

FCC TEST REPORT  
for  
Square Connect, Inc.

SQ Home Controller  
Model No.: SQB003-C-US

Prepared for : Square Connect, Inc.  
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Report Number : 201202772F-1  
Date of Test : Feb. 23~29, 2012  
Date of Report : Feb. 29, 2012

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## TEST REPORT

Applicant : Square Connect, Inc.  
 Manufacturer : Square Connect, Inc.  
 EUT : SQ Home Controller  
 Model No. : SQB003-C-US  
 Serial No. : N/A  
 Rating : DC 5V, 1A  
 Trade Mark : N/A

Measurement Procedure Used:  
 FCC Part15 Subpart C, Paragraph 15.247: 2010

The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

Date of Test : Feb. 23~29, 2012

*Andy chen*

Prepared by :

(Tested Engineer / Andy Chen)

*Jerry Du*

Reviewer :

(Project Manager / Jerry Du)

*Henry. Yang.*

Approved & Authorized Signer :

(Manager / Henry Yang)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT	: SQ Home Controller
Model Number	: SQB003-C-US
Test Power Supply	: 120V~, 60Hz for Adapter
Adapter	: Power Supply Model: SAW-0502000 Input: 100-240V~, 50-60Hz, 0.5A Output: 5V $\overline{---}$ , 2000mA
RF Transmission Frequency	: 908.40MHz-908.42MHz, 2412-2462MHz(802.11b/g)
Channels	: 11
Antenna Type	: RPSMA-J Port (It is a unique coupling to the interntional radiator, which considered sufficient to comply with the provisions of 15.203)
Antenna Gain	: 2dBi
Applicant Address	: Square Connect, Inc. 502 East Keji Building, Shenzhen High-Tech Ind-Park, Nanshan District, Shenzhen, China
Manufacturer Address	: Square Connect, Inc. fifth floor, NO.53, NO.2 Langshan Road, Daliang, Wanfeng, Shajing, Bao'an District, Shenzhen, China
Date of receiver	: Feb. 16, 2012
Date of Test	: Feb. 16~28, 2012

## 1.2.Auxiliary Equipment Used during Test

PC	: Manufacturer: DELL M/N: OPTIPLEX 380 S/N: 1J63X2X CE , FCC: DOC
MONITOR	: Manufacturer: DELL M/N: E170Sc S/N: CN-00V539-64180-055-0UPS CE , FCC: DOC
KEYBOARD	: Manufacturer: DELL M/N: SK-8115 S/N: CN-0DJ313-71616-06C-02XN CE , FCC: DOC Cable: 1m, unshielded
MOUSE	: Manufacturer: DELL M/N: M-UARDEL7 S/N: N/A CE , FCC: DOC Cable: 1m, unshielded
Printer	: Manufacturer:Brother M/N: MFC-3360C S/N: N/A CE, FCC:DOC
Power Line	: Non-Shielded, 1.5m
VGA Cable	: Non-Shielded, 1.5m
Network Cable	: Non-Shielded, 1.5m

### 1.3. Description of Test Facility

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

**CNAS - LAB Code: L3503**

Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

**FCC-Registration No.: 752021**

Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, August 20, 2010.

**IC-Registration No.: 8058A-1**

Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A, August 30, 2010.

**Test Location**

All Emissions tests were performed at  
Anbotek Compliance Laboratory Limited. at 1/F, 1 /Building, SEC Industrial Park,  
No.4 Qianhai Road, Nanshan District, Shenzhen, 518054, China

### 1.4. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.3dB
Conduction Uncertainty	:	Uc = 3.4dB

## 2. MEASURING DEVICE AND TEST EQUIPMENT

The following test equipments were used during test:

<b>Equipment</b>	<b>Manufacturer</b>	<b>Model #</b>	<b>Serial #</b>	<b>Data of Cal.</b>	<b>Due Data</b>
EMI Test Receiver	Rohde & Schwarz	ESCI	100119	May.03, 2011	May.02, 2012
EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	Sep.22, 2011	Sep.21, 2012
EMI Test Software	SHURPLE	ESK1	N/A	N/A	N/A
Spectrum Analyzer	Agilent	E7405A	MY45114970	Jun.21, 2011	Jun.20, 2012
Signal Generator	Rohde & Schwarz	SMR27	100124	Jul.06, 2011	Jul.05, 2012
Signal Generator	Rohde & Schwarz	SML03	102319	Aug.01, 2011	Aug.01, 2012
AC Power Source	Sepcial power system	YF650	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS21	100218	Apr.30, 2011	Apr.29, 2012
Power Meter	Rohde & Schwarz	NRVD	101287	Jul.19, 2011	Jul.18, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Coaxial Cable	N/A	N/A	N/A	May.31, 2011	May.30, 2012
Universal radio Communication tester	Rohde & Schwarz	CMU200	101724	Sep.08, 2011	Sep.07, 2012
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
BiConilog Antenna	ETS-LINDGREN	3142C	00042670	May.03, 2011	May.02, 2012
BiConilog Antenna	ETS-LINDGREN	3142C	00042673	May.03, 2011	May.02, 2012
Loop Antenna	ETS-LINGREN	6502	00071730	May.03, 2011	May.02, 2012
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00035926	Dec.30, 2011	Dec.29, 2012
Double-ridged Waveguide horn	ETS-LINDGREN	3117	00041545	Dec.30, 2011	Dec.29, 2012
Pre-amplifier	CD	PAM0203	804203	Jun.21, 2011	Jun.20, 2012
RF Switch	CD	RSU-M3	706543	Jun.21, 2011	Jun.20, 2012
Thermo-/Hygrometer	N/A	TH01	N/A	May.03, 2011	May.02, 2012
Shielding Room	Zhong Yu Electronic	N/A	N/A	N/A	N/A
3m Anechoic Chamber	Zhong Yu Electronic	N/A	N/A	Apr.28, 2011	Apr.27, 2012

### 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC Part 15, Paragraph 15.247

#### 3.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107, 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15, Paragraph 15.247(b)(1)	Peak Output Power	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(2)	6dB Bandwidth	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	100kHz Bandwidth of Frequency Band Edges	PASS	Complies
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS	Complies
FCC Part 15, Paragraph 15.247(a)(1)	Frequency Separation	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Number of Hopping Frequency	-	N/A
FCC Part 15, Paragraph 15.247(a)(1)(iii)	Time of Occupancy	-	N/A
FCC Part 15, Paragraph 15.247(c)	Peak Power Density	PASS	Complies

\* The digital circuit porting of the EUT has been tested and verified to comply with FCC Part 15, Subpart B., Class B Digital Devices and the associated Radio Receiver has also been tested and found to comply with FCC Part 15, Subpart B – Radio Receivers.

#### 3.2. Description of Test Modes

The EUT has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

IEEE802.11b: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 11Mbps highest data rate (worst case) are chosen for the final testing.

IEEE802.11g: Channel 1(2412MHz), Channel 6(2437MHz) and Channel 11(2462MHz) with 54Mbps data rate (the worst case) are chosen for the final testing.



## 3.3. List of channels:

√ - available

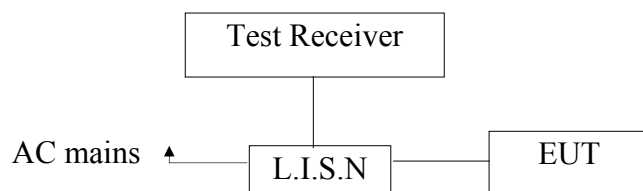
X - tested

Number	Frequency(MHz)	802.11 b/g	
1	2412	√	X
2	2417	√	
3	2422	√	
4	2427	√	
5	2432	√	
6	2437	√	X
7	2442	√	
8	2447	√	
9	2452	√	
10	2457	√	
11	2462	√	X

## 4. Conducted Emission Test

### 4.1. Block Diagram of Test Setup

#### 4.1.1. Block diagram of connection between the EUT and simulators



(EUT: SQ Home Controller)

### 4.2. Power Line Conducted Emission Measurement Limits (15.207)

Frequency MHz	Limits dB( $\mu$ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

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

### 4.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

EUT : SQ Home Controller  
 Model Number : SQB003-C-US  
 Applicant : Square Connect, Inc.

### 4.4. Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in test mode (ON) and measure it.

#### 4.5. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2009 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9KHz.

The frequency range from 150KHz to 30MHz is checked.

The test results are reported on Section 4.6.

#### 4.6. Power Line Conducted Emission Measurement Results

**PASS.**

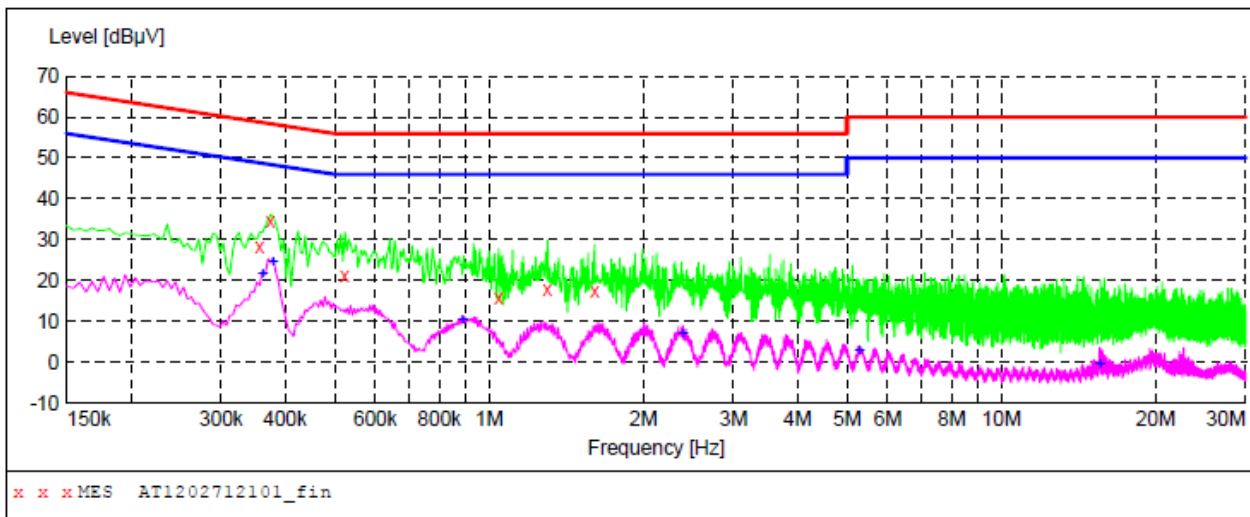
The frequency range from 150KHz to 30 MHz is investigated.

Please refer the following pages.

