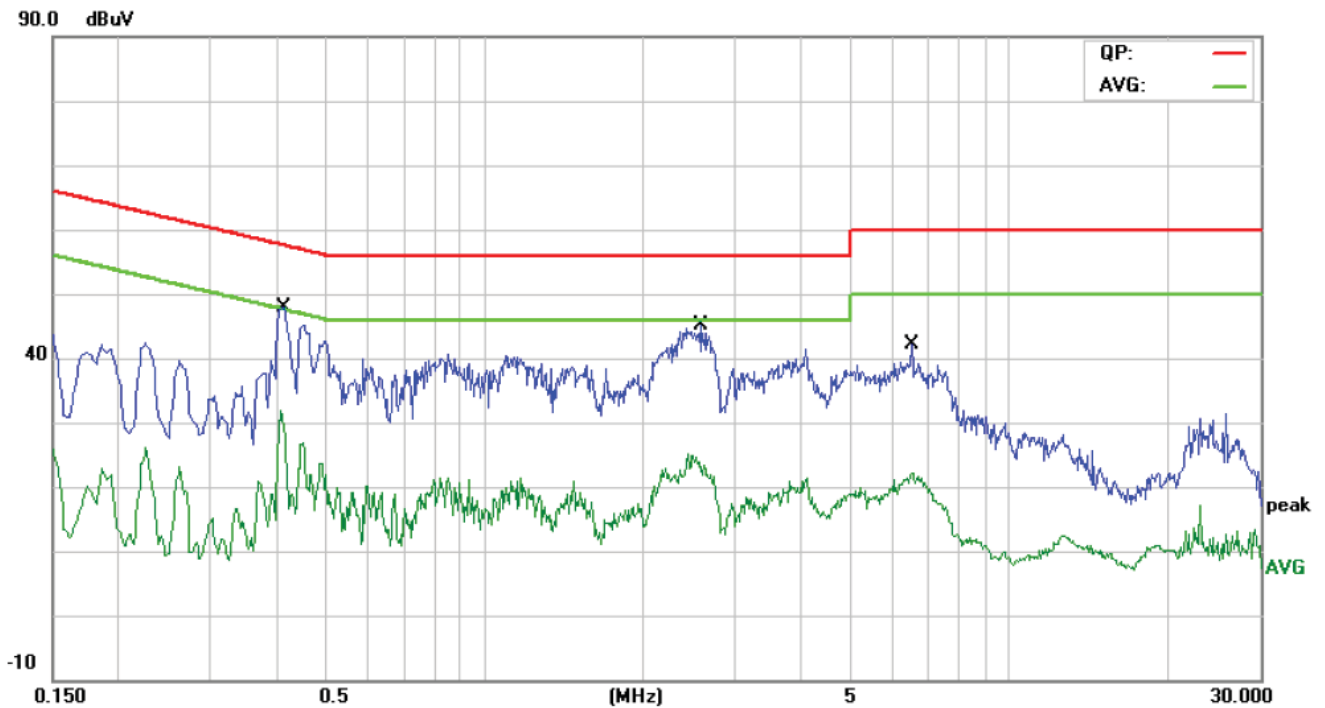
3.6 Deviation

The test is no deviation from the standard.

