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

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FCC ID: XCO-HSG17AIR
IC: 7756A-HSG17AIR

TEST REPORT

Application No. :	SHEM110900119401
Applicant:	Hansong(Nanjing) Technology Ltd.
FCC ID:	XCO-HSG17AIR
IC:	7756A-HSG17AIR
Fundamental Frequency :	2412-2462 MHz
Equipment Under Test (EUT):	
Marking:	Klipsch
Name:	Klipsch G-17 Air
Model No.:	G-17 Air
Standards:	FCC PART 15 SUBPART C, Section 15.247
	RSS-210 Issue 8 (December 2010)
	RSS-Gen Issue 3 (December 2010)
Date of Receipt:	Oct. 22, 2011
Date of Test:	Oct. 27, 2011 to February 10, 2012
Date of Issue:	February 31, 2012
Test Result :	**PASS ***

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

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

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

2 Test Summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-210 Issue 8 Annex 8	Pass
Maximum peak output power	15.247(b)	RSS-210 Issue 8 Annex 8	Pass
Power spectrum density	15.247(e)	RSS-210 Issue 8 Annex 8	Pass
Radiated emission	15.205 & 15.209	RSS-210 Issue 8 Clause 2	Pass
Emission outside the Frequency band	15.247(d)	RSS-210 Issue 8 Annex 8	Pass
Power line conducted emission	15.207	RSS-Gen Issue 8 Clause 7.2.4	Pass
Channel number of hopping system	15.247(a)(1)(iii)	RSS-210 Issue 8 Annex 8	NA
Average time of occupancy in any channel	15.247(a)(1)(iii)	RSS-210 Issue 8 Annex 8	NA
Occupied bandwidth	-	RSS-Gen Issue 3 Clause 4.6.1	Tested
Antenna Requirement	15.203	-	Compliance

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

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4 General Information

4.1 Client Information

Applicant :	Hansong(Nanjing) Technology Ltd.
Applicant Address:	8th Kangping Road, Jiangning Economy and Technology Development Zone,Nanjing,201106,China
Manufacturer:	Hansong(Nanjing) Technology Ltd.
Manufacturer Address:	8th Kangping Road, Jiangning Economy and Technology Development Zone,Nanjing,201106,China

4.2 Details of E.U.T.

Marking:	Klipsch
Name:	Klipsch G-17 Air
Model No.:	G-17 Air
Power Supply:	Input:100-240VAC,50/60Hz 1.6A, Output:27.0VDC, 2.4A
Hardware Version:	N/A
Software Version:	N/A
Frequency Band and Channels :	2412-2462 MHz 11 Channel(Low :2412, Middle:2437, High: 2462)
Modulation Type:	802.11b DSSS 802.11g OFDM

4.3 Description of Support Units

Name	Model No.	Remark
Kingwall Swithching Power Adapter	AS650-270-AB240	Input:100-240V~50/60Hz 1.6A Output:27.0V DC 2.4A
IPAD 2	N/A	16GB, WiFi

4.4 Test Location

Tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

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

No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.

4.6 Test Facility

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

- **CNAS (No. CNAS L0599)**

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

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

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

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

- **VCCI (Member No.: 3061)**

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

5 Test Results

5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2011-6-3	2012-6-1
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2011-6-3	2012-6-1
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2011-3-12	2012-3-10
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2011-6-3	2012-6-1
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2011-10-7	2012-10-5
6	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY－2009P	--	2011-10-15	2012-10-13
7	CLAMP METER	FLUKE	316	86080010	2011-04-22	2012-04-20
8	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2011-10-14	2012-10-13
9	High-low temperature cabinet	Shanghai YuanZhen	GW2050	--	2011-6-17	2012-6-16
11	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT1800.0/ 2000.0-0.2/40-5SSK	11	2011-10-26	2012-10-25
12	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/880.0-0.2/40-5SSK	9	2011-10-26	2012-10-25
13	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2011-4-8	2012-4-7
14	Low nosie amplifier	TESEQ	LNA6900	70133	2011-7-5	2012-7-4
15	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2011-06-04	2012-06-03
16	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2011-05-07	2012-05-06

18	AVG Power Sensor	Rohde & Schwarz	NRP-Z22	1137	2011-05-07	2012-05-06
20	Power meter	Rohde & Schwarz	NRP	101641	2011-05-05	2012-05-04

5.2 E.U.T. Operation

Input voltage: 27.0V DC (Power adapter)

Operating Environment:

Temperature: 24.0 °C

Humidity: 50 % RH

Atmospheric Pressure: 1010 mbar

EUT Operation: The EUT has been tested under operating condition.

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

802.11 b mode:Channel low (2412MHz) mid(2437MHz) high(2462MHz) with the worst case 1Mbps date rate was report for radiated spurious emission.

802.11 g mode:Channel low (2412MHz) mid(2437MHz) high(2462MHz) with the worst case 6Mbps date rate was report for radiated spurious emission.

5.3 Test Procedure & Measurement Data

5.3.1 Conducted Emission Test

Test Requirement: FCC Part15 15.207

Test date: Oct. 22, 2011

Standard Applicable According to section 15.207,frequency 150KHz to 30MHz shall not not exceed the limit table as blew.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*

EUT Setup 1.The conducted emission tests were performed in the test site,using the setup in accordance with the ANSI C C63.10-2009.

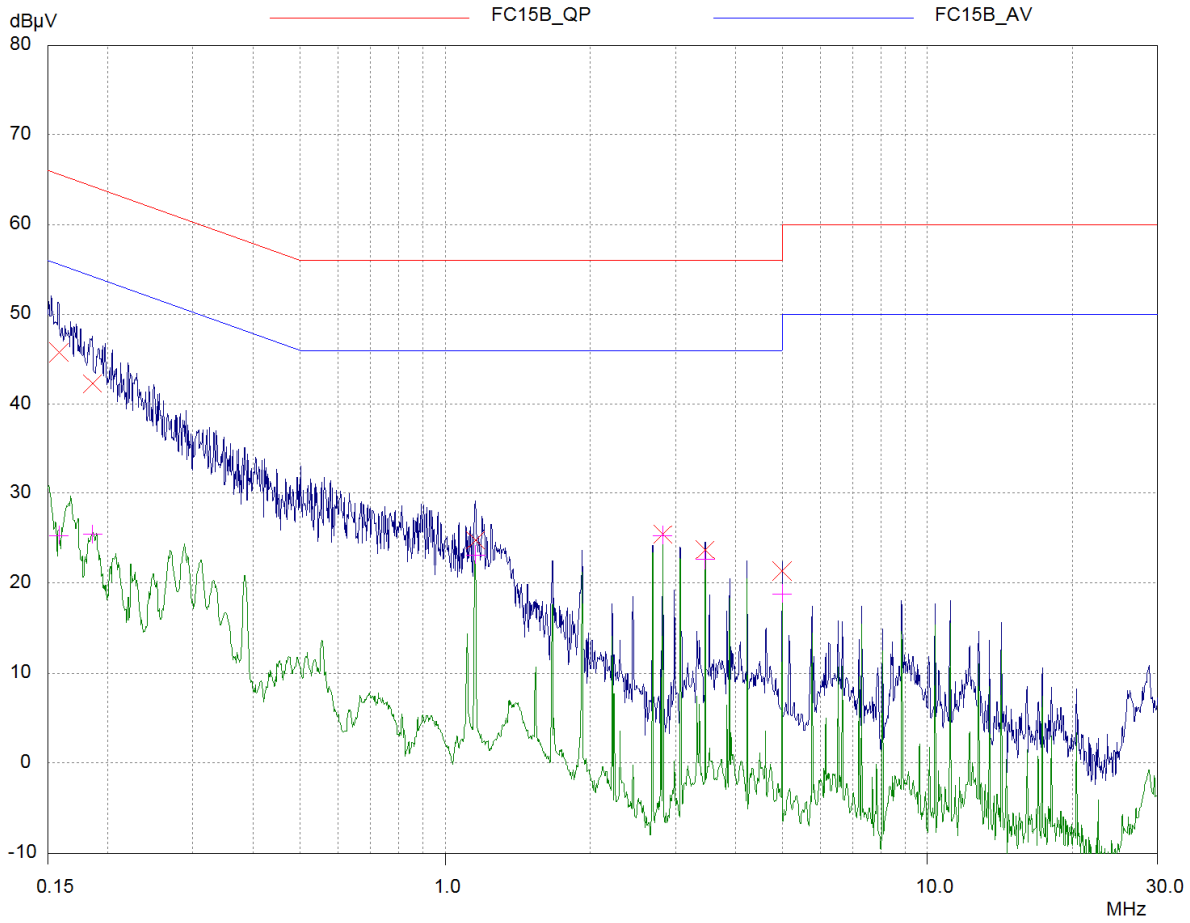
2.EUT is charged with AC/DC power adapter.The AC/DC Power adapter was plug-in LISN.The rear of the EUT and periphearals were placed flushed with the rear of the tabletop.

3.The LISN was connected with 120V AC/60Hz power source.

Measurement Result Operation mode:WiFi Link Mode connect with IPAD 2

Note:All test modes have been tested.

L line:

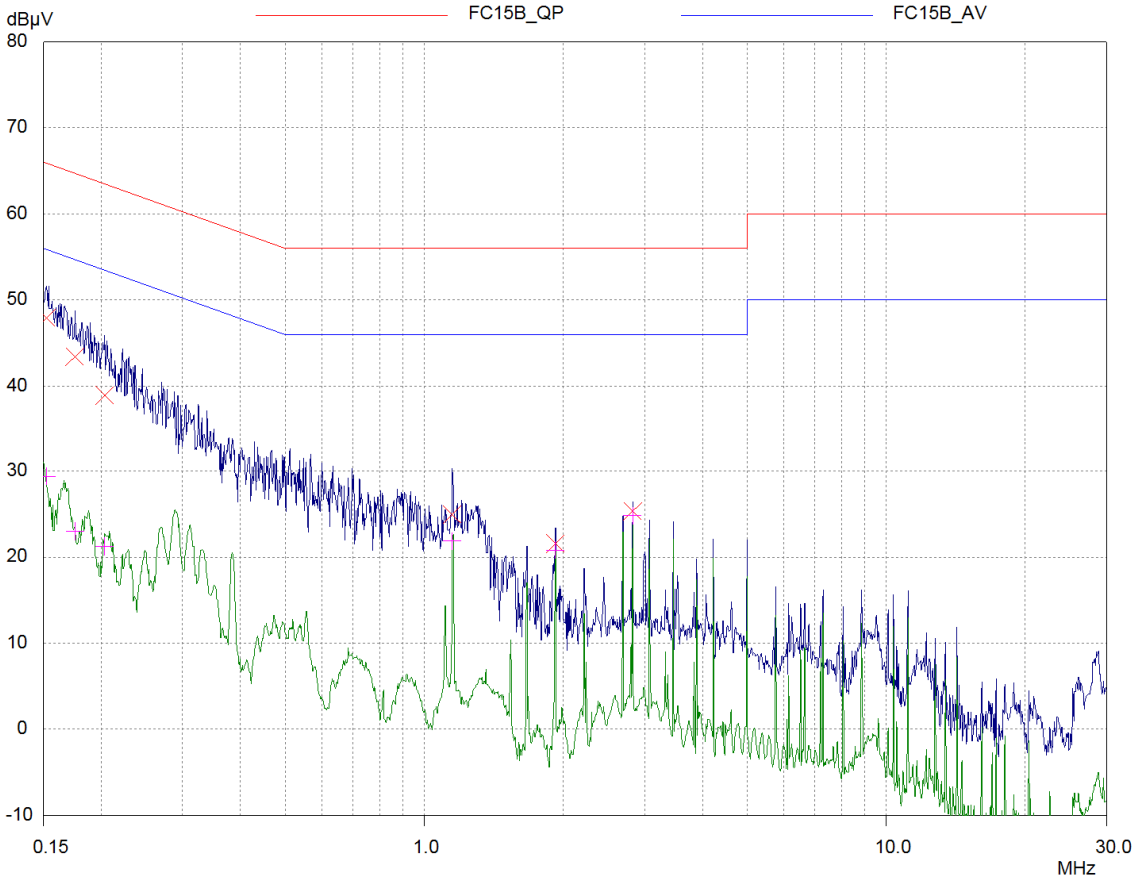


Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.15798	45.78	65.57	19.79
0.18534	42.28	64.24	21.96
1.1535	24.76	56.00	31.24
2.82078	25.44	56.00	30.56
3.45771	23.68	56.00	32.32
4.99218	21.34	56.00	34.66

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.15798	25.29	55.57	30.28
0.18534	25.41	54.24	28.83
1.1535	23.15	46.00	22.85
2.82078	25.29	46.00	20.71
3.45771	22.58	46.00	23.42
4.99218	18.83	46.00	27.17

N Line:



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB
0.1518	47.92	65.90	17.98
0.17526	43.40	64.71	21.31
0.20316	38.94	63.48	24.54
1.1489	24.94	56.00	31.06
1.92279	21.60	56.00	34.40
2.82078	25.36	56.00	30.64

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB
0.1518	29.40	55.90	26.50
0.17526	22.99	54.71	31.72
0.20316	21.28	53.48	32.20
1.1489	21.84	46.00	24.16
1.92279	20.83	46.00	25.17
2.82078	24.85	46.00	21.15

5.3.2 Peak Output Power Measurement

Test Requirement: FCC Part 15 15.247(a)(2),(b)

Test date Oct 30 2011

Standard Applicable: According to section 15.247(a)(2),(b)
(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Measuremet Produre

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF calbe from the antenna port to the spectrum.
3. Set the occur band to the entire emission bandwitdth of the signal.
4. Record the max.channel power reading
5. Repeat above procedures until all the frequency measured were complete.

Measurement Result:

The test was performed with 802.11b, the data was shown the worst case 802.11b 1Mbps.

CH	Frequency (MHz)	Reading Peak Power(dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Limit (dBm)	Result
LOW	2412	10.36	2.30	12.66	30	PASS
MID	2437	9.55	2.30	11.85	30	PASS
HIGH	2462	9.96	2.30	12.26	30	PASS

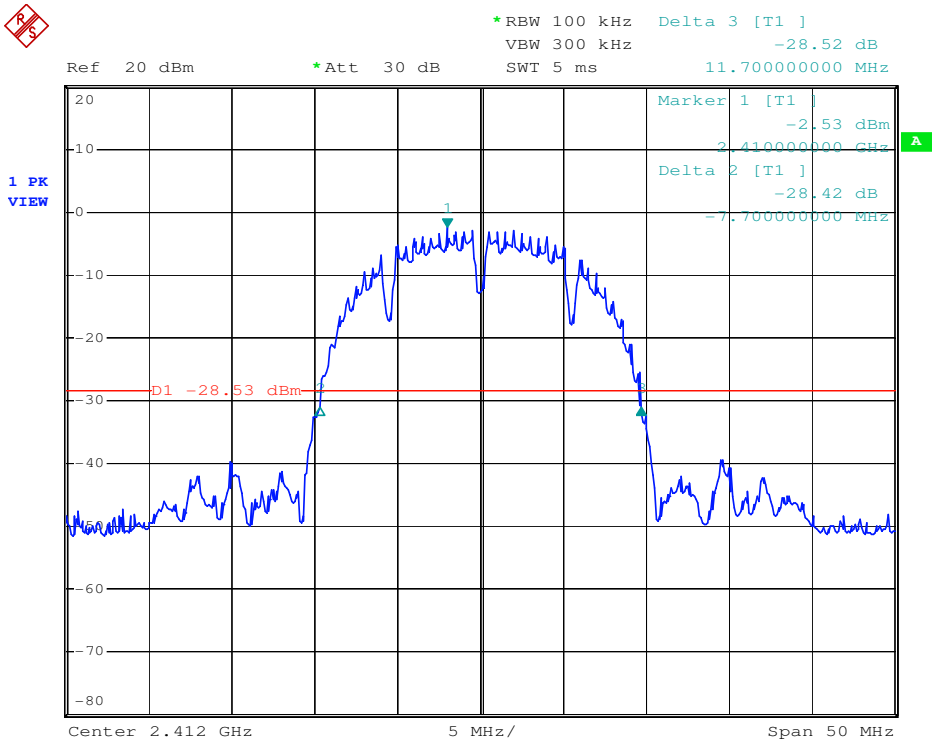
The test was performed with 802.11g, the data was shown the worst case 802.11g 6Mbps.

CH	Frequency (MHz)	Reading Peak Power(dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Limit (dBm)	Result
LOW	2412	15.10	2.30	17.40	30	PASS
MID	2437	14.03	2.30	16.33	30	PASS
HIGH	2462	13.65	2.30	15.95	30	PASS

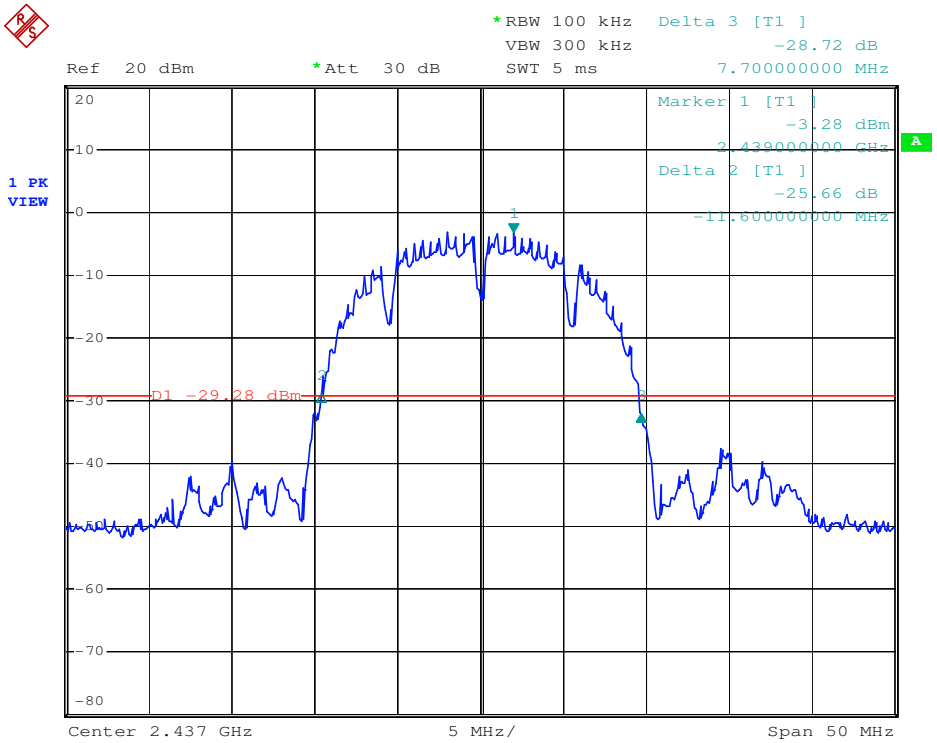
Peak Power Output Data Plot 802.11b 1Mbps