**CONDUCTED EMISSION TEST DATA**

EUT: SQ Home Controller M/N: SQB003-C-US  
 Operating Condition: On  
 Test Site: 1# Shielded Room  
 Operator: Andy Chen  
 Test Specification: AC 120V/60Hz for Adapter  
 Comment: Live Line  
 Tem:25°C Hum:50%

**SCAN TABLE: "Voltage (150K~30M) FIN"**  
 Short Description: 150K-30M Disturbance Voltages



**MEASUREMENT RESULT: "AT1202712101\_fin"**

3/1/2012 9:20AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.357000	28.20	10.1	59	30.6	QP	L1	GND
0.375000	34.40	10.1	58	24.0	QP	L1	GND
0.523500	21.20	10.1	56	34.8	QP	L1	GND
1.045000	15.70	10.2	56	40.3	QP	L1	GND
1.301500	17.70	10.2	56	38.3	QP	L1	GND
1.607500	17.20	10.3	56	38.8	QP	L1	GND

**MEASUREMENT RESULT: "AT1202712101\_fin2"**

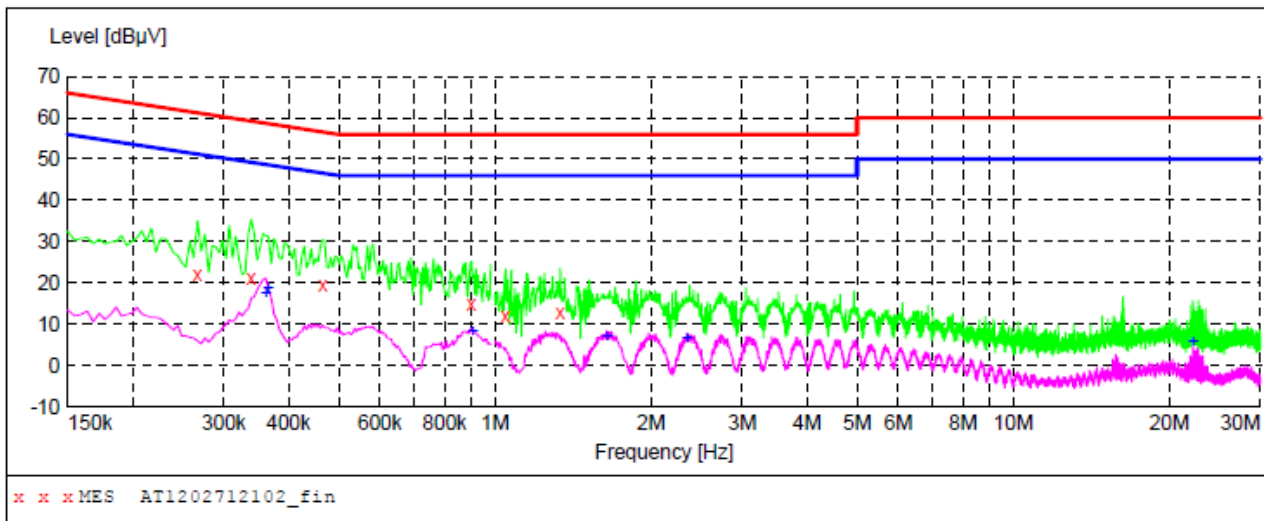
3/1/2012 9:20AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.361500	21.60	10.1	49	27.1	AV	L1	GND
0.379500	24.60	10.1	48	23.7	AV	L1	GND
0.888000	10.20	10.1	46	35.8	AV	L1	GND
2.390500	7.00	10.3	46	39.0	AV	L1	GND
5.288500	2.70	10.5	50	47.3	AV	L1	GND
15.580000	-0.50	10.7	50	50.5	AV	L1	GND

**CONDUCTED EMISSION TEST DATA**

EUT: SQ Home Controller M/N: SQB003-C-US  
 Operating Condition: On  
 Test Site: 1# Shielded Room  
 Operator: Andy Chen  
 Test Specification: AC 120V/60Hz for Adapter  
 Comment: Neutral Line  
 Tem:25°C Hum:50%

**SCAN TABLE: "Voltage (150K~30M) FIN"**  
 Short Description: 150K-30M Disturbance Voltages



**MEASUREMENT RESULT: "AT1202712102\_fin"**

3/1/2012 9:23AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.267000	21.80	10.1	61	39.4	QP	N	GND
0.339000	21.20	10.1	59	38.0	QP	N	GND
0.465000	19.40	10.1	57	37.2	QP	N	GND
0.901500	14.90	10.1	56	41.1	QP	N	GND
1.049500	12.10	10.2	56	43.9	QP	N	GND
1.337500	12.70	10.2	56	43.3	QP	N	GND

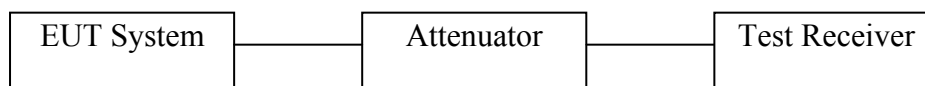
**MEASUREMENT RESULT: "AT1202712102\_fin2"**

3/1/2012 9:23AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.361500	17.30	10.1	49	31.4	AV	N	GND
0.366000	18.50	10.1	49	30.1	AV	N	GND
0.906000	8.40	10.1	46	37.6	AV	N	GND
1.643500	7.10	10.3	46	38.9	AV	N	GND
2.350000	6.40	10.3	46	39.6	AV	N	GND
22.253500	5.80	10.8	50	44.2	AV	N	GND

## 5. FCC Part 15.247 Requirements for DSSS & OFDM Modulation

### 5.1 Test Setup



### 5.2 6dB Bandwidth

#### a. Limit

For the direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

#### b. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = RBW, Span = 50MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### c. Test Setup

See 5.1

#### d. Test Results

Pass

#### e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	9.4		Pass
Mid	2437	9.4	>500	Pass
High	2462	9.4		Pass

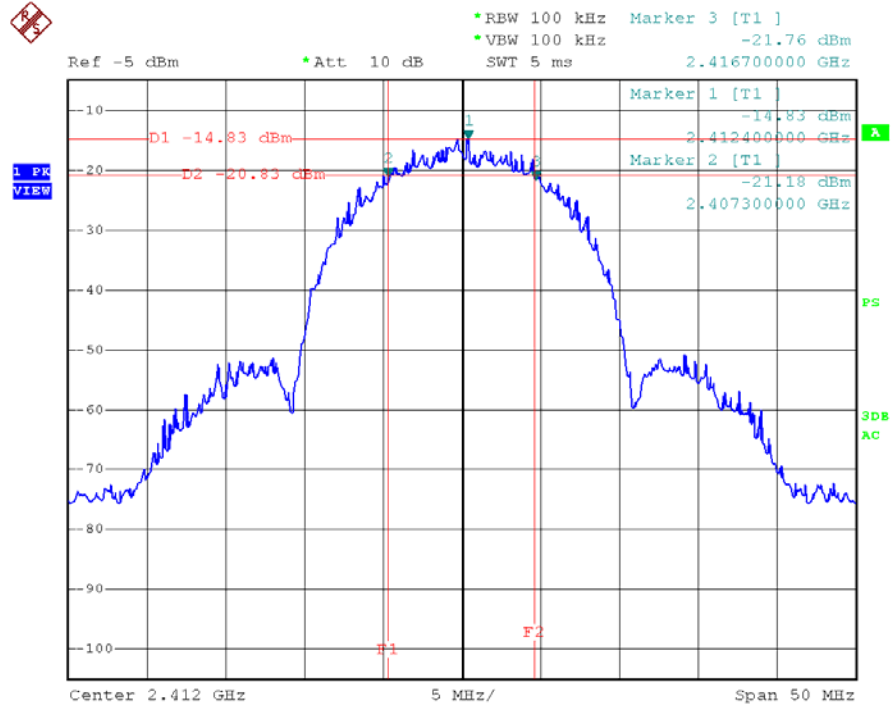
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Results
Low	2412	16.4		Pass
Mid	2437	16.4	>500	Pass
High	2462	16.5		Pass

#### f. Test Plots

See the following page.