3.7 Test Data

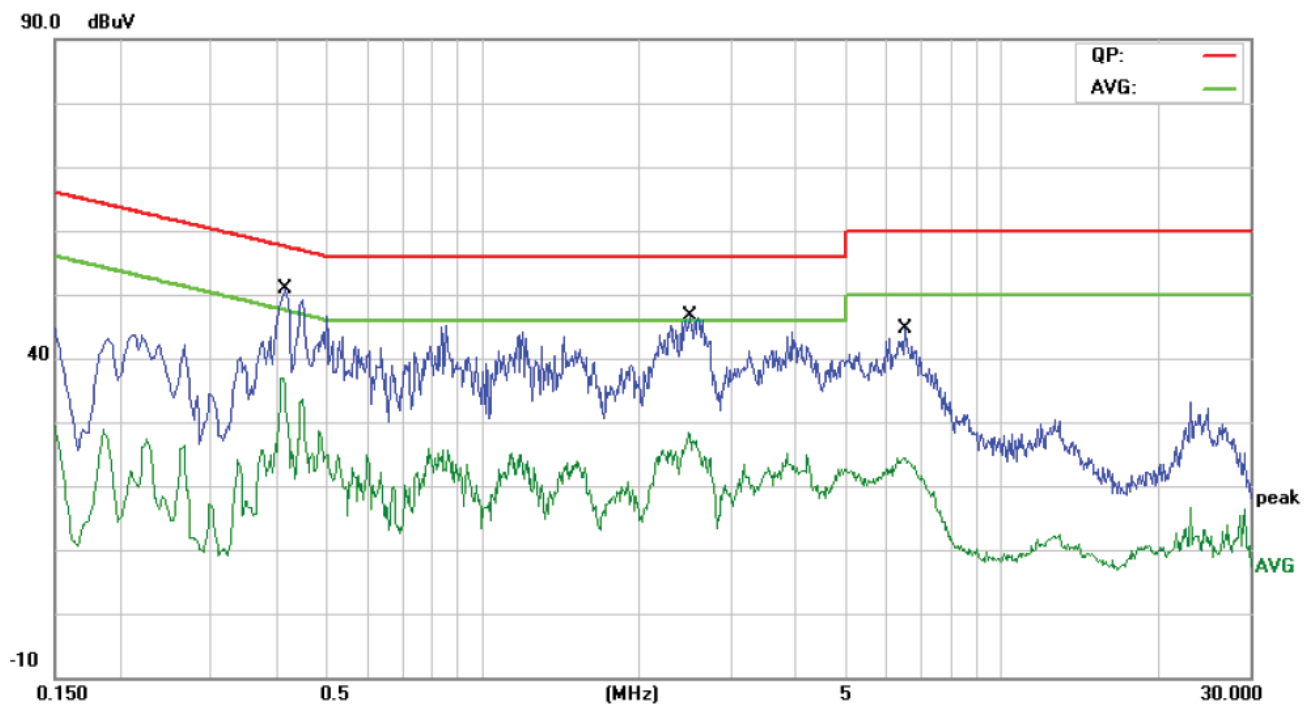
Please see the next page.

E.U.T :	2.4GHz Wireless Mouse USB dongle	Model Name :	iM-LM-036
Temperature :	23°C	Relative Humidity :	55 %
Terminal	Line		
Test Voltage :	AC 120 V / 60Hz		
Test Mode :	USB data communication with PC mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.4140	35.73	9.60	45.33	57.57	-12.24	QP	
2		0.4140	17.94	9.60	27.54	47.57	-20.03	AVG	
3		2.5900	29.98	9.36	39.34	56.00	-16.66	QP	
4		2.5900	13.57	9.36	22.93	46.00	-23.07	AVG	
5		6.5060	23.44	9.81	33.25	60.00	-26.75	QP	
6		6.5060	11.05	9.81	20.86	50.00	-29.14	AVG	

E.U.T :	2.4GHz Wireless Mouse USB dongle	Model Name :	iM-LM-036
Temperature :	23°C	Relative Humidity :	55 %
Terminal	Neutral		
Test Voltage :	AC 120 V / 60Hz		
Test Mode :	USB data communication with PC mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.4180	35.42	9.62	45.04	57.49	-12.45	QP	
2		0.4180	19.38	9.62	29.00	47.49	-18.49	AVG	
3		2.5020	30.49	9.39	39.88	56.00	-16.12	QP	
4		2.5020	17.27	9.39	26.66	46.00	-19.34	AVG	
5		6.4940	23.66	9.83	33.49	60.00	-26.51	QP	
6		6.4940	12.10	9.83	21.93	50.00	-28.07	AVG	

4. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC Part 15.109

4.1.2 Test Limit

Radiated Emission Limit

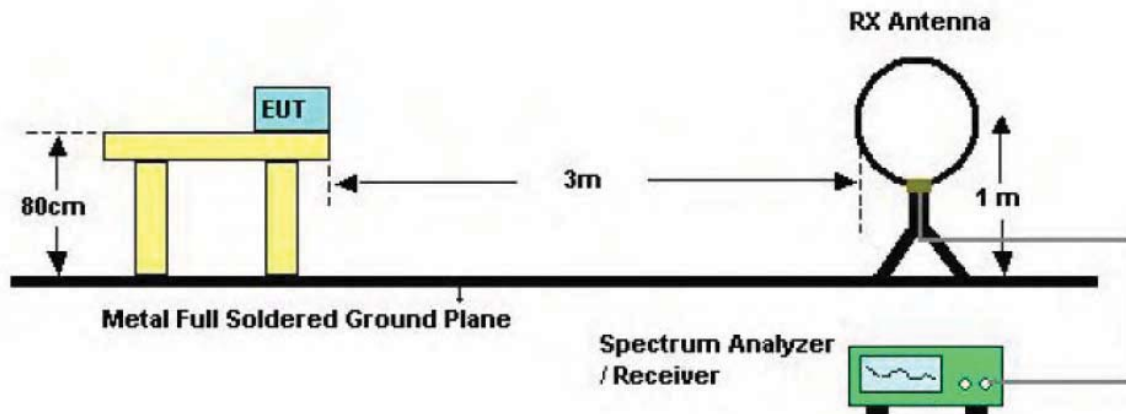
Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (meters)
30~88	40	3
88~216	43.5	3
216~960	46	3
Above 960	54	3
Note: Emission Level(dBuV/m)=20log Emission Level(uV/m)		

For unintentional radiators (FCC Part 15, section 15.33(1)):

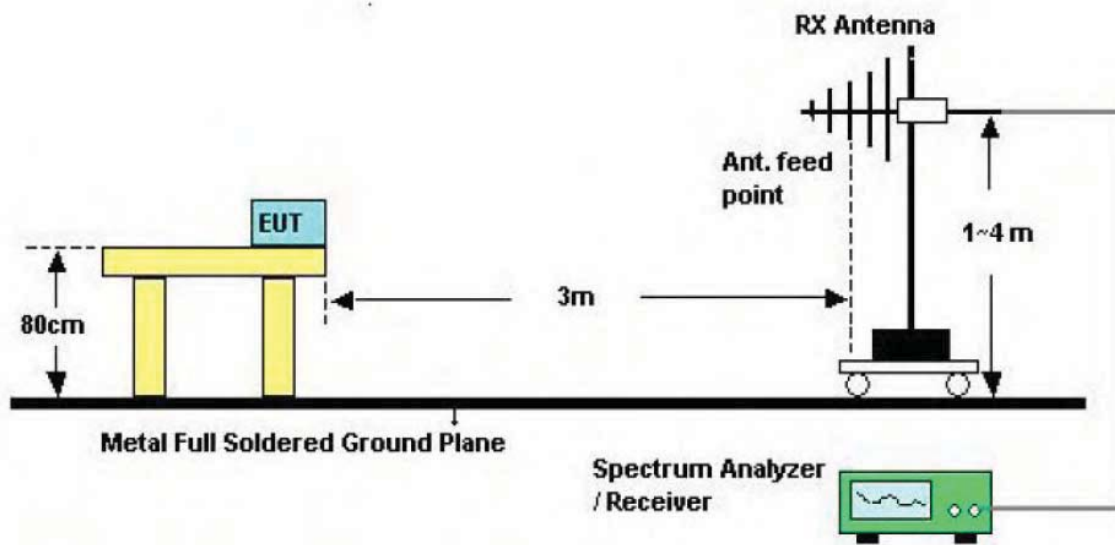
Except as otherwise indicated in paragraphs (b)(2) or (b)(3), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705~108	1000
108~500	2000
500~1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