26dB Bandwidth

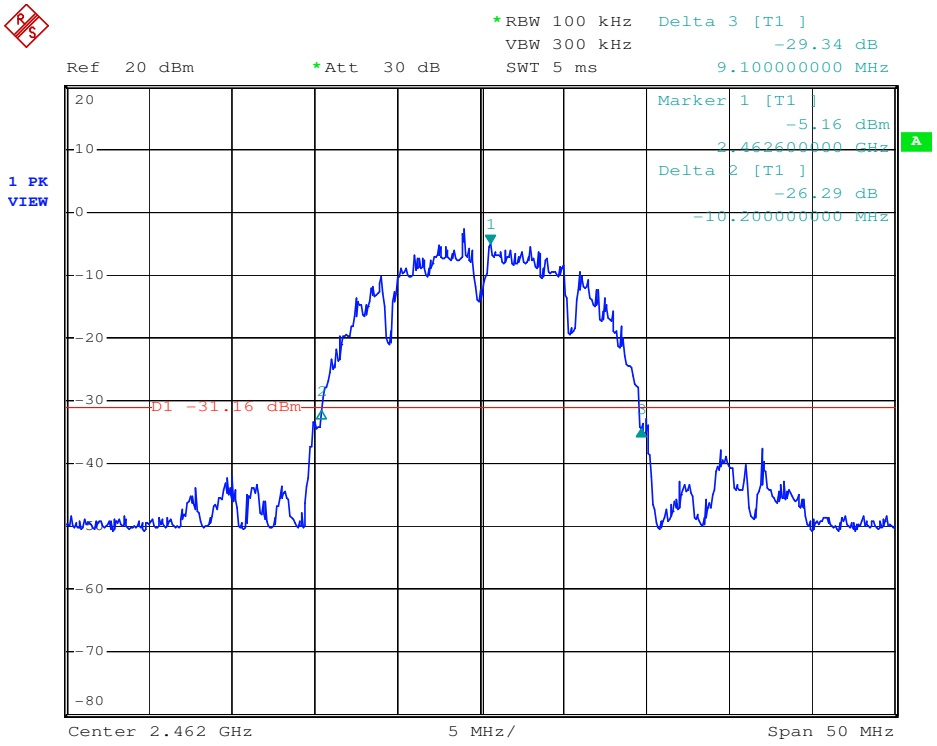
CH Low 2412MHz



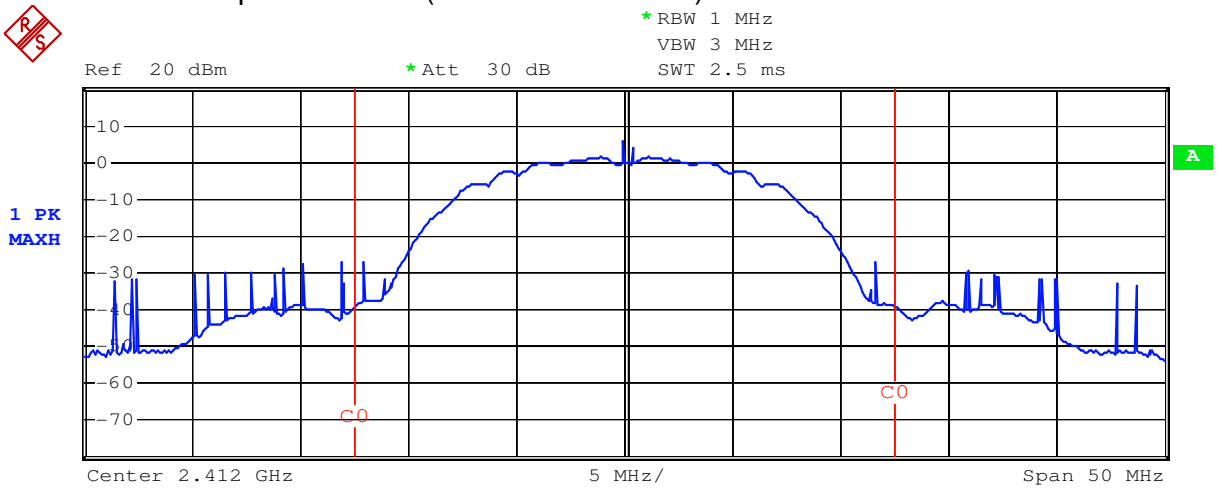
CH Middle 2437MHz



CH High 2462MHz



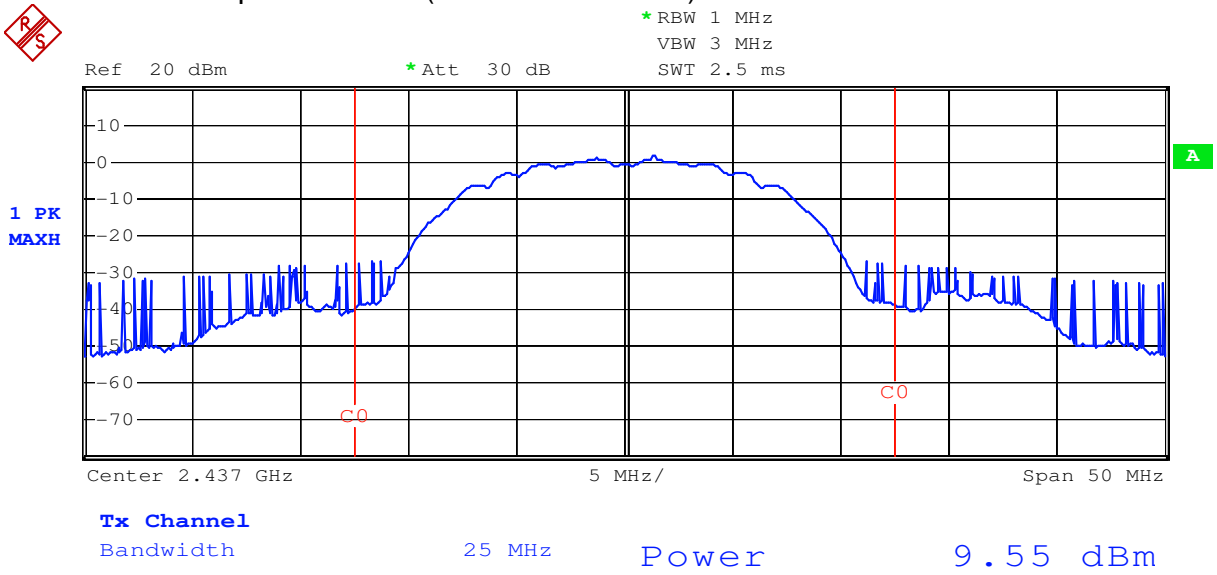
Peak Power Output Data Plot(CH Low 2412MHz)



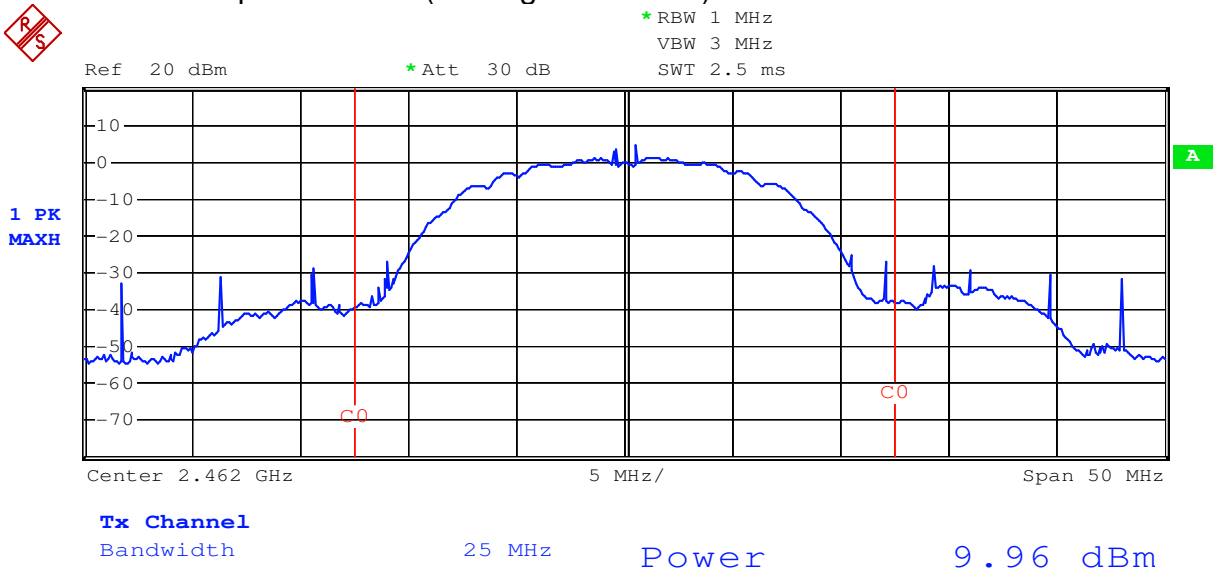
Tx Channel

Bandwidth 25 MHz Power 10.36 dBm

Peak Power Output Data Plot(CH Mid 2437MHz)



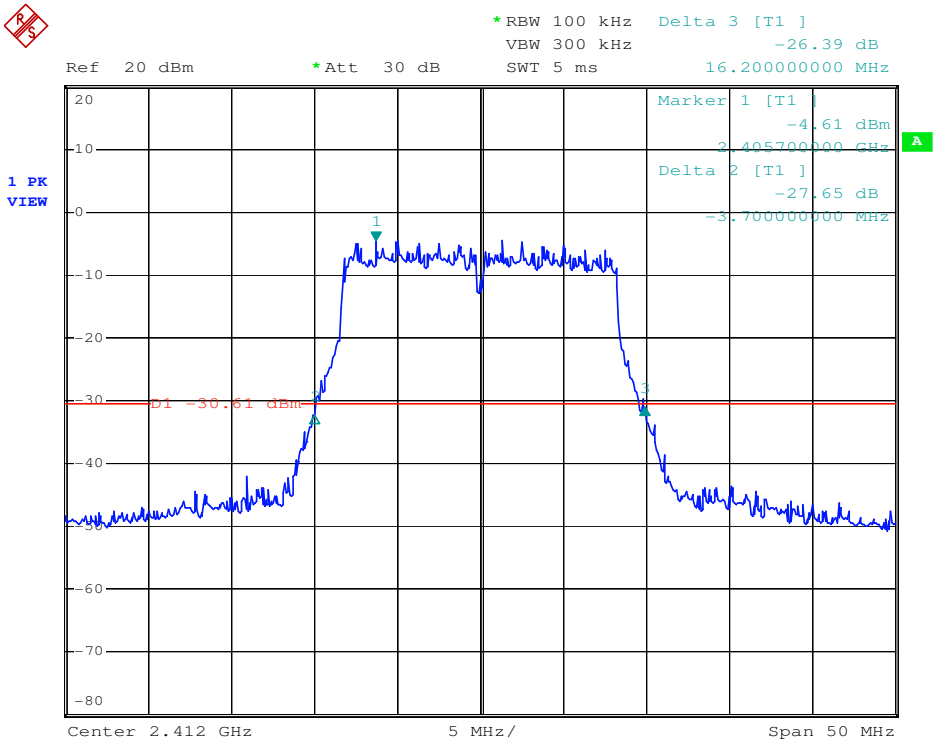
Peak Power Output Data Plot(CH High 2462MHz)



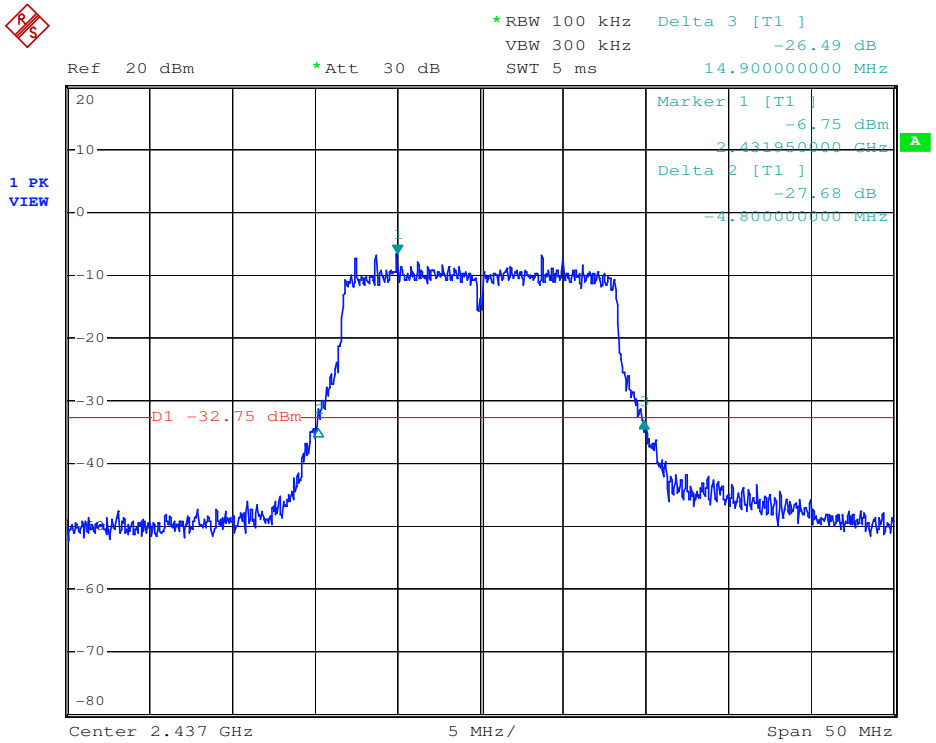
Peak Power Output Data Plot 802.11g 6Mbps

26dB Bandwidth

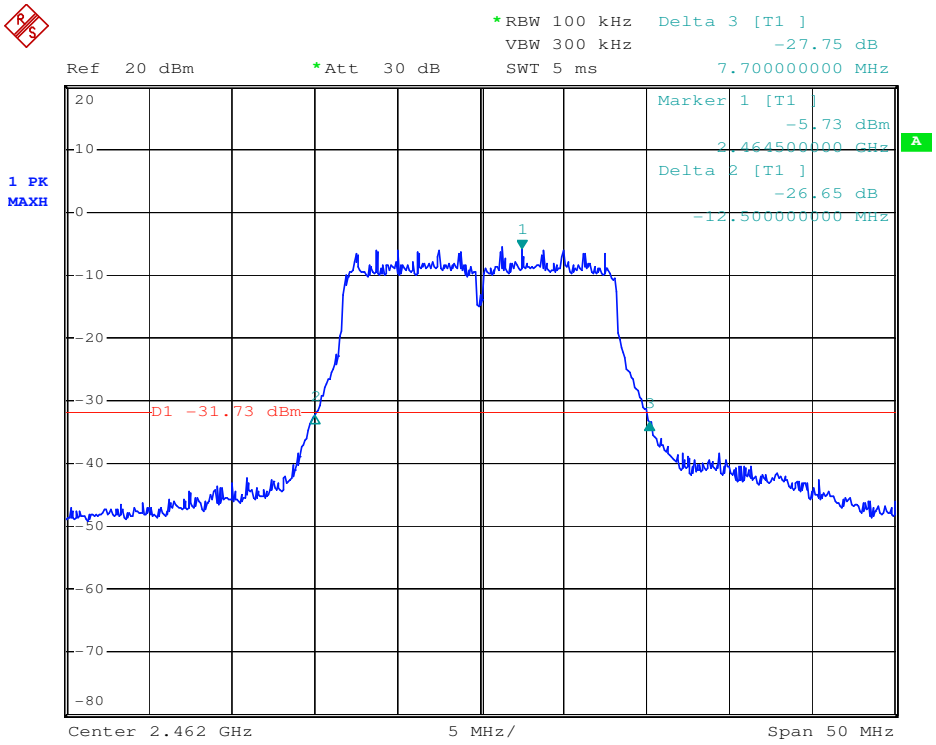
CH Low 2412MHz



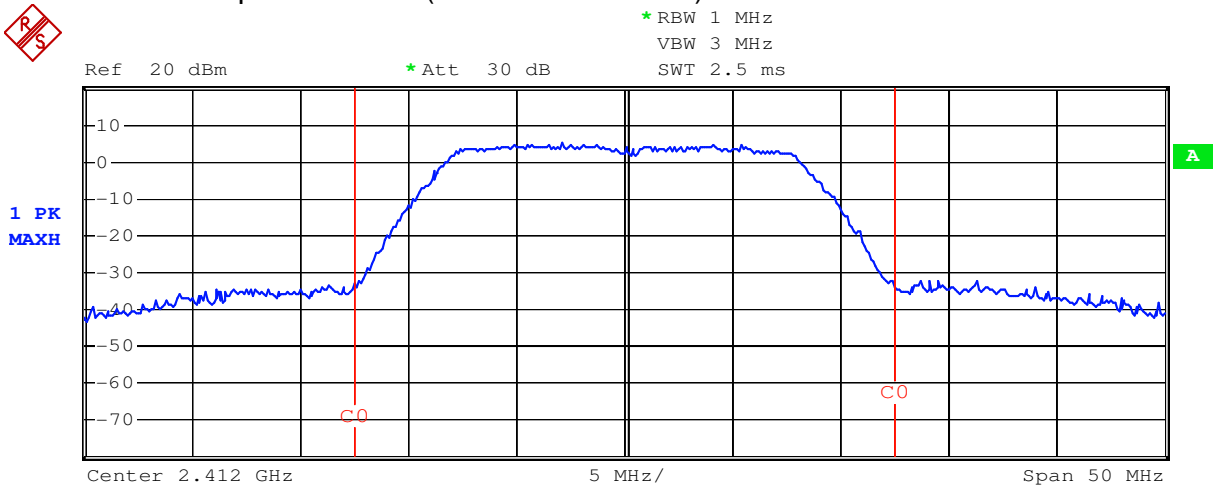
CH Mid 2437MHz



CH High 2462MHz



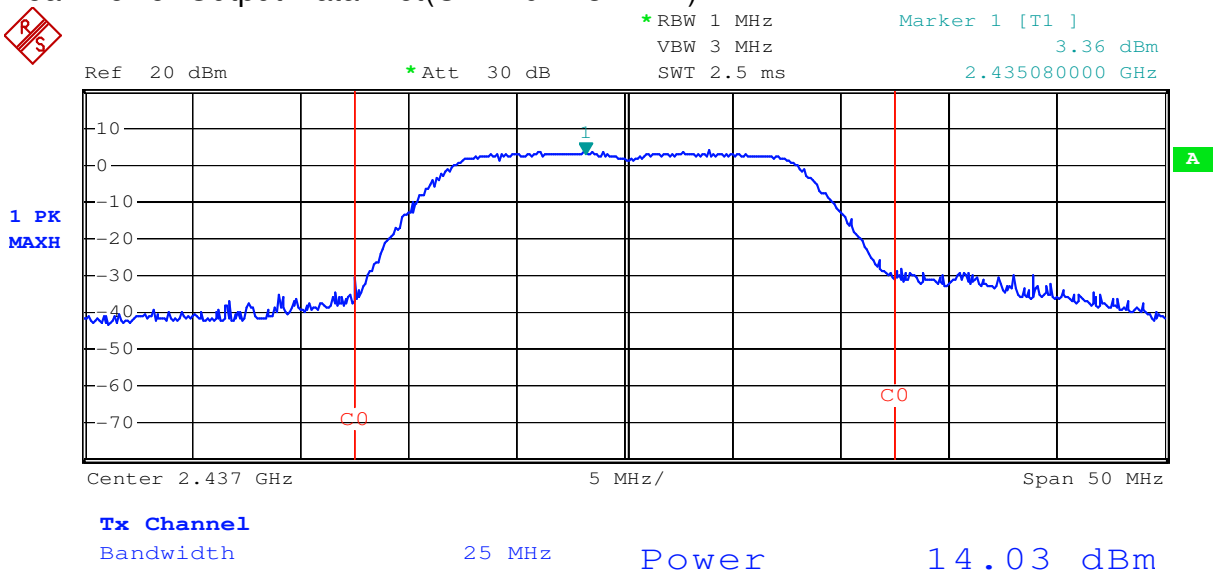
Peak Power Output Data Plot(CH Low 2412MHz)



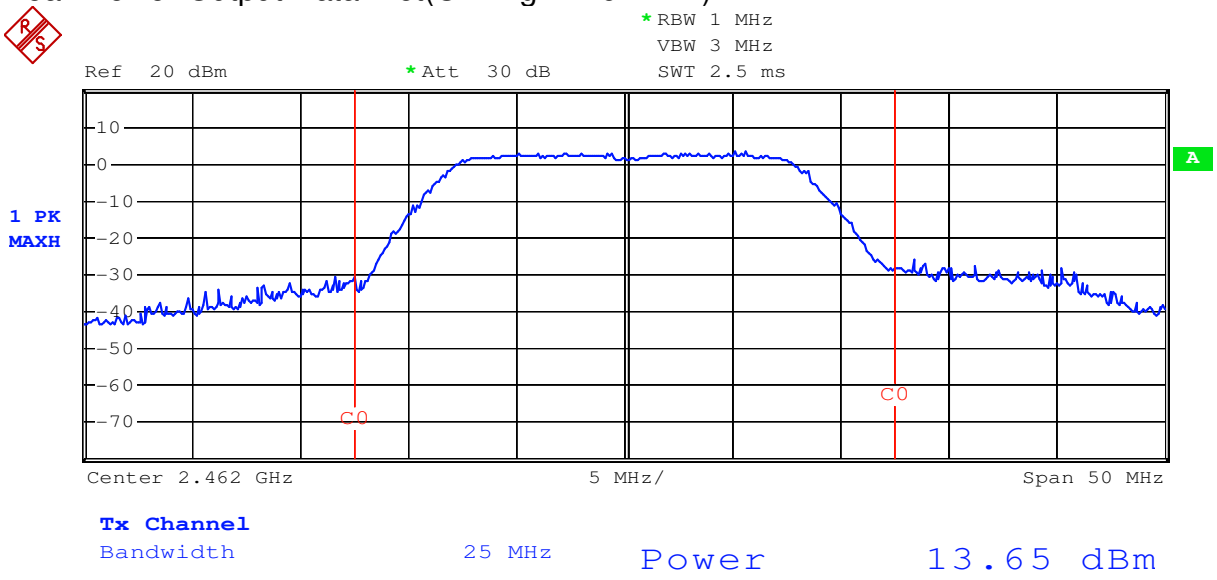
Tx Channel

Bandwidth	25 MHz	Power	15.10 dBm

Peak Power Output Data Plot(CH Mid 2437MHz)