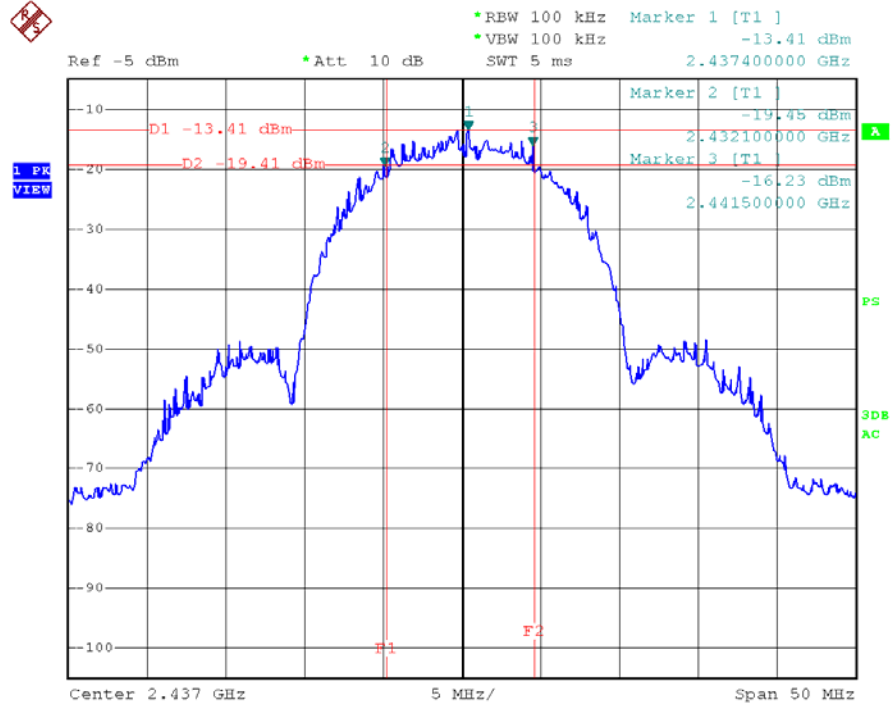
Test Mode: 802.11b---Low



6dB down-2412-11M

Date: 28.FEB.2012 20:01:02

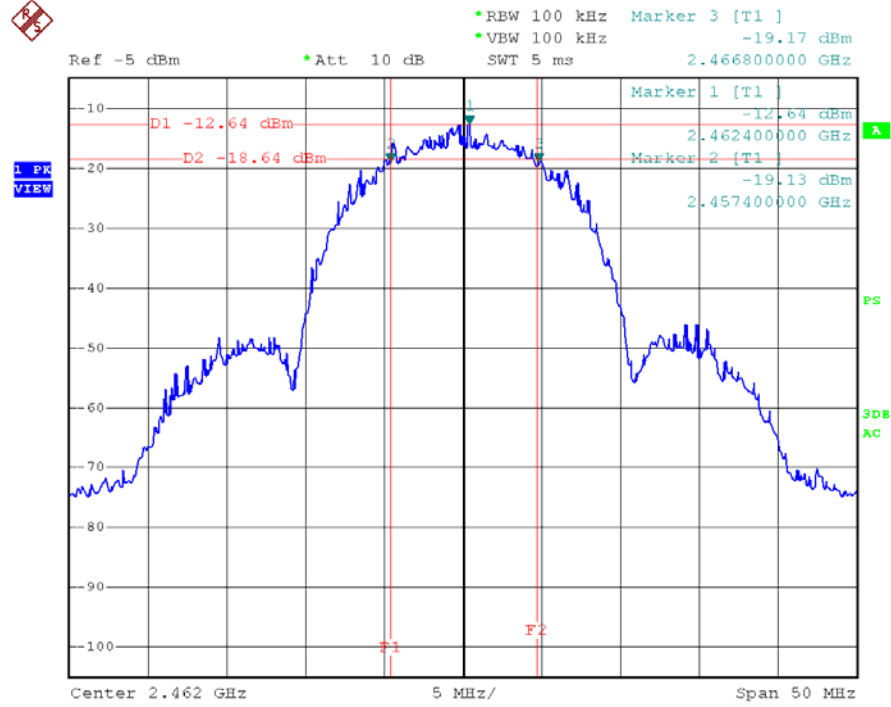
Test Mode: 802.11b---Mid



6dB down-2437-11M

Date: 28.FEB.2012 19:59:06

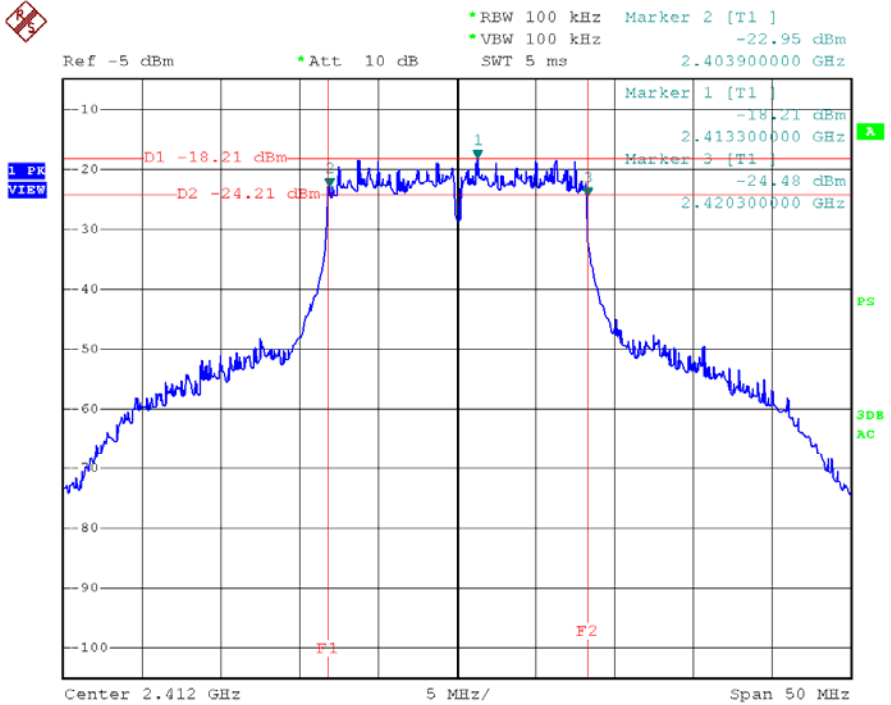
Test Mode: 802.11b---High



6dB down-2462-11M

Date: 28.FEB.2012 20:04:05

Test Mode: 802.11g---Low



6dB down-2412-54M

Date: 28.FEB.2012 20:11:14





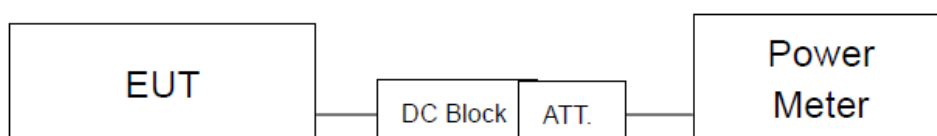
### 5.3 Maximum Peak output power test

#### a. Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 watt (30dBm).
2. Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antenna of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### b. Configuration of Measurement



#### c. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to DTS test procedure of Oct 2007 KDB558074 for compliance to FCC 47CFR 15.247 requirements. For FCC §15.247(b) the power output was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Peak output power was read directly from power meter. The test was performed at 3 channels (lowest, middle and highest).

#### d. Test Results

Pass

#### e. Test Data

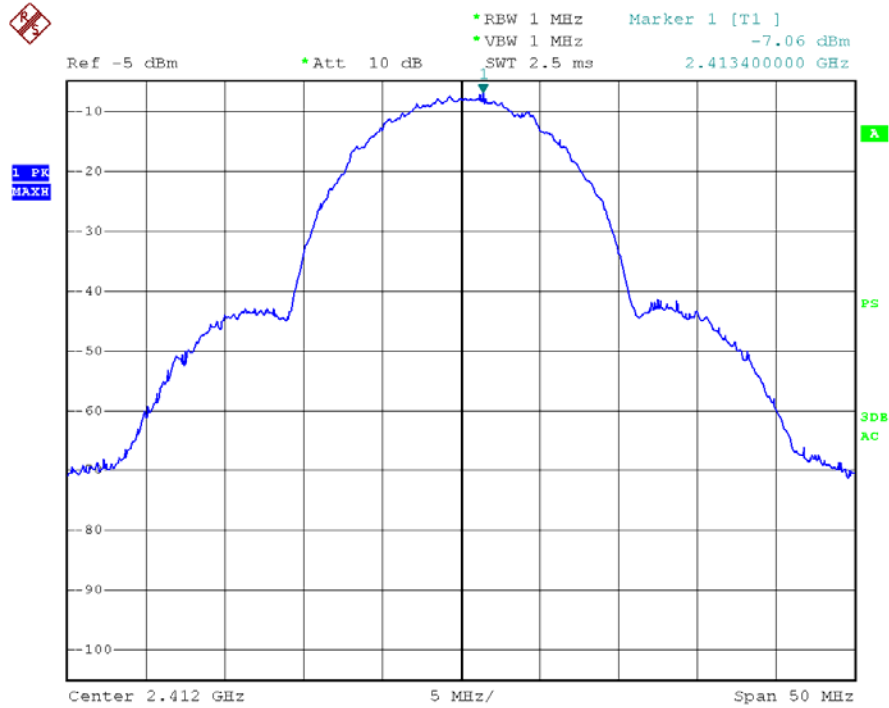
Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Maximum transmit power		Limit		Result
		(dBm)	(watts)	(dBm)	(watts)	
Low	2412	-7.06	0.0001968	30	1	Pass
Mid	2437	-8.22	0.0001507			Pass
High	2462	-6.35	0.0002223			Pass

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Maximum transmit power		Limit		Result
		(dBm)	(watts)	(dBm)	(watts)	
Low	2412	-6.92	0.0002032	30	1	Pass
Mid	2437	-6.08	0.0002466			Pass
High	2462	-5.16	0.0003048			Pass

