



**SGS-CSTC Standards
Technical Services (Shanghai)
Co., Ltd.**

588 West Jindu Road, Songjiang District, Shanghai, China

FCC ID: ZT5-LELO215021
IC: 9798A-LELOV3

Telephone: +86 (0) 21 6191 5666
Fax: +86 (0) 21 6191 5655
ee.shanghai@sgs.com

Report No.: SHEM111200164304
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EMC TEST REPORT

Application No. : SHEM111200164304
Applicant: Suzhou Armocon Technology Co.,Ltd.
3-5/F No77 SuHong Middle Road SIP Jiangsu China
FCC ID: ZT5-LELO215021
IC: 9798A-LELOV3
Fundamental Frequency : 2421MHz-2421MHz
Equipment Under Test (EUT):
EUT Name: Remote Controller
Brand Name: LELO
Model No: LELO Insignia-V3
Standards: FCC PART 15 SUBPART C, Section 15.249
RSS-210 Issue 8 (December 2010)
RSS-Gen Issue 3 (December 2010)
Date of Receipt: Dec 27, 2011
Date of Test: Dec 27, 2011 to Jan 6, 2012
Date of Issue: Jan 6, 2012
Test Result : PASS *

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

Jim Xu
E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

Neil Zhang
E&E Project Engineer
SGS-CSTC(Shanghai) Co., Ltd.

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2 Test Summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Radiated emission	15.249 & 15.205	RSS-210 Issue 8 Annex A2.9 & Clause 2.2	Pass
Assigned bandwidth (20dB bandwidth)	15.215(c)	-	Pass
Occupied bandwidth	-	RSS-Gen Issue 3 Clause 4.6.1	Pass
Antenna Requirement	15.203	-	PASS
Power line conducted emission	15.207	RSS-Gen Issue 3 Clause 7.2.4	N/A
Spurious emission for receiver	15B	RSS-310 Issue 3 Clause 3.1	N/A

Noted 1: “-”means not require in the rules.

Noted 2: NA =Not Applicable



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4 General Information

4.1 Client Information

Applicant: Suzhou Armocon Technology Co.,Ltd.
Address of Applicant: 3-5/F No77 SuHong Middle Road SIP Jiangsu China
Manufacturer: Suzhou Armocon Technology Co.,Ltd.
Address of Manufacturer: 3-5/F No77 SuHong Middle Road SIP Jiangsu China

4.2 General Description of E.U.T.

EUT Name: Remote Controller
Brand Name: LELO
Model No: LELO Insignia-V3

4.3 Details of E.U.T.

EUT Power Supply: Battery 2*1.5V
Modulation: MSK
Operation Frequency Range: 2421MHz-2421MHz
1 Channel
Hardware Version: Not supplied by client
Software Version: Not supplied by client

4.4 Description of Support Units

Name	Model No.	Remark
NA	NA	NA

4.5 Standards Applicable for Testing

47CFR Part 15 (2009)
ANSI C63.10: 2009
RSS-210 Issue 8 (December 2010)
RSS-Gen Issue 3 (December 2010)

4.6 Test Location

All tests were performed at SGS E&E EMC lab

SGS-CSTC EMC Laboratory, No.588 West Jindu Road, Songjiang District, Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5655



4.7 Mode of operation during the test / Test peripherals used

While testing the transmitter mode of the EUT, the internal modulation was used.

For the EUT is handheld round-shaped device, it was set up and tested in two axes (X and Y).

The two axes were tested one by one while the test receiver worked as “max hold”

continuously and the highest reading among the whole test procedure was recorded.

4.8 Deviation from Standards

None.

4.9 Other Information Requested by the Customer

None.

4.10 Test Confident level

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

4.11 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2012-03-17.

- Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

- VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3172 and C-3514 respectively. Date of Registration: 2009-11-30. Date of Expiry: 2012-03-17.



4.12 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-6-3	2012-6-1
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-6-3	2012-6-1
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2011-3-12	2012-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-6-3	2012-6-1
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-10-7	2012-10-5
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY-2009P	--	2011-10-13	2012-10-11
7	CLAMP METER	FLUKE	316	86080010	2011-04-22	2012-04-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2011-10-13	2012-10-11
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-6-17	2012-6-16
11	Tunable Notch Filter	Wainwright instruments GmbH	WRCT1800.0/2000.0-0.2/40-5SSK	11	2011-1-26	2012-1-25
12	Tunable Notch Filter	Wainwright instruments GmbH	WRCT800.0/88.0-0.2/40-5SSK	9	2011-1-26	2012-1-25
13	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2011-4-8	2012-4-7
14	Low nosie amplifier	TESEQ	LNA6900	70133	2011-7-5	2012-7-4
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-06-04	2012-06-03
16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-05-07	2012-05-06
18	AVG Power Sensor	Rohde & Schwarz	NRP-Z22	1137	2011-05-07	2012-05-06
20	Power meter	Rohde & Schwarz	NRP	101641	2011-05-05	2012-05-04