Peak Power Output Data Plot(CH High 2462MHz)



5.3.3 6dB Bandwidth

Test Requirement: FCC Part15 247(a)(2)

Test date: Oct 30.2011

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

Measurement Procedure:
1. Place the EUT on the table and set it in 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 =3* RBW, Span=30/ 50MHz, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

Measurement Result:

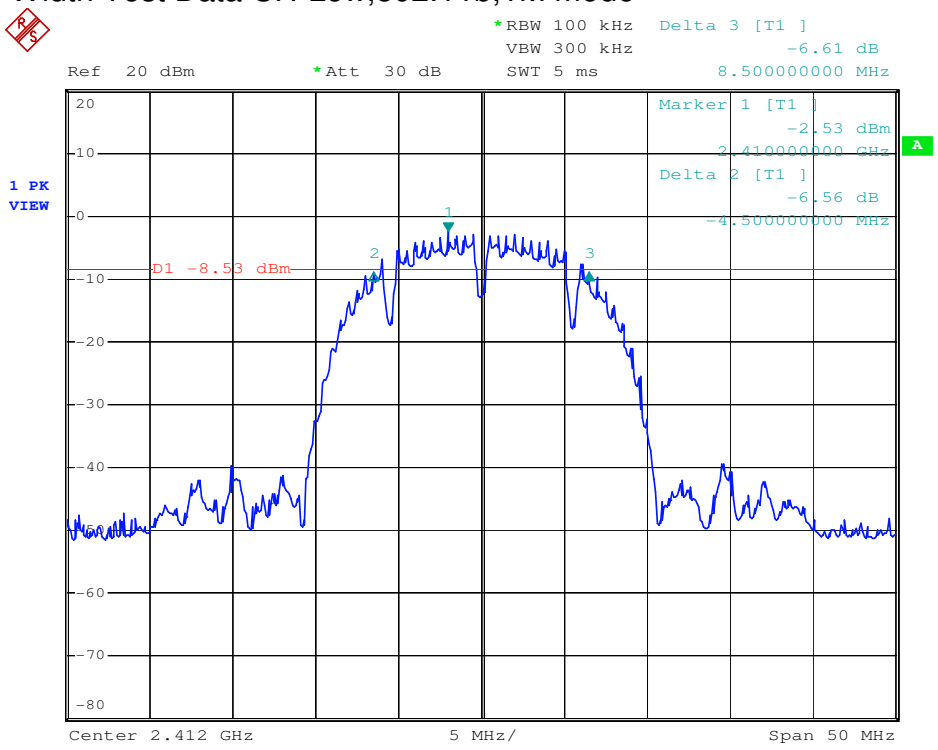
The test was performed with 802.11b, the data was shown the worst case 802.11b 1Mbps.

CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	13.00	500	PASS
MID	2437	13.00	500	PASS
HIGH	2462	13.00	500	PASS

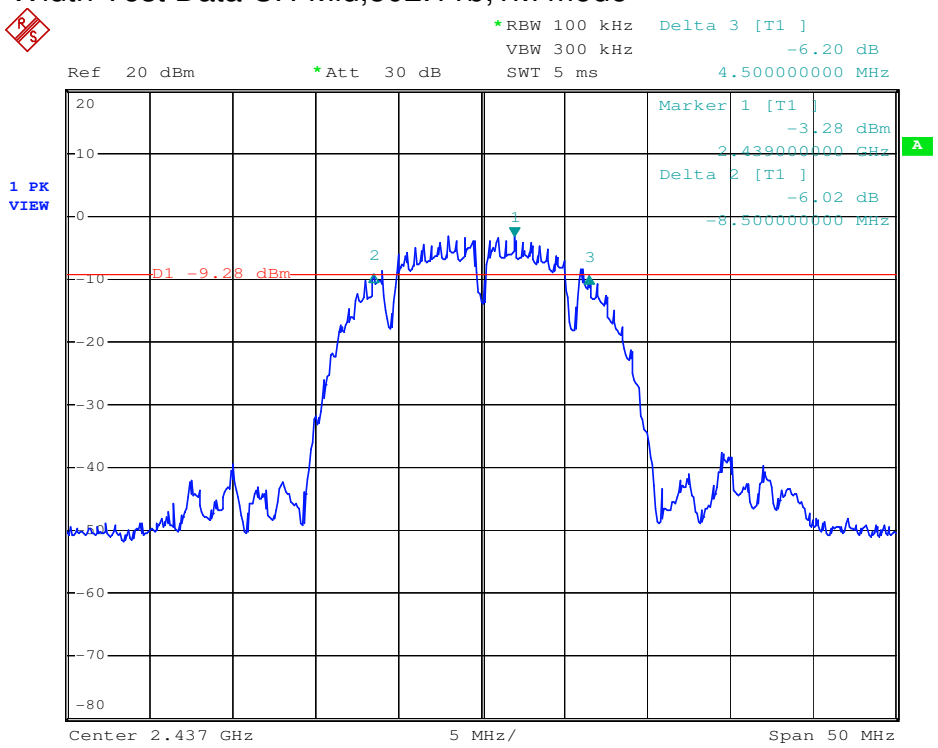
The test was performed with 802.11g, the data was shown the worst case 802.11g 6Mbps.

CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
LOW	2412	16.60	500	PASS
MID	2437	16.50	500	PASS
HIGH	2462	16.50	500	PASS

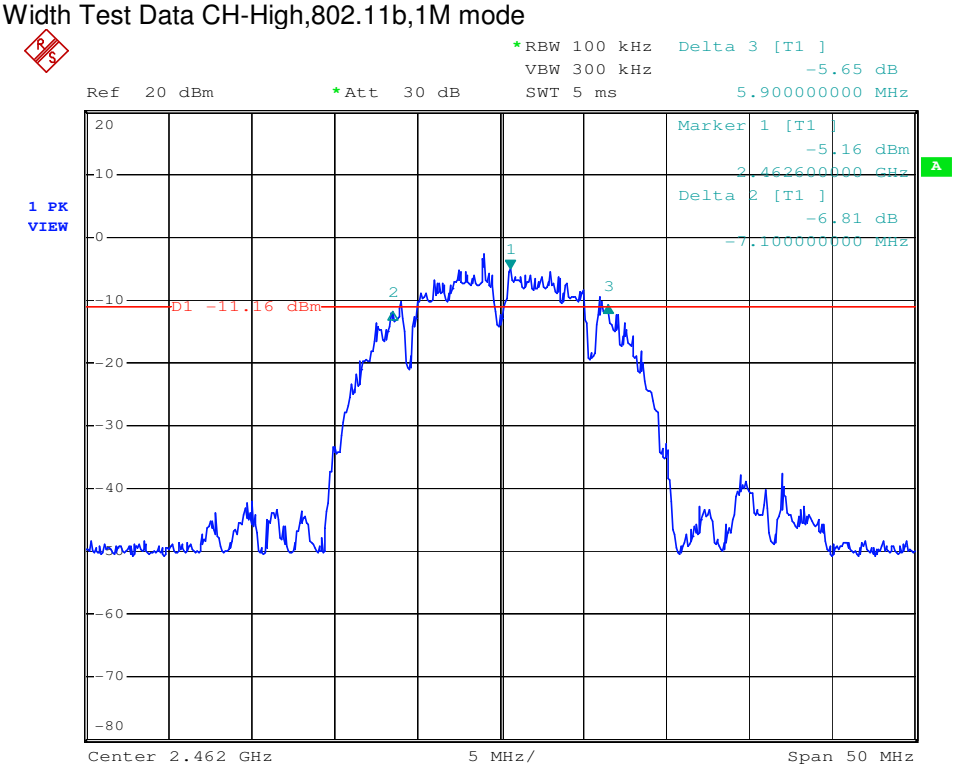
6dB Band Width Test Data CH-Low,802.11b,1M mode



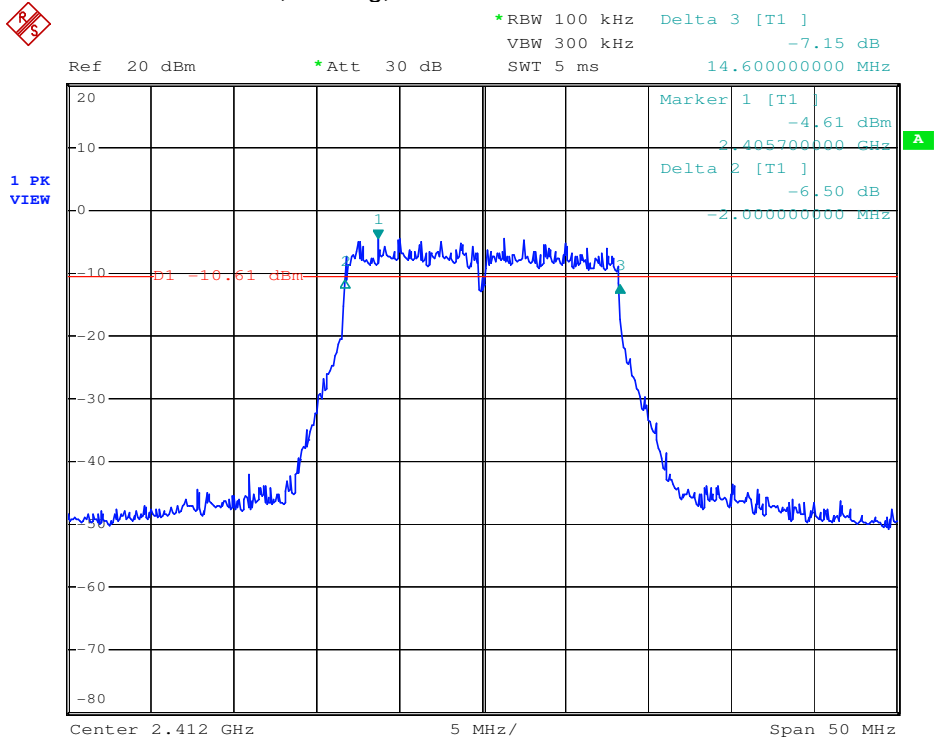
6dB Band Width Test Data CH-Mid,802.11b,1M mode



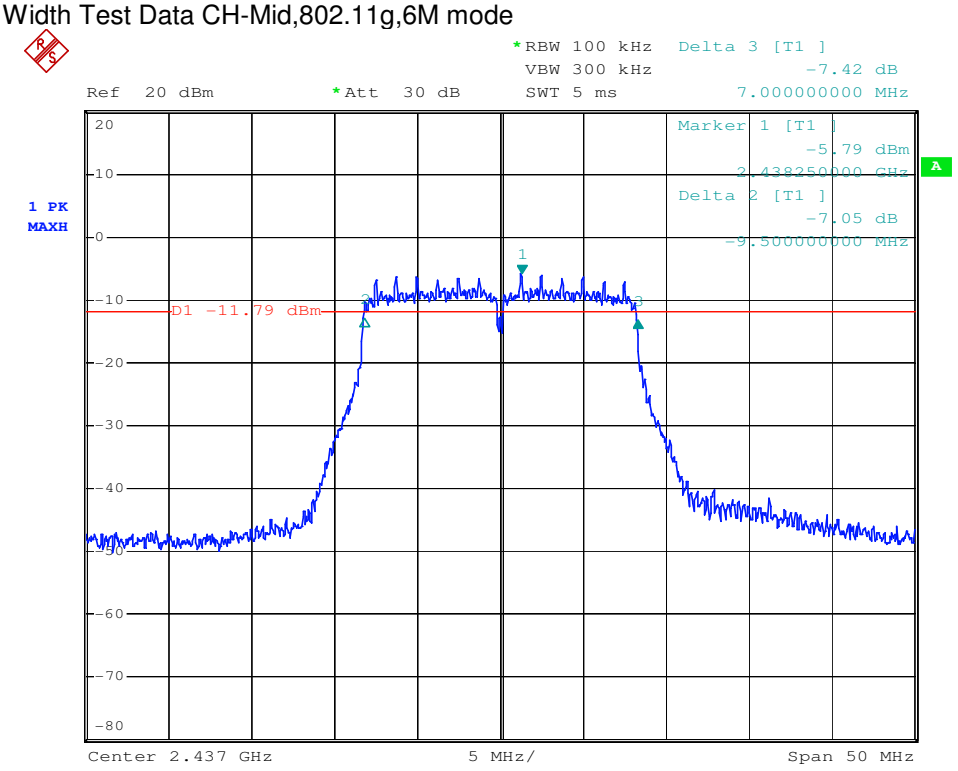
6dB Band Width Test Data CH-High,802.11b,1M mode



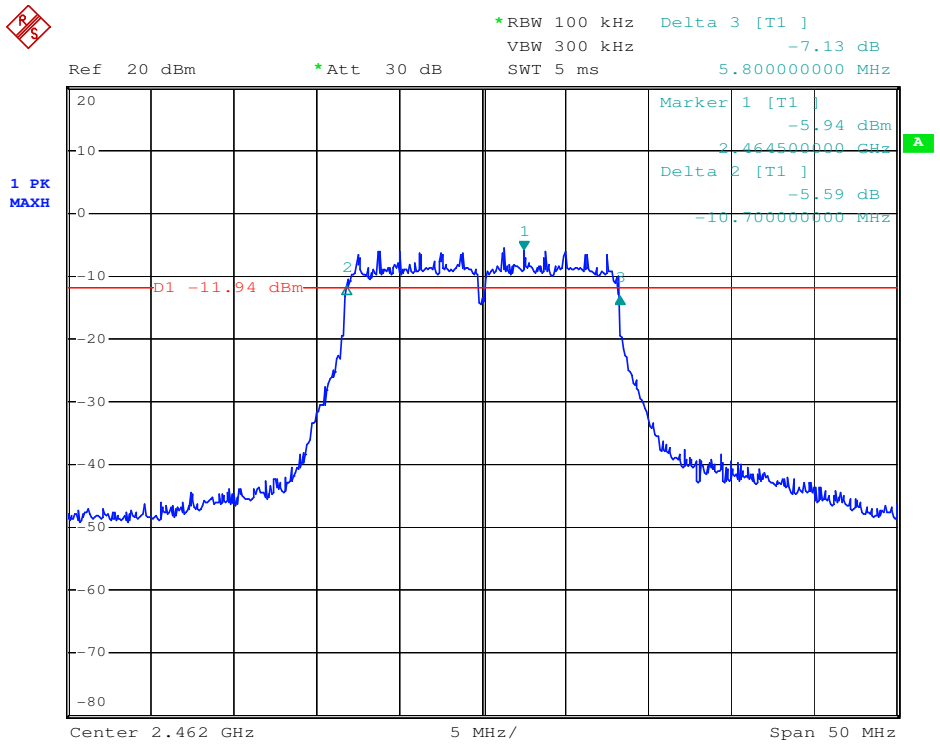
6dB Band Width Test Data CH-Low,802.11g,6M mode



6dB Band Width Test Data CH-Mid,802.11g,6M mode



6dB Band Width Test Data CH-High,802.11g,6M mode



5.3.4 Radiated Emission Band Edge

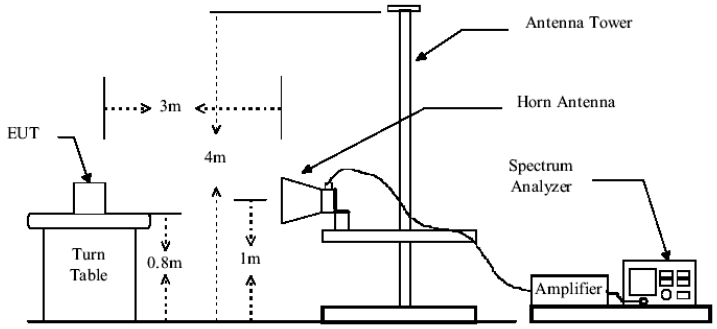
Test Requirement: FCC Part15 247(c)

Test date: Oct 26.2011

Standard Applicable: According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in 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 section 15.205(a),must also comply with the radiated emission limits specified in 15.209(a).

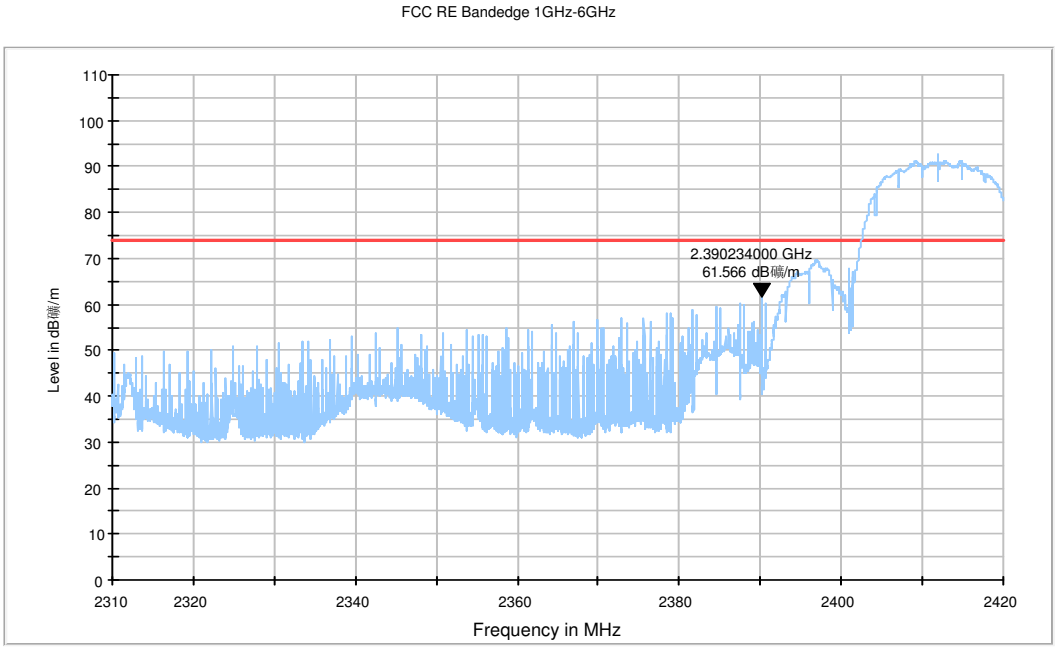
Measurement Procedure: The EUT was setup according to ANSI C63.10,2009 and tested according to ANSI C63.10,2009 for compliance to FCC 47 CFR 15.247 requirements.The EUT is placed on a turn table which is 0.8 m above ground.The turn table is rotated 360 degrees to determine to the position of the maximum emission level.The EUT was positioned such that the distance from antenna to the EUT was 3 menters.The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level
This is repeated for both horizontal and vertical polarization of the antenna.In order to find the maximum emission,all of the interface cables were manipulated according to ANSI C63.10:2009 on radiated measurement.
Spectrum analyzer parameters setting as shown below:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