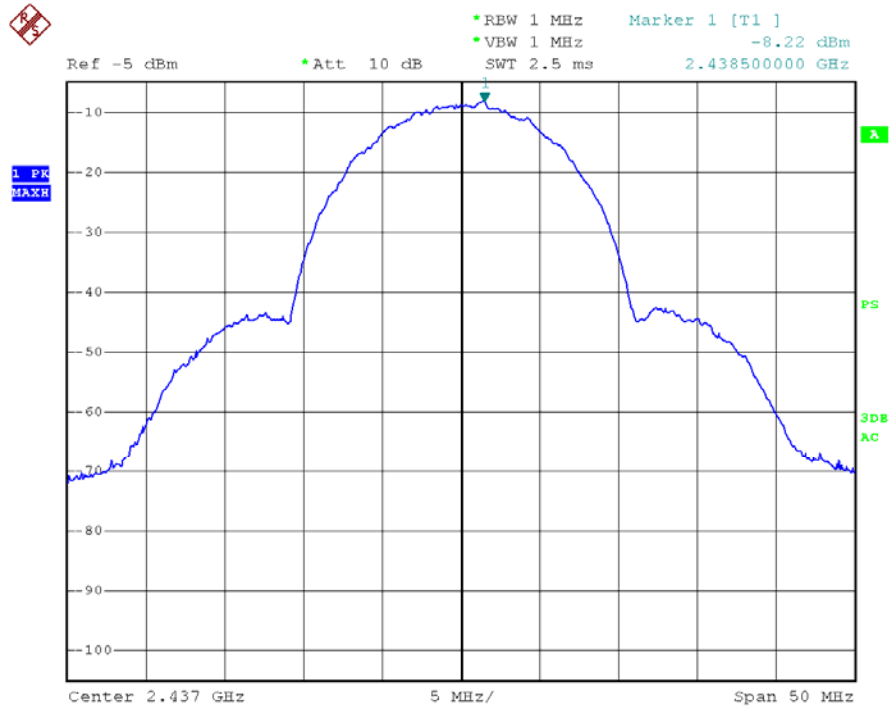
Test Mode: 802.11b ---Low



Power-2412-11M

Date: 28.FEB.2012 19:53:07

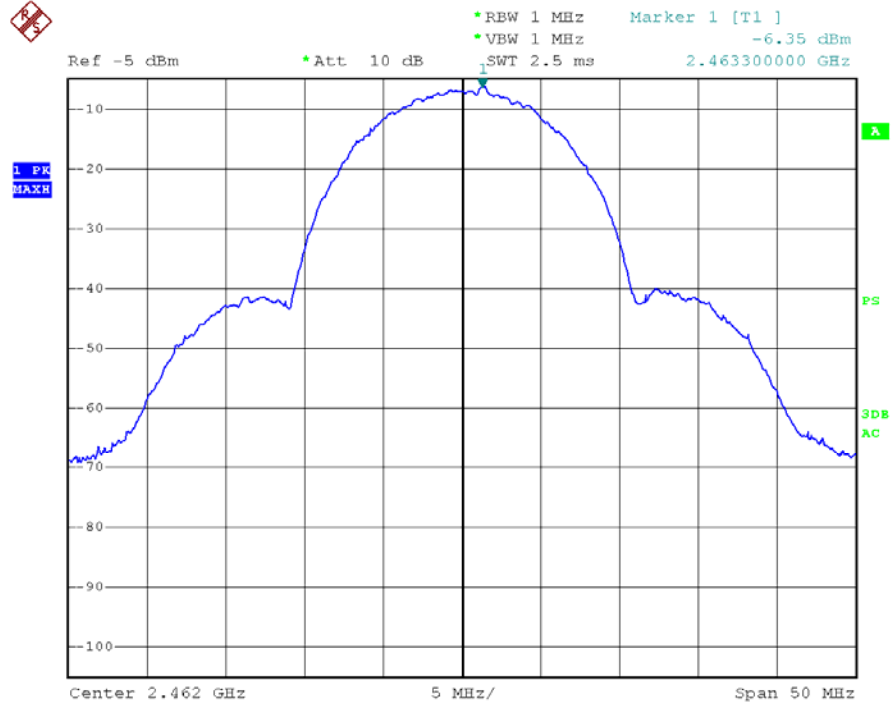
Test Mode: 802.11b---Mid



Power-2437-11M

Date: 28.FEB.2012 19:51:08

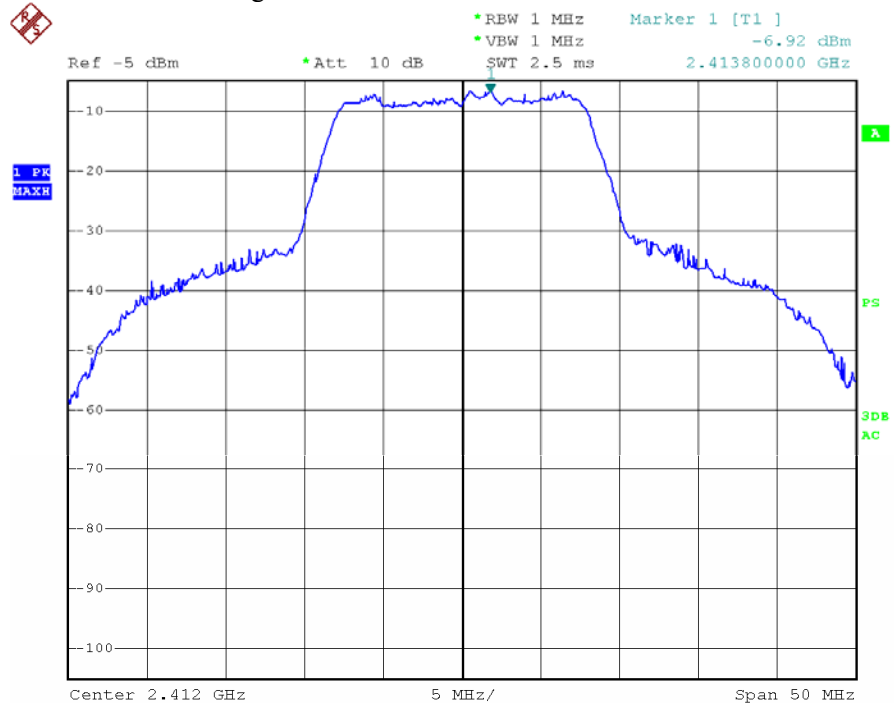
Test Mode: 802.11b---High



Power-2462-11M

Date: 28.FEB.2012 19:48:54

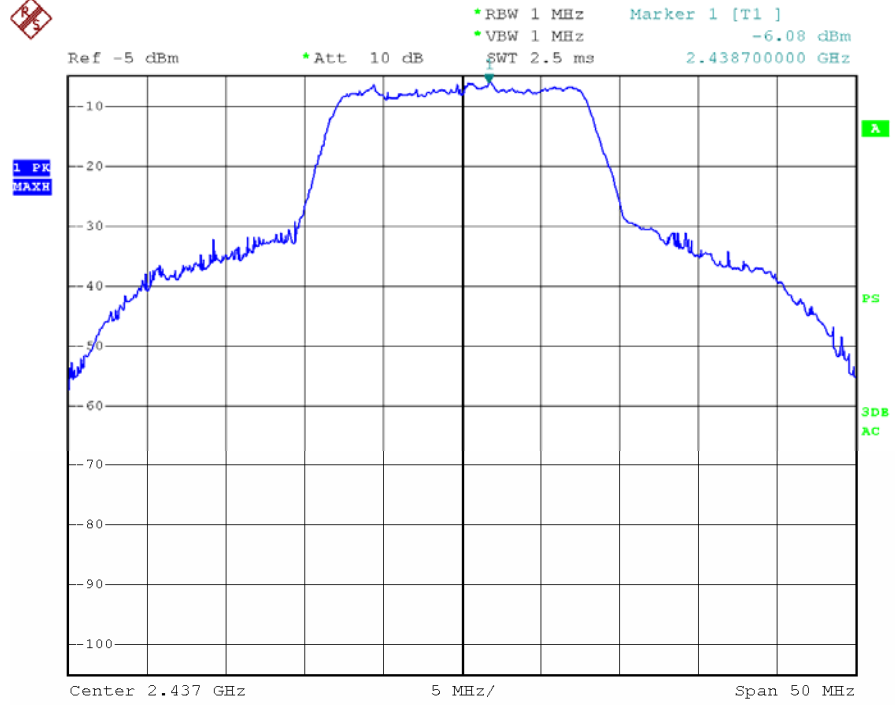
Test Mode: 802.11g ---Low



Power-2412-54M

Date: 28.FEB.2012 19:44:04

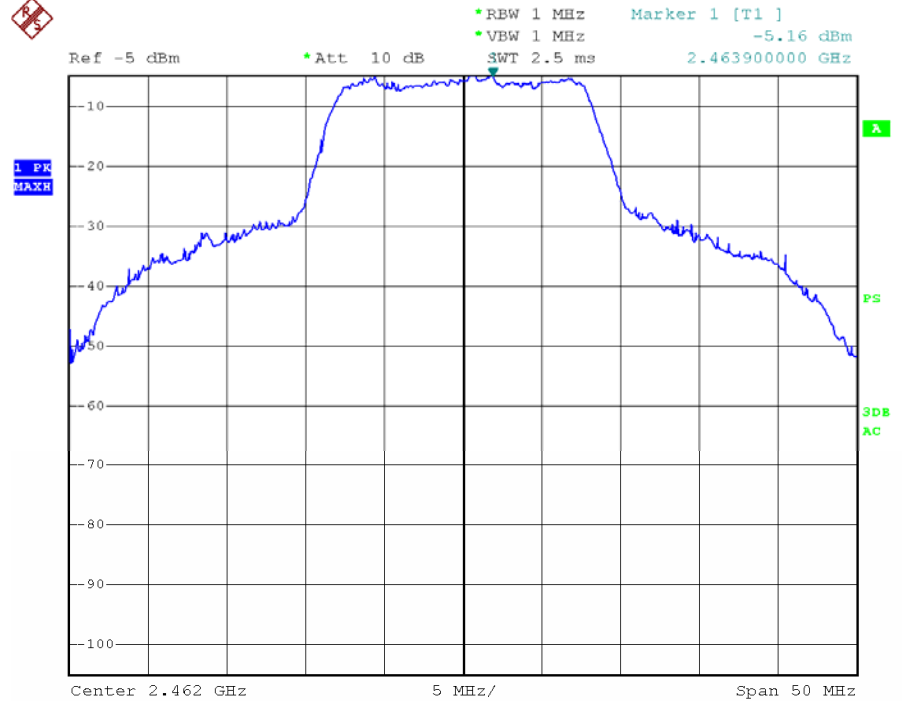
Test Mode: 802.11g---Mid



Power-2437-54M

Date: 28.FEB.2012 19:45:14

Test Mode: 802.11g---High



Power-2462-54M

Date: 28.FEB.2012 19:47:03

### 5.4 Band Edges Measurement

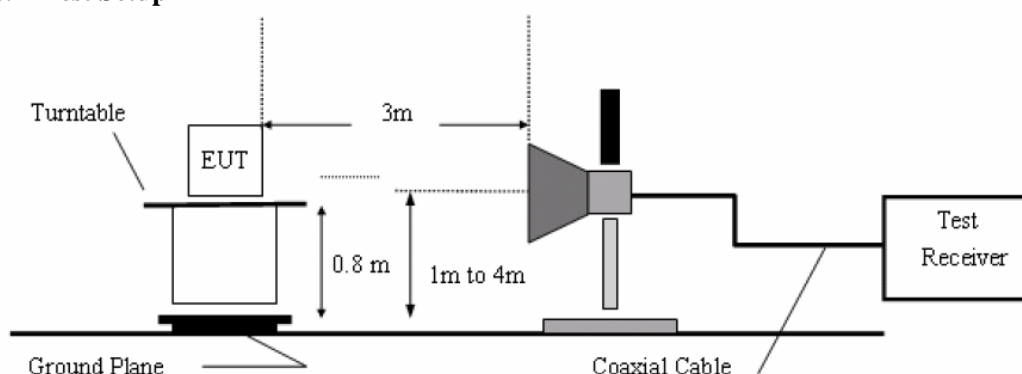
#### a. Limit

According to §15.247(c), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, 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).