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4.13 E.U.T. Operation

Input voltage:	Battery 2*1.5V
Operating Environment:	
Temperature:	24.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	1010 mbar
EUT Operation:	While testing the transmitter mode of the EUT, the internal modulation was used. For the EUT is handheld round-shaped device, it was set up and tested in two axes (X and Y). The two axes were tested one by one while the test receiver worked as "max hold" continuously and the highest reading among the whole test procedure was recorded.



5 Test Procedure & Measurement Data

5.1 Spurious Emission Test

Test Requirement:	FCC part 15.249 & 15.205		
Test date:	Jan 2,2012 to Jan 4,2012		
Limit:	15.249(a): Except as provided in paragraph (b) of this section, 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

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

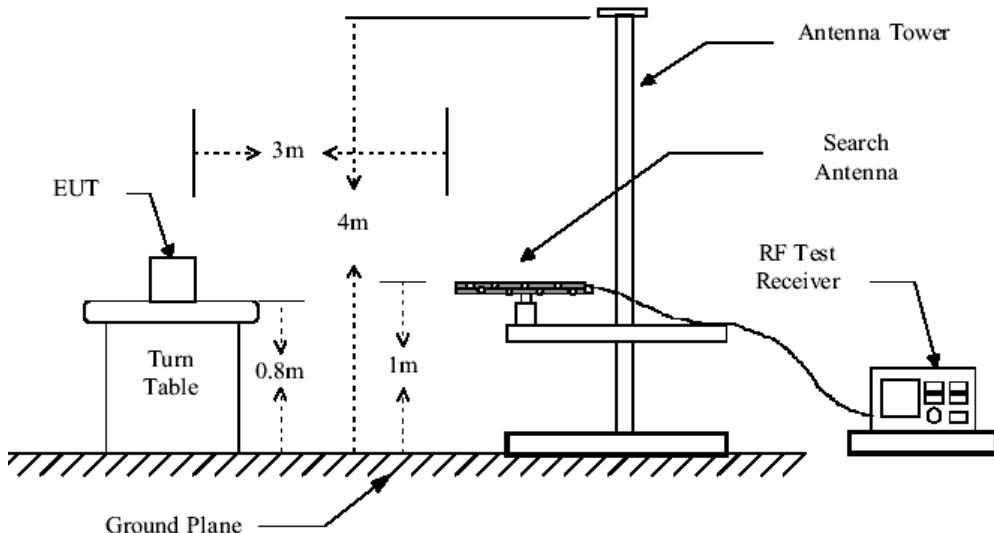
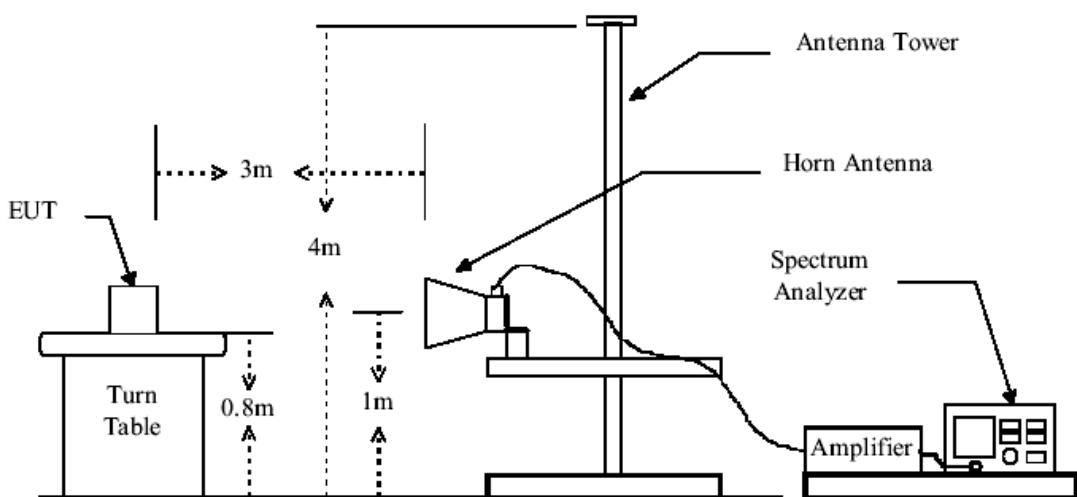
Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

15.249 (d) 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 Section 15.209, whichever is the lesser attenuation.

Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). 1MHz resolution bandwidth and Peak detector apply (1000 MHz – 25GHz)
Above 1GHz
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

7. The field strength of spurious emission was measured in the following position: EUT satnd-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position(X axis) and the worst case was recored.

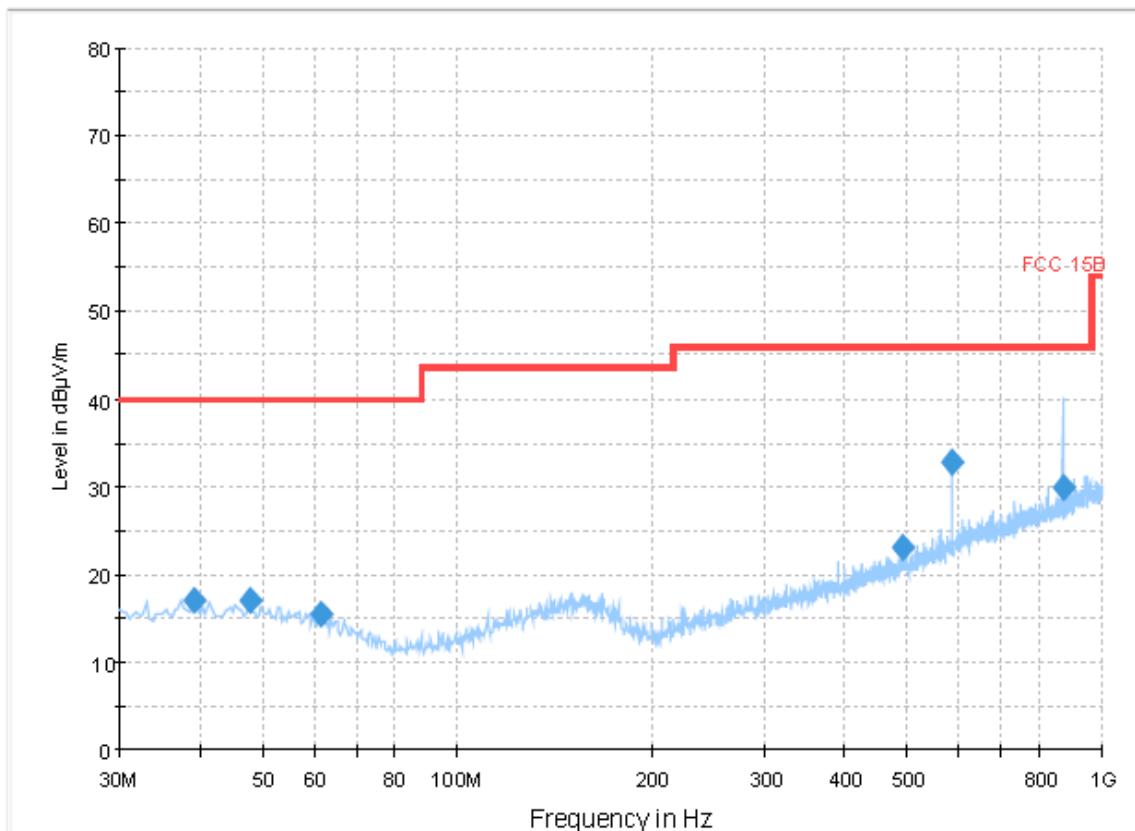
Radiated Test Set-up:**Radiated Emission Test Set-up, Frequency Below 1000MHz****Radiated Emission Test Set-up Frequency Over 1GHz**

Low nosie amplifier was used below 1GHz,High pass Filter was used above 1GHz.

TX mode:

Horizontal:

FCC15 B RE 30M-1 GHz

**Final Result 1**

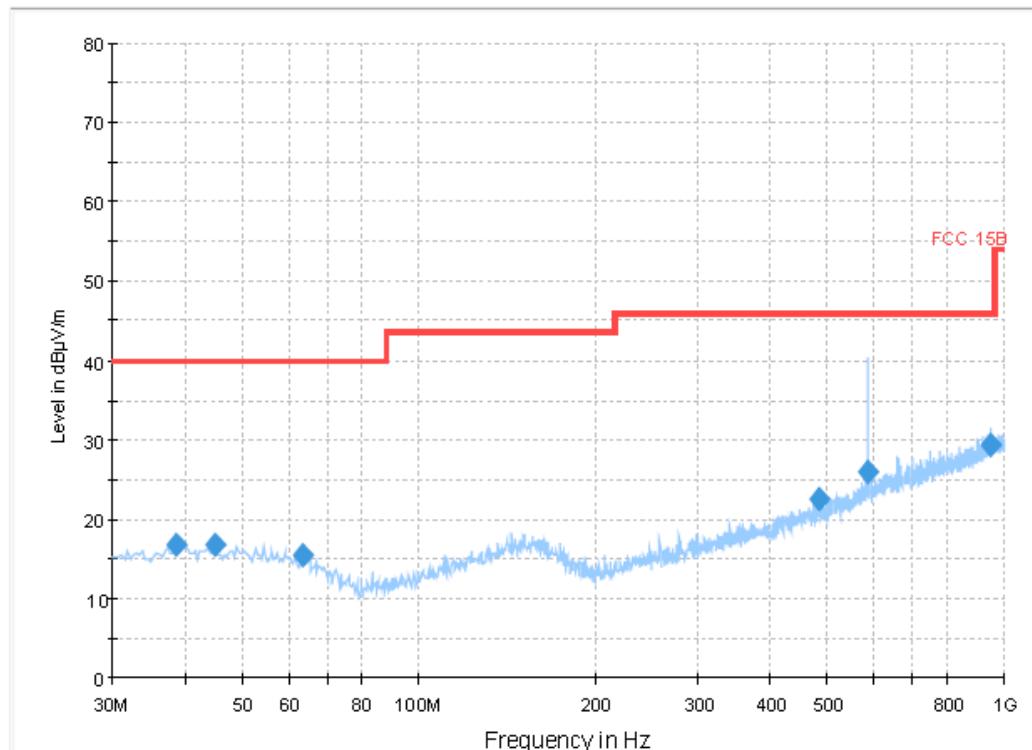
Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
39.312000	17.1	1000.000	120.000	200.0	H	134.0	-9.0	22.9
47.848000	17.0	1000.000	120.000	100.0	H	164.0	-9.3	23.0
61.816000	15.6	1000.000	120.000	100.0	H	223.0	-10.4	24.4
491.720000	23.0	1000.000	120.000	100.0	H	0.0	-4.2	23.0
584.973760	32.8	1000.000	120.000	150.0	H	214.0	-2.2	13.2
869.089920	29.9	1000.000	120.000	183.0	H	50.0	2.1	16.1

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dB μ V/m)	Comment
39.312000	40.0	
47.848000	40.0	
61.816000	40.0	
491.720000	46.0	
584.973760	46.0	
869.089920	46.0	

Vertical:

FCC15 B RE 30M-1GHz



Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)
38.536000	16.7	1000.000	120.000	200.0	V	84.0	-9.1	23.3
45.132000	16.8	1000.000	120.000	100.0	V	301.0	-9.3	20.0
63.368000	15.4	1000.000	120.000	100.0	V	0.0	-10.6	24.6
483.960000	22.5	1000.000	120.000	100.0	V	80.0	-4.3	23.5
585.268320	26.0	1000.000	120.000	100.0	V	46.0	-2.1	20.0
945.680000	29.5	1000.000	120.000	100.0	V	348.0	3.2	16.5

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dB μ V/m)	Comment
38.536000	40.0	
45.132000	40.0	
63.368000	40.0	
483.960000	46.0	
585.268320	46.0	
945.680000	46.0	



Peak Detector Measurement:

Above 1GHz

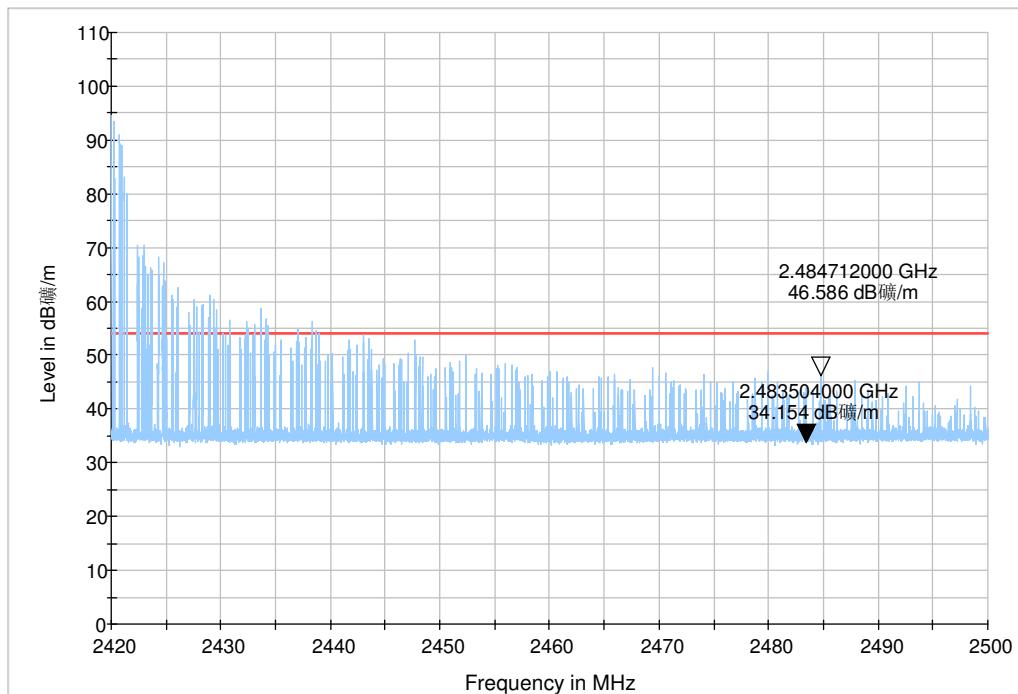
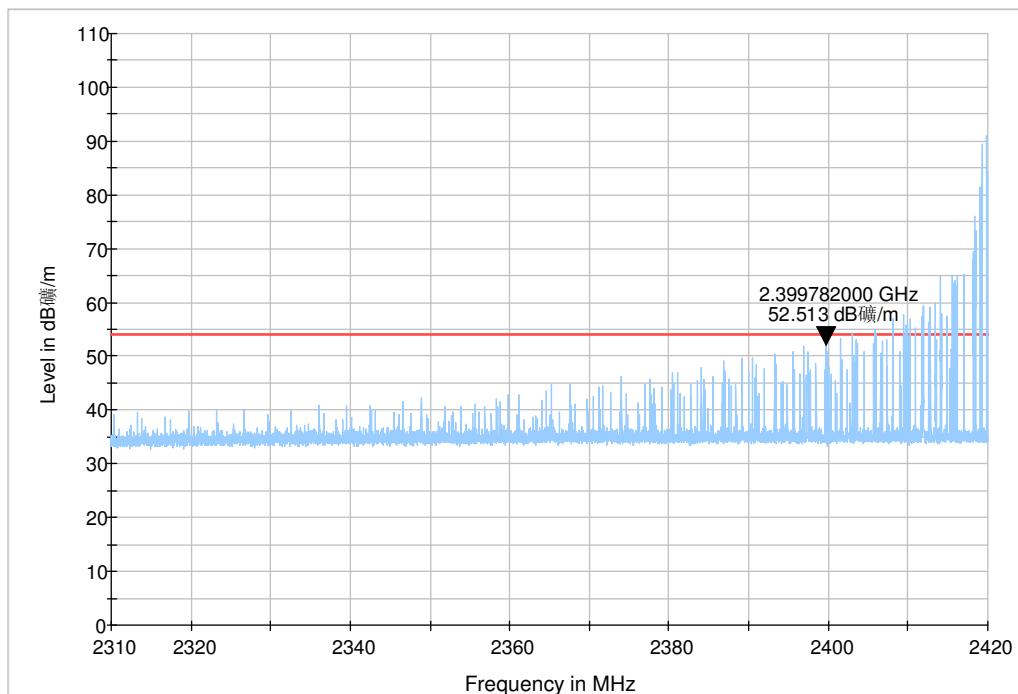
Frequency (MHz)	Antenna	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Original Receiver Reading (dBuV)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV /m)	Margin (dB)
2420.94	H	27.60	4.80	NA	61.10	32.40	93.50	94.00	0.50
2420.93	V	27.60	4.80	NA	58.80	32.40	91.20	94.00	2.80
4842.78	H	31.60	6.90	-43.90	56.52	-5.40	51.12	54.00	2.28
7265.19	H	35.50	8.10	-43.80	47.35	-0.20	47.16	54.00	6.84
9686.37	H	38.10	9.80	-42.30	39.73	5.60	45.33	54.00	8.67
2399.78	H	27.3	4.6	-42.7	63.31	-10.8	52.51	54.00	1.49
2484.71	H	27.6	4.8	-42.5	56.69	-10.1	46.59	54.00	7.41
2400.66	V	27.3	4.6	-42.7	59.06	-10.8	48.26	54.00	5.74
2486.50	V	27.6	4.8	-42.5	49.81	-10.1	39.71	54.00	14.29