Radiated Emission Test Set-up Frequency Over 1GHz



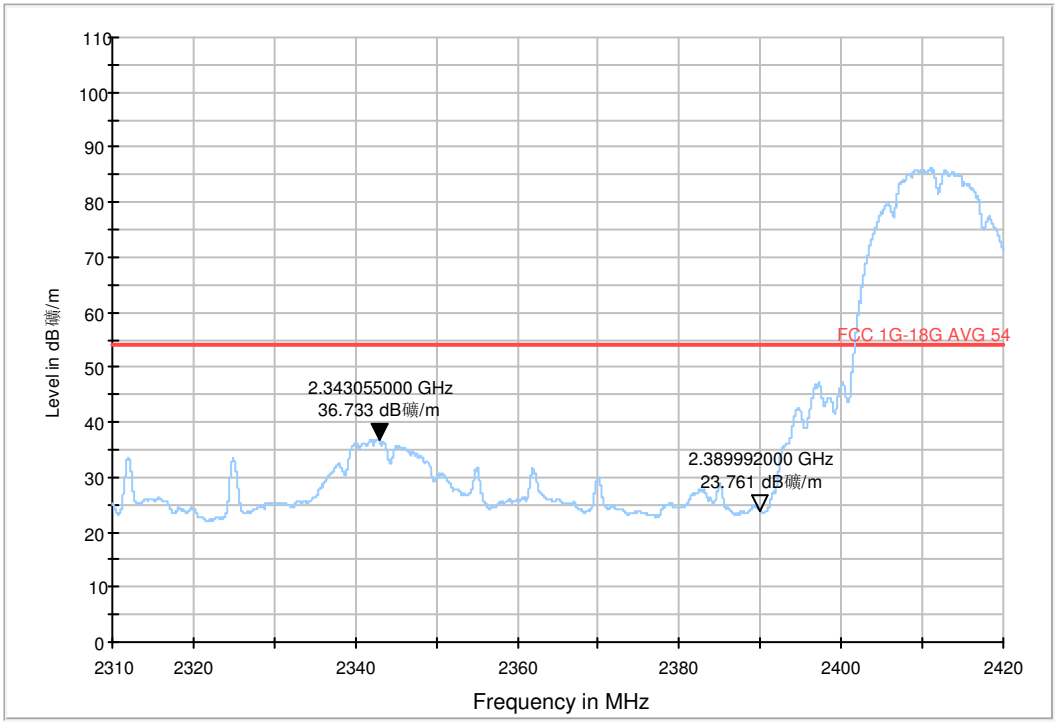
The field strength is calculated by adding the Antenna Factor,Preamplifier Factor&Cable Factor. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

Measurement Result:
CH Low 802.11b Mode 1M
Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390	71.61	-10.04	61.57	74.00	12.43

Horizontal, AVG Detector:

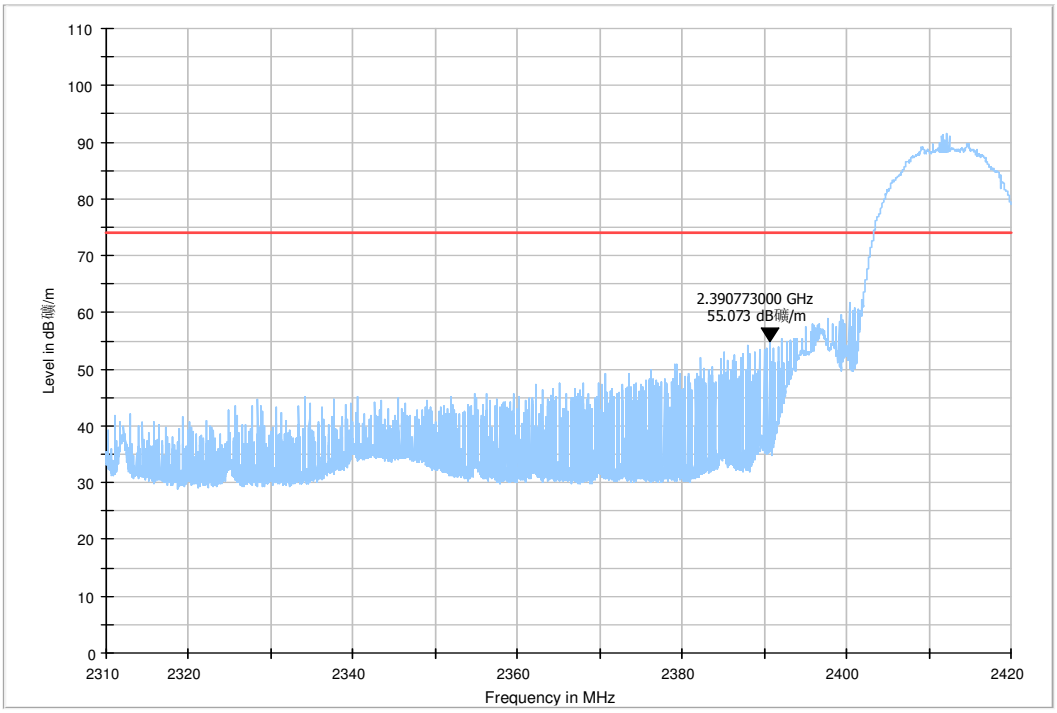


Horizontal, AV Detector:

Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2343	46.77	-10.04	36.73	54.00	17.27

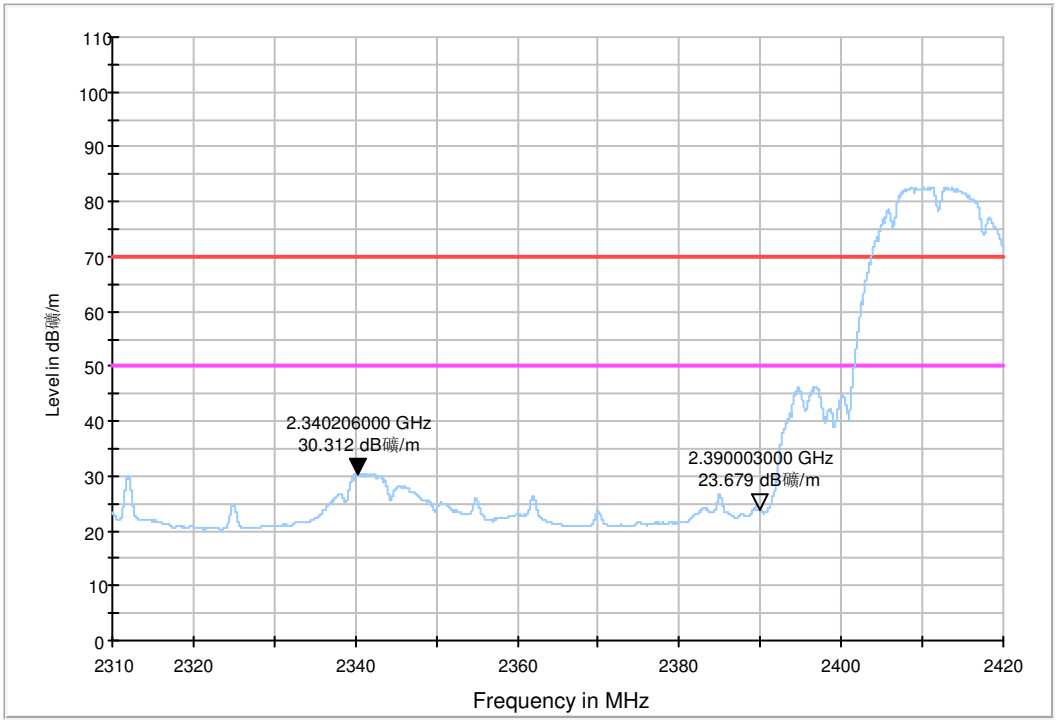
CH Low 802.11b Mode 1M

Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390	65.11	-10.04	55.07	74.00	18.93

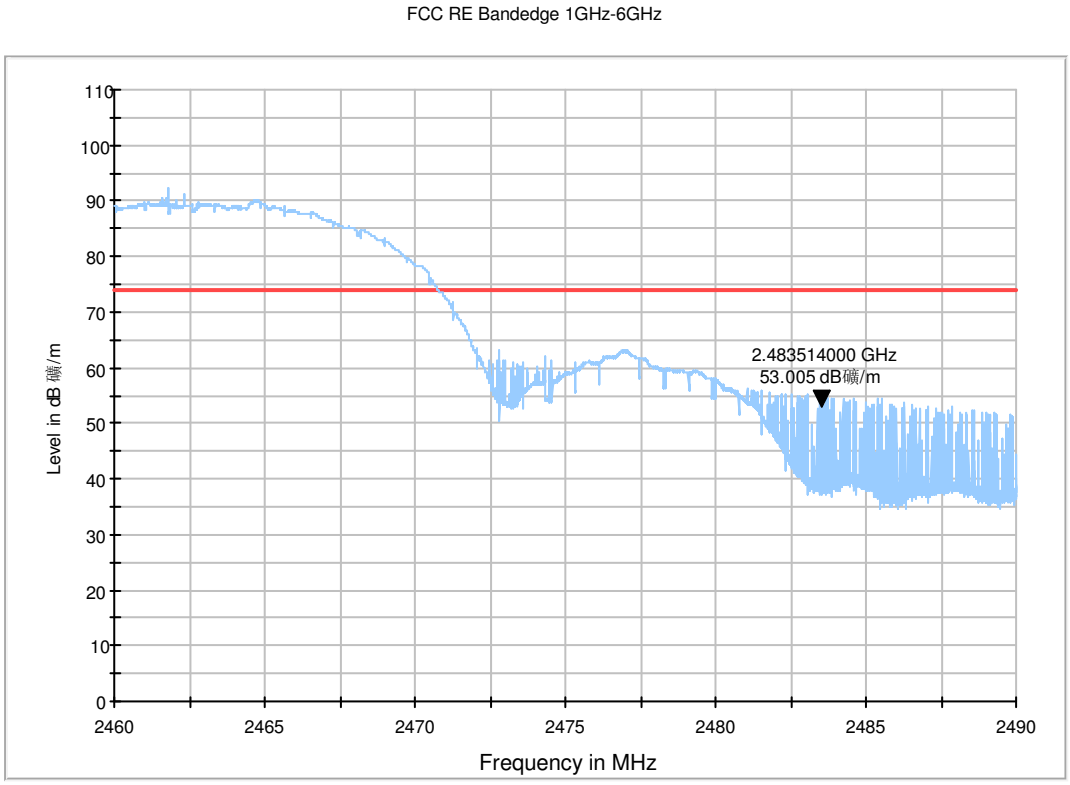
Vertical, AVG Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2343	40.35	-10.04	30.31	54.00	23.69

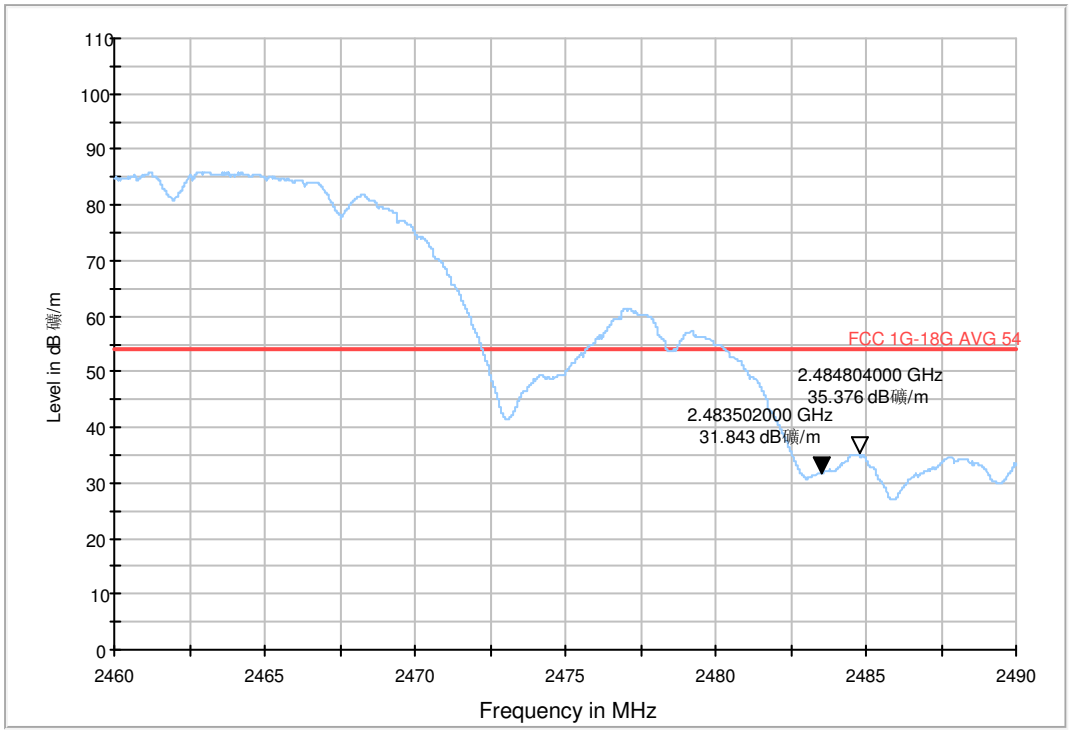
CH High 802.11b Mode 1M

Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	63.05	-10.04	53.01	74.00	20.99

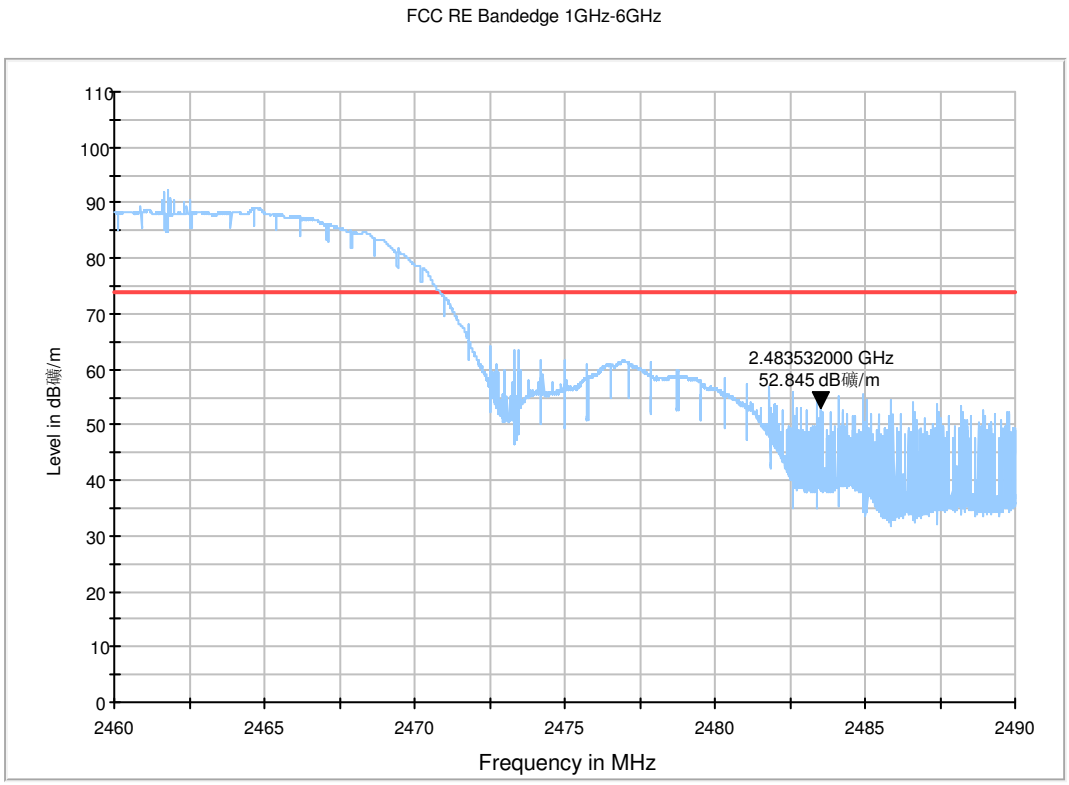
Horizontal, AV Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2484.8	45.42	-10.04	35.38	54.00	18.72

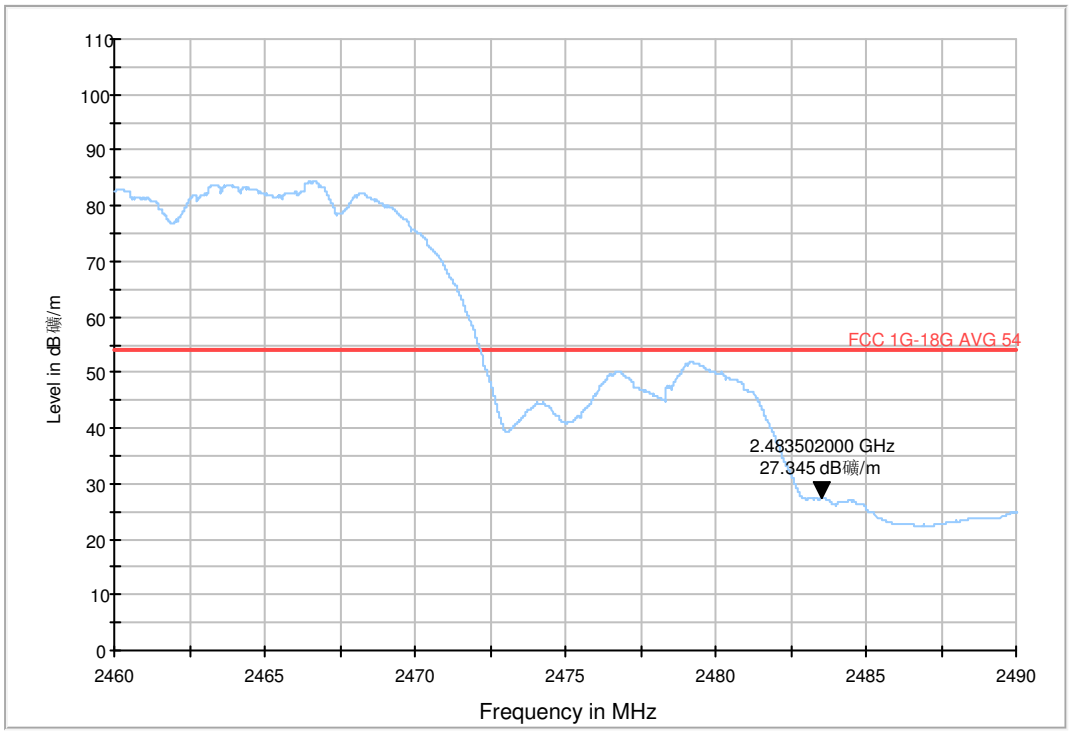
CH High 802.11b Mode 1M

Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2483.5	62.89	-10.04	52.85	74.00	21.15

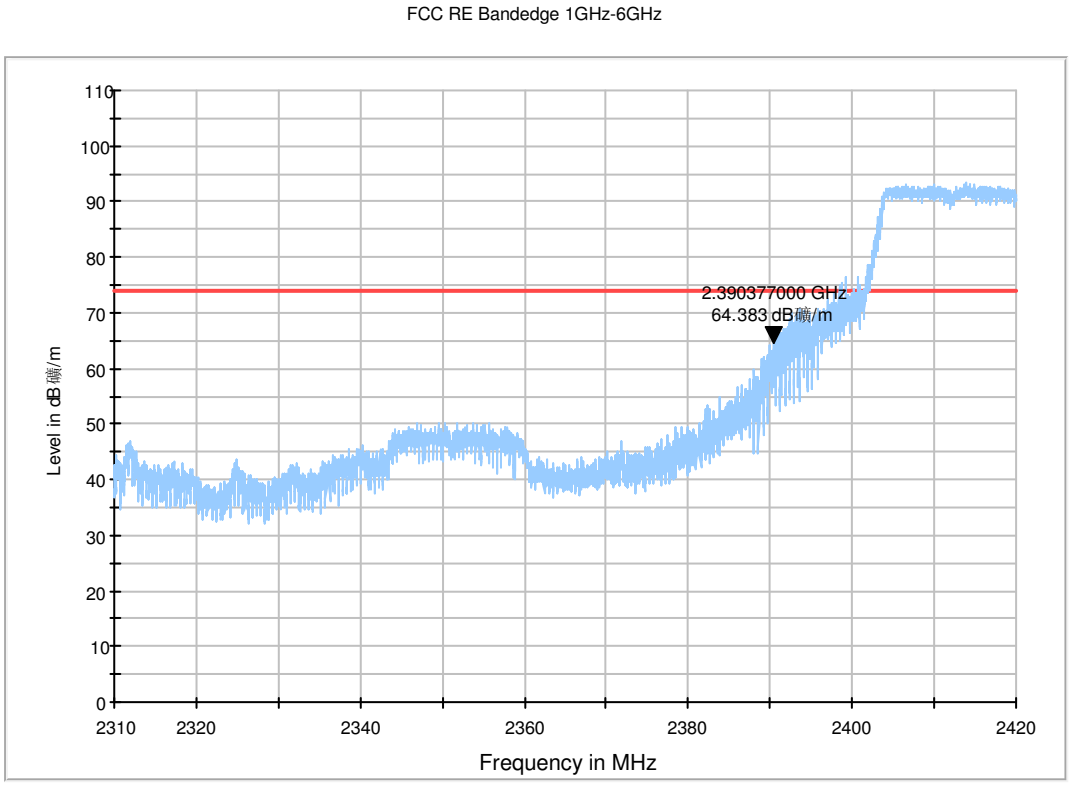
Vertical, AVG Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.5	37.39	-10.04	27.35	54.00	26.65