#### b. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Peak detector: RBW=100KHz, VBW=100KHz, SWT=AUTO  
Average detector: RBW=1MHz, VBW=10Hz, SWT=AUTO  
The EUT is tested in 9\*6\*6 Chamber.
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

#### c. Test Setup



#### d. Test Results

Pass

#### e. Test Data

Test mode: IEEE 802.11b

Channel	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low	2310~2390	PK	36.45	74	-37.55
		AV	28.89	54	-25.11
High	2483.5~2500	PK	38.20	74	-35.80
		AV	34.82	54	-19.18

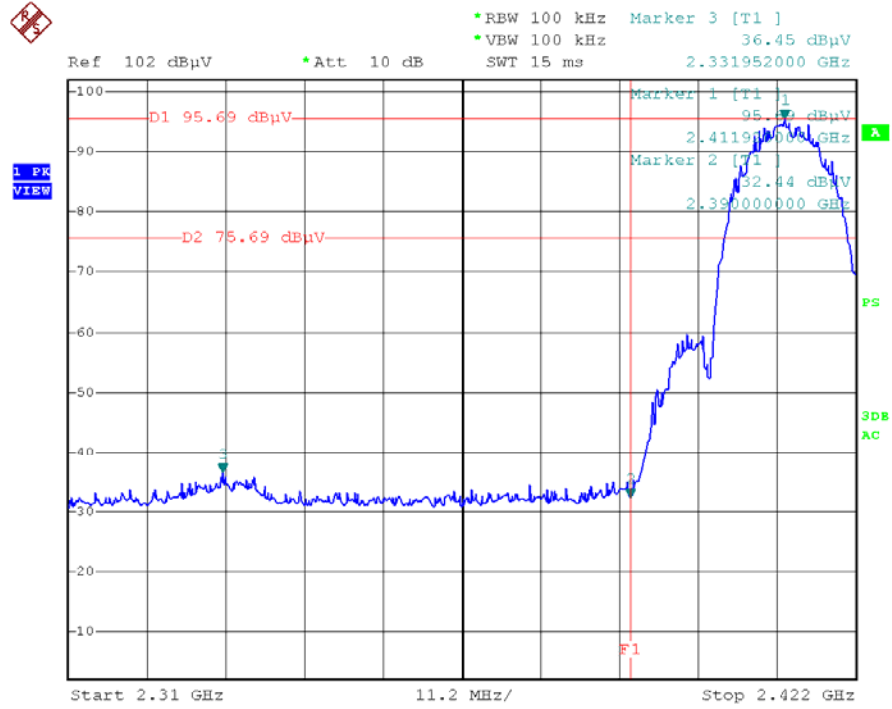
Test mode: IEEE 802.11g

Channel	Restrict Freq. Band (MHz)	Detector Mode	Maximum level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low	2310~2390	PK	47.69	74	-26.31
		AV	39.37	54	-14.63
High	2483.5~2500	PK	52.83	74	-21.17
		AV	47.47	54	-6.53

#### f. Test Plots

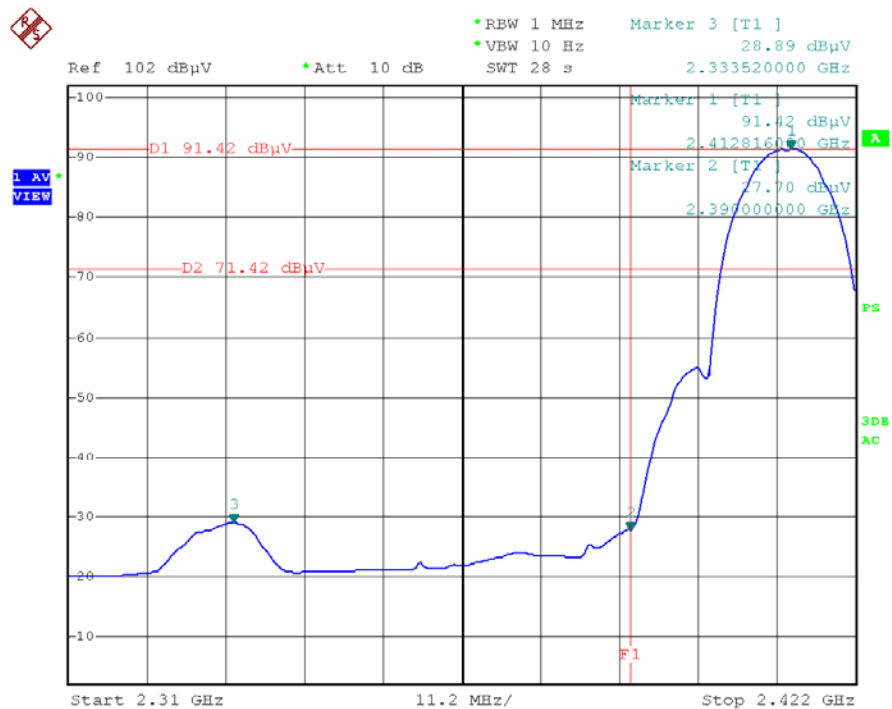
See the following page.