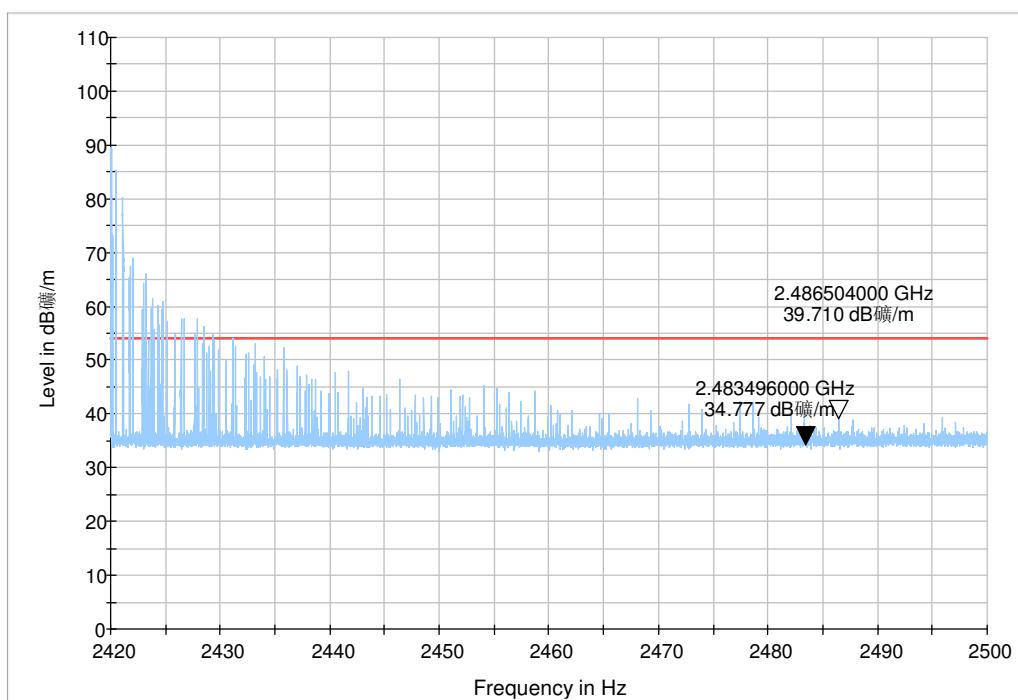
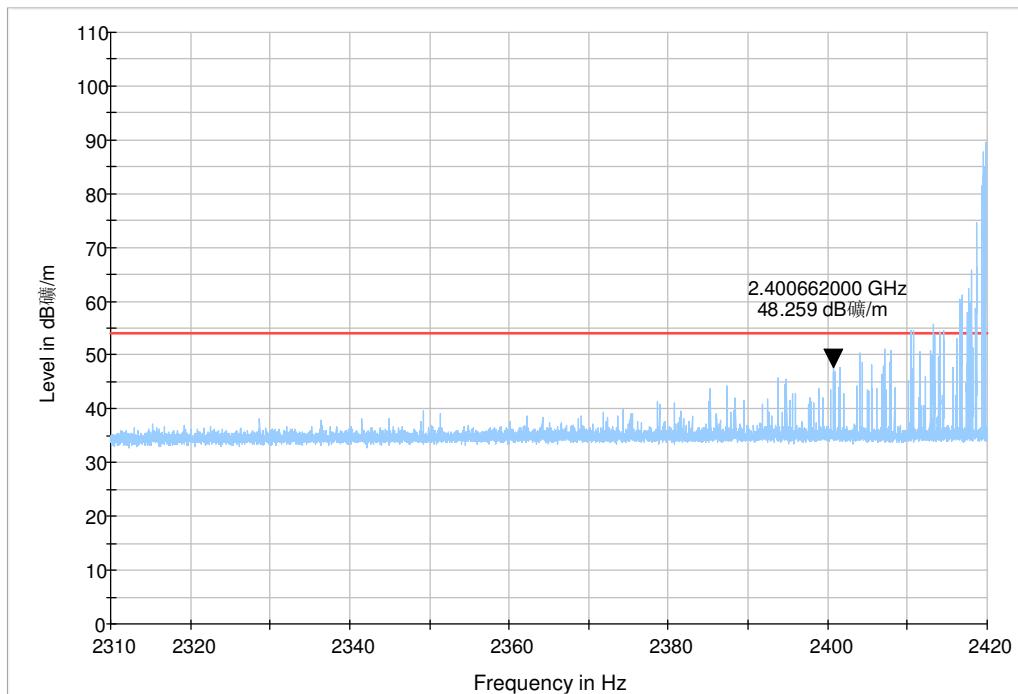
Remark:

1. For fundamental emission test, no amplifier is employed.
2. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
3. Corrected Reading = Original Receiver Reading + Correct Factor
4. Margin = limit – Corrected Reading
5. If the PK reading is lower than AV limit, the AV test can be elided.
6. The shaded data is the fundamental emission.