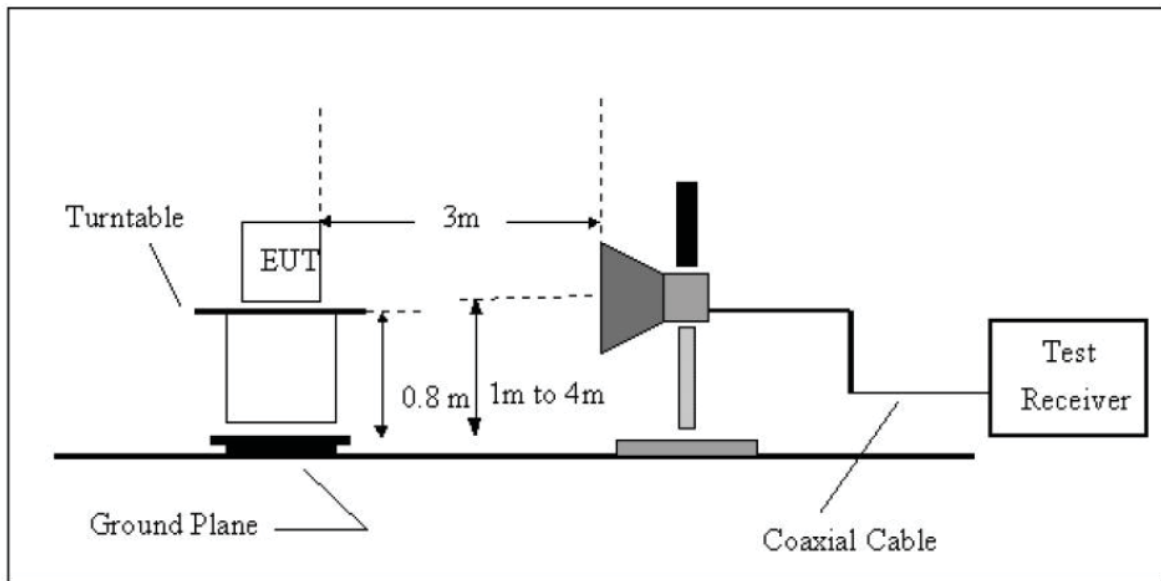
4.2 Test Setup



Bellow 30MHz Test Setup



30MHz to 1000MHz Test Setup



Above 1GHz Test Setup

4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency from 30MHz up to 1GHz.
- (2) The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The height of the equipment or of the substitution antenna shall be 0.8m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- (4) The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- (6) For more details, please refer to the EUT Test Photos.

4.4 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSP30	DE25181	2012-12-31	2013-12-30
Spectrum Analyzer	Agilent	E4407B	MY49510055	2012-12-31	2013-12-30
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	101165	2012-12-31	2013-12-30

Bilog Antenna	SCHWARZBECK	VULB9168	9168-438	2013-02-12	2014-02-11
Horn Antenna	SCHWARZBECK	BBHA 9120D	BBHA9120D	2013-02-12	2014-02-11
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170D	2013-02-12	2014-02-11
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2013-02-12	2014-02-11
Pre-amplifier	SCHWARZBECK	BBV9743	9743-019	2013-10-28	2014-10-27
Pre-amplifier	Quietek	AP-180C	CHM-0602012	2013-10-28	2014-10-27

4.5 EUT Operating Condition

(1) Setup the EUT and peripherals refer to the description of test mode.

