FCC Part 15
EMI TEST REPORT

of

E.U.T. : ZIGBEE MODULE

Model No. : ZBM-221

FCC ID. : XBTZBM-221

for

APPLICANT : United Integrated Services CO., LTD.

ADDRESS : 5F No 3 Lane 7 Paokao Road Hsintien 23144
Taipei Hsien ,Taiwan

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C
Tel : (02)26023052 Fax : (02)26010910
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Report Number : 13-01-RBF-036

TEST REPORT CERTIFICATION

Applicant	: United Integrated Services CO., LTD.
	5F No 3 Lane 7 Paokao Road Hsintien 23144 Taipei Hsien ,Taiwan
Manufacturer	: United Integrated Services CO., LTD.
	5F No 3 Lane 7 Paokao Road Hsintien 23144 Taipei Hsien ,Taiwan
Description of EUT	
a) Type of EUT	: ZIGBEE MODULE
b) Trade Name	: UIS
c) Model No.	: ZBM-221
d) Power Supply	: DC 3V

Regulation Applied : 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 ETC.

Summary of Tests

Test	Results
Radiated Emission	**Pass**
Conducted Emission	**Pass**
Emission Bandwidth	**Pass**
Output Power	**Pass**
100 kHz Bandwidth of Band Edges	**Pass**
Power Density	**Pass**
Out-of-Band Conducted Emission	**Pass**

Date Test Item Received	:	*Jan. 26, 2013*
Date Test Campaign Completed	:	*Feb. 06, 2013*
Date of Issue	:	*May 17, 2013*

Test Engineer : 

(Vincent Chang, Engineer)

Approve & Authorized : 

S. S. Liou, Section Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

Table of Contents Page

1 GENERAL INFORMATION 1

1.1 Product Description 1
1.2 Characteristics of Device 1
1.3 Test Methodology 1
1.4 Test Facility 1

2 PROVISIONS APPLICABLE 2

2.1 Definition 2
2.2 Requirement for Compliance 3
2.3 Restricted Bands of Operation 5
2.4 Labeling Requirement 5
2.5 User Information 6

3. SYSTEM TEST CONFIGURATION 7

3.1 Justification 7
3.2 Devices for Tested System 7

4 RADIATED EMISSION MEASUREMENT 8

4.1 Applicable Standard 8
4.2 Measurement Procedure 8
4.3 Measuring Instrument 10
4.4 Radiated Emission Data 11
4.5 Field Strength Calculation 23
4.6 Photos of Radiation Measuring Setup 24

5 CONDUCTED EMISSION MEASUREMENT 25

5.1 Standard Applicable 25
5.2 Measurement Procedure 25
5.3 Conducted Emission Data 27
5.4 Result Data Calculation 29
5.5 Conducted Measurement Equipment 29
5.6 Photos of Conduction Measuring Setup 30

6 ANTENNA REQUIREMENT 31

6.1 Standard Applicable 31
6.2 Antenna Construction and Directional Gain 31

7 EMISSION BANDWIDTH MEASUREMENT 32

7.1 Standard Applicable 32
7.2 Measurement Procedure 32

7.3 Measurement Equipment 32
7.4 Measurement Data 33

8 OUTPUT POWER MEASUREMENT 37

8.1 Standard Applicable 37
8.2 Measurement Procedure 37
8.3 Measurement Equipment 37
8.4 Measurement Data 38

9 100 KHZ BANDWIDTH OF BAND EDGES MEASUREMENT 42

9.1 Standard Applicable 42
9.2 Measurement Procedure 42
9.3 Measurement Equipment 42
9.4 Measurement Data 43

10 POWER DENSITY MEASUREMENT 46

10.1 Standard Applicable 46
10.2 Measurement Procedure 46
10.3 Measurement Equipment 46
10.4 Measurement Data 47

11 OUT-OF-BAND CONDUCTED EMISSION MEASUREMENT 51

11.1 Standard Applicable 51
11.2 Measurement Procedure 51
11.3 Measurement Equipment 51
11.4 Measurement Data 52

1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : ZIGBEE MODULE
b) Trade Name : UIS
c) Model No. : ZBM-221
d) Power Supply : DC 3V

1.2 Characteristics of Device

Frequency band	:	2405MHz~2480MHz
Number of channels	:	16 channels
Channel spacing	:	5MHz
Transmitter antenna source	:	Dipole

1.3 Test Methodology

Both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003). Other required measurements were illustrated in separate sections of this test report for details. For RF test the measurement procedure was refered to FCC KDB 558074 D01 DTS Meas Guidance v02.

Test Frequency:
Channel Low:2405MHz
Channel Middle:2440MHz
Channel High:2480MHz

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO. 34. LIN 5, DINGFU VIL., LINKOU DIST., NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.
This site has been fully described in a report submitted to your office, and accepted in a letter dated Jan. 11, 2011.

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

Except for Class A digital devices, for equpment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

(3) Antenna Requirement

For intentional device, according to §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.

(4) Bandwidth Requirement

According to 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

(5) Output Power Requirement

According to 15.247(b), The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(6) 100 kHz Bandwidth of Frequency Band Edges Requirement

According to 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, 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) (see § 15.205(c)).

(7) Power Density Requirement

According to 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

For both radiated and conducted emissions below 1 GHz, the system was configured for testing in a typical fashion as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation. Measurement was performed under the condition that a computer program was exercised to simulate data communication of EUT, and the transmission rate was set to maximum allowed by EUT. Three highest emissions were verified with varying placement of the cables connected to EUT to maximize the emission from EUT.

For conducted and radiated spurious emissions, whichever RF channel is operated, the digital circuits function identically. As the reason, measurement of radiated emissions from digital circuits is only performed with channel 1 by transmitting mode.

3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID	Cable Description
ZIGBEE MODULE *	United Integrated Services	ZBM-221 / XBTZBM-221XXX	0.5m Unshielded USB Cable
Notebook PC	DELL	PP25L	1.8mUnshielded AC Power Cord

Remark "*" means equipment under test.

4 RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).
For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and digitally modulated intentional radiators, and the out band emission shall be comply with §15.247 (d).

4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

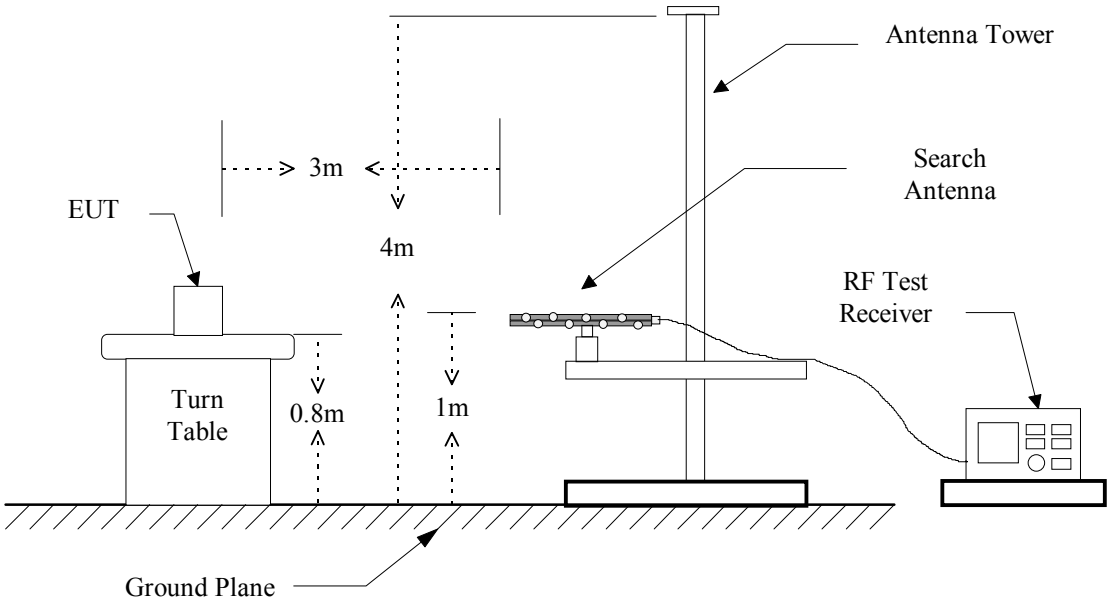
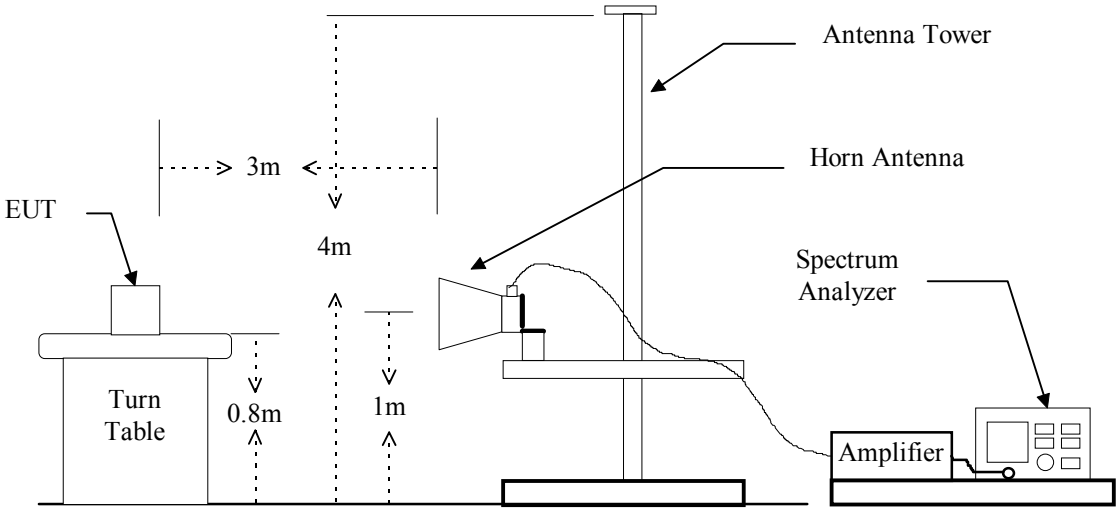


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement:

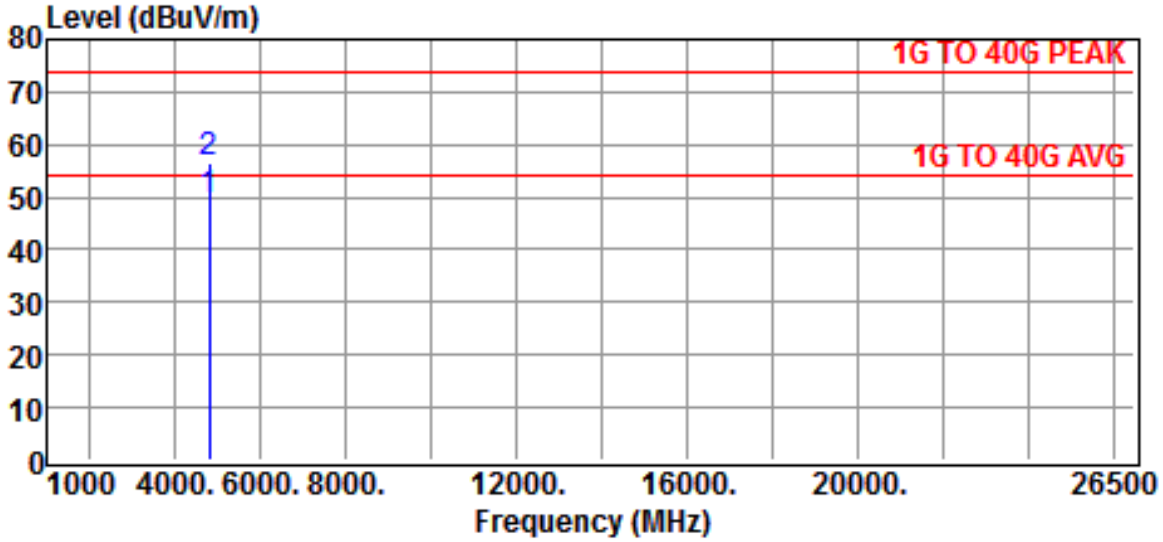
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Test Receiver	Rohde & Schwarz	ESVS30	2012/05/07	2013/05/07
EMI Test Receiver	Rohde & Schwarz	ESL	2012/07/30	2013/07/30
Bi-Log Antenna	ETC	MCTD 2756	2013/01/17	2014/01/17
Log-periodic Antenna	EMCO	3146	2012/10/17	2013/10/17
Double Ridged Guide Horn Antenna	EMCO	3116	2012/10/26	2013/10/29
Biconical Antenna	EMCO	3110	2012/10/17	2013/10/17
Double Ridged Antenna	EMCO	3115	2012/05/18	2013/05/18
Amplifier	HP	8449B	2013/01/09	2014/01/09
Amplifier	HP	83051A	2012/05/16	2013/05/16
Amplifier	HP	8447D	2012/05/16	2013/05/16
Spectrum	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