Test Mode: 802.11b ---Low



Bandedges-2412-11M

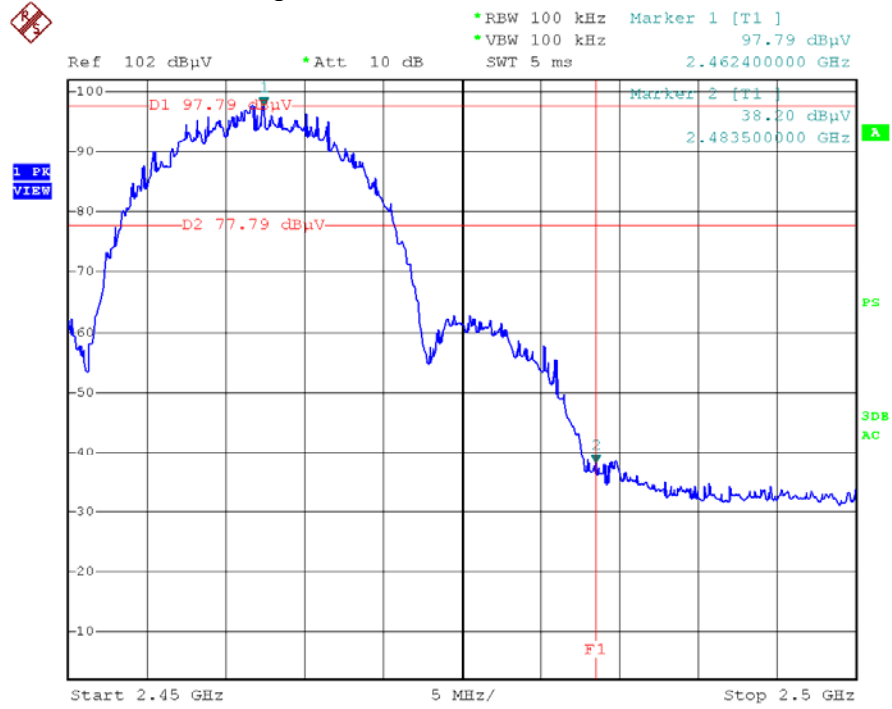
Date: 28.FEB.2012 21:34:37



Bandedges-2412-11M-AV

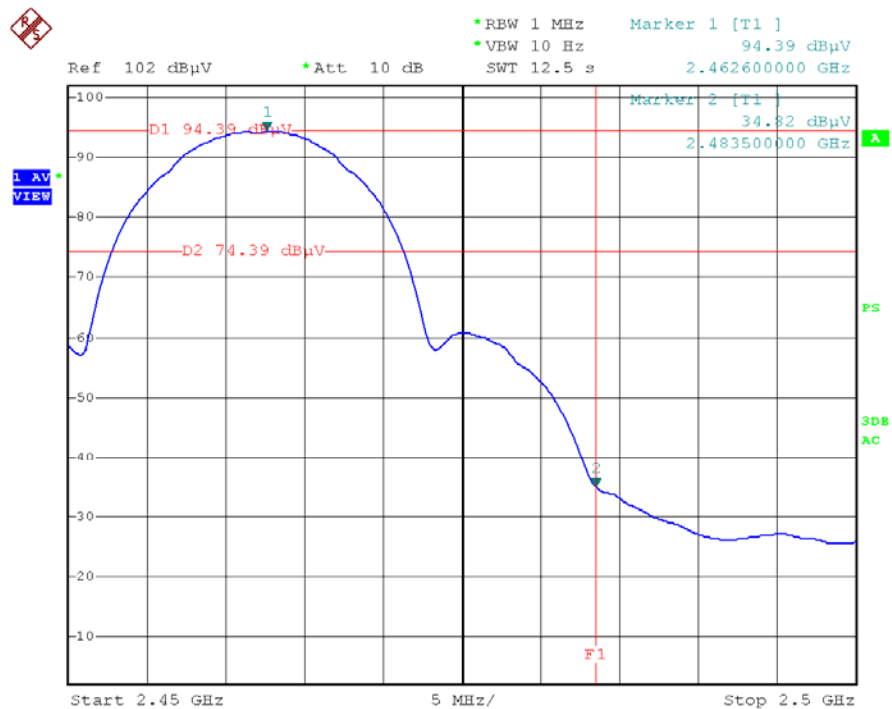
Date: 28.FEB.2012 21:26:07

Test Mode: 802.11b ---High



Bandedges-2462-11M

Date: 28.FEB.2012 21:36:20

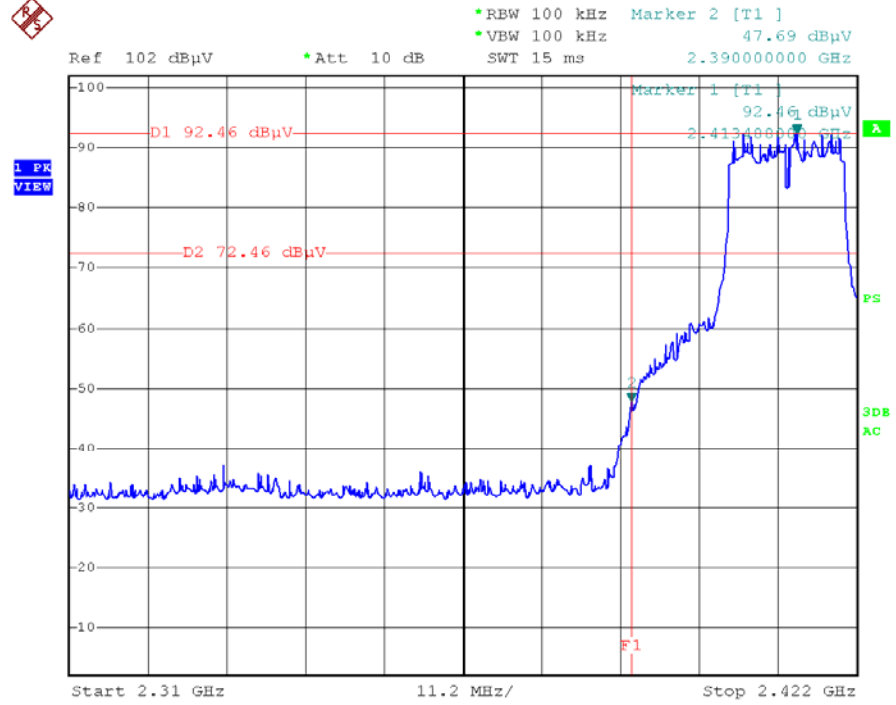


Bandedges-2462-11M-AV

Date: 28.FEB.2012 21:28:57

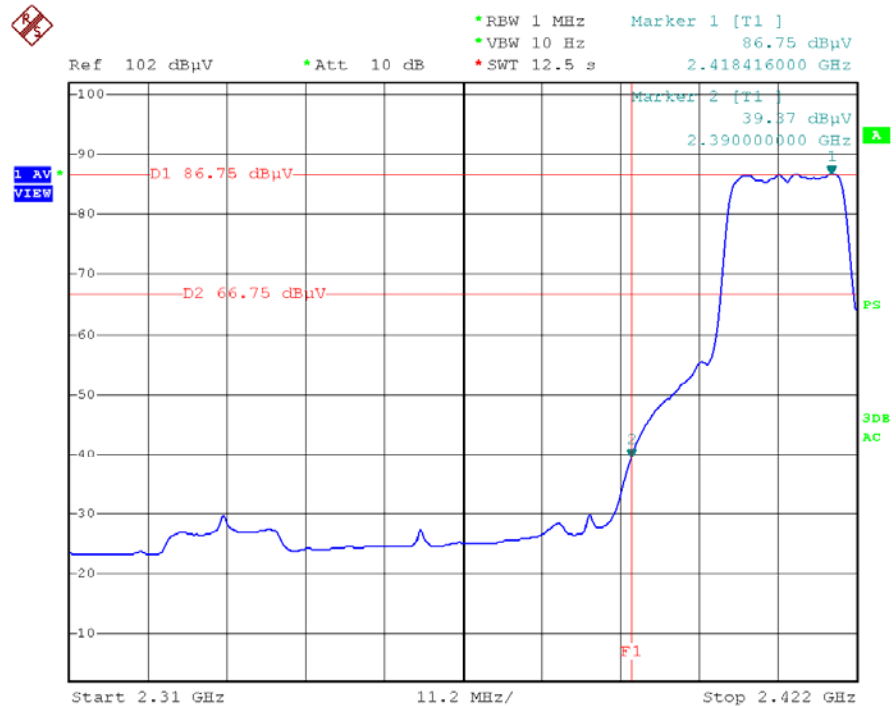


Test Mode: 802.11g ---Low



Bandedges-2412-54M

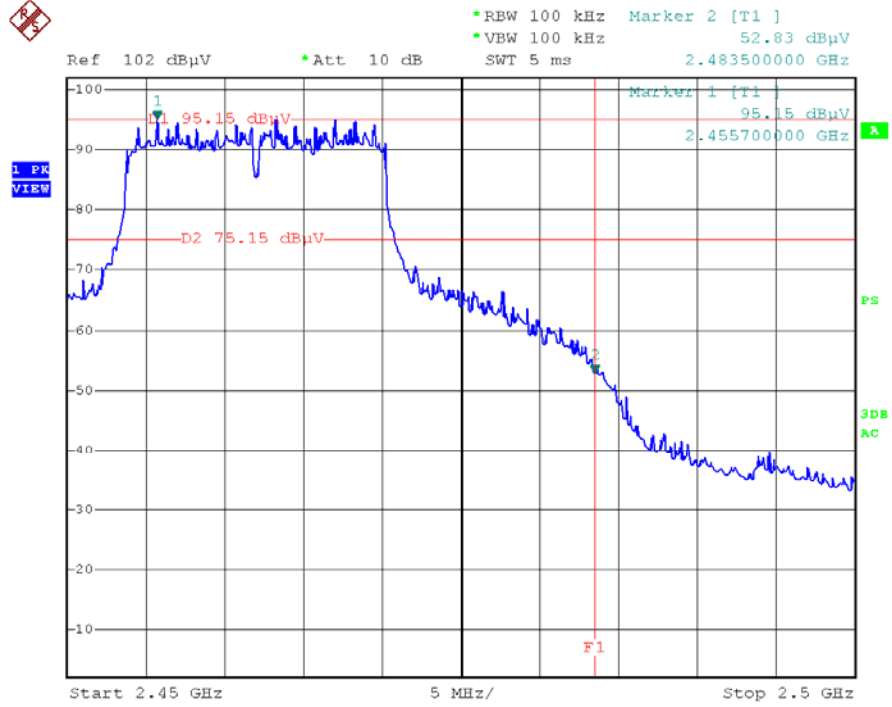
Date: 28.FEB.2012 21:10:10



Bandedges-2412-54M-AV

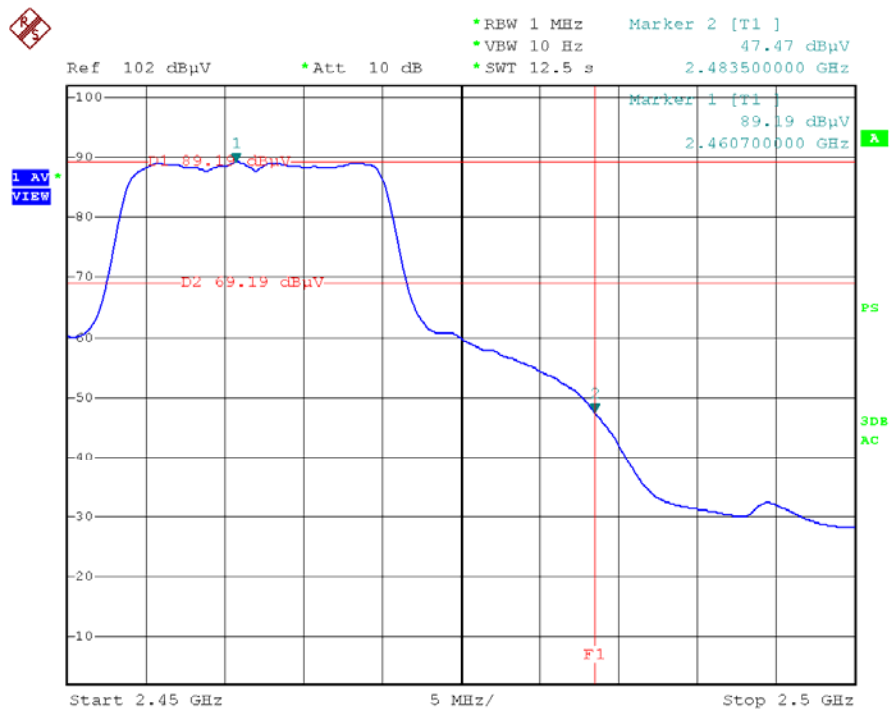
Date: 28.FEB.2012 21:23:50

Test Mode: 802.11g ---High



Bandedges-2462-54M

Date: 28.FEB.2012 21:15:31



Bandedges-2462-54M-AV

Date: 28.FEB.2012 21:20:20

### 5.5 Peak Power Spectral Density

#### a. Limit

1. For direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.
2. The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

#### b. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5MHz, Sweep=500s
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

#### c. Test Setup

See 5.1

#### d. Test Results

Pass

#### e. Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	PPSD (dBm/3KHz)	$\Sigma$ PPSD (dBm/3KHz)	Limit (dBm)	Result
Low	2412	-12.75	-	8.00	Pass
Mid	2437	-12.92	-		Pass
High	2462	-12.61	-		Pass

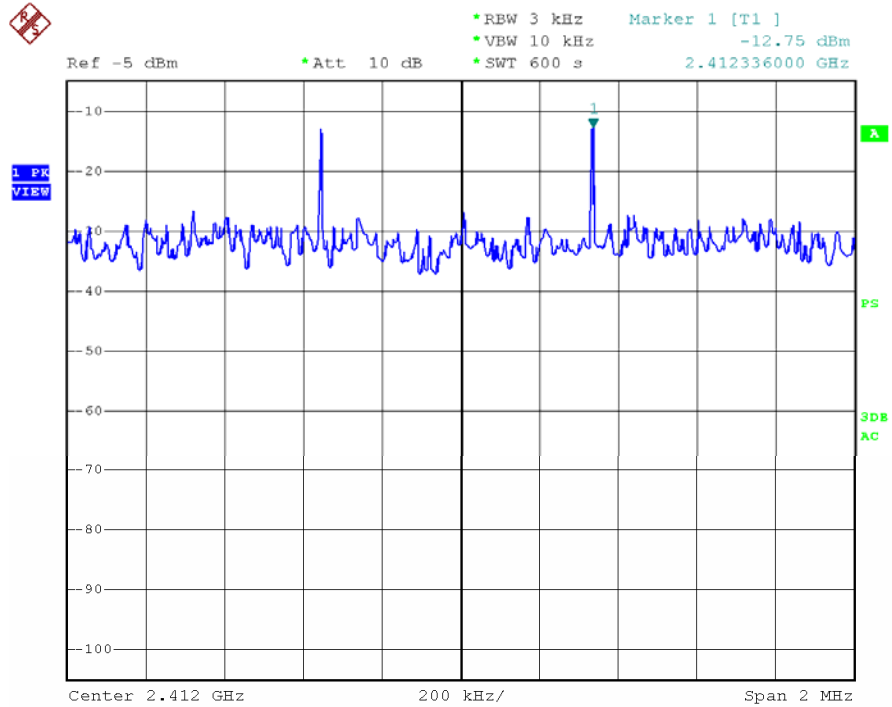
Test mode: IEEE 802.11g

Channel	Frequency (MHz)	PPSD (dBm)	$\Sigma$ PPSD (dBm)	Limit (dBm)	Result
Low	2412	-29.02	-	8.00	Pass
Mid	2437	-29.45	-		Pass
High	2462	-29.82	-		Pass