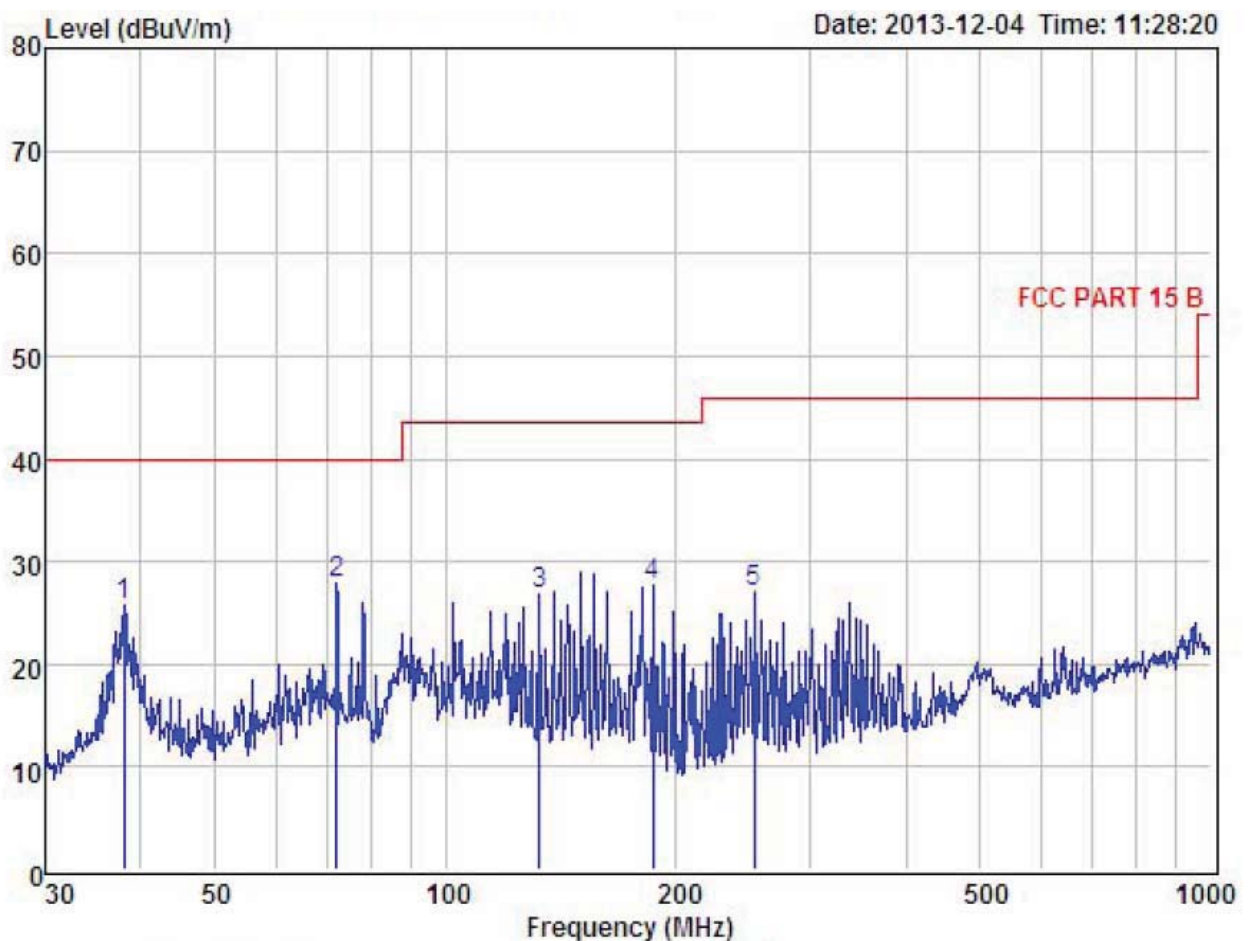
4.6 Deviation

The test is no deviation from the standard.