4.4 Radiated Emission Data

4.4.1 RF Portion

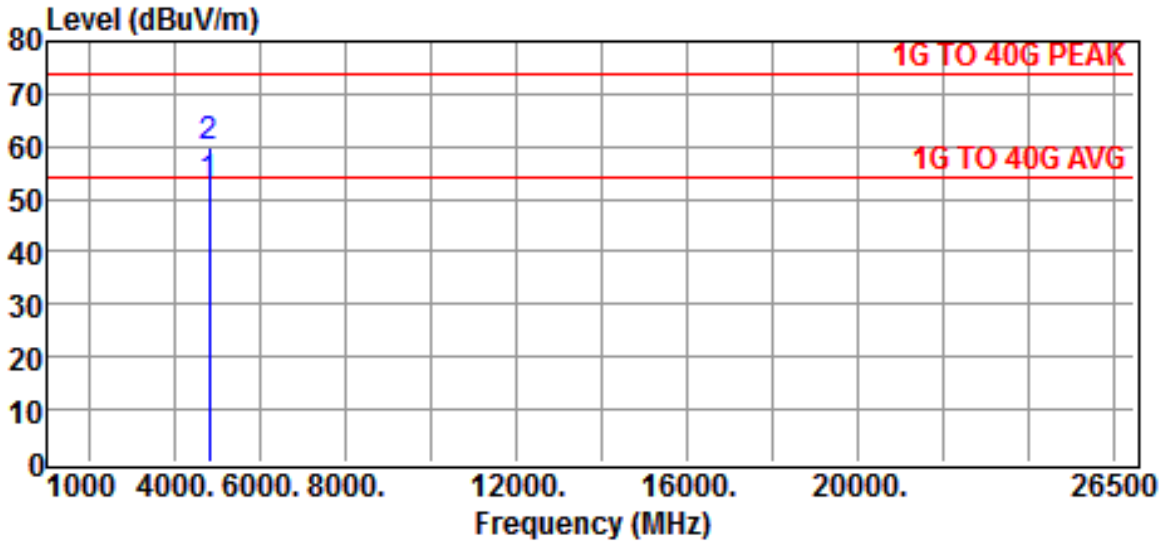


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH Low		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4810.0000	48.2	1.3	49.5	54.0	-4.5	Average
4810.0000	55.1	1.3	56.4	74.0	-17.6	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

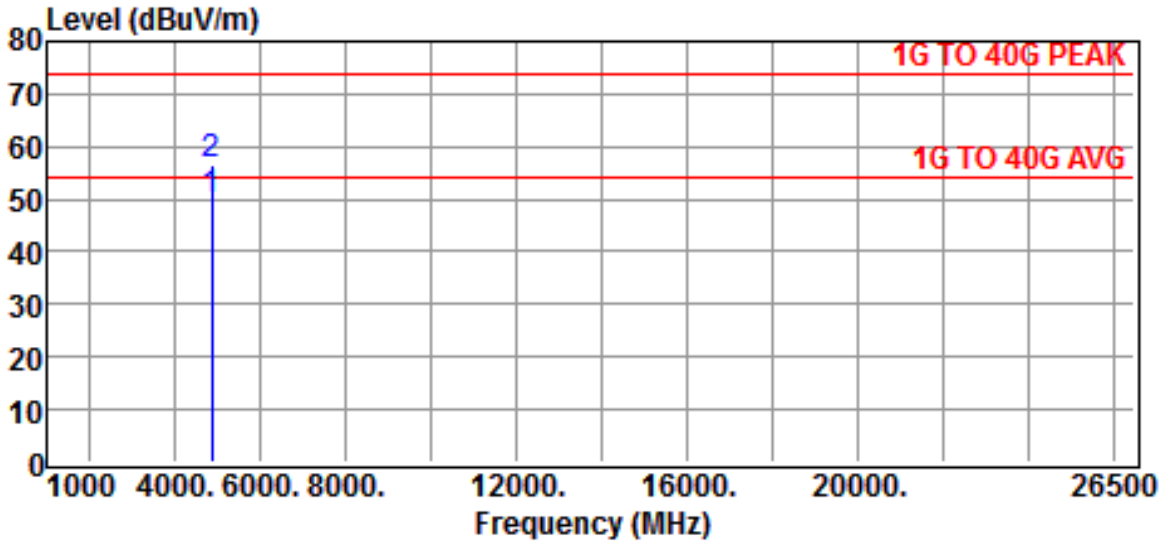


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:221	Temp.	:20
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH Low		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4810.0000	51.5	1.3	52.8	54.0	-1.2	Average
4810.0000	58.4	1.3	59.7	74.0	-14.3	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

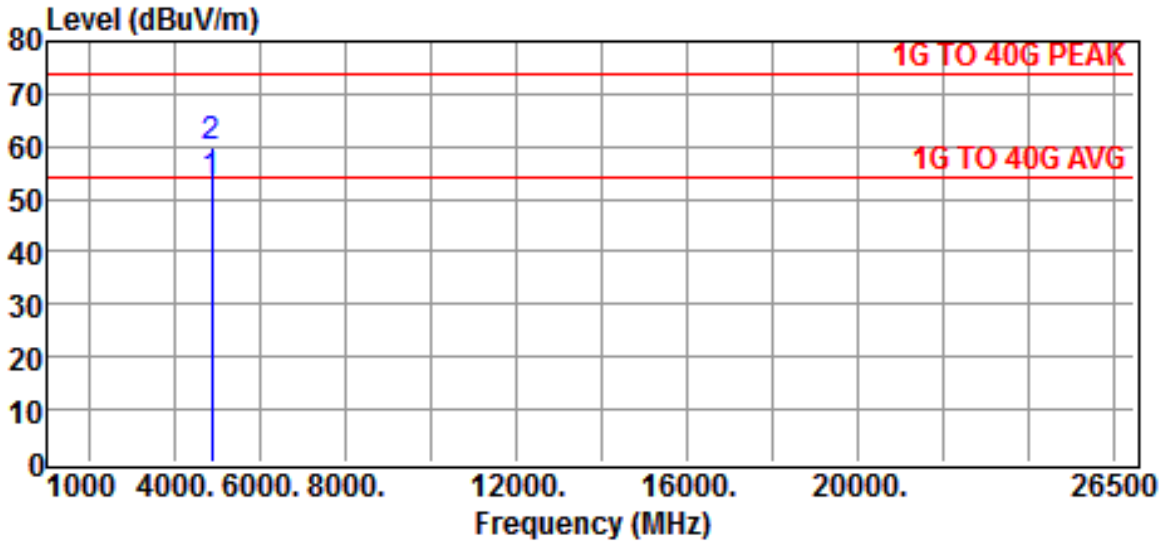


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH Mid		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4880.0000	48.3	1.4	49.7	54.0	-4.3	Average
4880.0000	55.3	1.4	56.7	74.0	-17.3	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

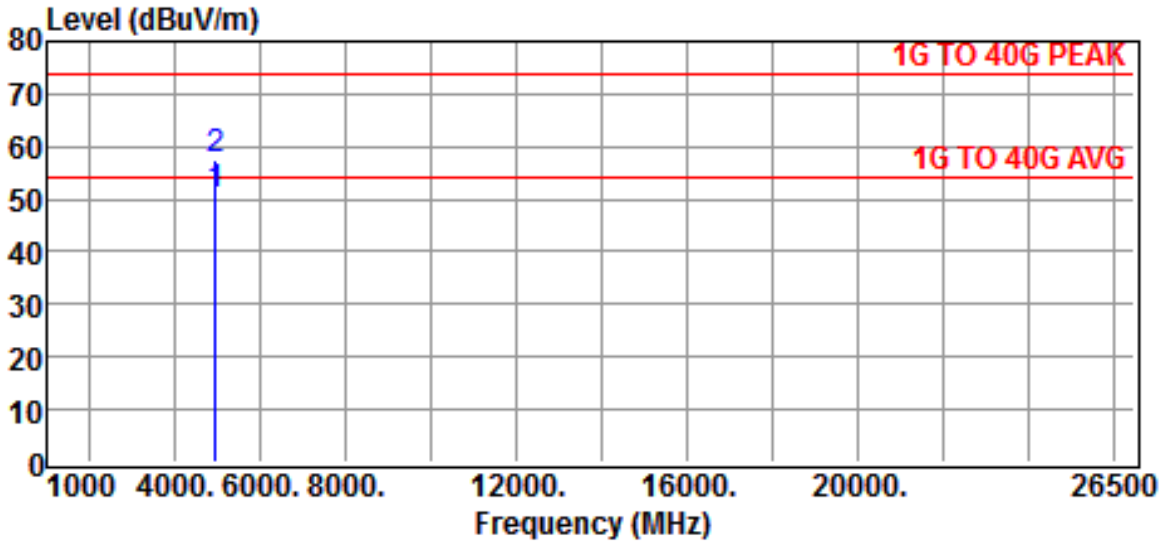


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH Mid		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4880.0000	51.9	1.4	53.3	54.0	-0.7	Average
4880.0000	58.6	1.4	60.0	74.0	-14.0	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

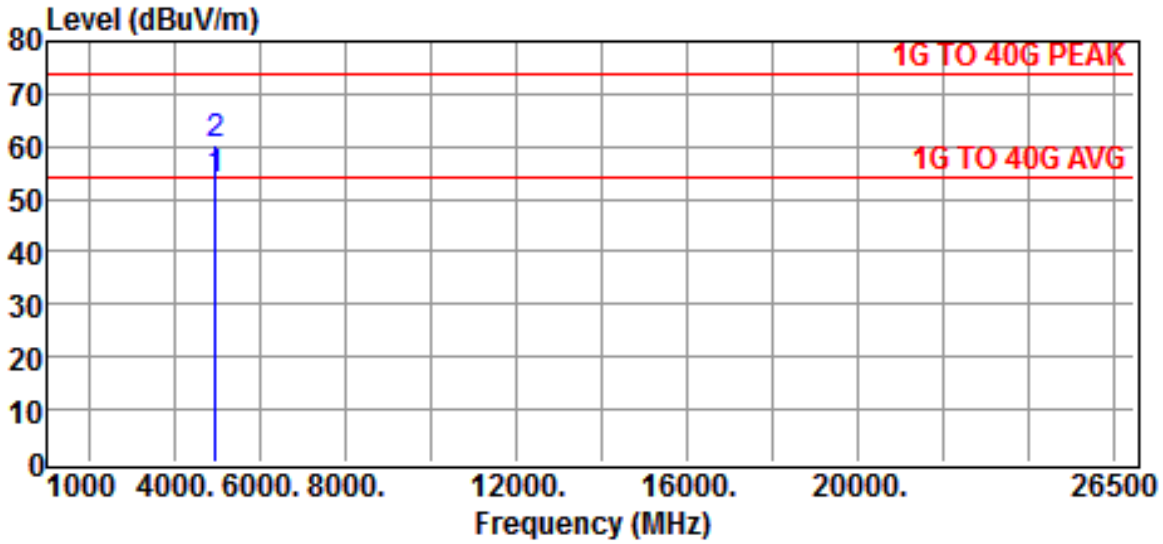


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH High		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4960.0000	48.9	1.6	50.5	54.0	-3.5	Average
4960.0000	55.8	1.6	57.4	74.0	-16.6	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result



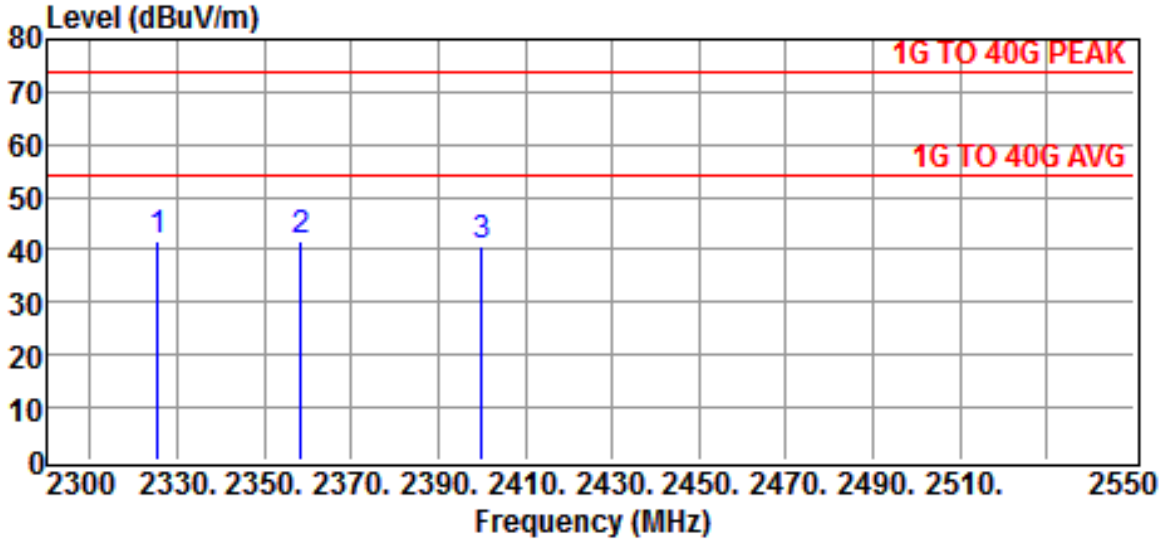
Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	:CH High		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4960.0000	51.8	1.6	53.4	54.0	-0.6	Average
4960.0000	58.7	1.6	60.3	74.0	-13.7	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