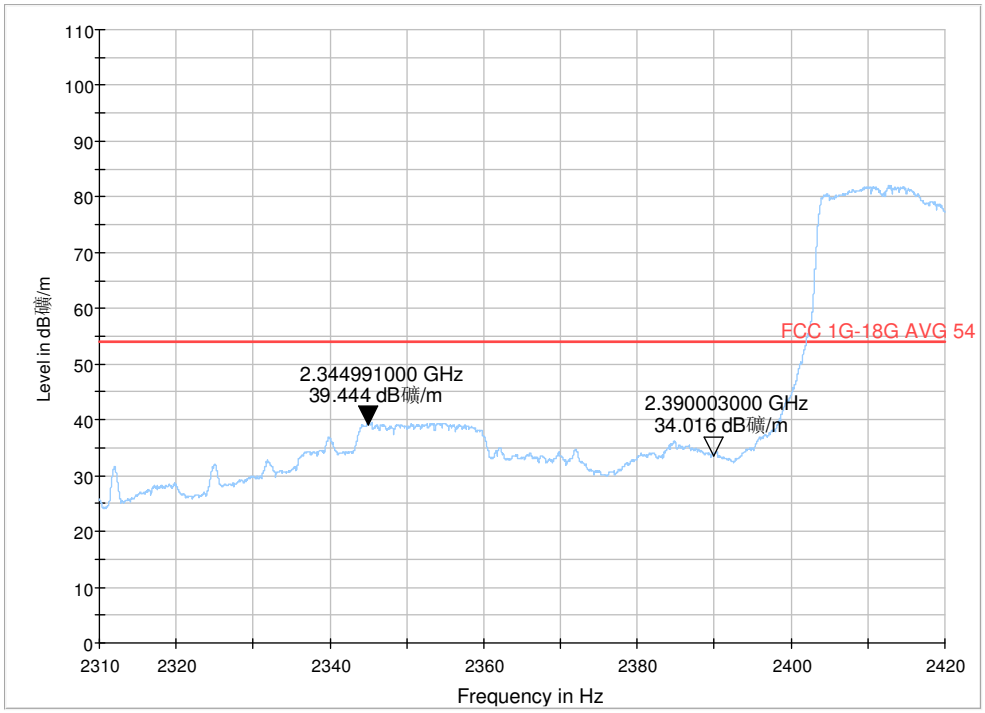
CH Low 802.11g Mode 6M

Horizontal, Peak Detector:



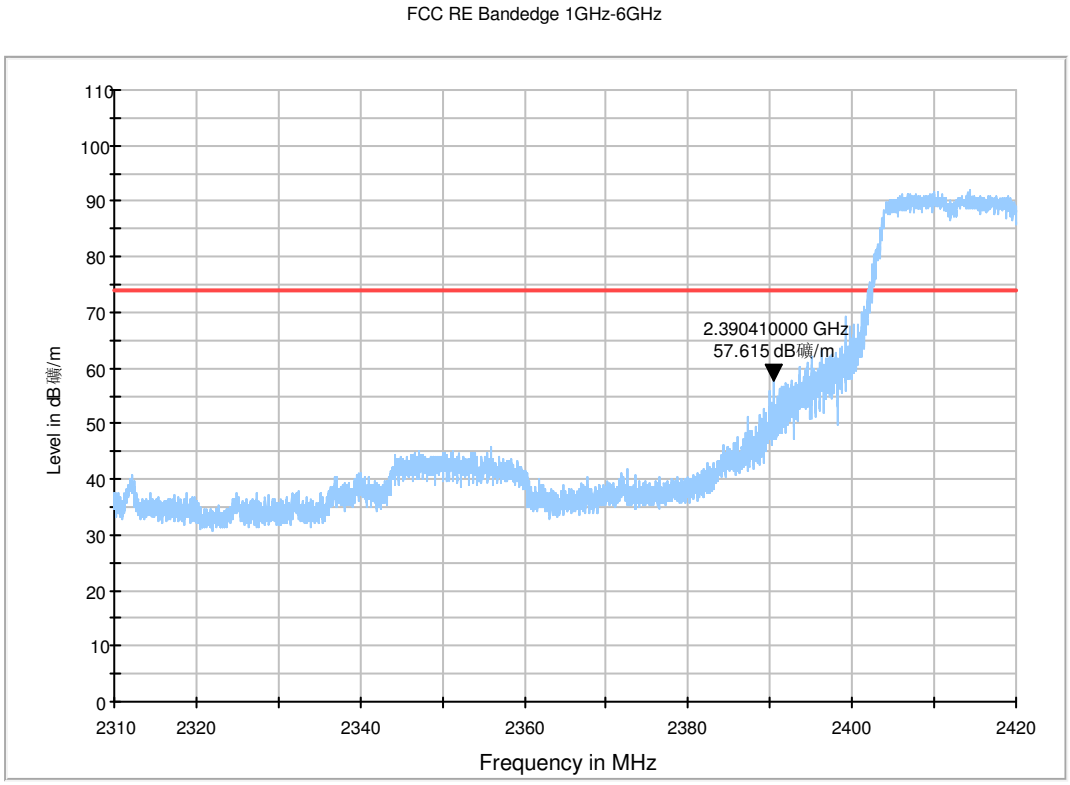
Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390	84.42	-10.04	64.38	74.00	9.62

Horizontal, AV Detector:



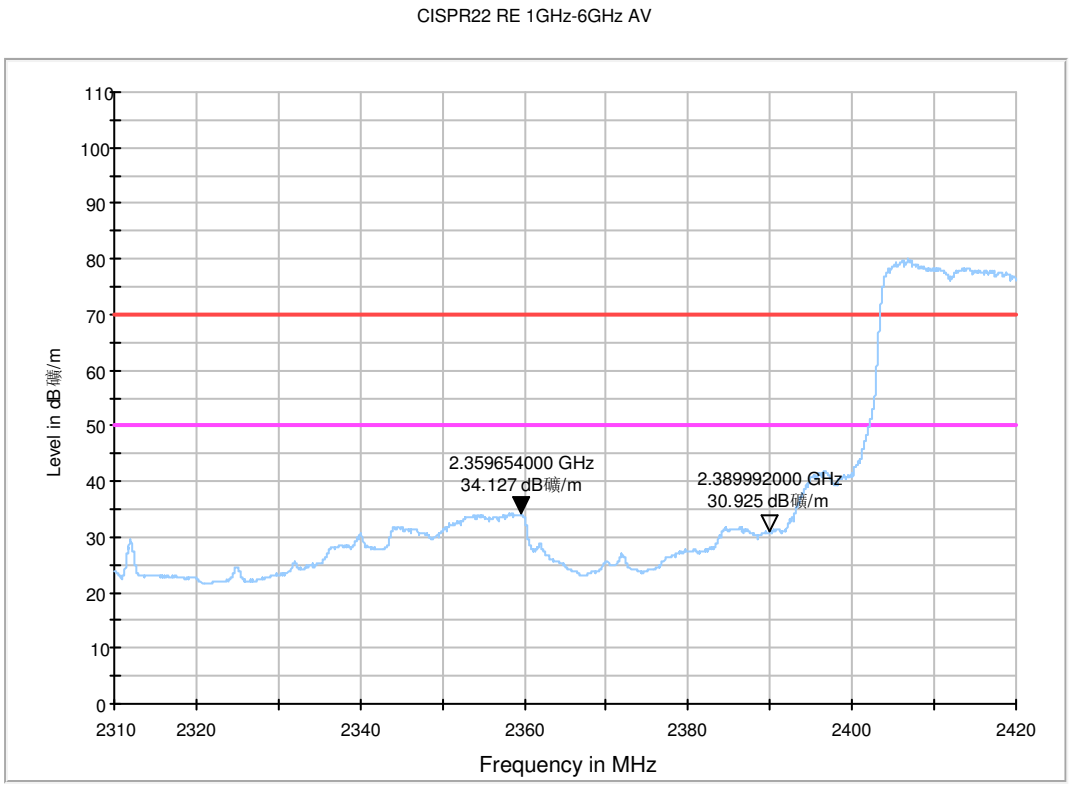
Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2344.99	49.48	-10.04	39.44	54.00	14.56

CH Low 802.11g Mode 6M
Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2390	67.66	-10.04	57.62	74.00	16.38

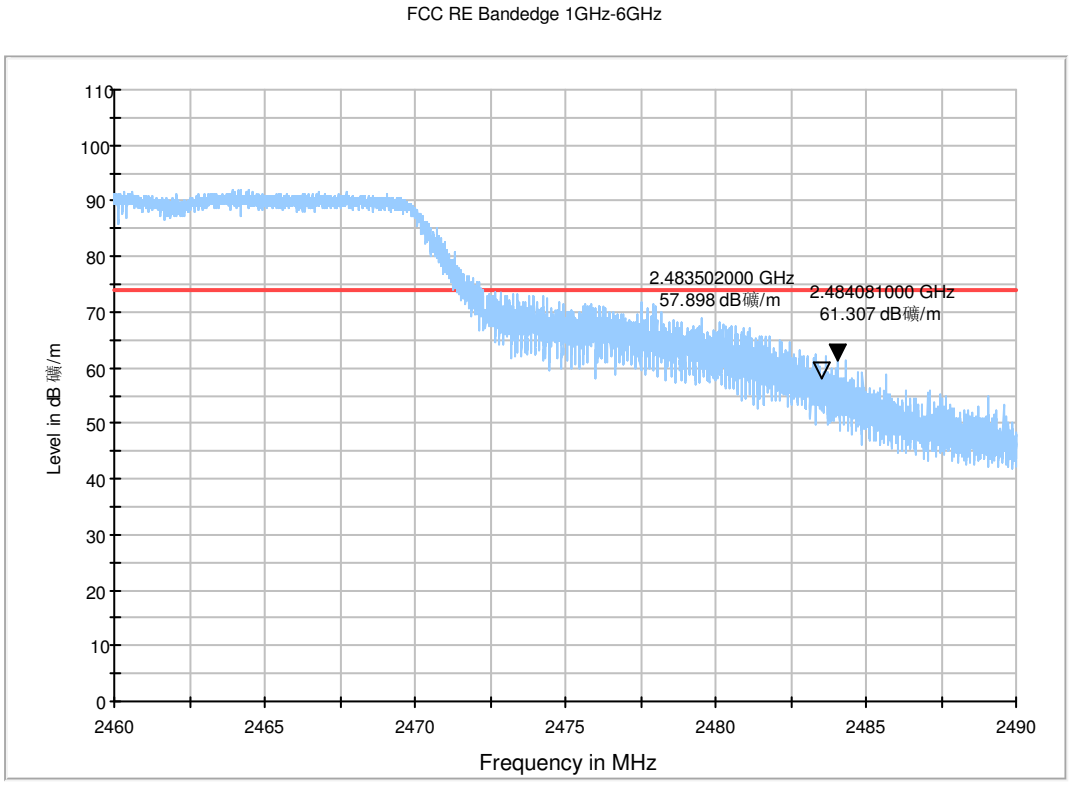
Vertical, AVG Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2359.65	44.17	-10.04	34.13	54.00	19.87

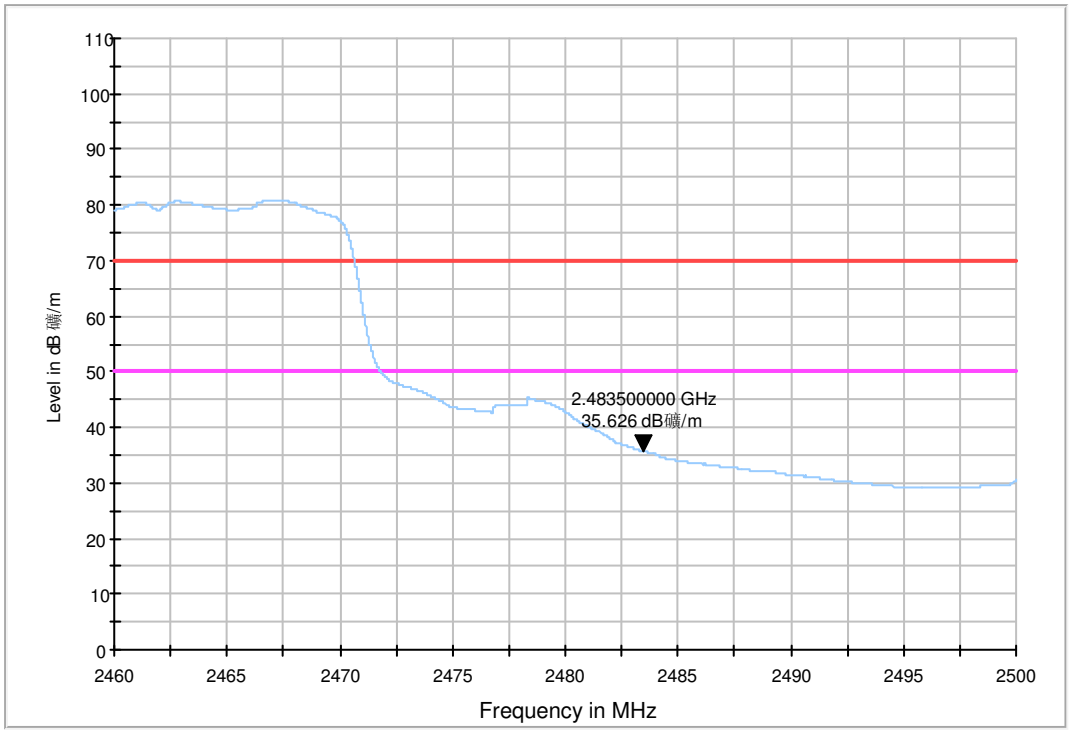
CH High 802.11g Mode 6M

Horizontal, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2484.08	71.35	-10.04	61.31	74.00	12.69

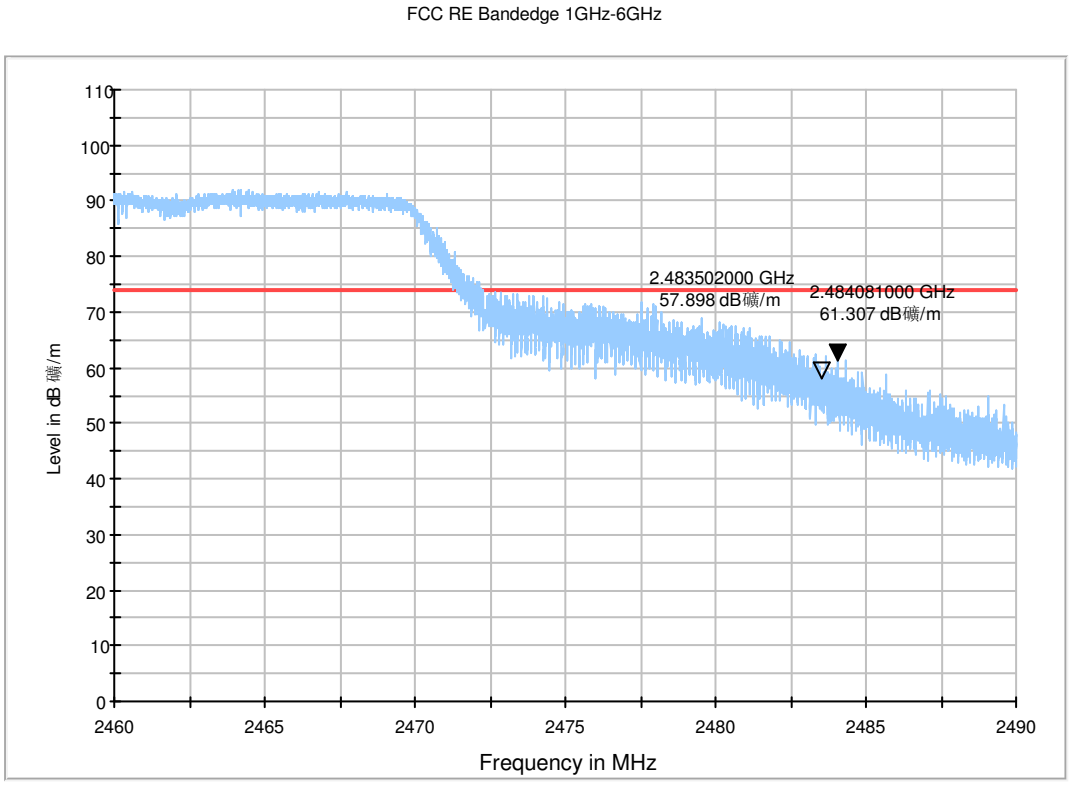
Horizontal, AV Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2484.8	45.67	-10.04	35.63	54.00	18.37

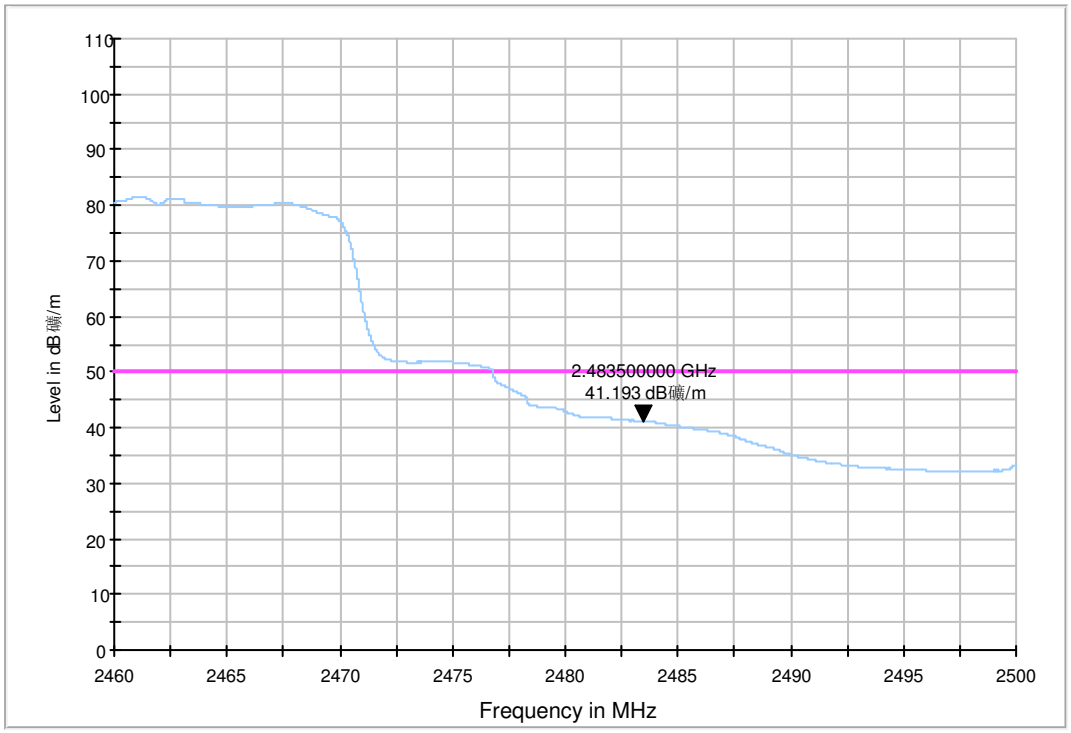
CH High 802.11g Mode 6 M

Vertical, Peak Detector:



Frequency (MHz)	Peak Reading (dBuV)	Factor (dB/m)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
2484.08	71.35	-10.04	61.31	74.00	12.69

Vertical, AVG Detector:



Frequency (MHz)	AV Reading (dBuV)	Factor (dB/m)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
2483.5	51.23	-10.04	41.19	54.00	12.81

5.3.5 Conducted Spurious Emission Test

Test Requirement: FCC Part15 247(c)

Test date: Oct 30, 2011

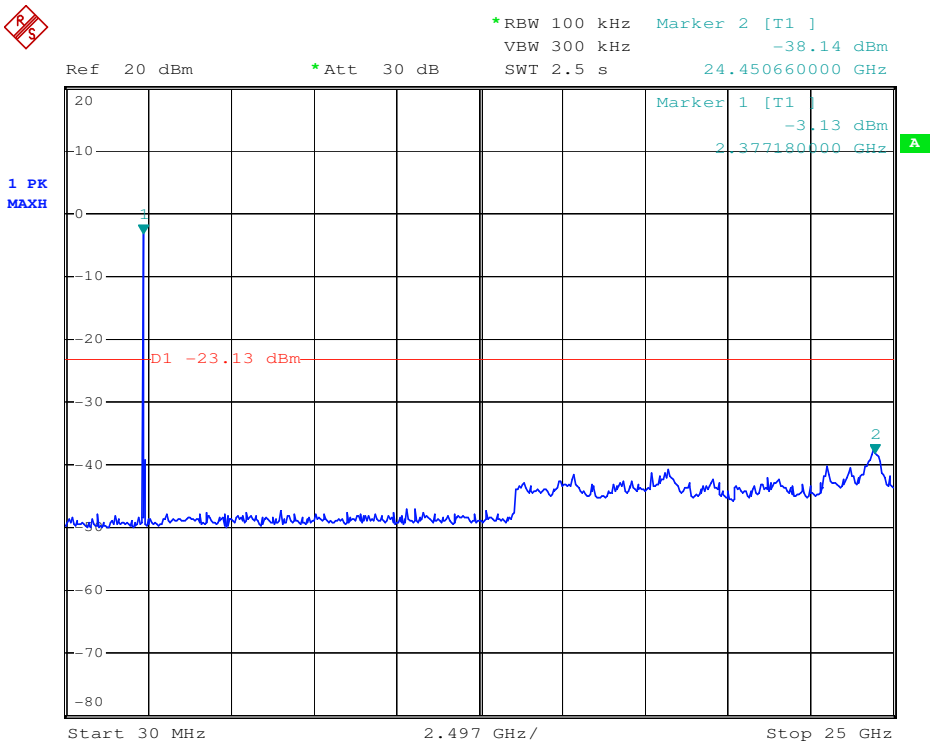
Standard Applicable: According to section 15.247(c),in any 100KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating,the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power,In addition,radiated emissions which fall in the restricted bands,as defined in section 15.205(a),must also comply with the radiated emission limits specified in 15.209(a).