Test Plot:

Horizontal, Peak Detector:



Vertical, Peak Detector:



5.2 20dB Bandwidth

Test Requirement: FCC Part15 215(c)

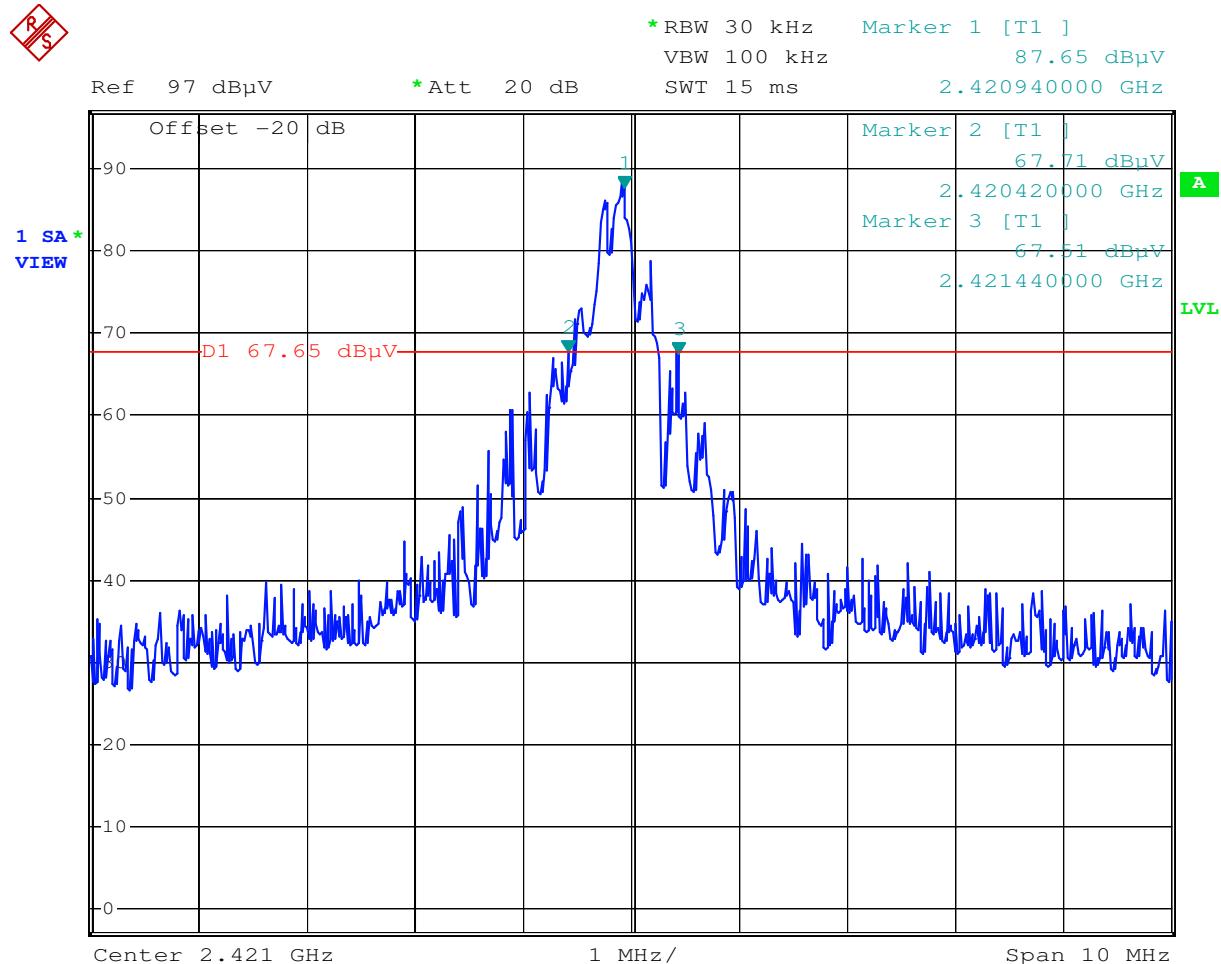
Test date: Jan 5.2012

Standard Applicable: Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band as clause 3.1 shows. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Measurement Procedure: The 20dB Bandwidth per FCC § 15.215(c) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 30kHz, the video bandwidth set at 100kHz, and the SPAN>>RBW.