4.4.2 Radiated Eimssion of Restricted bands

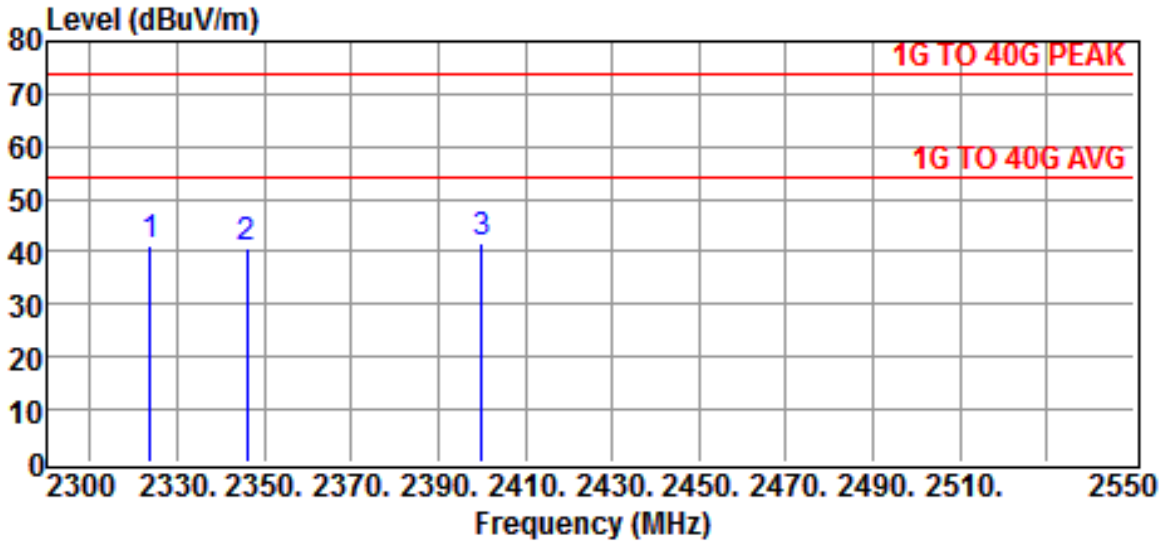


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH Low - Restricted Bands		
Test Mode	:		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2325.5000	47.5	-6.0	41.5	74.0	-32.5	Peak
2358.5000	47.8	-5.9	41.9	74.0	-32.1	Peak
2400.0000	46.4	-5.8	40.6	74.0	-33.4	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit – Resul
5. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

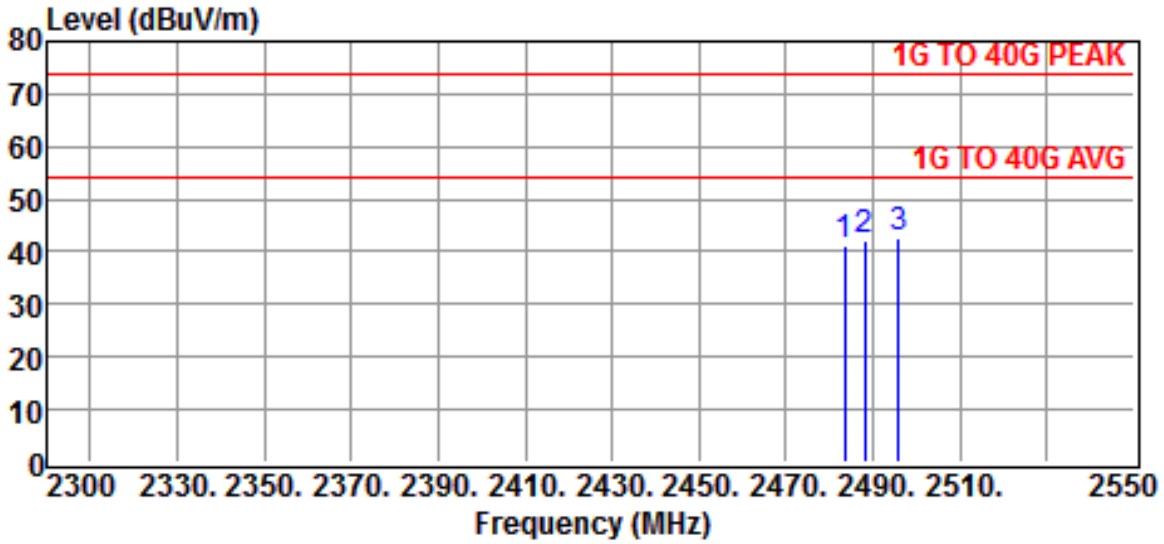


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH Low - Restricted Bands		
Test Mode	:		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2323.7500	47.0	-6.0	41.0	74.0	-33.0	Peak
2346.0000	46.5	-5.9	40.6	74.0	-33.4	Peak
2400.0000	47.4	-5.8	41.6	74.0	-32.4	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit – Resul
5. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

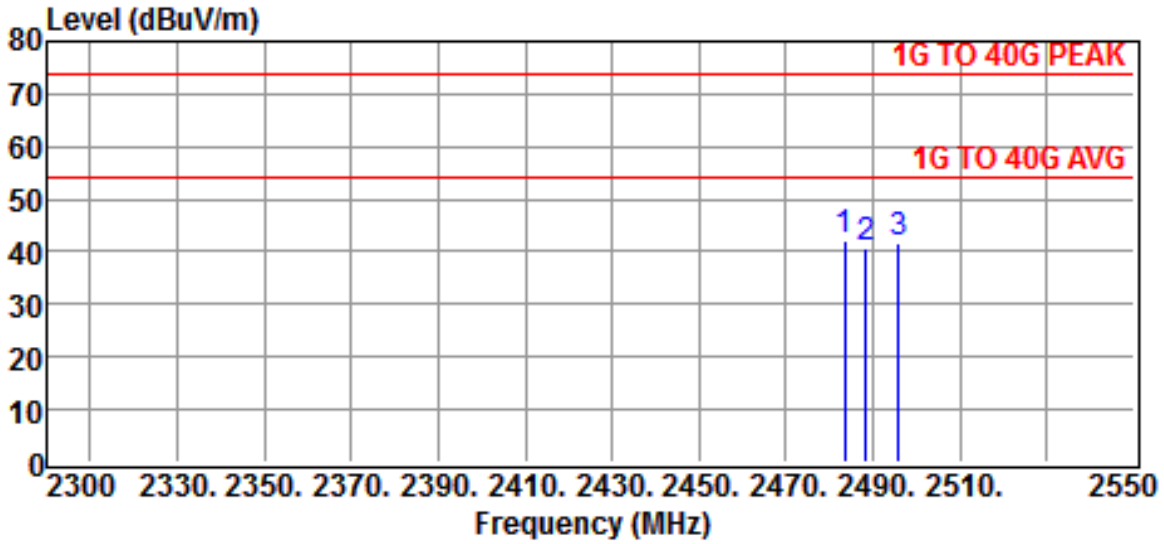


Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH High - Restricted Bands		
Test Mode	:		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2483.5000	46.8	-5.4	41.4	74.0	-32.6	Peak
2488.0000	47.7	-5.4	42.3	74.0	-31.7	Peak
2496.0000	47.9	-5.4	42.5	74.0	-31.5	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit – Resul
5. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2013-02-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH High - Restricted Bands		
Test Mode	:		

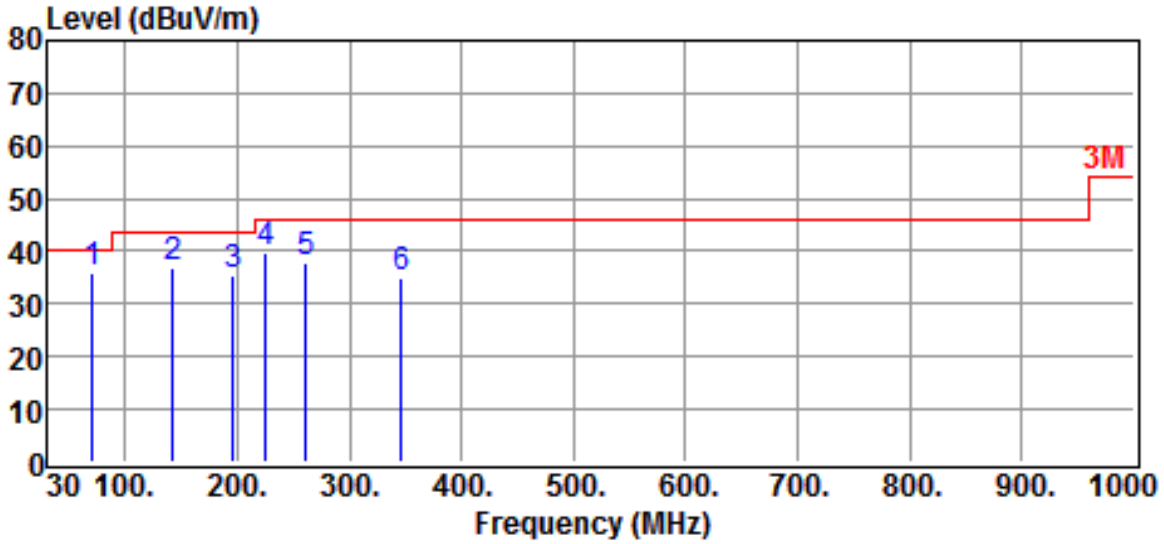
Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2483.5000	47.5	-5.4	42.1	74.0	-31.9	Peak
2488.2500	46.2	-5.4	40.8	74.0	-33.2	Peak
2496.0000	47.2	-5.4	41.8	74.0	-32.2	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit – Resul
5. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

4.4.3 Other Emission

a) Emission frequencies below 1 GHz

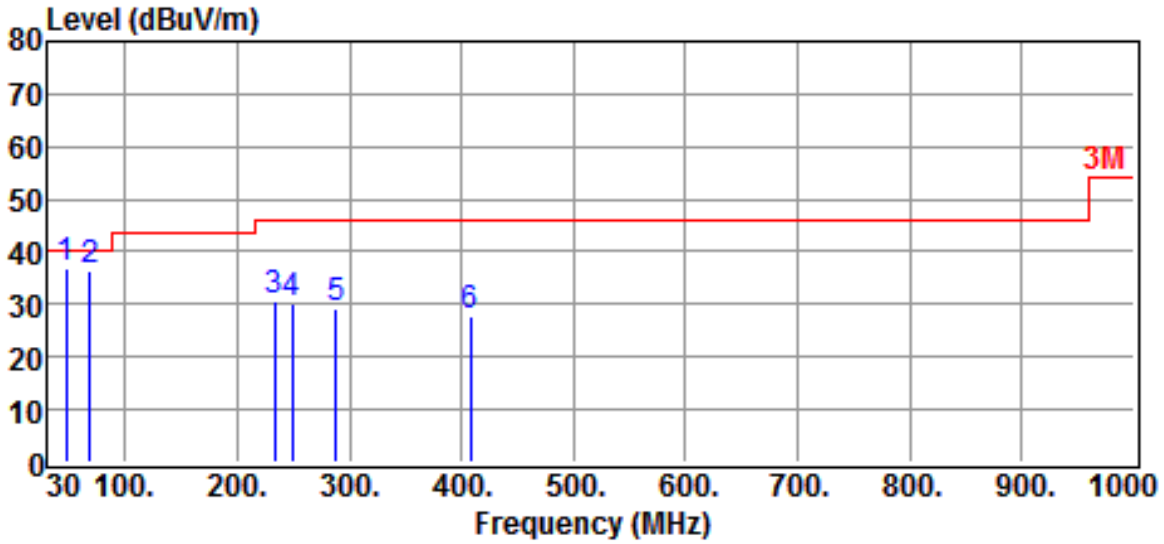


Site	:OPEN SITE	Date	:2013-02-06
Limit	:3M	Ant. Pol.	:HORIZONTAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH High (Worst case)		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
70.7400	25.4	10.4	35.8	40.0	-4.2	QP
142.5200	22.6	14.1	36.7	43.5	-6.8	QP
196.8400	18.8	16.8	35.6	43.5	-7.9	QP
225.9400	20.8	18.8	39.6	46.0	-6.4	QP
260.8600	17.0	21.1	38.1	46.0	-7.9	QP
346.2200	17.4	17.8	35.2	46.0	-10.8	QP

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result



Site	:OPEN SITE	Date	:2013-02-06
Limit	:3M	Ant. Pol.	:VERTICAL
EUT	: ZIGBEE MODULE	Temp.	:20°C
Power Rating	:DC 3V	Humi.	:65%
Model	: ZBM-221	Engineer.	:VC
Test Mode	: CH High (Worst case)		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
47.4600	24.8	12.3	37.1	40.0	-2.9	QP
68.8000	25.9	10.5	36.4	40.0	-3.6	QP
233.7000	11.5	19.0	30.5	46.0	-15.5	QP
249.2200	10.2	20.0	30.2	46.0	-15.8	QP
288.0200	5.9	23.5	29.4	46.0	-16.6	QP
408.3000	8.1	19.4	27.5	46.0	-18.5	QP

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The expanded uncertainty of the radiated emission tests is 3.53 dB.
4. The margin value=Limit - Result

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna FACTOR + Cable Loss + High Pass Filter Loss - Amplifier Gain

4.6 Photos of Radiation Measuring Setup

5 CONDUCTED EMISSION MEASUREMENT

5.1 Standard Applicable

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

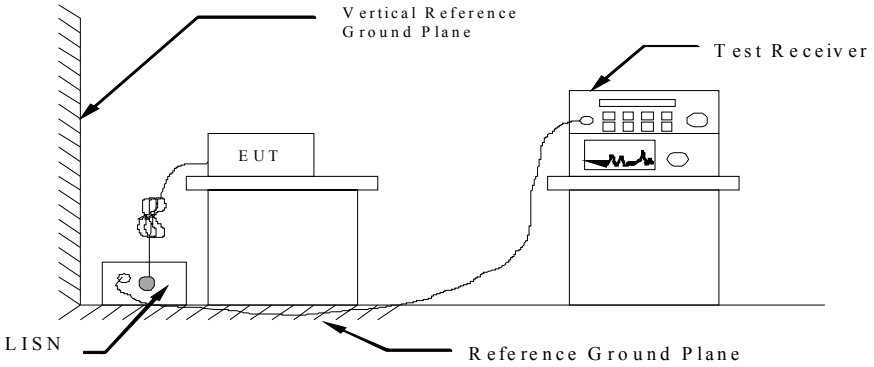
Frequency MHz	**Quasi Peak dB μV**	**Average dB μV**
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