Measurement Procedure:
1. Place the EUT on the table and set it in 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 center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW=100KHz VBW=300KHz, Sweep = auto
6. Repeat above procedures until all frequency measured were complete.

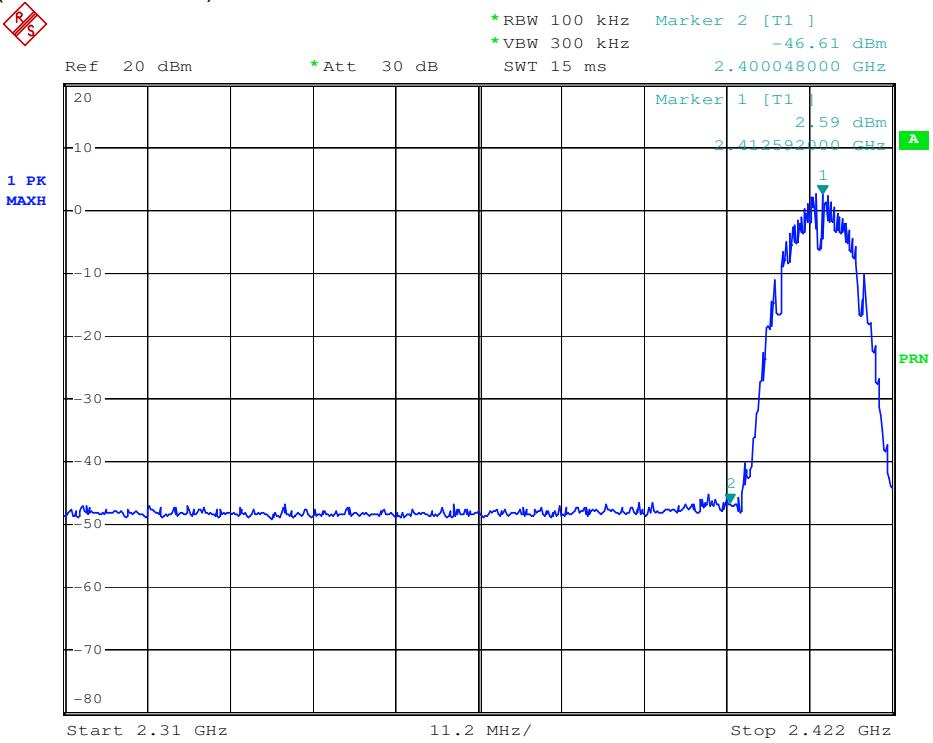
Measurement Result:

Conducted spurious Emission Measurement Result

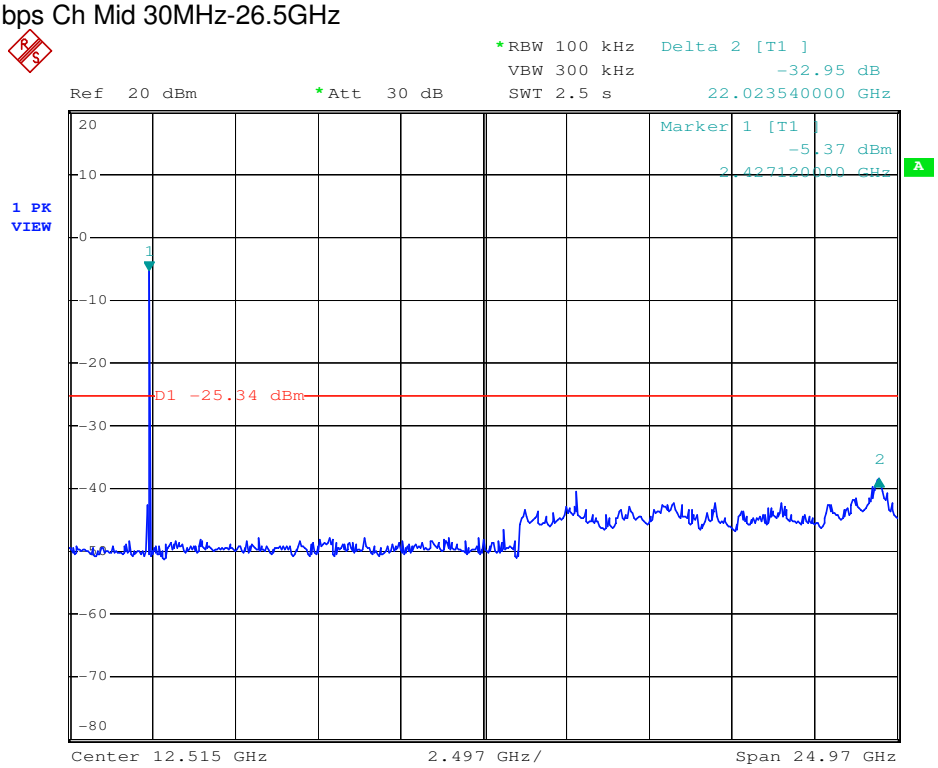
802.11b 1Mbps CH Low 30MHz-25GHz



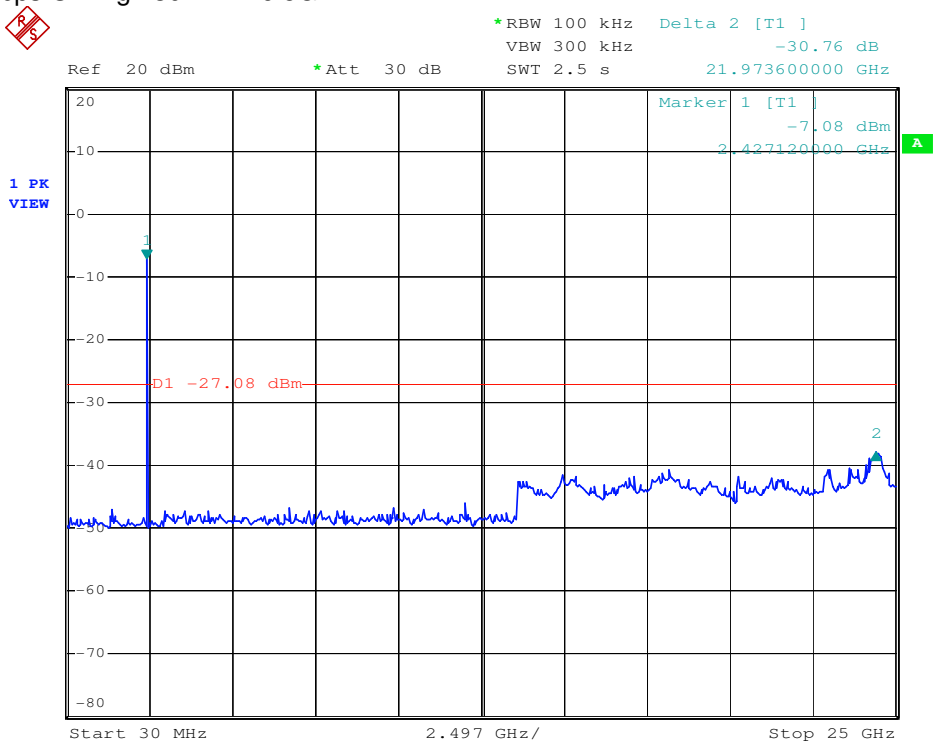
Band Edge (Conducted Mode)



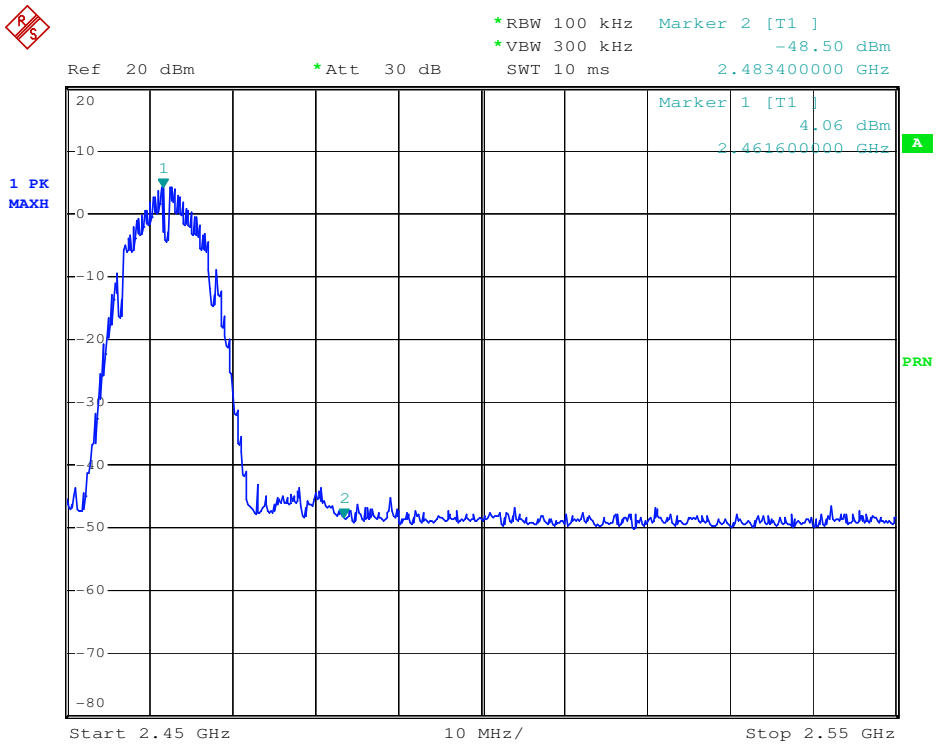
802.11b 1Mbps Ch Mid 30MHz-26.5GHz



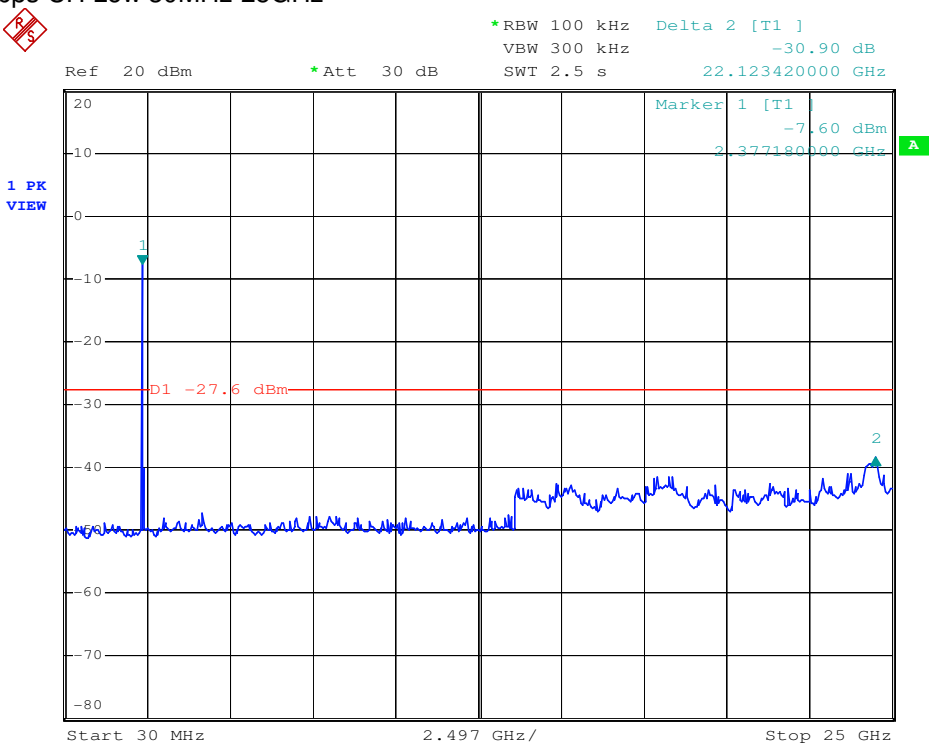
802.11b 1Mbps Ch High 30MHz-26.5GHz



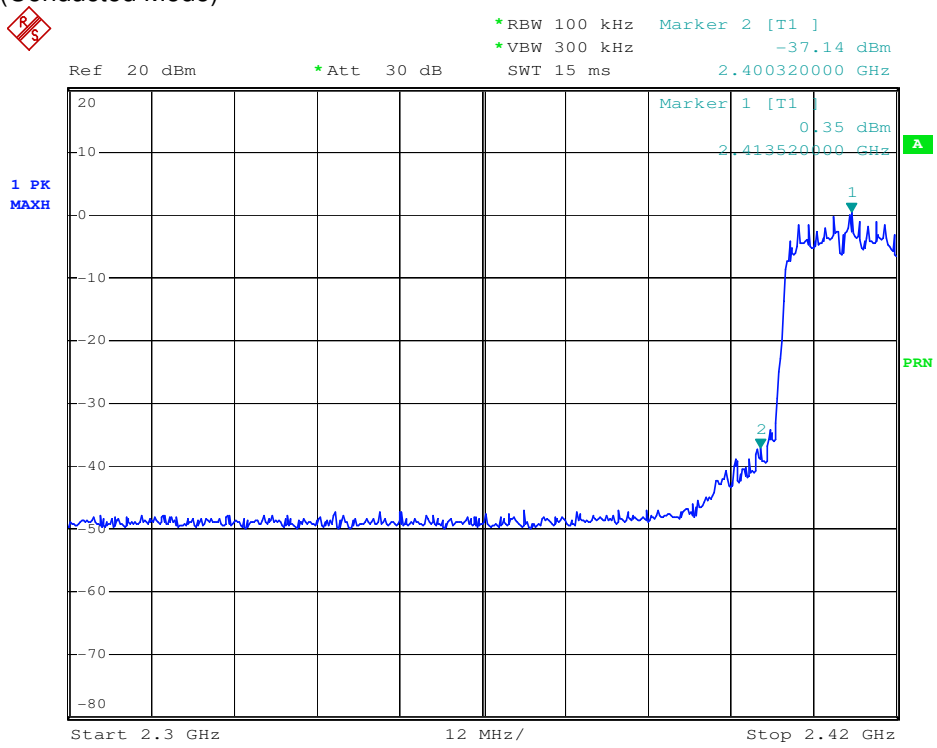
Band Edge



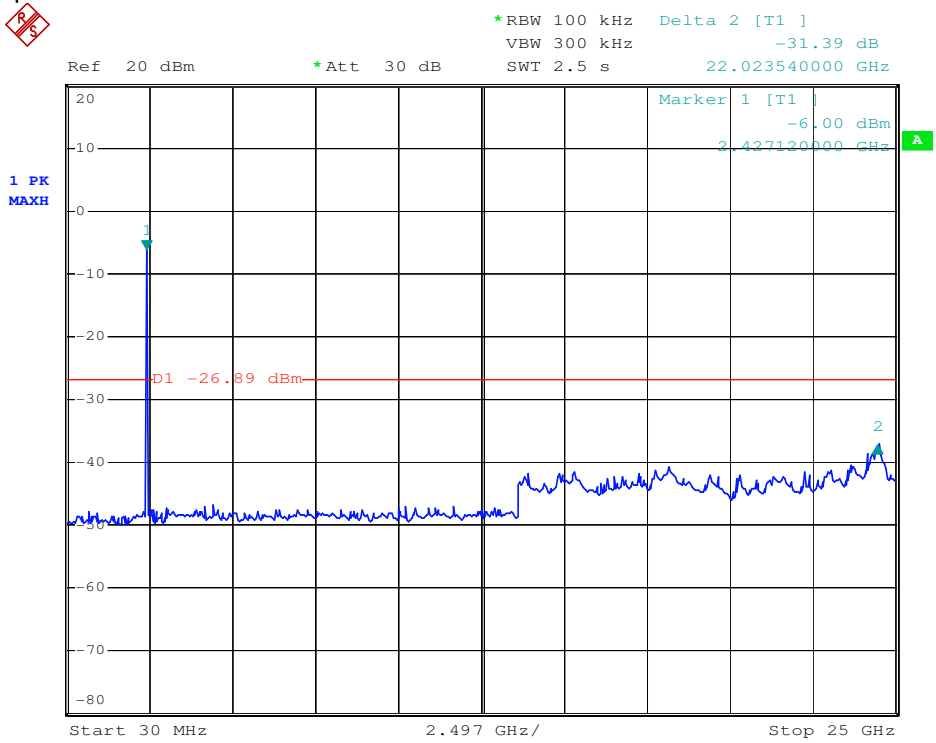
802.11g 1Mbps CH Low 30MHz-25GHz



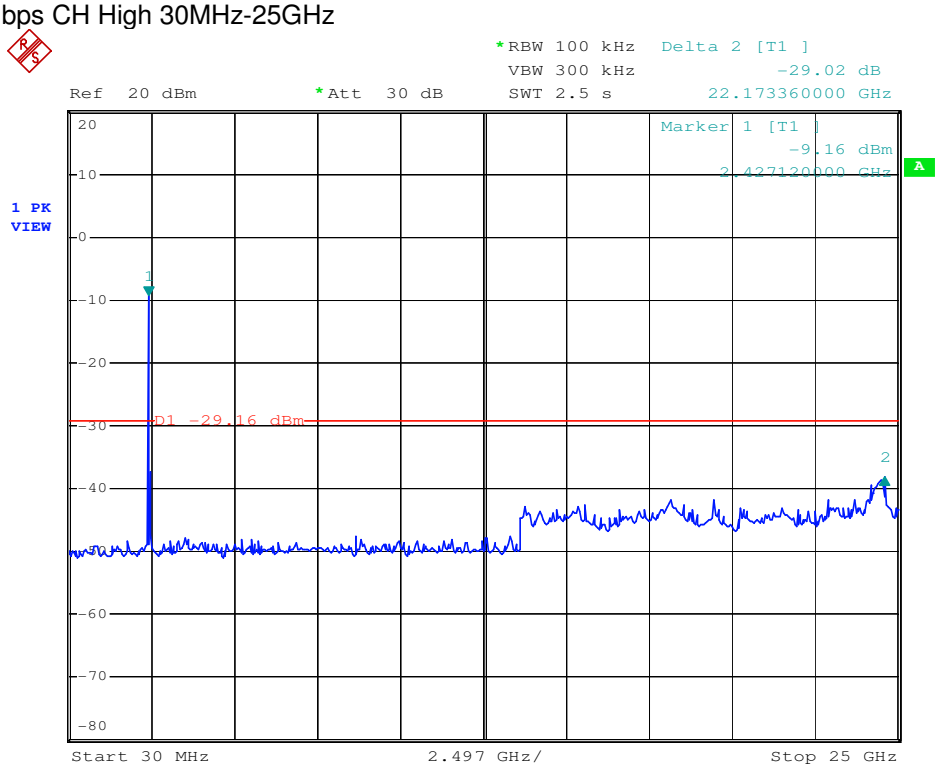
Band Edge (Conducted Mode)