Measurement Result:

CH	Frequency (MHz)	20dB bandwidth (MHz)	80% of permitted band (MHz)	Result
1	2421	2420.42 ~ 2421.44	2408.35 ~ 2475.15	PASS

20dB Band Width Test Data CH1 2421MHz

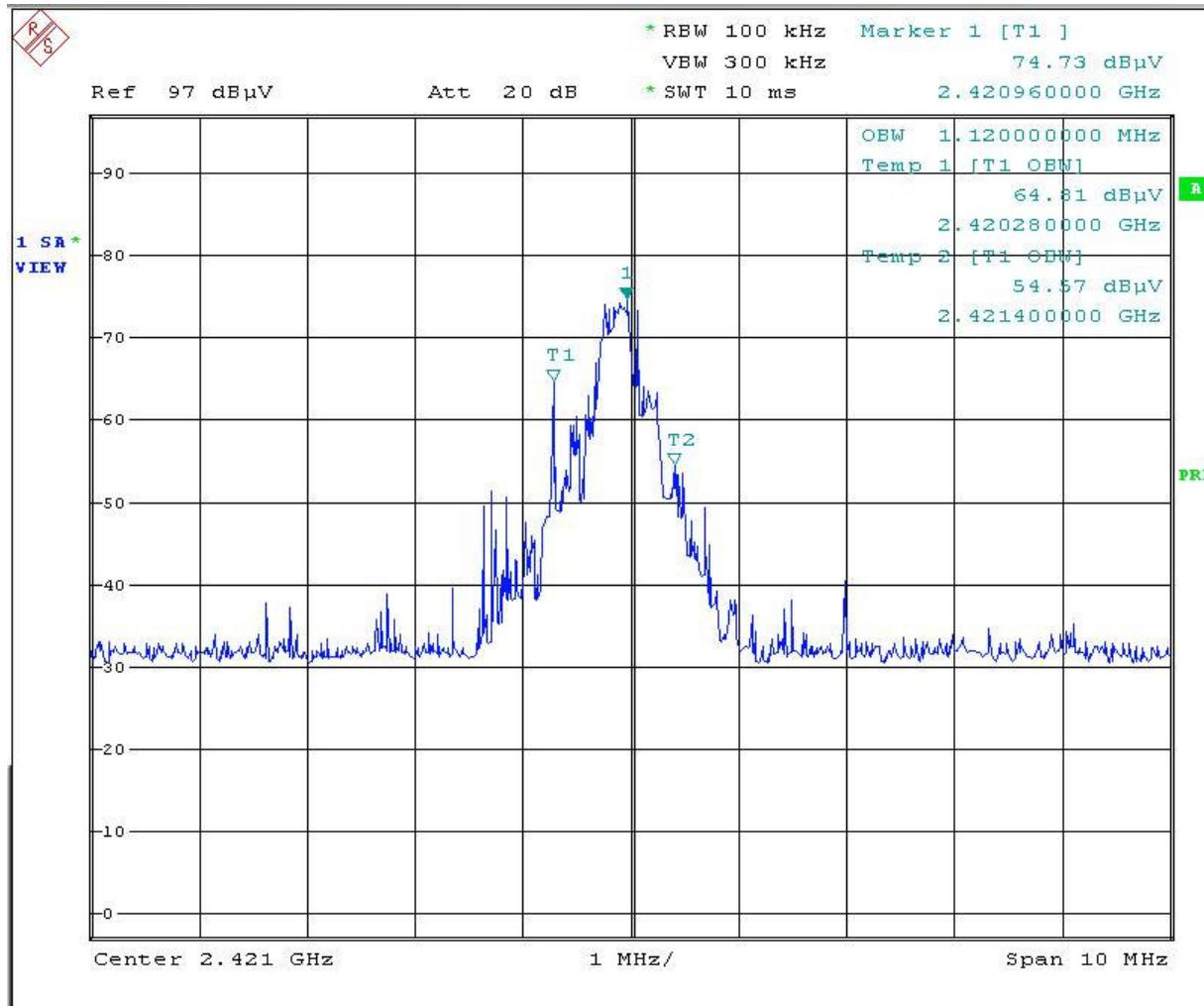
5.3 99% Occupied Bandwidth Test

Test Requirement: RSS-Gen Issue 3 Clause 4.6.1
Test date: Jan. 5, 2012
Standard Applicable According to the section RSS-Gen Issue 3 Clause 4.6.1
EUT Setup The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions set at 1MHz, the video bandwidth set at 3MHz.

Measurement Result:

CH	Frequency (MHz)	Bandwidth (MHz)
1	2421	1.12

Channel 2421MHz





5.4 Antenna Requirement

Test Requirement: FCC Part15 15.203

5.3.7.1 Standard Requirement

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.

5.3.7.2 Antenna Connected Construction

The antenna connector is de- signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

5.3.7.3 Result

The EUT antenna is internal Antenna. It comply with the standard requirement.

End of the Report