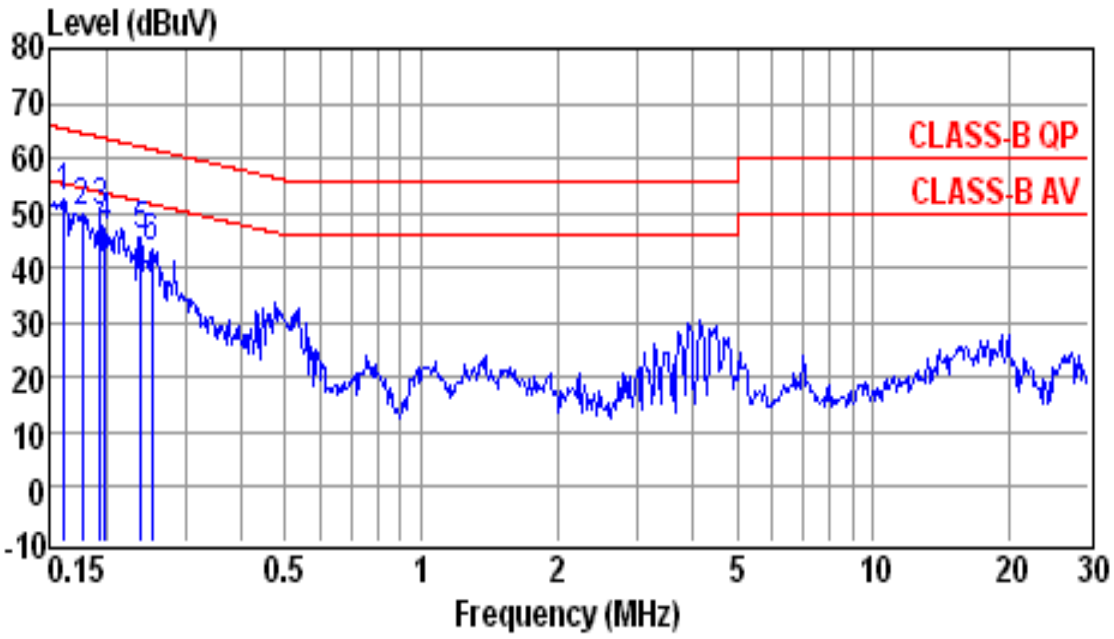
5.2 Measurement Procedure

1. Setup the configuration per figure 5.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then records the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 5: Conducted emissions measurement configuration



5.3 Conducted Emission Data

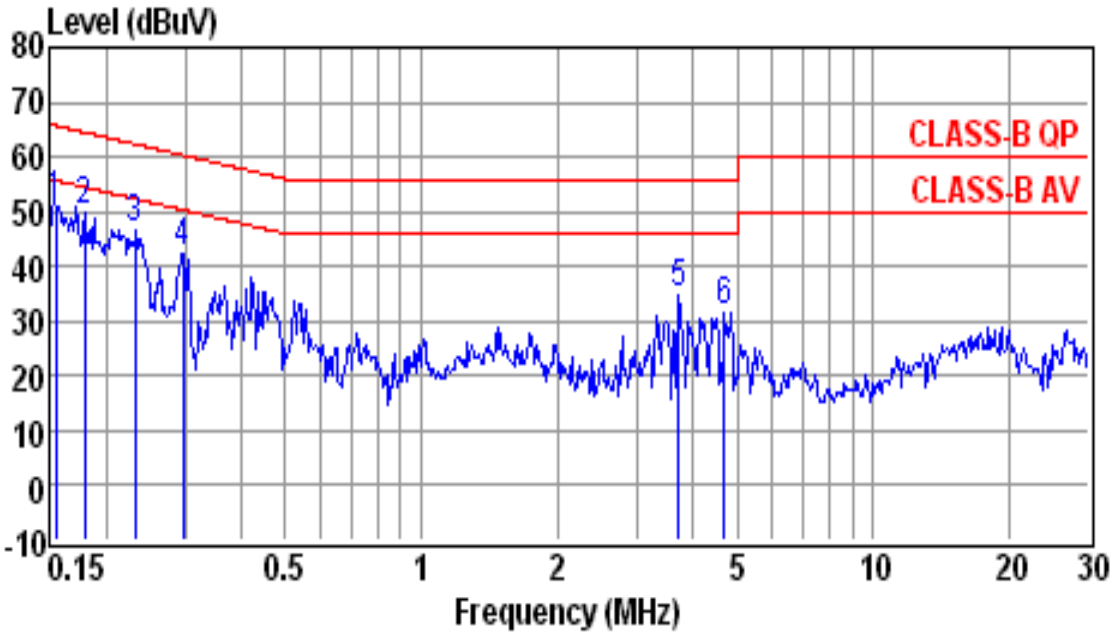


Site	: conducted #1	Date	: 05-17-2013
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 25 ℃ / 65%	Test Mode	: CH High (Worst case)
EUT	: ZIGBEE MODULE	Power Rating	:
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1624	42.2	10.3	52.5	65.3	-12.8	QP
0.1777	39.5	10.3	49.8	64.6	-14.8	QP
0.1945	39.5	10.3	49.8	63.8	-14.0	QP
0.1997	36.9	10.3	47.2	63.6	-16.4	QP
0.2391	35.2	10.3	45.5	62.1	-16.6	QP
0.2535	33.2	10.3	43.5	61.6	-18.1	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 05-17-2013
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 25 ℃ / 65%	Test Mode	: CH High (Worst case)
EUT	: ZIGBEE MODULE	Power Rating	:
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1549	40.8	10.3	51.1	65.7	-14.6	QP
0.1796	39.6	10.3	49.9	64.5	-14.6	QP
0.2329	36.5	10.3	46.8	62.3	-15.5	QP
0.2971	32.1	10.3	42.4	60.3	-17.9	QP
3.7200	24.1	10.5	34.6	56.0	-21.4	QP
4.6720	21.1	10.5	31.6	56.0	-24.4	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

RESULT = 22.5 + 0.1 = 22.6 dB μ V
Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]
= 13.48 μ V

5.5 Conducted Measurement Equipment

The following test equipments are used during the conducted test.

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2012/07/16	2013/07/16
LISN	EMCO	3825/2	2012/11/02	2013/11/02
LISN	Rohde & Schwarz	ESH2-Z5	2012/08/23	2013/08/23

5.6 Photos of Conduction Measuring Setup

6 ANTENNA REQUIREMENT

6.1 Standard Applicable

For intentional device, according to §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 §15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.2 Antenna Construction and Directional Gain

Please see photos submitted in Exhibit.

A dipole antenna is used. The antenna is equipped with a reversed SMA connector. The antenna gain is less than 6dBi. No need to reduce the peak output power.

7 EMISSION BANDWIDTH MEASUREMENT

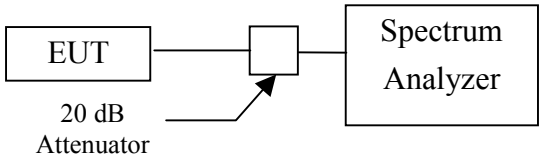
7.1 Standard Applicable

According to 15.247(a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value. The settings of spectrum analyzer is as followings.
   1) Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
   2) Set the video bandwidth (VBW) ≥ 3 x RBW.
   3) Detector = Peak.
   4) Trace mode = max hold.
   5) Sweep = auto couple.
   6) Allow the trace to stabilize.
   7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
3. Repeat above procedures until all frequencies measured were complete.

Figure 4: Emission bandwidth measurement configuration.



7.3 Measurement Equipment

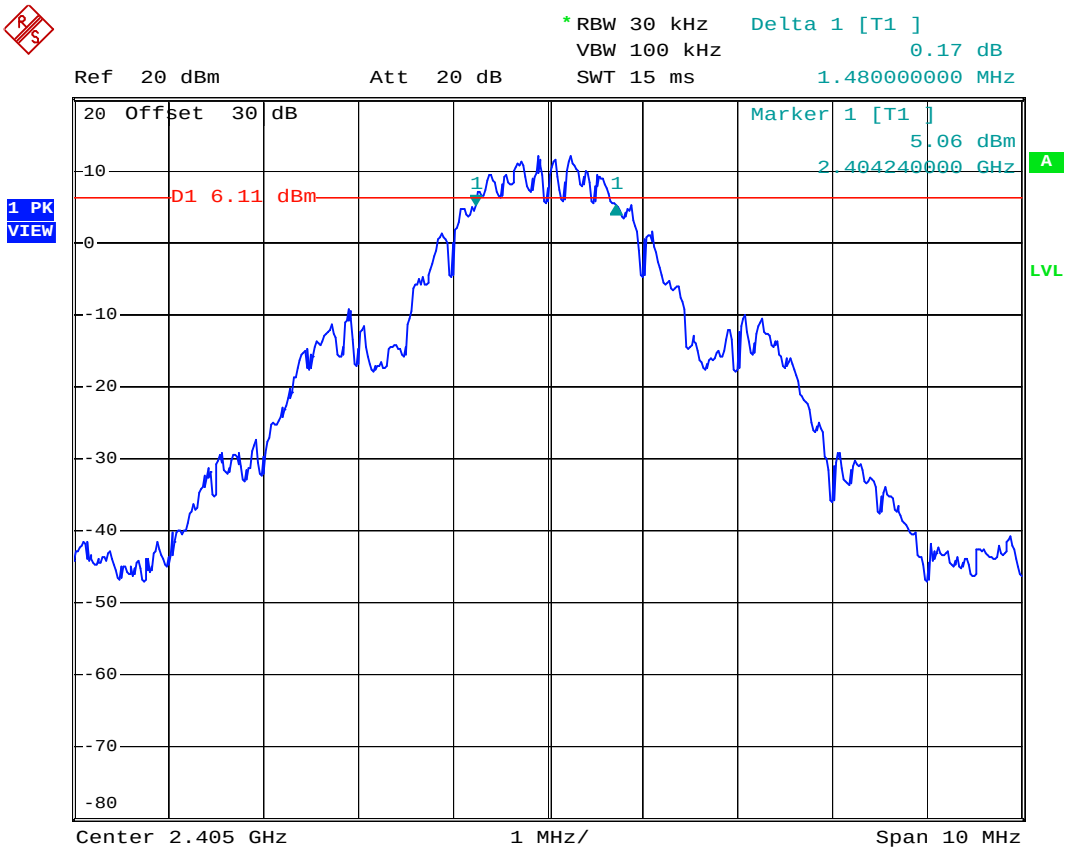
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/07