#### f. Test Plot

See the following pages

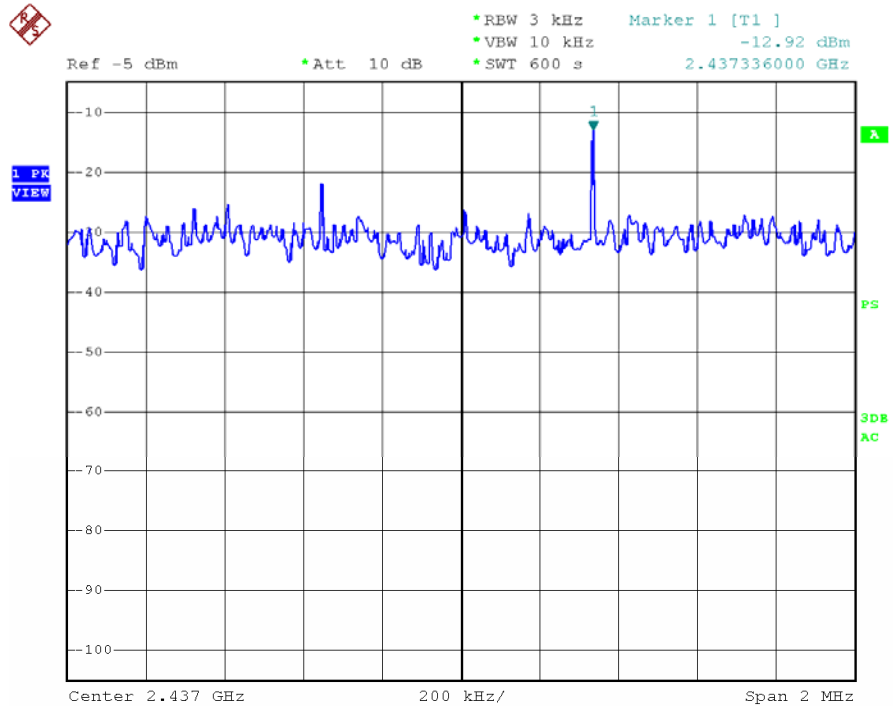
### 802.11 b CH--Low



Power Density-2412-11M

Date: 28.FEB.2012 20:53:04

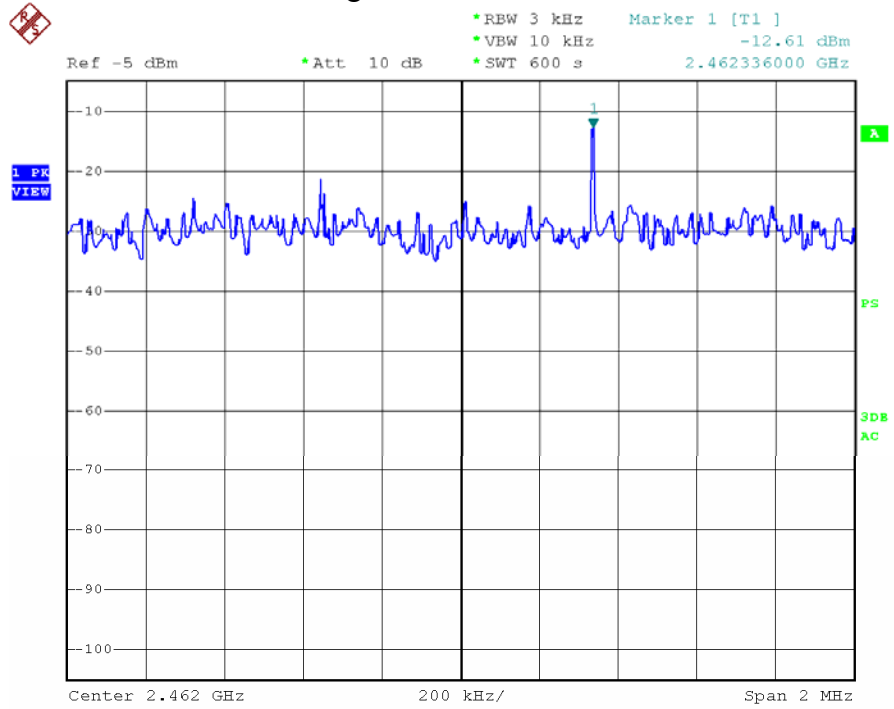
### CH--Mid



Power Density-2437-11M

Date: 28.FEB.2012 20:55:02

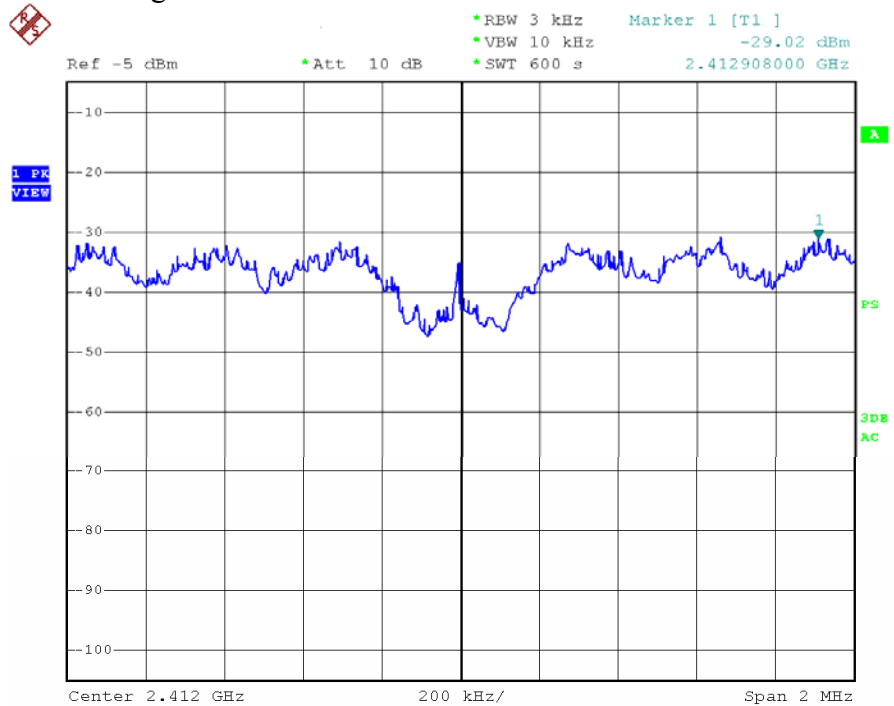
### CH--High



Power Density-2462-11M

Date: 28.FEB.2012 20:57:07

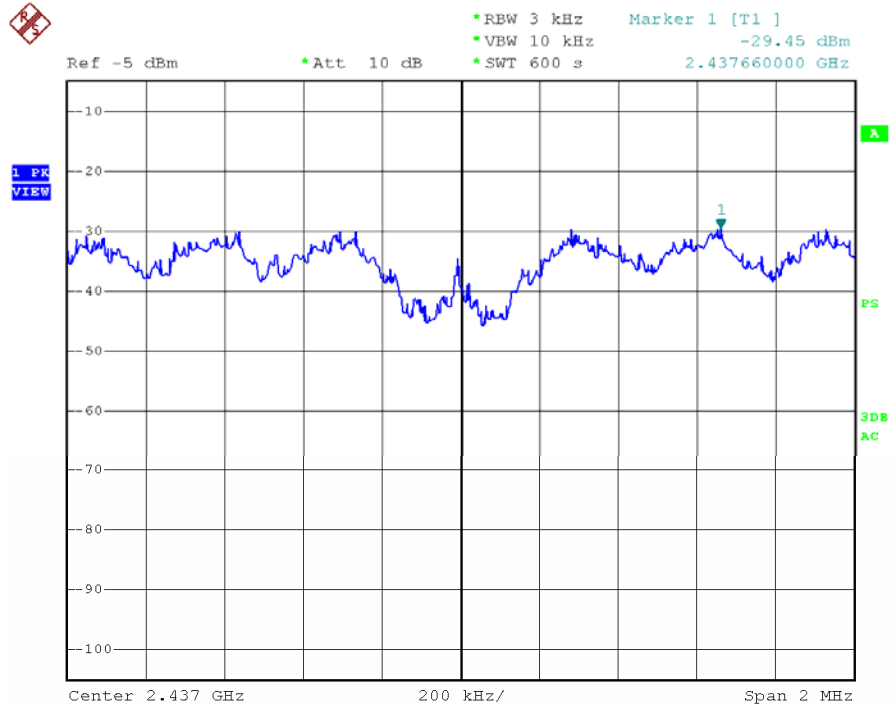
### 802.11g CH--Low



Power Density-2412-54M

Date: 28.FEB.2012 21:03:26

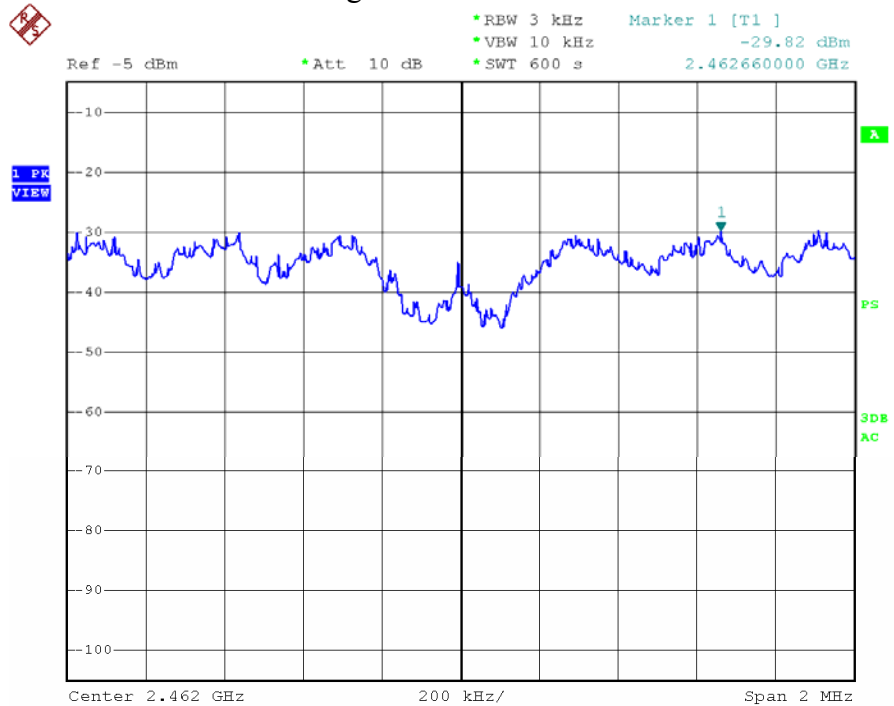
### CH--Mid



Power Density-2437-54M

Date: 28.FEB.2012 21:01:54

### CH--High



Power Density-2462-54M

Date: 28.FEB.2012 20:59:10

## 5.6 Radiated Emissions

### 5.6.1. Requirements (15.209 & 15.205):

#### 5.6.1.1. Test Limits (< 30 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30

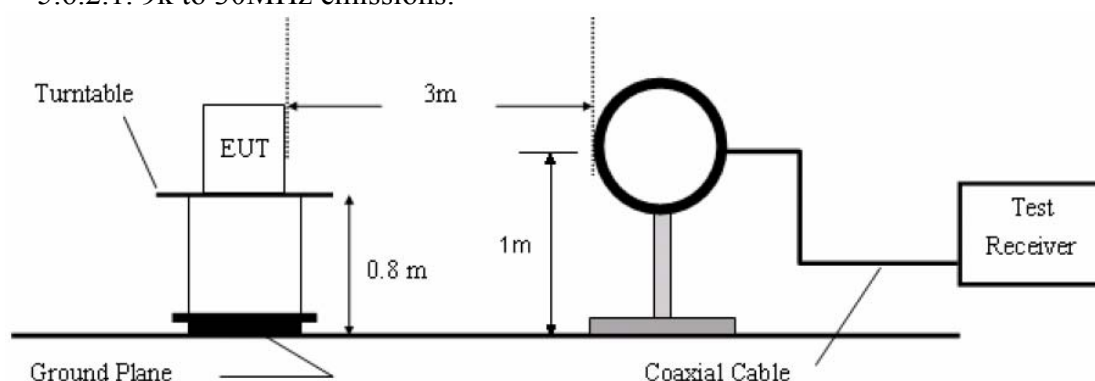
#### 5.6.1.2. Test Limits ( $\geq$ 30 MHz)

FIELD STRENGTH of Fundamental:	FIELD STRENGTH of Harmonics	S15.209	
902-928 MHz		30 - 88 MHz	40 dBuV/m @3M
2.4-2.4835 GHz		88 - 216 MHz	43.5
94 dB $\mu$ V/m @3m	54 dB $\mu$ V/m @3m	216 - 960 MHz	46
		ABOVE 960 MHz	54dBuV/m

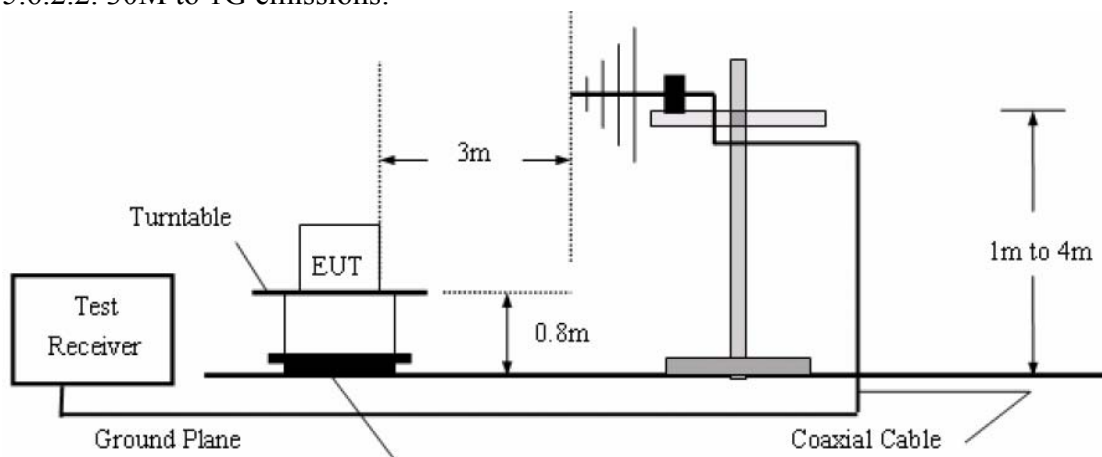
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 5.6.2. Test Configuration:

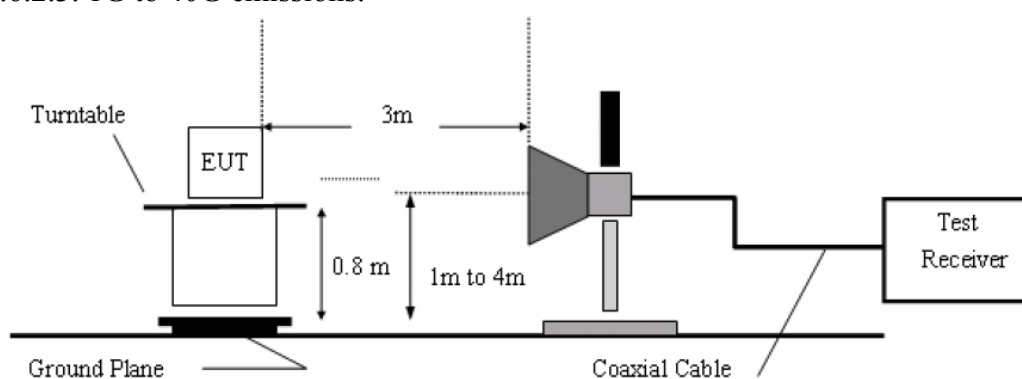
#### 5.6.2.1. 9k to 30MHz emissions:



## 5.6.2.2. 30M to 1G emissions:



## 5.6.2.3. 1G to 40G emissions:



## 5.6.3. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Measurements are made on 9KHz to 30MHz and 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9\*6\*6 Chamber.

The test results are listed in Section 5.6.4.