4.7 Test Data

(1) Bellow 1GHz

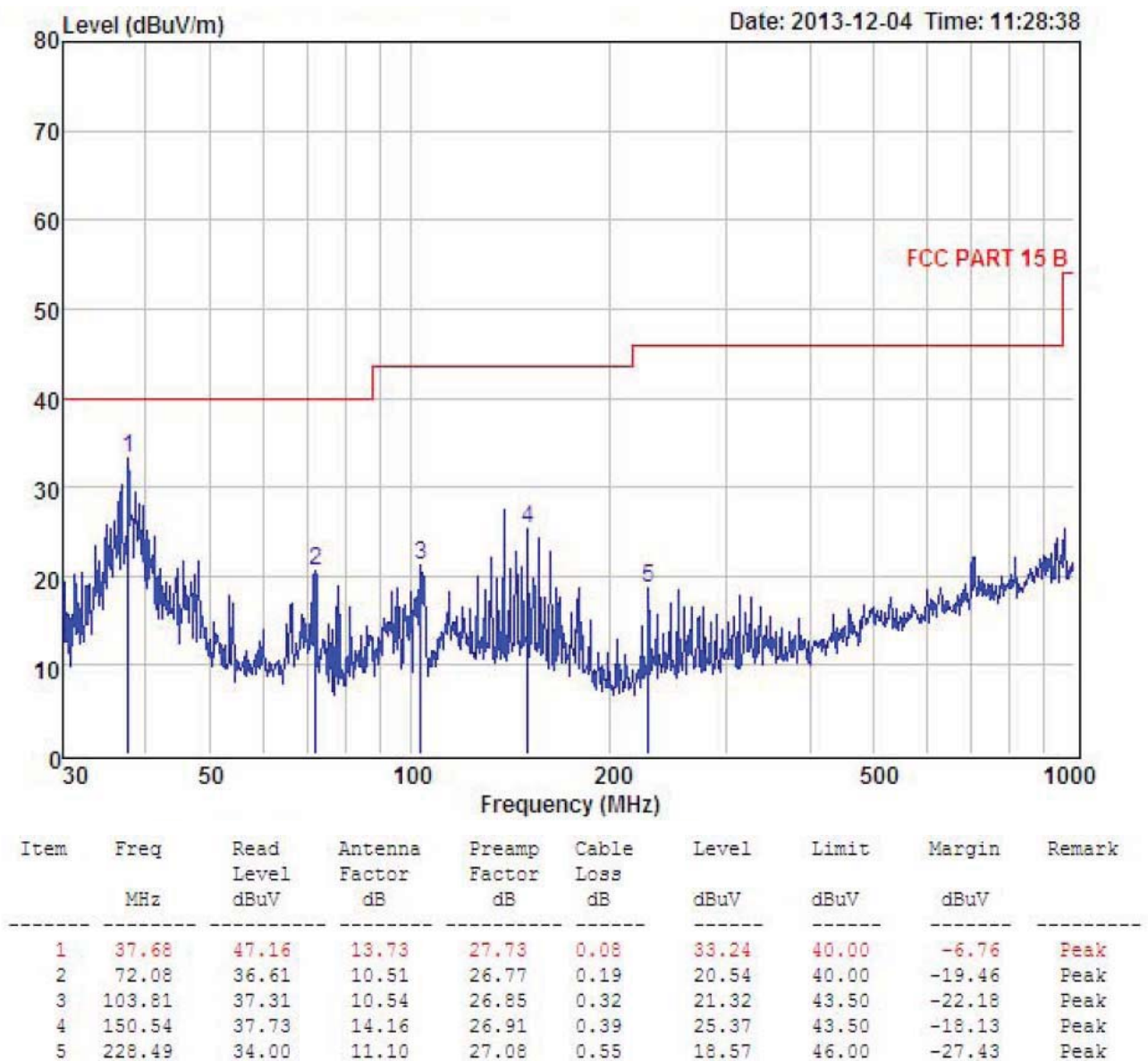
E.U.T :	2.4GHz Wireless Mouse USB dongle	Model Name :	iM-LM-036
Temperature :	23°C	Relative Humidity :	55 %
Test Voltage :	DC 5V from PC		
Antenna. Pol:	Horizontal		
Test Mode :	USB data communication with PC mode		



Item	Freq MHz	Read Level dBuV	Antenna Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	38.08	39.69	13.73	27.73	0.08	25.77	40.00	-14.23	Peak
2	72.08	44.02	10.51	26.77	0.19	27.95	40.00	-12.05	Peak
3	132.69	40.15	12.93	26.89	0.53	26.72	43.50	-16.78	Peak
4	186.44	43.19	10.95	26.94	0.57	27.77	43.50	-15.73	Peak
5	252.95	41.79	11.65	27.11	0.60	26.93	46.00	-19.07	Peak

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

E.U.T :	2.4GHz Wireless Mouse USB dongle	Model Name :	iM-LM-036
Temperature :	23°C	Relative Humidity :	55 %
Test Voltage :	DC 5V from PC		
Antenna. Pol:	Vertical		
Test Mode :	USB data communication with PC mode		



Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

(2) Above 1GHz~18 GHz

E.U.T :	2.4GHz Wireless Mouse USB dongle	Model Name :	iM-LM-036
Temperature :	23°C	Relative Humidity :	55 %
Test Voltage :	DC 5V from PC		
Test Mode :	USB data communication with PC mode		

Freq. (MHz)	Ant. Pol. H/V	Emission Level (dBuV/m)		Limit3m (dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
1645.500	V	45.41	40.51	74.00	54.00	28.59	13.49
4810.000	V	48.22	42.36	74.00	54.00	25.78	11.64
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
1645.500	H	46.21	41.03	74.00	54.00	27.79	12.97
3346.000	H	50.74	43.71	74.00	54.00	23.26	10.29
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--

Note

- (1) Peak measuring use spectrum setting: RBW/VBW 1 MHz/3 MHz with PK detector.
Average measuring use spectrum setting: RBW/VBW 1 MHz/10 Hz with PK detector.
- (2) The emission levels of other frequencies are very lower than the limit and not show in the test report. Only worse case is reported as above.