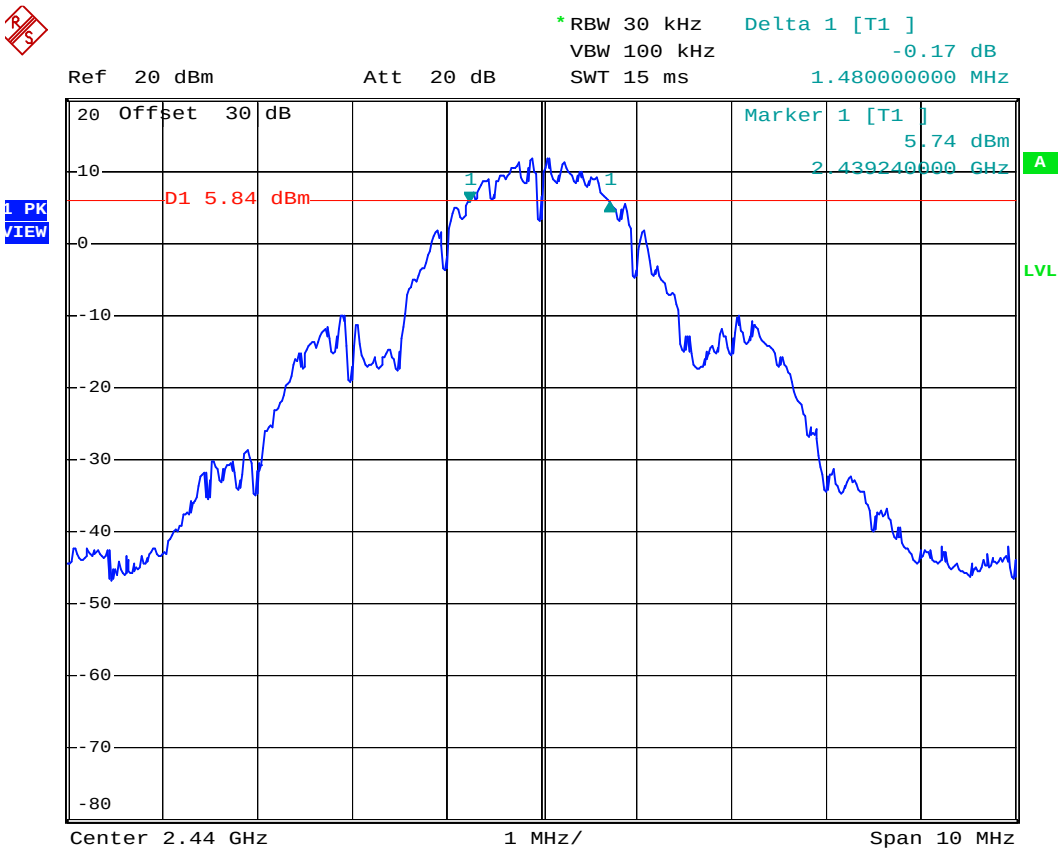
7.4 Measurement Data

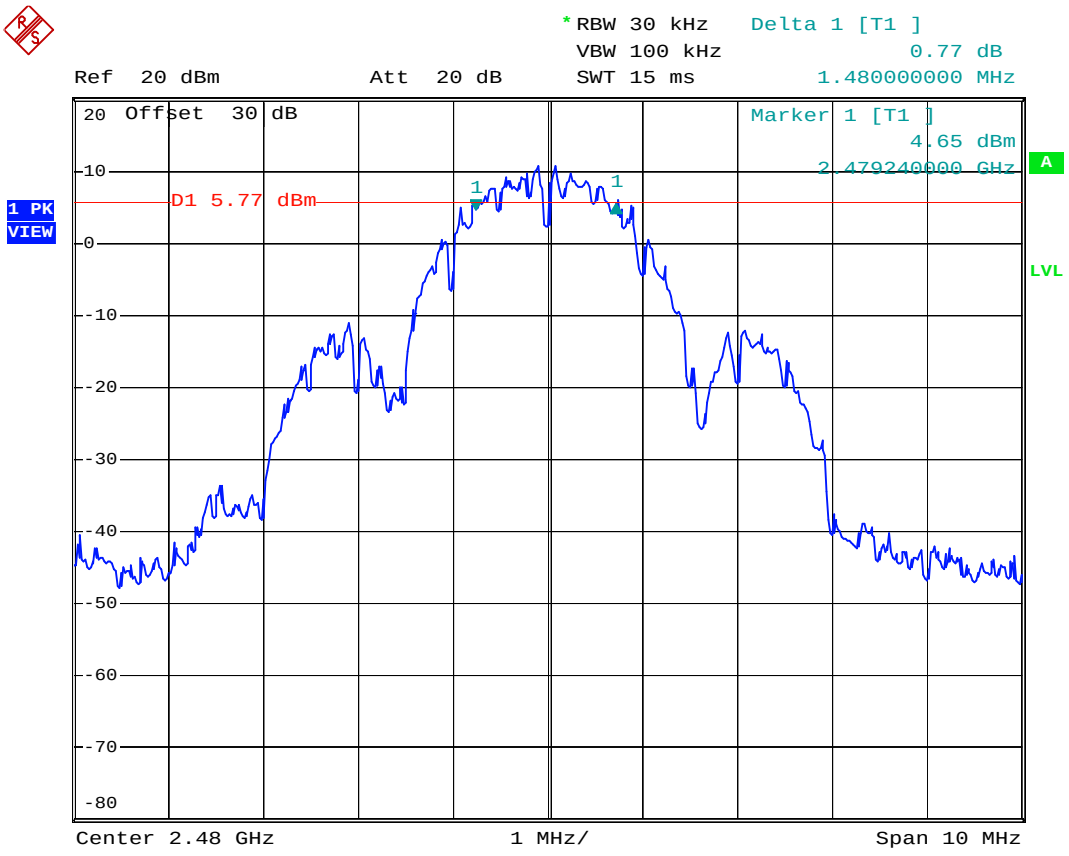
Test Date : Feb. 06, 2013 Temperature : 20 °C Humidity : 65 %

a) Channel Low: 6 dB Emission Bandwidth is 1.48 MHz
b) Channel Mid: 6 dB Emission Bandwidth is 1.48 MHz
c) Channel High: 6 dB Emission Bandwidth is 1.48 MHz

Note : The expanded uncertainty: frequency $\times 1.65 \times 10^{-6}$ (1 GHz $< f \leq$ 18 GHz).


*RBW 30 kHz
VBW 100 kHz
SWT 15 ms
Delta 1 [T1]
0.17 dB
1.480000000 MHz
Ref 20 dBm
Att 20 dB
Offset 30 dB
Marker 1 [T1]
5.06 dBm
2.404240000 GHz
D1 6.11 dBm
1 PK
VIEW
A
LVL
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.405 GHz
1 MHz/
Span 10 MHz


*RBW 30 kHz
Delta 1 [T1]
VBW 100 kHz
-0.17 dB
Ref 20 dBm
Att 20 dB
SWT 15 ms
1.480000000 MHz
20 Offset 30 dB
Marker 1 [T1]
5.74 dBm
2.439240000 GHz
D1 5.84 dBm
1 PK
VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.44 GHz
1 MHz/
Span 10 MHz


*RBW 30 kHz
VBW 100 kHz
SWT 15 ms
Delta 1 [T1]
0.77 dB
1.480000000 MHz
Ref 20 dBm
Att 20 dB
20 Offset 30 dB
Marker 1 [T1]
4.65 dBm
2.479240000 GHz
D1 5.77 dBm
1 PK
VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 2.48 GHz
1 MHz/
Span 10 MHz

8 OUTPUT POWER MEASUREMENT

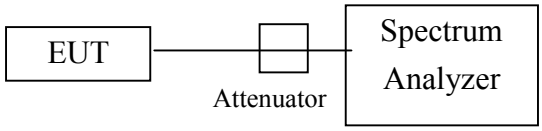
8.1 Standard Applicable

According to 15.247(b), The maximum peak conducted output power of the intentional radiator shall not exceed the following:
(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. The settings of spectrum analyzer is as followings.
   1) Set the RBW = maximum available (at least 1 MHz).
   2) Set the VBW = 3 x RBW or maximum available setting (must be ≥ RBW).
   3) Set the span to fully encompass the DTS bandwidth.
   4) Detector = peak.
   5) Sweep time = auto couple.
   6) Trace mode = max hold.
   7) Allow trace to fully stabilize.
   8) Use the spectrum analyzer's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges.
4. Repeat above procedures until all frequencies measured were complete.

Figure 5: Output power and measurement configuration.



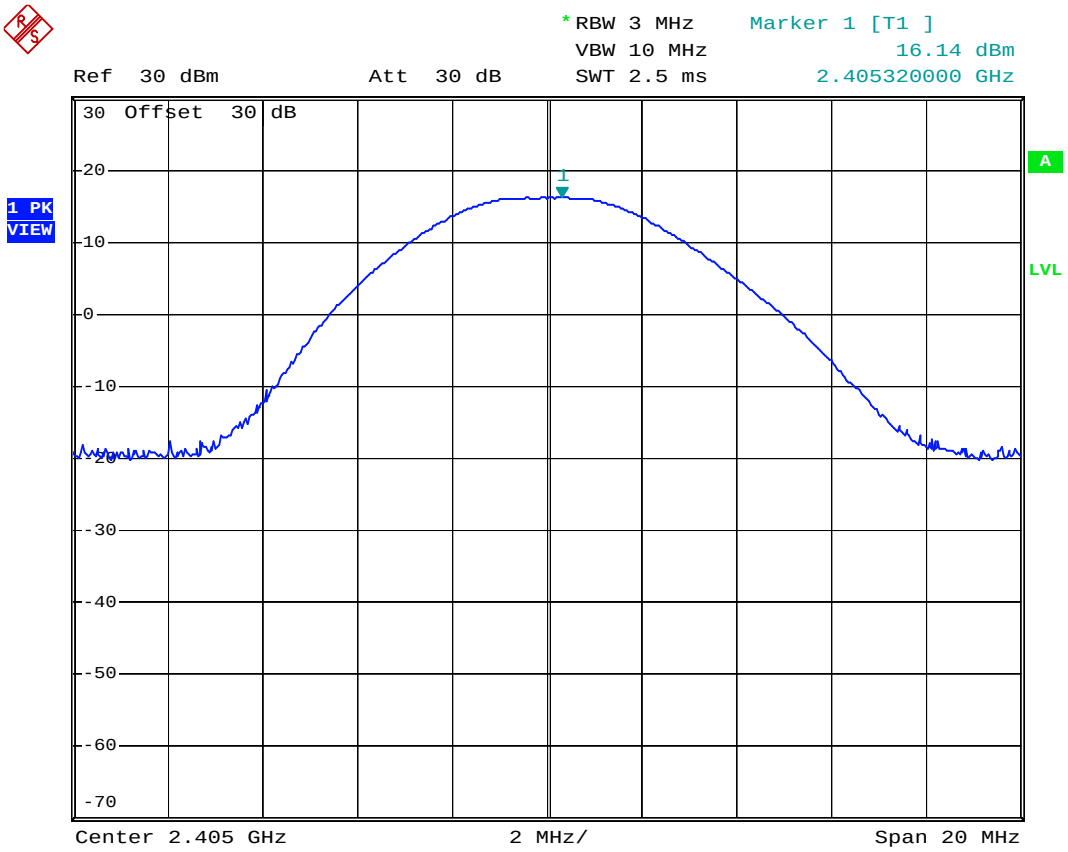
8.3 Measurement Equipment

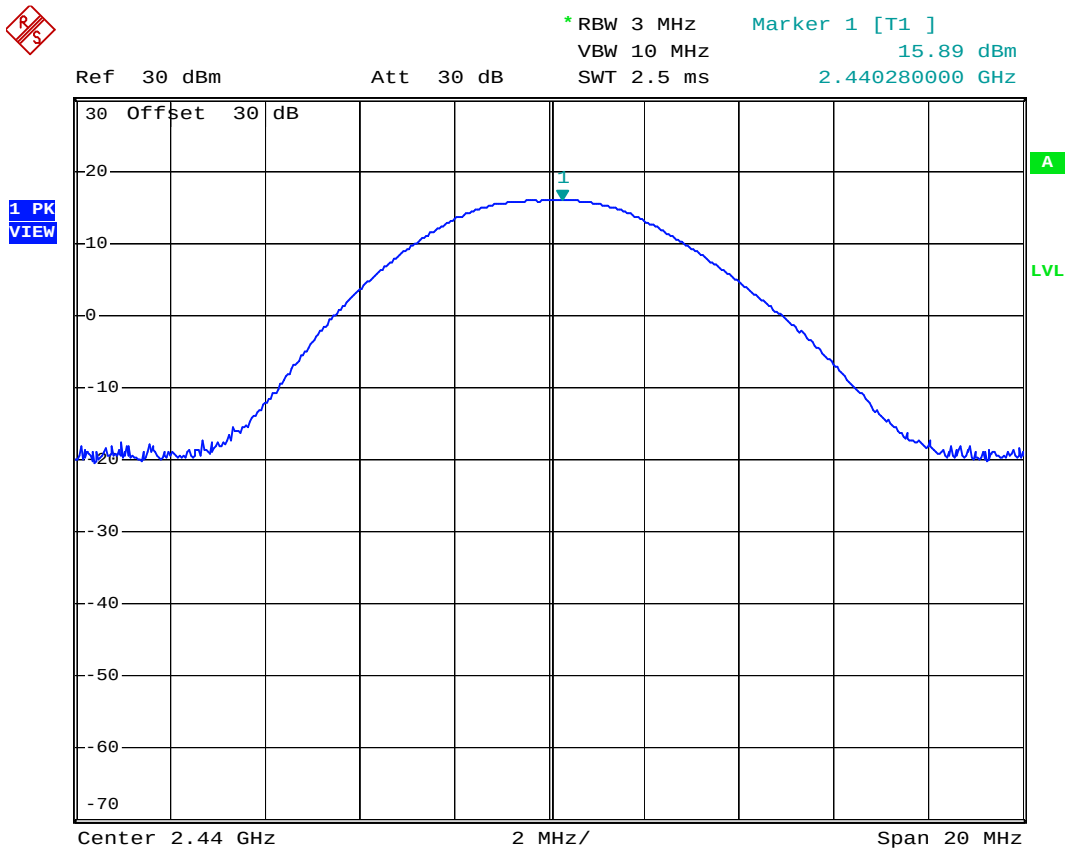
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/07

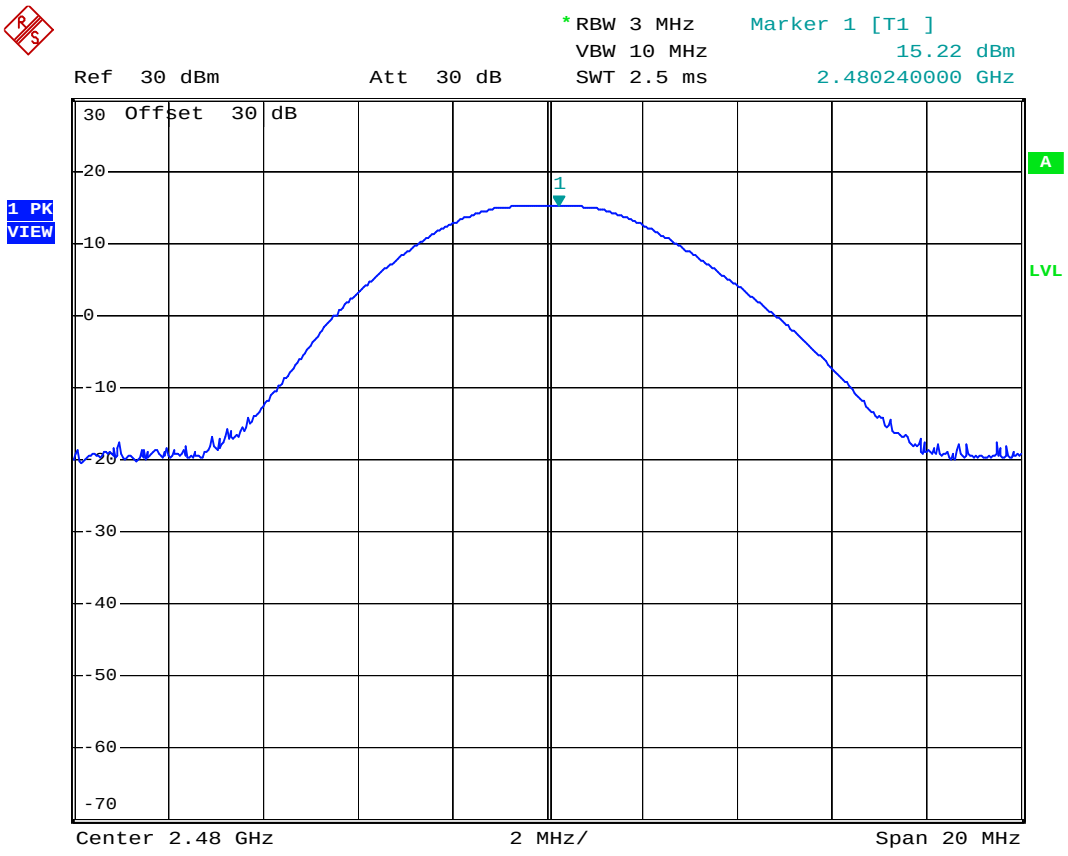
8.4 Measurement Data

Test Date : Feb. 06, 2013 Temperature : 20 °C Humidity : 65 %

a) Channel Low: Output Peak Power is 16.14 dBm **41.115** mW
b) Channel Mid: Output Peak Power is 15.89 dBm **38.815** mW
c) Channel High: Output Peak Power is 15.22 dBm **33.266** mW


*RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
16.14 dBm
2.405320000 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 PK
VIEW
A
LVL
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.405 GHz
2 MHz/
Span 20 MHz


*RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
15.89 dBm
2.440280000 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 PK
VIEW
A
LVL
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.44 GHz
2 MHz/
Span 20 MHz


*RBW 3 MHz
VBW 10 MHz
SWT 2.5 ms
Marker 1 [T1]
15.22 dBm
2.480240000 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 PK
VIEW
A
LVL
1
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.48 GHz
2 MHz/
Span 20 MHz

9 100 kHz BANDWIDTH OF BAND EDGES MEASUREMENT

9.1 Standard Applicable

According to 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, 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) (see § 15.205(c)).