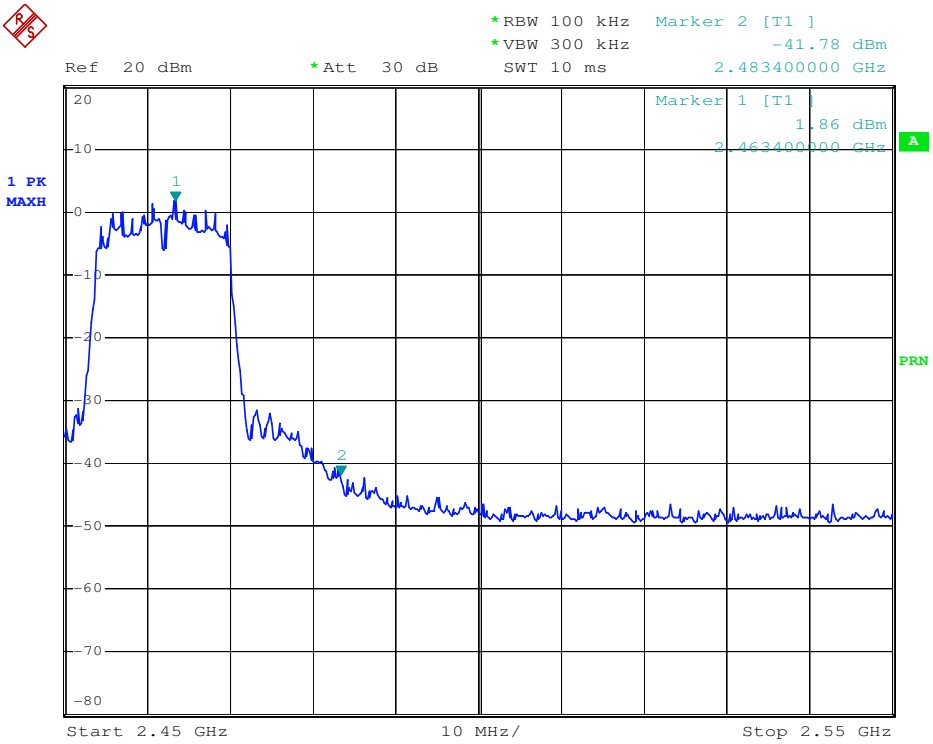
802.11g 6Mbps CH Middle 30MHz-25GHz



802.11g 6Mbps CH High 30MHz-25GHz



Band Edge



5.3.6 Spurious Radiated Emission Test

Test Requirement: FCC Part15 247(c)

Test date: Sep 22,2011 to Sep 26,2011

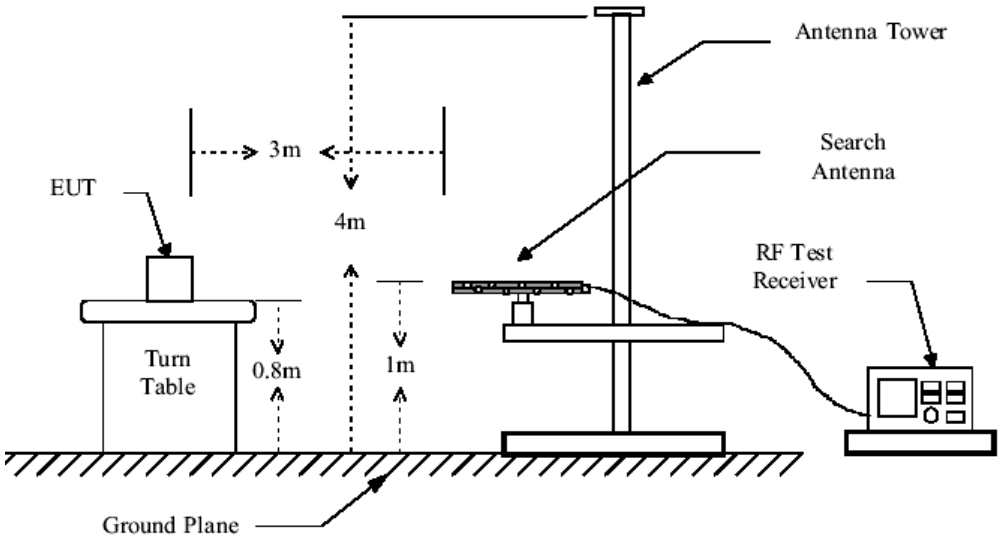
Standard Applicable: According to section 15.247(c),all other emissions outside these bands shall not exceed the general radiated emission limits specified in section15.209(a).And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to the tenth harmonic of the highest fundamental frequency or to 40GHz,which is lower.

Measurement Procedure:

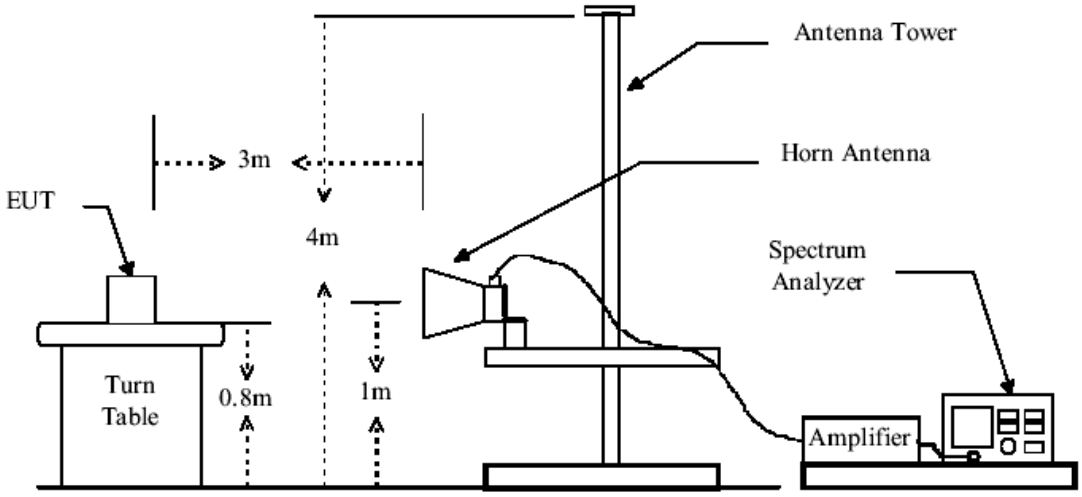
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz). 1MHz resolution bandwidth and Peak detector apply (1000 MHz – 25GHz)
Above 1GHz
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.
7. The field strength of spurious emission was measured in the following position:EUT lie-down position（X，Y axis）.The worst emission was found in 802.11b 1Mbps and 802.11g 6Mbps and the wrost case was recored.

Radiated Test Set-up:

Radiated Emission Test Set-up,Frequency Below 1000MHz



Radiated Emission Test Set-up Frequency Over 1GHz



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

802.11b 1Mbps Mode

Operation Mode: TX Low Mid CH 2412MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4824.0	31.0	1.2	0.5	43.4	56.21	45.51	74	Vertical
7236.0	35.5	1.7	0.6	43.1	45.23	39.93	74	V
4824.0	31.0	1.2	0.5	43.4	58.47	47.77	74	Horizontal
7236.0	35.5	1.7	0.6	43.1	45.27	39.97	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4824.0	31.0	1.2	0.5	43.4	52.19	41.49	54	Vertical
7236.0	35.5	1.7	0.6	43.1	43.20	37.9	54	V
4824.0	31.0	1.2	0.5	43.4	52.81	42.11	54	Horizontal
7236.0	35.5	1.7	0.6	43.1	42.62	37.32	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode: TX Mid CH 2437MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4876.0	31.1	1.3	0.5	43.5	54.87	44.27	74	Vertical
7314.0	35.7	1.7	0.6	43.1	43.29	38.19	74	V
4876.0	31.1	1.3	0.5	43.5	52.45	41.85	74	Horizontal
7314.0	35.7	1.7	0.6	43.1	43.76	38.66	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4876.0	31.1	1.3	0.5	43.5	50.13	39.53	54	Vertical
7314.0	35.7	1.7	0.6	43.1	40.03	34.93	54	V
4876.0	31.1	1.3	0.5	43.5	48.17	37.57	54	Horizontal
7314.0	35.7	1.7	0.6	43.1	40.35	35.25	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode:TX High CH 2462MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4928.0	31.4	1.4	0.5	43.9	54.27	43.67	74	Vertical
7392.0	35.8	1.7	0.6	43.1	45.31	40.31	74	V
4928.0	31.4	1.4	0.5	43.9	53.76	43.16	74	Horizontal
7392.0	35.8	1.7	0.6	43.1	42.18	37.18	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4928.0	31.4	1.4	0.5	43.9	51.26	40.66	54	Vertical
7392.0	35.8	1.7	0.6	43.1	41.28	36.28	54	V
4928.0	31.4	1.4	0.5	43.9	49.65	39.05	54	Horizontal
7392.0	35.8	1.7	0.6	43.1	40.38	35.38	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

6. Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

802.11g 6Mbps Mode

Operation Mode: TX Low Mid CH 2412MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4824.0	31.0	1.2	0.5	43.4	60.39	49.69	74	Vertical
7236.0	35.5	1.7	0.6	43.1	48.57	43.27	74	V
4824.0	31.0	1.2	0.5	43.4	61.72	51.02	74	Horizontal
7236.0	35.5	1.7	0.6	43.1	49.58	44.28	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4824.0	31.0	1.2	0.5	43.4	54.13	43.43	54	Vertical
7236.0	35.5	1.7	0.6	43.1	44.29	38.99	54	V
4824.0	31.0	1.2	0.5	43.4	54.49	43.79	54	Horizontal
7236.0	35.5	1.7	0.6	43.1	45.27	39.97	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode: TX Mid CH 2437MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4876.0	31.1	1.3	0.5	43.5	59.29	48.69	74	Vertical
7314.0	35.7	1.7	0.6	43.1	47.37	42.27	74	V
4876.0	31.1	1.3	0.5	43.5	59.69	49.09	74	Horizontal
7314.0	35.7	1.7	0.6	43.1	47.91	42.81	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4876.0	31.1	1.3	0.5	43.5	53.57	42.97	54	Vertical
7314.0	35.7	1.7	0.6	43.1	42.62	37.52	54	V
4876.0	31.1	1.3	0.5	43.5	54.73	44.13	54	Horizontal
7314.0	35.7	1.7	0.6	43.1	43.49	38.39	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

Operation Mode:TX High CH 2462MHz

30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
59.48	13.7	0.8	24.6	41.7	31.6	40	Vertical
138.36	14.5	1.3	24.6	38.2	29.4	43.5	Vertical
214.55	11.1	1.6	24.5	53.0	41.2	43.5	Horizontal
479.99	17.1	2.4	24.4	45.2	40.3	46	Horizontal

1~25 GHz Harmonics & Spurious Emissions. Peak & Average Measurement

Peak Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4928.0	31.4	1.4	0.5	43.9	58.92	48.32	74	Vertical
7392.0	35.8	1.7	0.6	43.1	48.51	43.51	74	V
4928.0	31.4	1.4	0.5	43.9	58.77	48.17	74	Horizontal
7392.0	35.8	1.7	0.6	43.1	45.43	40.43	74	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
4928.0	31.4	1.4	0.5	43.9	53.85	43.25	54	Vertical
7392.0	35.8	1.7	0.6	43.1	44.47	39.47	54	V
4928.0	31.4	1.4	0.5	43.9	53.89	43.29	54	Horizontal
7392.0	35.8	1.7	0.6	43.1	42.51	37.51	54	H

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

7. Final Test Level =Receiver Reading + Antenna Factor + Cable Factor +Fiter–Preamplifier Factor

5.3.7 Peak Power Spectral Density

Test Requirement: FCC Part15 247(e)

Test date: Oct. 27, 2011

Standard Applicable: According to section 15.247(e),For digitally modulated systems,the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dB in any 3KHz band during any time in terval 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 powr spectral density.

Measurement Procedure: The EUT was tested according to ANSI C63.10,2009 for compliance to FCC 47CFR 15.247 requiremnts.
Set RBW=3KHz,Set VBW=10KHz,Span=100KHz,Sweep time=34s,Set detector=Peak detector.

Measurement Result:

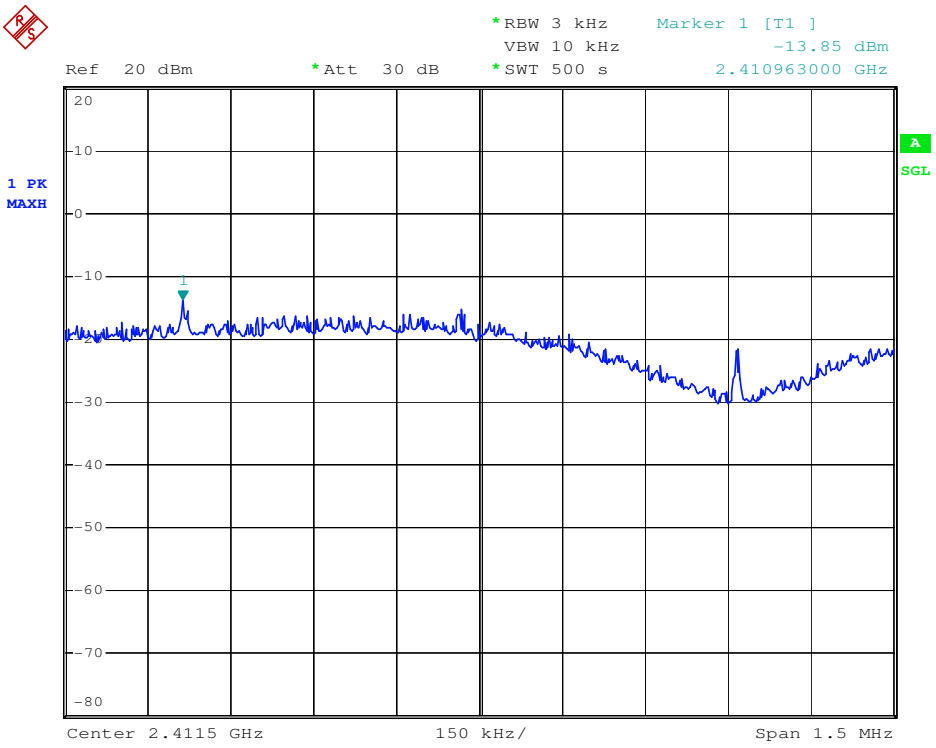
802.11b 1Mbps

CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2412	-13.85	2.30	-11.55	8	PASS
MID	2437	-17.64	2.30	-15.34	8	PASS
HIGH	2462	-16.88	2.30	-14.58	8	PASS

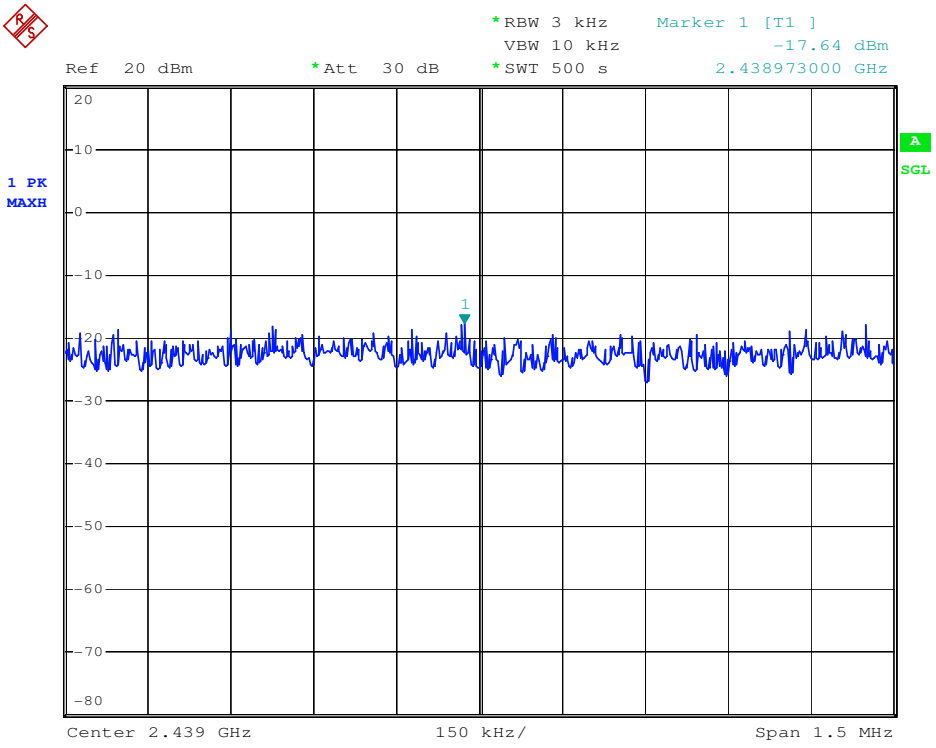
802.11g 6Mbps

CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2412	-19.00	2.30	-16.70	8	PASS
MID	2437	-19.12	2.30	-16.82	8	PASS
HIGH	2462	-18.73	2.30	-16.43	8	PASS

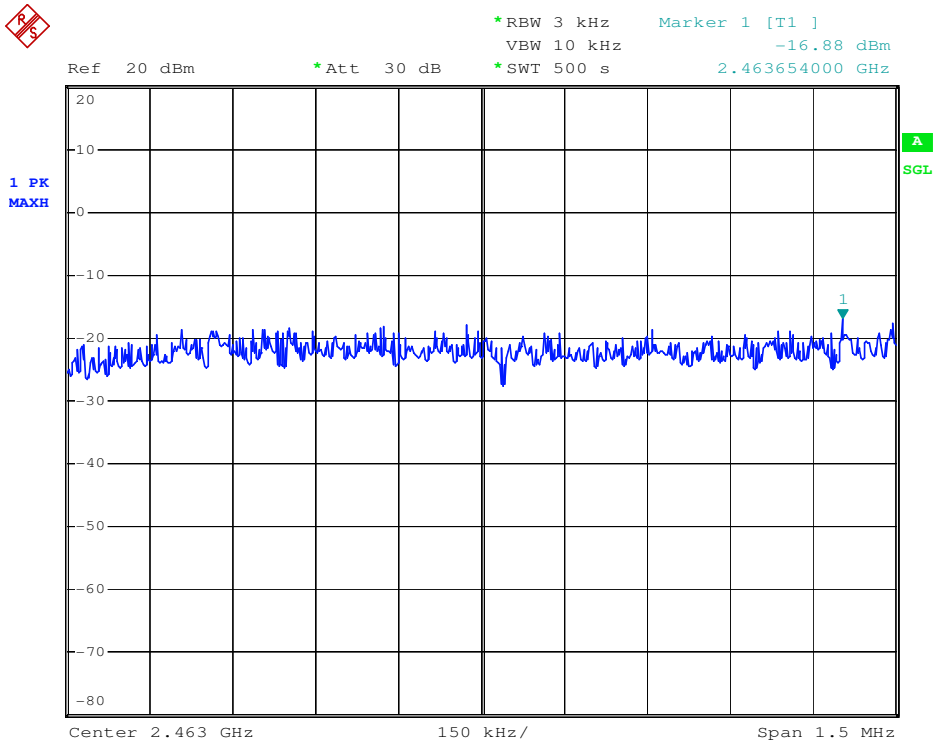
Channel Low 2412MHz (802.11b 1Mbps)