## 5.6.4. Test Results



FCC ID: CGO- SQB003

**Below 30MHz**

There is no emissions were detected below 30MHz

**From 30MHz to 1 GHz**

Operation Mode: Normal link

Temperature: 25°C

Humidity: 70 % RH

Test Date:Feb. 27, 2012

Tested by: Andy Chen

Polarity: Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Detector Mode (PK/QP)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
60.0690	V	Peak	61.00	-25.24	35.76	40.00	-4.24
125.0066	V	Peak	64.63	-25.10	39.53	43.50	-3.97
159.7844	V	Peak	64.33	-26.49	37.84	43.50	-5.66
250.3011	V	Peak	63.83	-22.55	41.28	46.00	-4.72
480.5276	V	Peak	58.56	-19.63	38.89	46.00	-7.11
801.7862	V	Peak	53.24	-12.59	40.65	46.00	-5.35
125.0066	H	Peak	64.81	-30.01	34.80	43.50	-8.70
159.7844	H	Peak	71.35	-31.49	39.86	43.50	-3.64
250.3011	H	Peak	69.22	-26.27	42.95	46.00	-3.05
375.9384	H	Peak	60.96	-21.90	39.06	46.00	-6.94
480.5276	H	Peak	62.34	-19.90	42.44	46.00	-3.56
801.7862	H	Peak	55.41	-13.59	41.82	46.00	-4.18

Notes:

1. Measuring frequencies from 30 MHz to the 1GHz and the IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/Quasi-peak detector mode.
3. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

FCC ID: CGO- SQB003

**Above 1 GHz**

Operation Mode: TX / IEEE 802.11b / CH Low

Temperature: 25°C

Humidity: 70 % RH

Test Date: Feb. 27, 2012

Tested by: Andy Chen

Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4824	H	46.21	35.76	4.58	34.94	51.61	---	74.00	54.00	-22.39	Peak
2.	4824	H	38.56	35.76	4.58	34.94	---	43.92	74.00	54.00	-10.08	AVG
3.	7240	H	43.47	37.85	5.63	35.25	51.70	---	74.00	---	-22.30	Peak
4.	9648	H	44.48	39.39	6.34	35.70	54.51	---	74.00	---	-19.49	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4824	V	46.37	35.13	4.58	34.94	---	51.14	74.00	54.00	-2.86	AVG
2.	4824	V	51.34	35.13	4.58	34.94	56.11	---	74.00	54.00	-17.89	Peak
3.	7240	V	41.45	36.90	5.63	35.25	48.73	---	74.00	---	-25.27	Peak
4.	9648	V	43.14	38.57	6.34	35.70	52.35	---	74.00	---	-21.65	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

FCC ID: CGO- SQB003

Operation Mode: TX / IEEE 802.11b / CH Mid  
 Temperature: 25°C  
 Humidity: 70 % RH

Test Date: Feb. 27, 2012  
 Tested by: Andy Chen  
 Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	41.07	35.83	4.61	34.93	---	46.58	74.00	54.00	-7.42	AVG
2.	4874	H	45.33	35.83	4.61	34.93	50.84	---	74.00	54.00	-23.16	Peak
3.	7311	H	42.14	37.86	5.64	35.26	50.38	---	74.00	54.00	-23.64	Peak
4.	9748	H	42.15	39.51	6.36	35.70	52.32	---	74.00	---	-21.68	Peak
5.	12185	H	---	---	---	---	---	---	---	---	---	---
6.	14622	H	---	---	---	---	---	---	---	---	---	---
7.	17059	H	---	---	---	---	---	---	---	---	---	---
8.	19496	H	---	---	---	---	---	---	---	---	---	---
9.	21933	H	---	---	---	---	---	---	---	---	---	---
10.	24370	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4874	V	45.10	35.18	4.61	34.93	---	49.46	74.00	54.00	-4.04	AVG
2.	4874	V	51.26	35.18	4.61	34.93	56.12	---	74.00	54.00	-17.88	Peak
3.	7311	V	42.27	36.92	5.64	35.26	49.57	---	74.00	54.00	-24.43	Peak
4.	9748	V	41.28	38.71	6.36	35.70	50.65	---	74.00	---	-23.35	Peak
5.	12185	V	---	---	---	---	---	---	---	---	---	---
6.	14622	V	---	---	---	---	---	---	---	---	---	---
7.	17059	V	---	---	---	---	---	---	---	---	---	---
8.	19496	V	---	---	---	---	---	---	---	---	---	---
9.	21933	V	---	---	---	---	---	---	---	---	---	---
10.	24370	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

FCC ID: CGO- SQB003

Operation Mode: TX / IEEE 802.11b / CH High  
 Temperature: 25°C  
 Humidity: 70 % RH

Test Date: Feb. 27, 2012  
 Tested by: Andy Chen  
 Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	39.24	35.90	4.68	34.92	---	44.90	74.00	54.00	-9.4	AVG
2.	4924	H	46.20	35.90	4.68	34.92	51.86	---	74.00	54.00	-22.14	Peak
3.	7386	H	41.12	37.88	5.65	35.28	49.37	---	74.00	54.00	-24.63	Peak
4.	9848	H	42.20	39.61	6.38	35.70	52.49	---	74.00	---	-21.87	Peak
5.	12310	H	---	---	---	---	---	---	---	---	---	---
6.	14772	H	---	---	---	---	---	---	---	---	---	---
7.	17234	H	---	---	---	---	---	---	---	---	---	---
8.	19696	H	---	---	---	---	---	---	---	---	---	---
9.	22158	H	---	---	---	---	---	---	---	---	---	---
10.	24620	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4924	V	48.02	35.23	4.68	34.92	53.01	---	74.00	54.00	-21.02	Peak
2.	4924	V	44.44	35.23	4.68	34.92	---	49.43	74.00	54.00	-4.77	AVG
3.	7386	V	42.36	36.96	5.65	35.28	49.69	---	74.00	54.00	-24.31	Peak
4.	9848	V	42.24	38.81	6.38	35.70	51.73	---	74.00	---	-22.27	Peak
5.	12310	V	---	---	---	---	---	---	---	---	---	---
6.	14772	V	---	---	---	---	---	---	---	---	---	---
7.	17234	V	---	---	---	---	---	---	---	---	---	---
8.	19696	V	---	---	---	---	---	---	---	---	---	---
9.	22158	V	---	---	---	---	---	---	---	---	---	---
10.	24620	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

FCC ID: CGO- SQB003

Operation Mode: TX / IEEE 802.11g / CH Low  
 Temperature: 25°C  
 Humidity: 70 % RH

Test Date: Feb. 27 2012  
 Tested by: Andy Chen  
 Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4824	H	43.15	35.76	4.58	34.94	48.57	---	74.00	---	-25.55	Peak
2.	4824	H	31.05	35.76	4.58	34.94	---	36.45	---	54.00	-17.65	AVG
3.	7240	H	43.13	37.85	5.63	35.25	51.36	---	74.00	---	-22.64	Peak
4.	9648	H	41.35	39.39	6.34	35.70	51.38	---	74.00	---	-22.62	Peak
5.	12060	H	---	---	---	---	---	---	---	---	---	---
6.	14472	H	---	---	---	---	---	---	---	---	---	---
7.	16884	H	---	---	---	---	---	---	---	---	---	---
8.	19296	H	---	---	---	---	---	---	---	---	---	---
9.	21708	H	---	---	---	---	---	---	---	---	---	---
10.	24120	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4824	V	32.10	35.13	4.58	34.94	---	36.87	74.00	54.00	-17.13	AVG
2.	4824	V	44.12	35.13	4.58	34.94	48.89	---	74.00	54.00	-25.11	Peak
3.	7240	V	42.60	36.90	5.63	35.25	49.88	---	74.00	---	-24.12	Peak
4.	9648	V	42.22	38.59	6.34	35.70	51.45	---	74.00	---	-22.55	Peak
5.	12060	V	---	---	---	---	---	---	---	---	---	---
6.	14472	V	---	---	---	---	---	---	---	---	---	---
7.	16884	V	---	---	---	---	---	---	---	---	---	---
8.	19296	V	---	---	---	---	---	---	---	---	---	---
9.	21708	V	---	---	---	---	---	---	---	---	---	---
10.	24120	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

FCC ID: CGO- SQB003

Operation Mode: TX / IEEE 802.11g / CH Mid  
 Temperature: 25°C  
 Humidity: 70 % RH

Test Date: Feb. 27, 2012  
 Tested by: Andy Chen  
 Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4874	H	41.07	35.83	4.61	34.93	46.58	---	74.00	54.00	-27.42	Peak
2.	7311	H	42.00	37.86	5.64	35.26	50.24	---	74.00	54.00	-23.76	Peak
3.	9748	H	41.12	39.51	6.36	35.70	51.29	---	74.00	---	-22.17	Peak
4.	12185	H	---	---	---	---	---	---	---	---	---	---
5.	14622	H	---	---	---	---	---	---	---	---	---	---
6.	17059	H	---	---	---	---	---	---	---	---	---	---
7.	19496	H	---	---	---	---	---	---	---	---	---	---
8.	21933	H	---	---	---	---	---	---	---	---	---	---
9.	24370	H	---	---	---	---	---	---	---	---	---	---
Note: An item 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4874	V	42.23	35.18	4.61	34.93	46.77	---	74.00	54.00	-27.23	Peak
2.	7311	V	41.04	36.92	5.64	35.26	50.51	---	74.00	54.00	-23.49	Peak
3.	9748	V	41.64	38.71	6.36	35.70	51.29	---	74.00	---	-22.17	Peak
4.	12185	V	---	---	---	---	---	---	---	---	---	---
5.	14622	V	---	---	---	---	---	---	---	---	---	---
6.	17059	V	---	---	---	---	---	---	---	---	---	---
7.	19496	V	---	---	---	---	---	---	---	---	---	---
8.	21933	V	---	---	---	---	---	---	---	---	---	---
9.	24370	V	---	---	---	---	---	---	---	---	---	---
Note: An item 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

FCC ID: CGO- SQB003

Operation Mode: TX / IEEE 802.11g / CH High  
 Temperature: 25°C  
 Humidity: 70 % RH

Test Date: Feb. 27, 2012  
 Tested by: Andy Chen  
 Polarity: Ver. / Hor.

Item	Freq. (MHz)	Ant.Pol H/V	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Level		Peak Limit (dBuV/)	AV Limit (dBuV/)	Margin (dB)	Remark
							Peak (dBuV/)	AV (dBuV/)				
1.	4924	H	41.07	35.90	4.68	34.92	46.73	---	74.00	54.00	-27.07	Peak
2.	7386	H	41.35	37.88	5.65	35.28	49.60	---	74.00	54.00	-24.40	Peak
3.	9848	H	42.26	39.61	6.38	35.70	52.55	---	74.00	---	-21.45	Peak
4.	12310	H	---	---	---	---	---	---	---	---	---	---
5.	14772	H	---	---	---	---	---	---	---	---	---	---
6.	17234	H	---	---	---	---	---	---	---	---	---	---
7.	19696	H	---	---	---	---	---	---	---	---	---	---
8.	22158	H	---	---	---	---	---	---	---	---	---	---
9.	24620	H	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												
1.	4924	V	43.14	35.23	4.68	34.92	48.13	---	74.00	54.00	-25.87	Peak
2.	7386	V	41.13	36.96	5.65	35.28	48.46	---	74.00	54.00	-25.54	Peak
3.	9848	V	42.05	38.81	6.38	35.70	51.54	---	74.00	---	-22.46	Peak
4.	12310	V	---	---	---	---	---	---	---	---	---	---
5.	14772	V	---	---	---	---	---	---	---	---	---	---
6.	17234	V	---	---	---	---	---	---	---	---	---	---
7.	19696	V	---	---	---	---	---	---	---	---	---	---
8.	22158	V	---	---	---	---	---	---	---	---	---	---
9.	24620	V	---	---	---	---	---	---	---	---	---	---
Note: An item 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emission												

## Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1GHz - 26GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = 200 ms.
  - b. AV Setting 1GH z- 26GHz, RBW = 1MHz, VBW = 10Hz, Sweep time = 200 ms.
5. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.