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW of spectrum analyzer to 100kHz and VBW to ≥ 300kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement Equipment

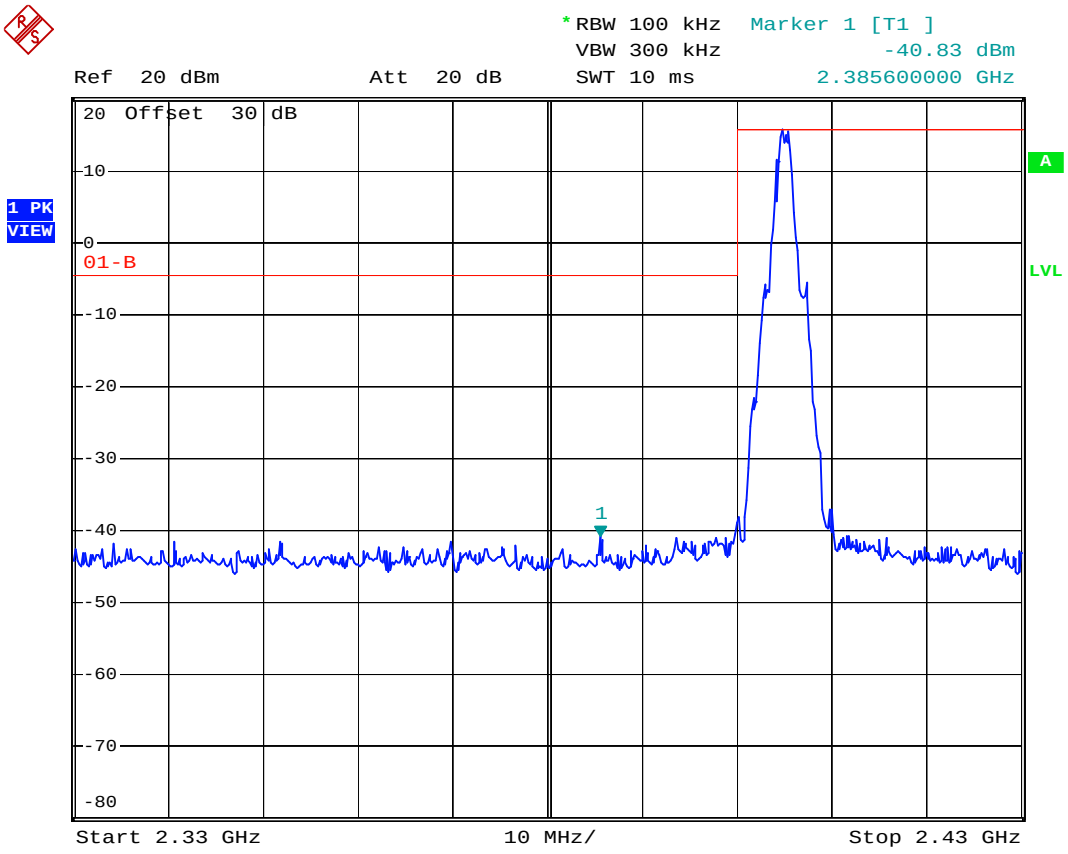
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/07

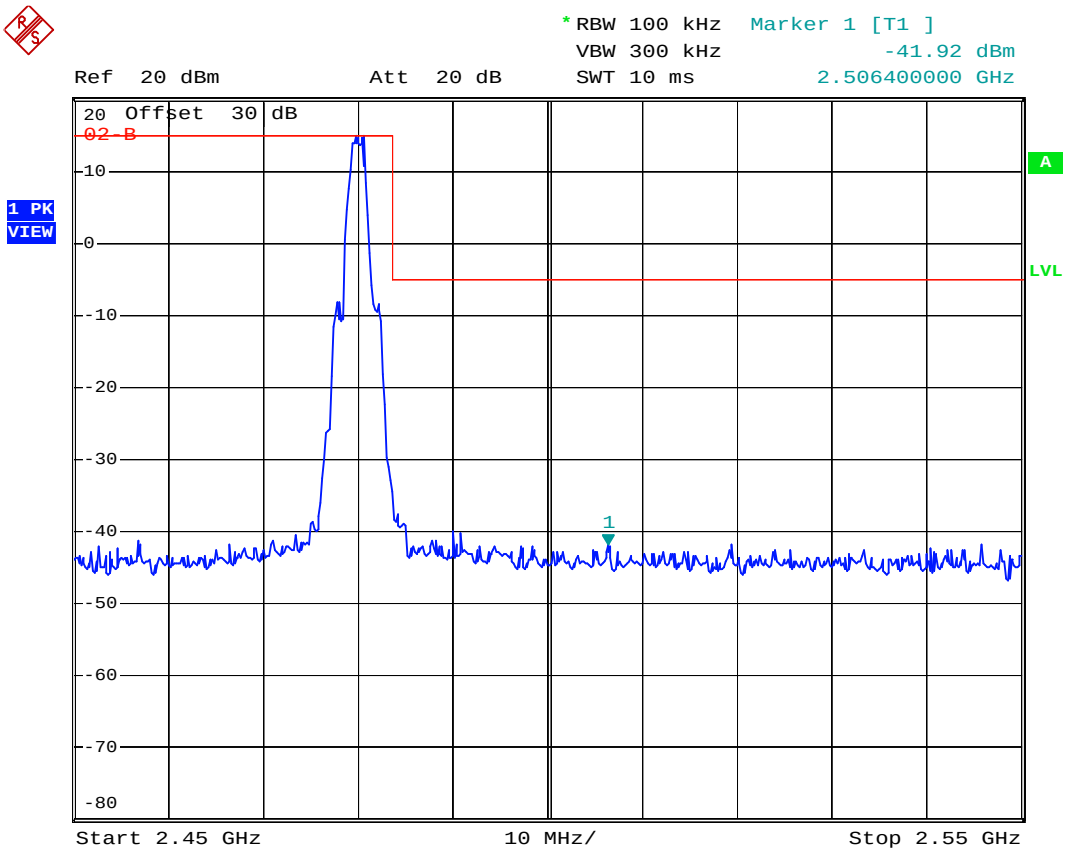
9.4 Measurement Data

Test Date : Feb. 06, 2013 Temperature : 20 °C Humidity : 65 %

a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

Note : The expanded uncertainty: 2dB.


*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
-40.83 dBm
Ref 20 dBm
Att 20 dB
SWT 10 ms
2.385600000 GHz
20 Offset 30 dB
1 PK
VIEW
A
LVL
01-B
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 2.33 GHz
10 MHz/
Stop 2.43 GHz


*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
-41.92 dBm
Ref 20 dBm
Att 20 dB
SWT 10 ms
2.506400000 GHz
20 Offset 30 dB
02-B
1 PK
VIEW
A
LVL
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 2.45 GHz
10 MHz/
Stop 2.55 GHz

10 POWER DENSITY MEASUREMENT

10.1 Standard Applicable

According to 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Following the procedures below.

    1) Set analyzer center frequency to DTS channel center frequency.
    2) Set the span to 1.5 times the DTS channel bandwidth.
    3) Set the RBW ≥ 3 kHz.
    4) Set the VBW ≥ 3 x RBW.
    5) Detector = peak.
    6) Sweep time = auto couple.
    7) Trace mode = max hold.
    8) Allow trace to fully stabilize.
    9) Use the peak marker function to determine the maximum amplitude level.
    10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4. Repeat above procedures until all measured frequencies were complete.

10.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/07

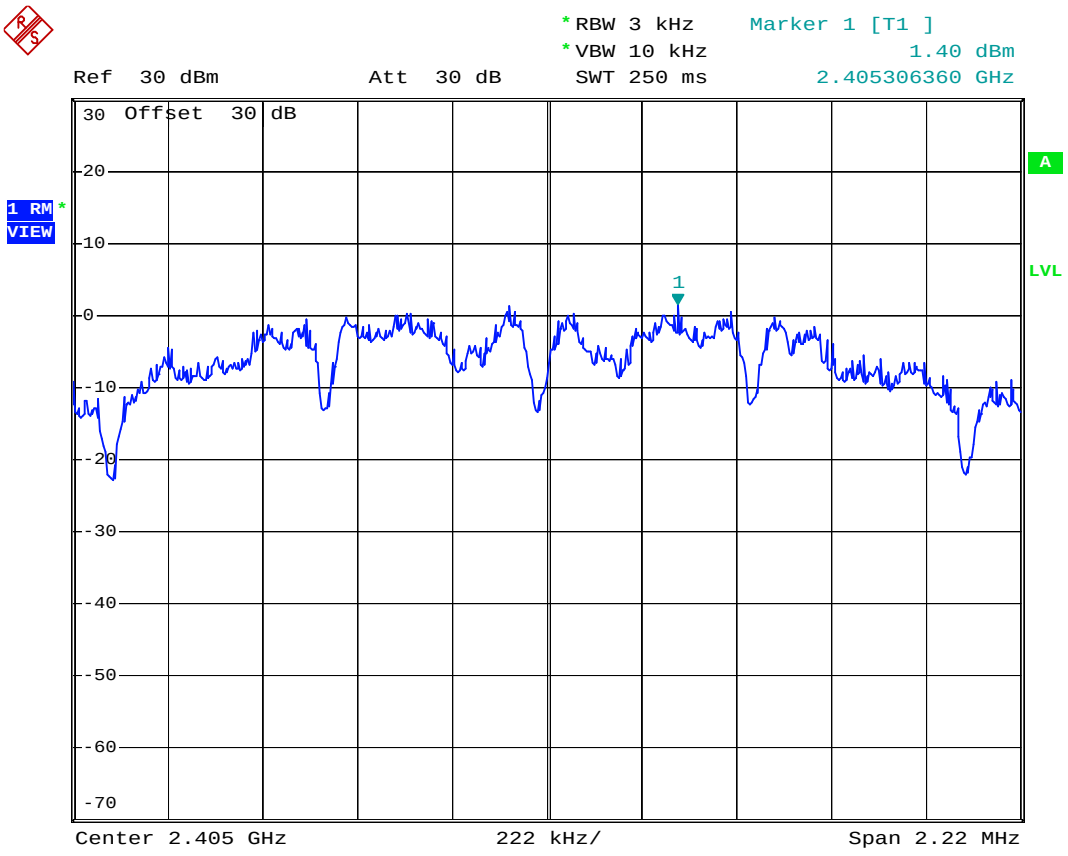
10.4 Measurement Data

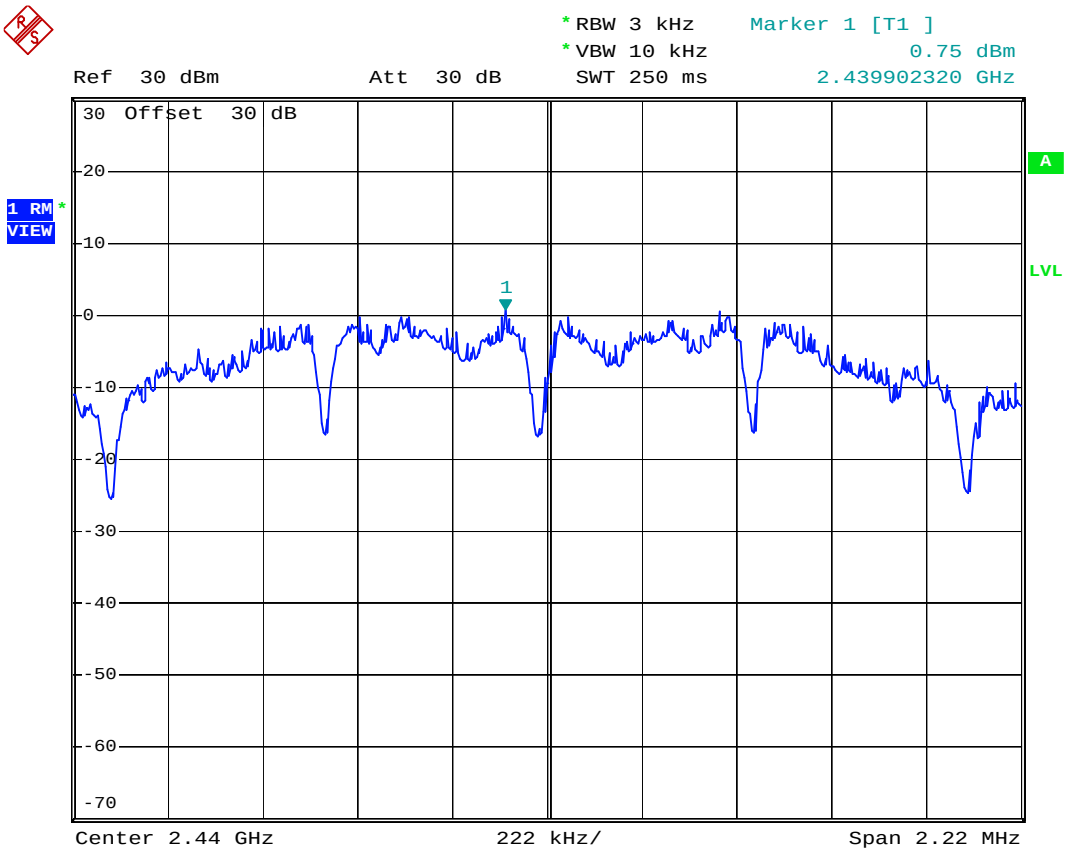
Test Date : Feb. 06, 2013 Temperature : 20 °C Humidity : 65 %