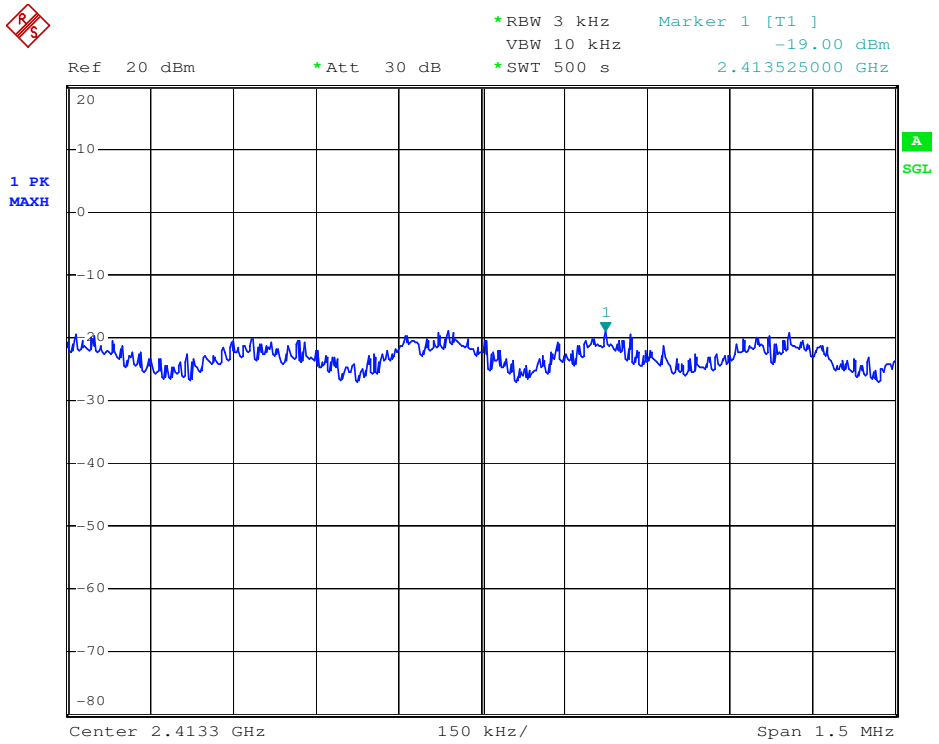
Channel Low 2437MHz (802.11b 1Mbps)



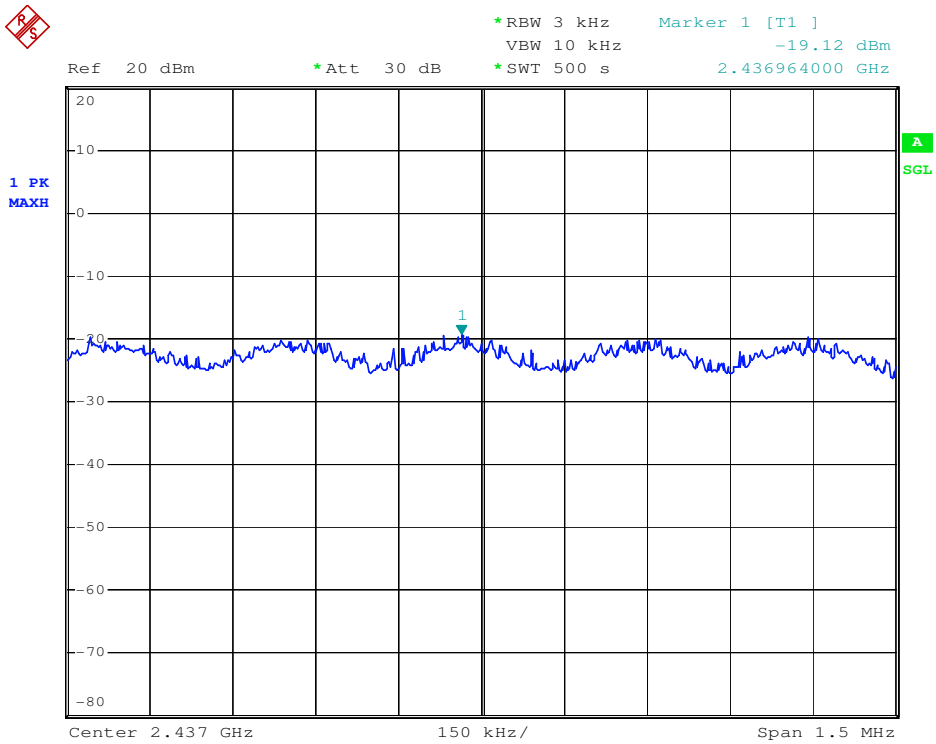
Channel High 2462MHz (802.11b 1Mbps)



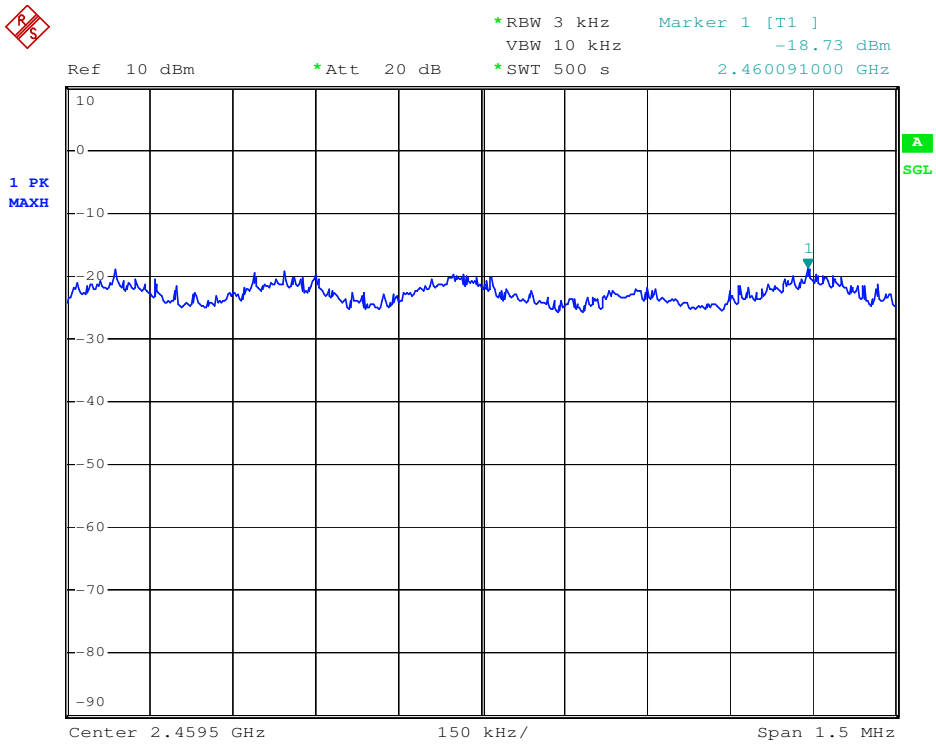
Channel Low 2412MHz (802.11g 6Mbps)



Channel Low 2437MHz (802.11g 6Mbps)



Channel High 2462MHz (802.11g 6Mbps)



5.3.8 Occupied Bandwidth Test

Test Requirement: RSS-Gen Issue 3 Clause 4.6.1

Test date: February. 15, 2011

Standard Applicable According to the section RSS-Gen Issue 3 Clause 4.6.1

EUT Setup The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions set at 300kHz,the video bandwidth set at 1MHz.

Measurement Result:

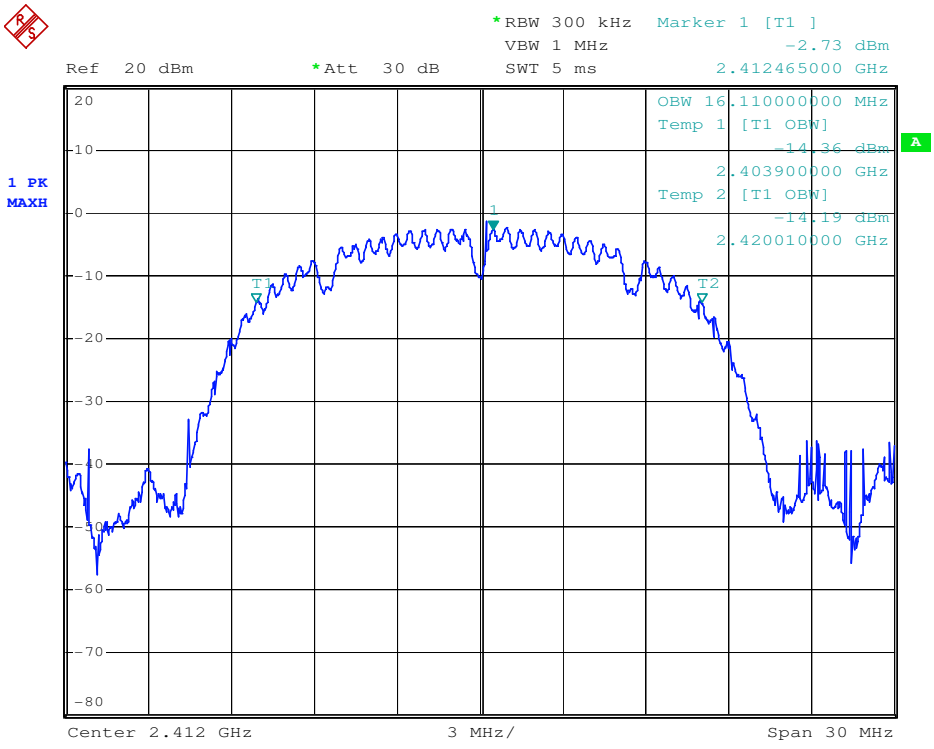
802.11b 1Mbps

CH	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	16.11
MID	2437	16.14
HIGH	2462	16.14

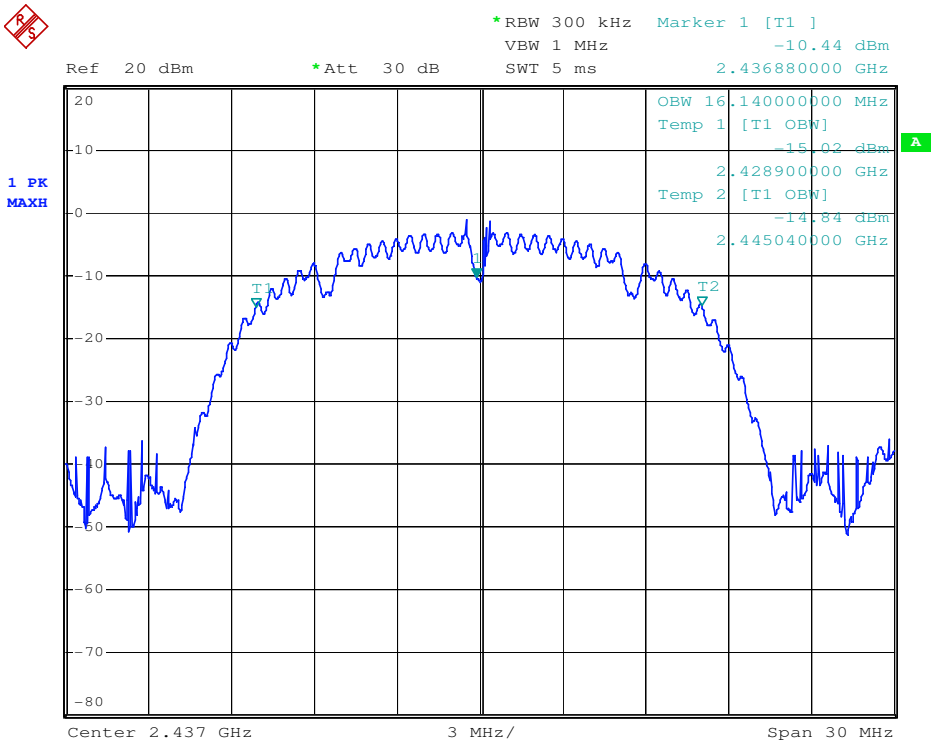
802.11g 6Mbps

CH	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	16.86
MID	2437	16.92
HIGH	2462	16.86

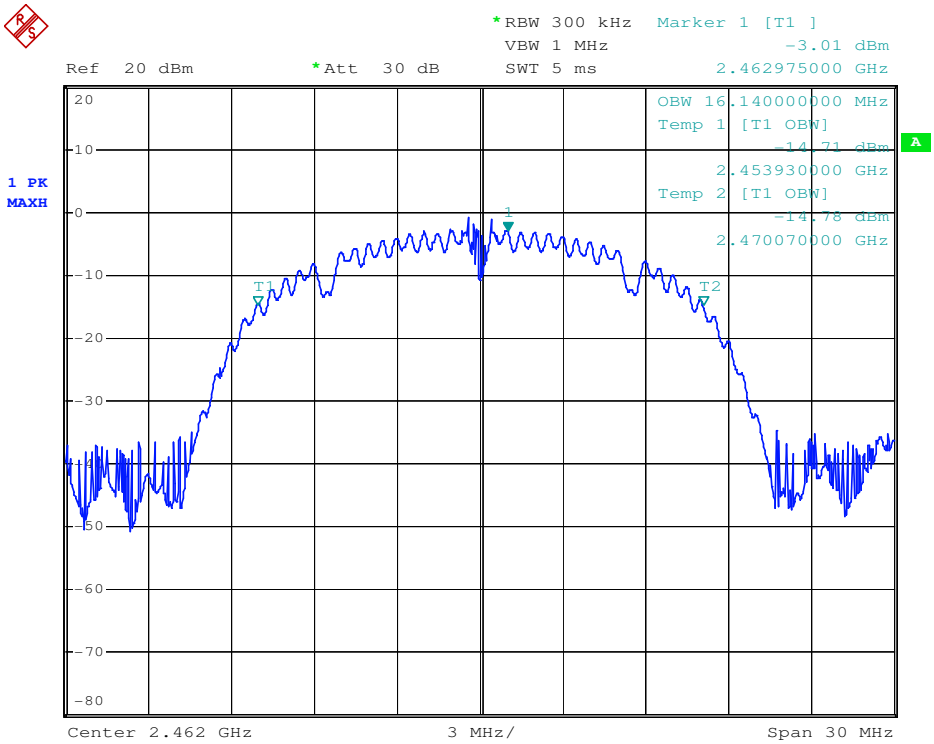
Channel Low 2412MHz (802.11b 1Mbps)



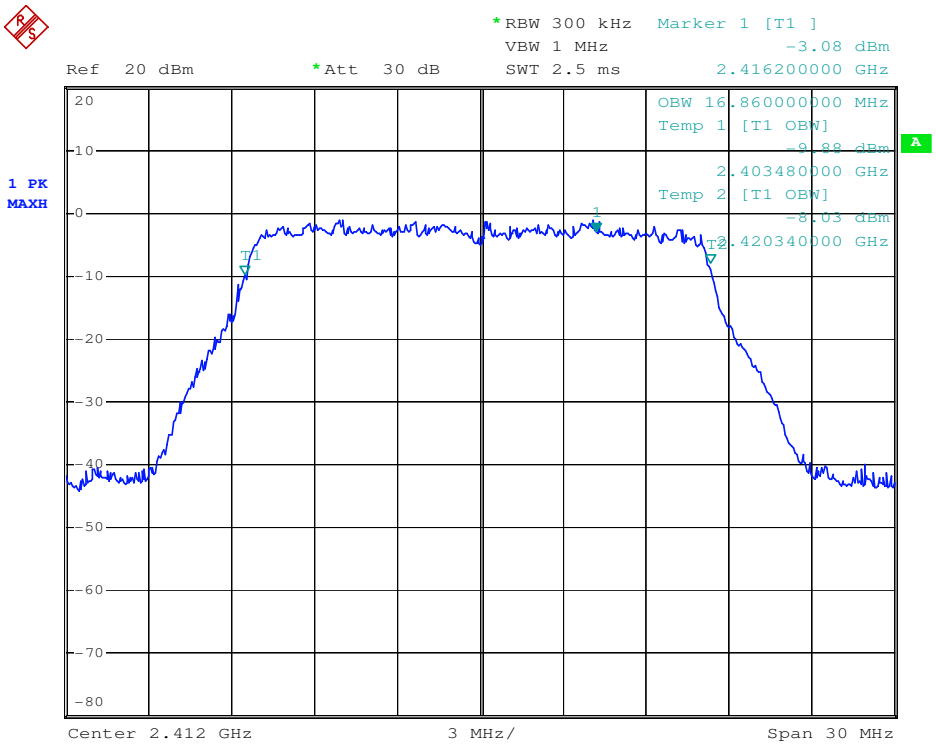
Channel Middle 2437MHz (802.11b 1Mbps)



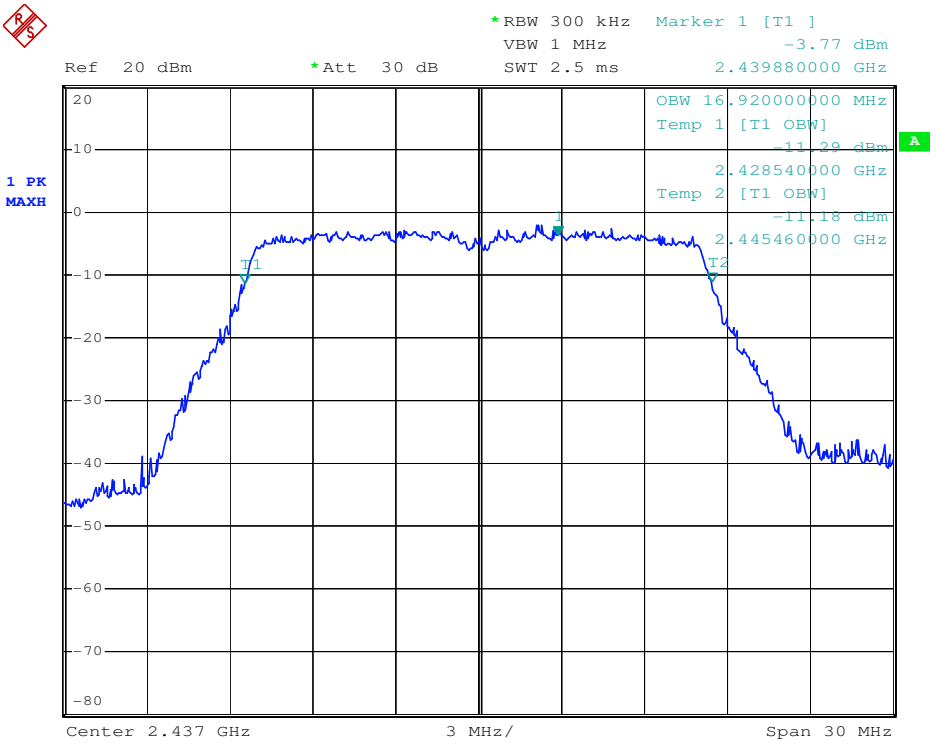
Channel High 2462MHz (802.11b 1Mbps)



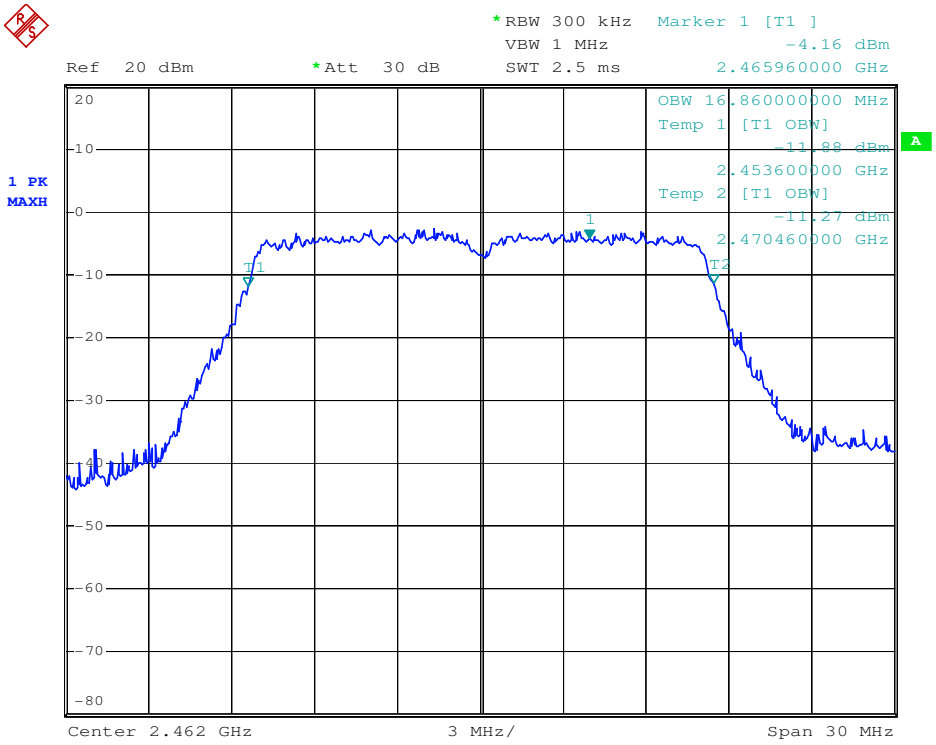
Channel Low 2412MHz (802.11g 6Mbps)



Channel Middle 2437MHz (802.11g 6Mbps)



Channel High 2462MHz (802.11g 6Mbps)



5.3.9 Antenna Requirement

Test Requirement: FCC Part15 15.203

5.3.7.1 Standard Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.3.7.2 Antenna Connected Construction

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

5.3.7.3 Result

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

End of the Report