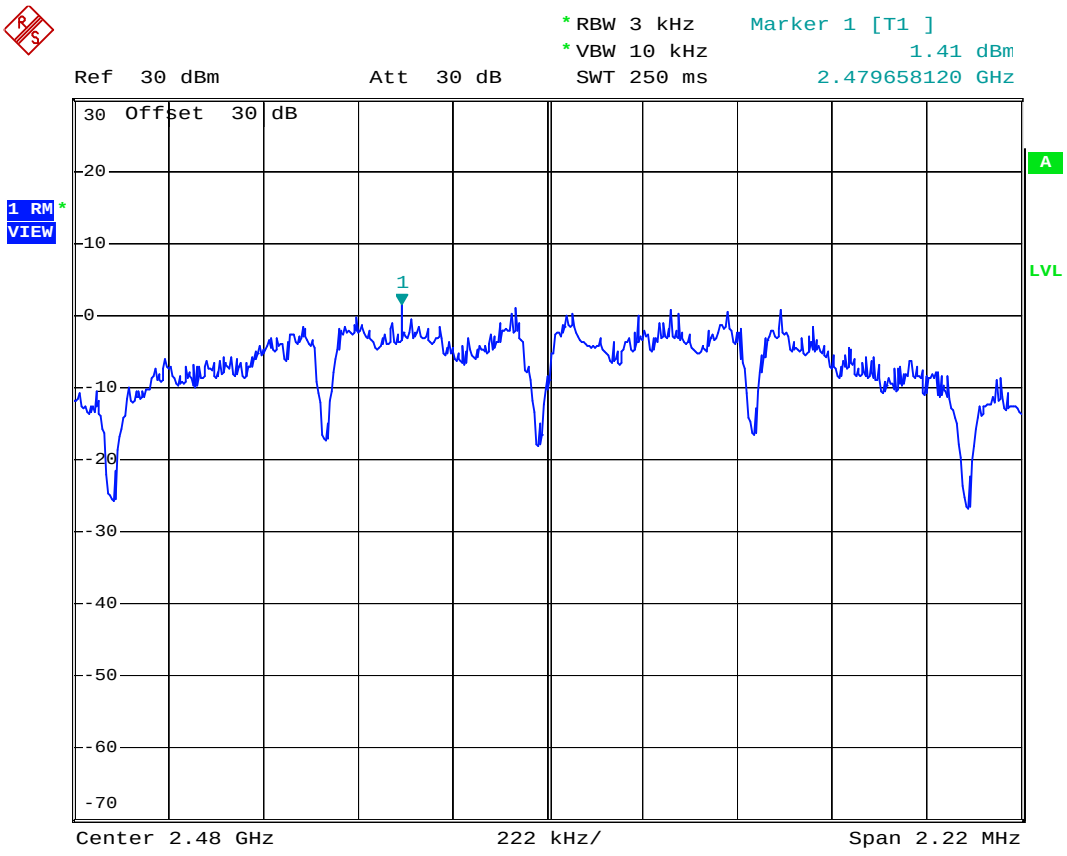
Maximun Power Density (MPD) Test Result

a)	Channel Low:	MPD is	1.40	dBm =	1.380	mW
b)	Channel Mid:	MPD is	0.75	dBm =	1.189	mW
c)	Channel High:	MPD is	1.41	dBm =	1.384	mW

Note : The expanded uncertainty: 2dB.


*RBW 3 kHz
*VBW 10 kHz
SWT 250 ms
Marker 1 [T1]
1.40 dBm
2.405306360 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 RM
VIEW
A
LVL
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.405 GHz
222 kHz/
Span 2.22 MHz


*RBW 3 kHz
*VBW 10 kHz
SWT 250 ms
Marker 1 [T1]
0.75 dBm
2.439902320 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 RM
VIEW
A
LVL
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 2.44 GHz
222 kHz/
Span 2.22 MHz


*RBW 3 kHz
*VBW 10 kHz
SWT 250 ms
Marker 1 [T1]
1.41 dBm
2.479658120 GHz
Ref 30 dBm
Att 30 dB
30 Offset 30 dB
1 RM *
VIEW
A
LVL
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Center 2.48 GHz
222 kHz/
Span 2.22 MHz

11 OUT-OF-BAND CONDUCTED EMISSION MEASUREMENT

11.1 Standard Applicable

According to 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, 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) (see § 15.205(c)).

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Use the following spectrum analyzer settings:

    1) Set start frequency to DTS channel edge frequency.
    2) Set stop frequency so as to encompass the spectrum to be examined.
    3) Set RBW = 100 kHz.
    4) Set VBW ≥ 300 kHz.
    5) Detector = peak.
    6) Trace Mode = max hold.
    7) Sweep = auto couple.
    8) Allow the trace to stabilize (this may take some time, depending on the extent of the span).
    9) Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

4. Repeat above procedures until all measured frequencies were complete.

11.3 Measurement Equipment

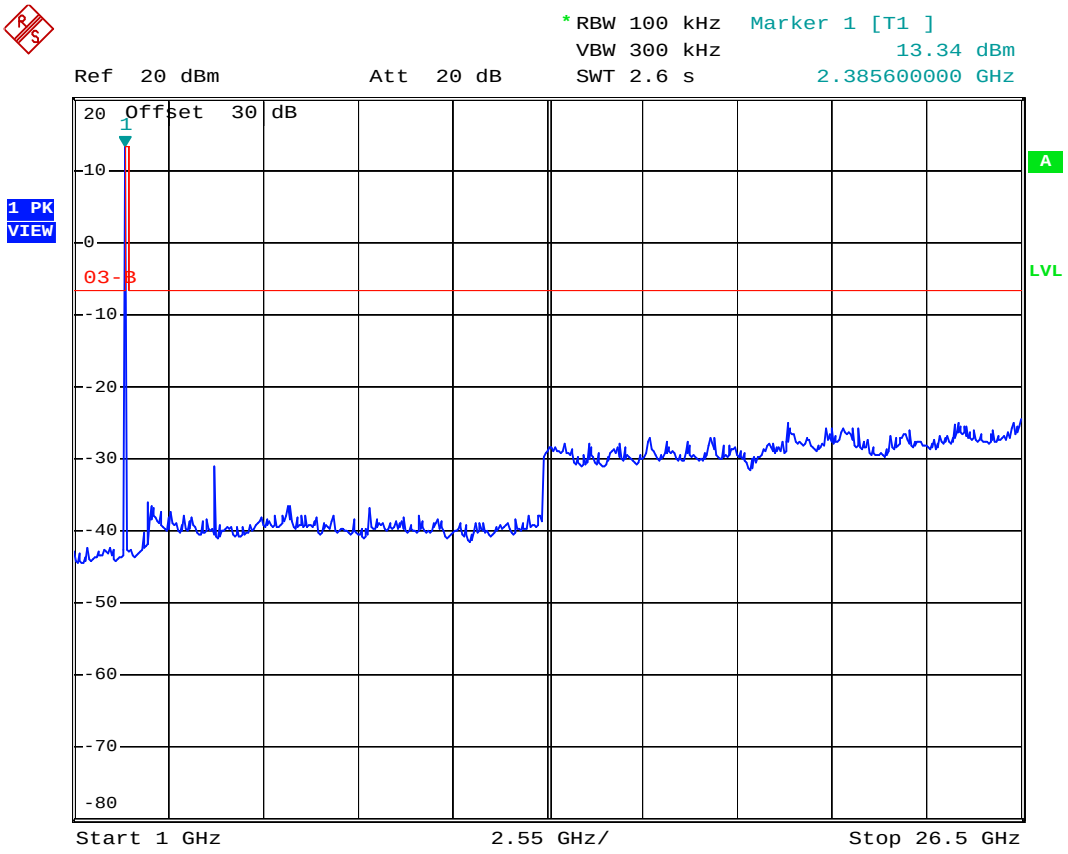
Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/07

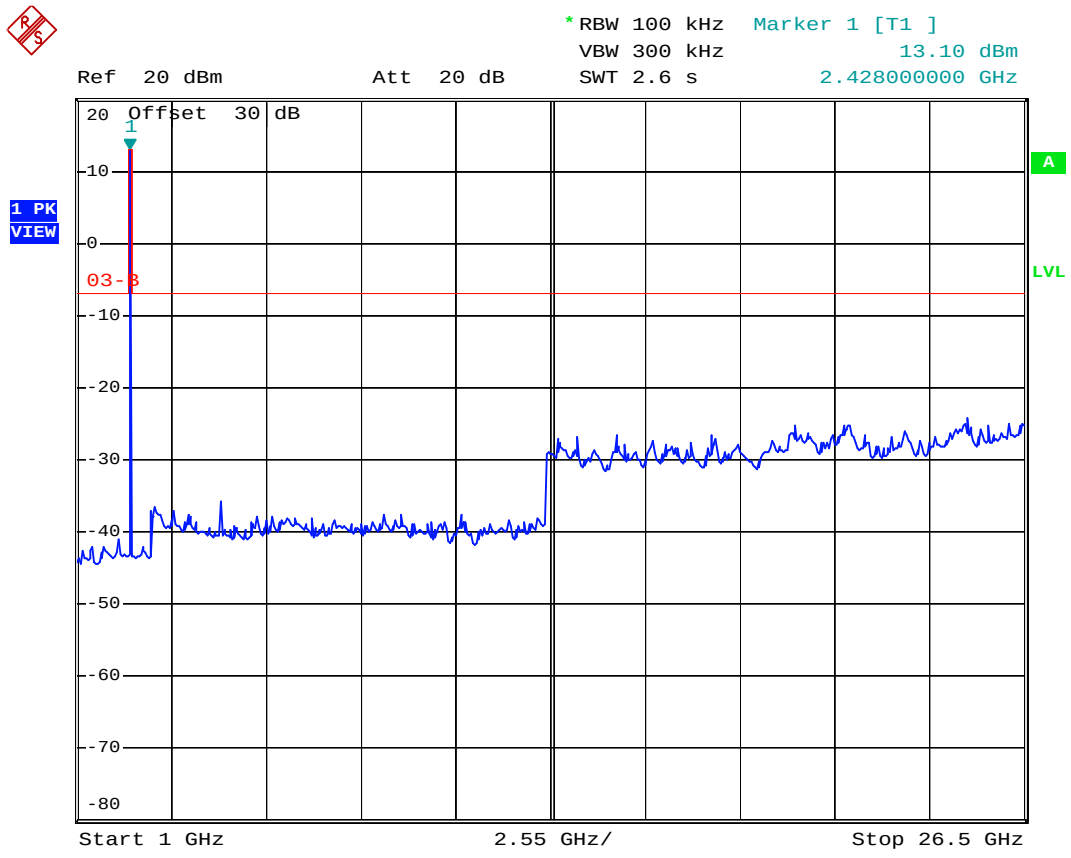
11.4 Measurement Data

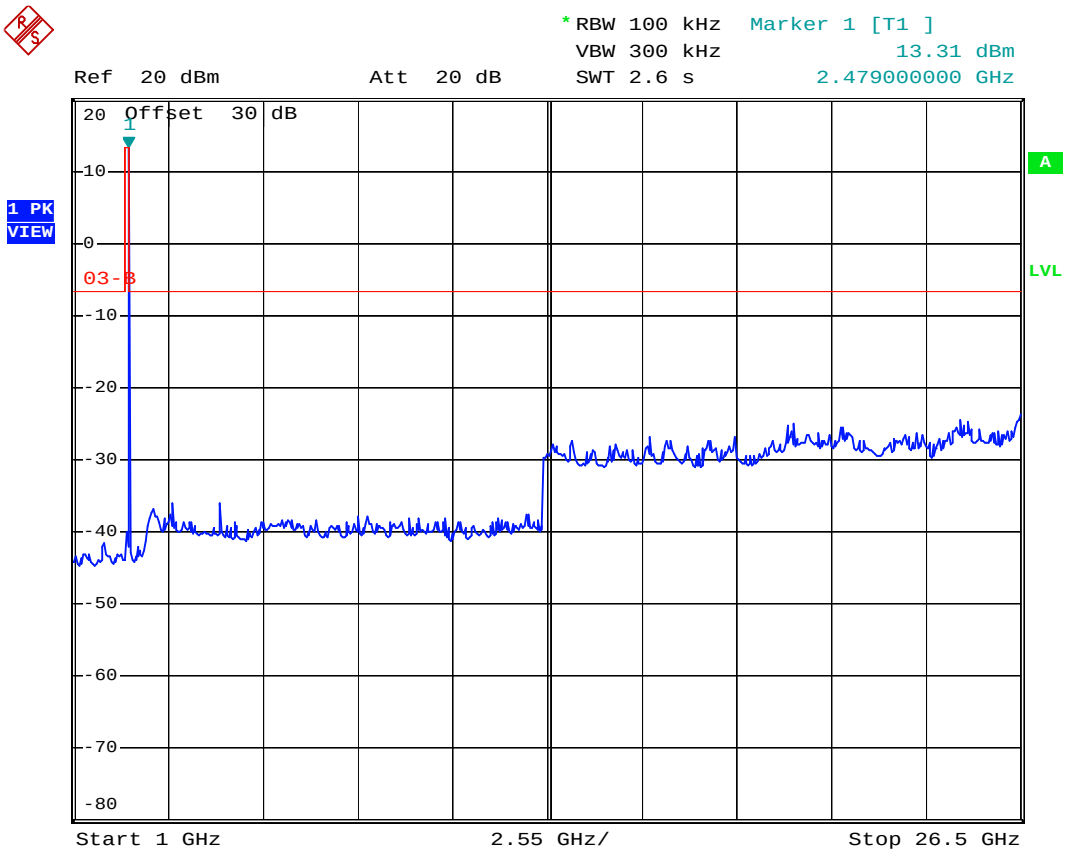
Test Date : Feb. 06, 2013 Temperature : 20 °C Humidity : 65 %

Test Mode	**Result**
Channel Low	1 GHz to 26.5 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
Channel Middle	1 GHz to 26.5 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
Channel High	1 GHz to 26.5 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.

Note : The expanded uncertainty: 2dB.


*RBW 100 kHz
VBW 300 kHz
SWT 2.6 s
Marker 1 [T1]
13.34 dBm
2.385600000 GHz
Ref 20 dBm
Att 20 dB
Offset 30 dB
1 PK
VIEW
A
LVL
03-8
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz

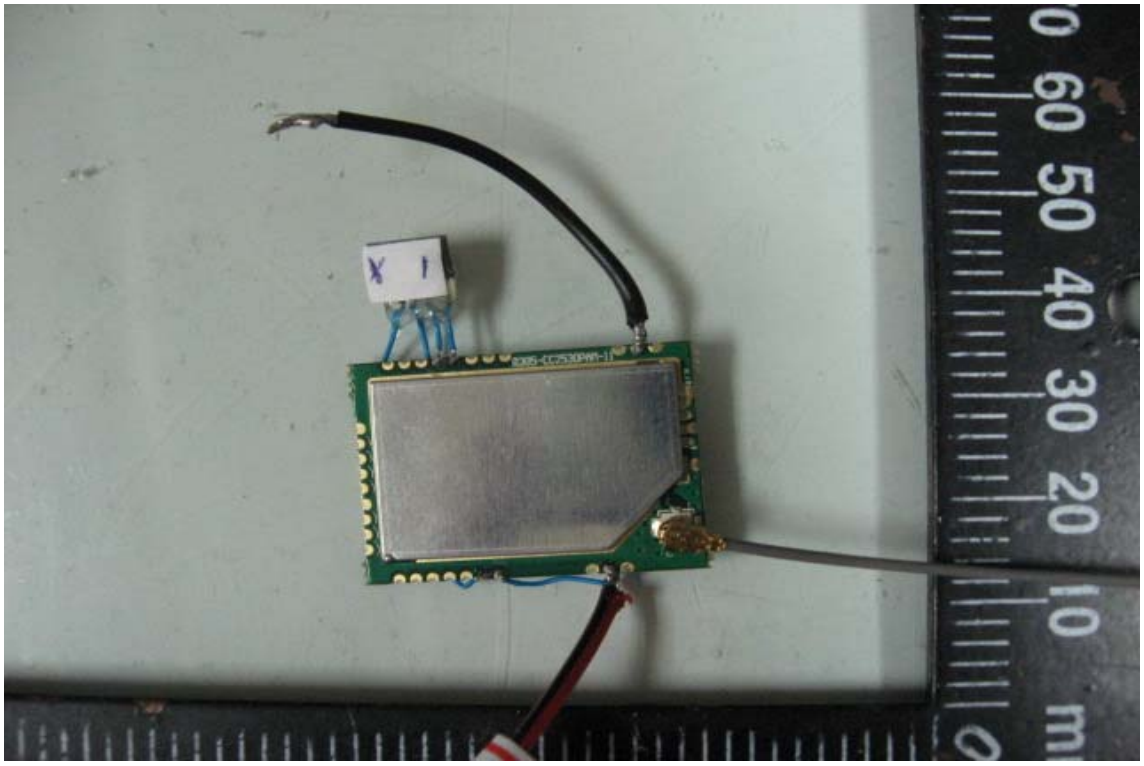

*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
13.10 dBm
Ref 20 dBm
Att 20 dB
SWT 2.6 s
2.428000000 GHz
20 Offset 30 dB
1
10
0
03-8
-10
-20
-30
-40
-50
-60
-70
-80
1 PK
VIEW
A
LVL
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz


*RBW 100 kHz
Marker 1 [T1]
VBW 300 kHz
13.31 dBm
Ref 20 dBm
Att 20 dB
SWT 2.6 s
2.479000000 GHz
20 Offset 30 dB
1
1 PK
VIEW
A
LVL
03-B
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
2.55 GHz/
Stop 26.5 GHz

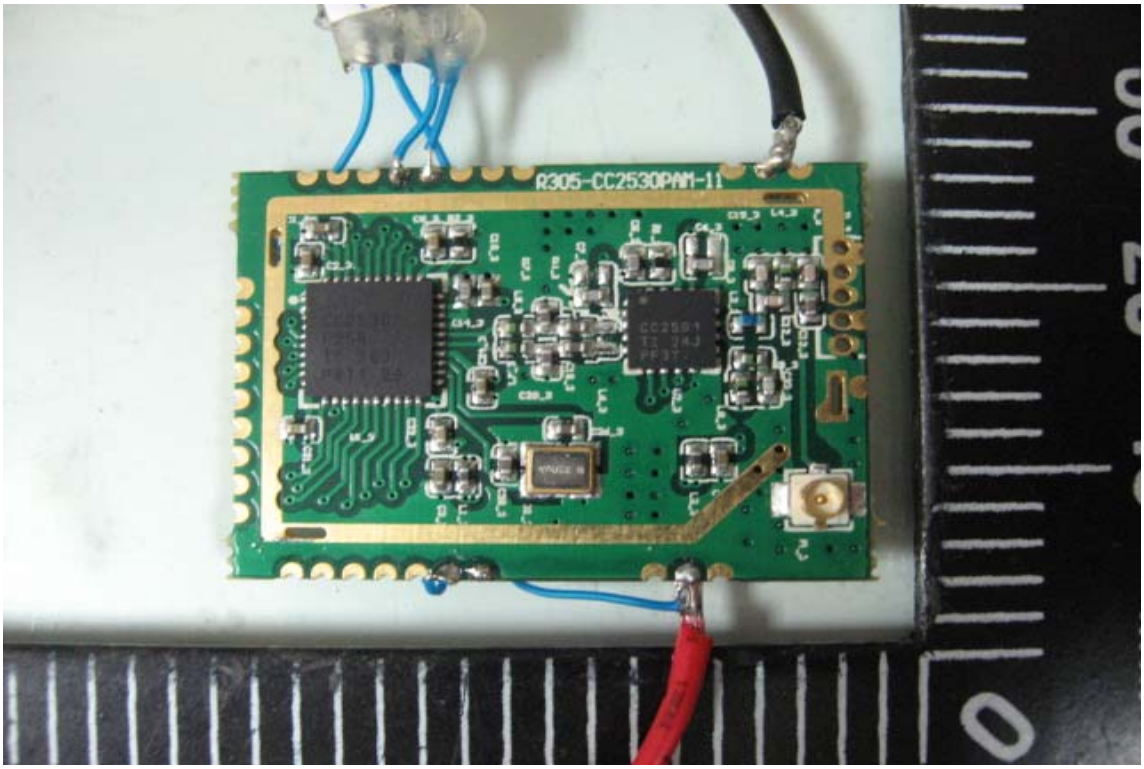
CONSTRUCTION PHOTOS OF EUT

EUT

1.

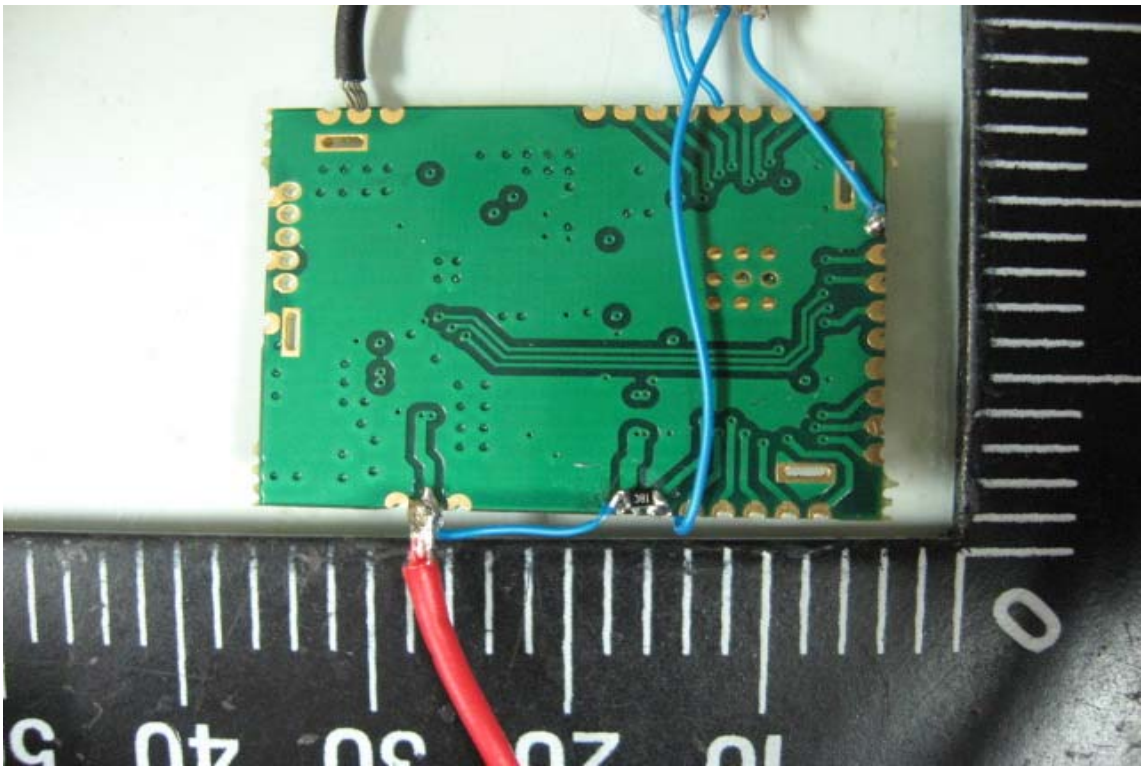


2.



CONSTRUCTION PHOTOS OF EUT

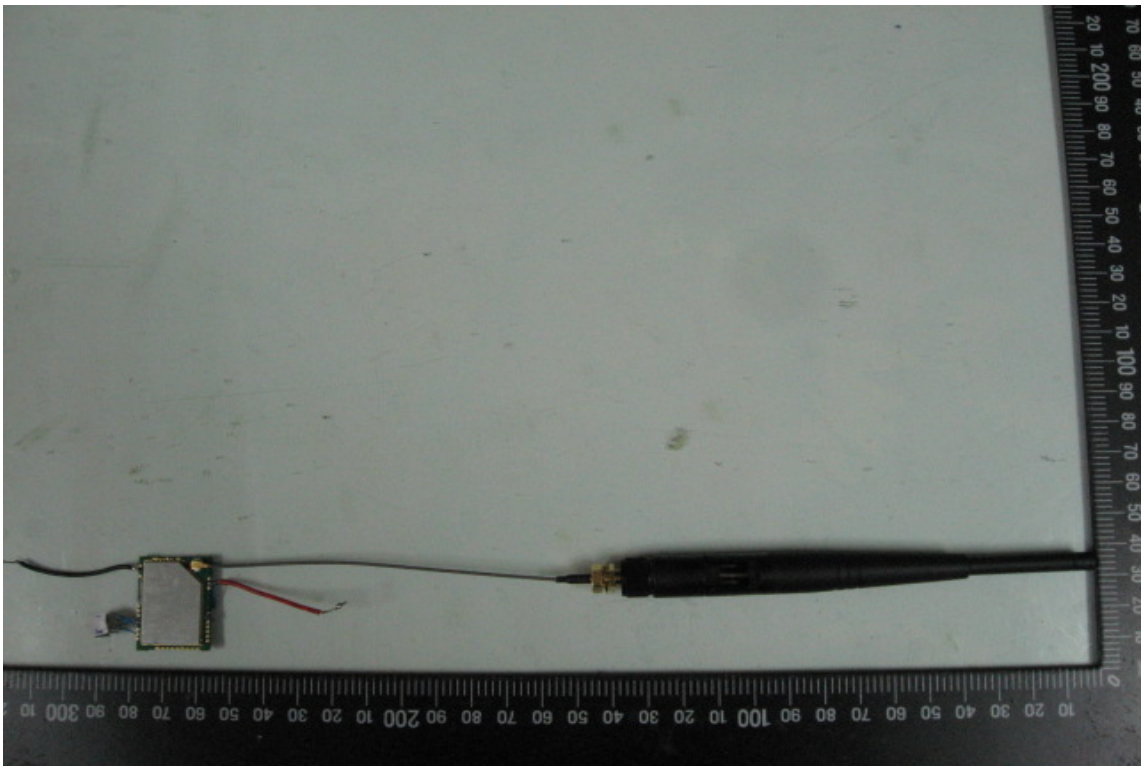
3.



CONSTRUCTION PHOTOS OF EUT

Antenna

1.



2.

CONSTRUCTION PHOTOS OF EUT

3.