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

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TEST REPORT

Application No.:	SHEM1211001682RF
Applicant:	Hansong (Nanjing) Technology Ltd.
Equipment Under Test (EUT):	
NOTE: The following sample(s) submitted was/were identified on behalf of the client as	
EUT Name:	wireless network audio player
Brand Name:	aperionaudio
Model No:	AWC02-AAP-NH1
FCC ID:	XCO-ARIS
IC:	7756A-ARIS
Standards:	47 CFR FCC Part 15 Subpart C (Section 15.247):2011
	RSS-210 Issue 8 (December 2010)
	RSS-Gen Issue 3 (December 2010)
Date of Receipt:	November 26, 2012
Date of Test:	November 28, 2012 to December 17, 2012
Date of Issue:	December 20, 2012
Test Result :	**PASS ***

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

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

E&E EMC Engineer
SGS-CSTC(Shanghai) Co., Ltd.

2 Test Summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	Test Procedure	RESULT
Power line conducted emission	15.207	RSS-Gen Issue 8 Clause 7.2.4	ANSI C63.10: 2009 Clause 6.2	PASS
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.9	PASS
Maximum peak output power	15.247(b)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.10.2	PASS
Power spectrum density	15.247(e)	RSS-210 Issue 8 Annex 8	ANSI C63.10,2009 Clause 6.11	PASS
Conducted Spurious Emission (30MHz to 25GHz)	Section 15.207 &15.247(d)	RSS-210 Issue 8 Annex 8.5	---	PASS
Radiated Spurious Emission (30MHz to 25GHz)	Section 15.209 &15.247(d)	RSS-210 Issue 8 Annex 8.5	ANSI C63.10,2009 Clause 6.4,6.5 and 6.6	PASS
Radiated Emission BandEdge	15.247(d)	---	ANSI C63.10,2009 Clause 6.9.2	PASS
Occupied bandwidth	---	RSS-Gen Issue 3 Clause 4.6.1	RSS-Gen Issue 3 Clause 4.6.1	Tested

The EUT contain only one Receiver (RX),

3 Contents

4 General Information

4.1 Client Information

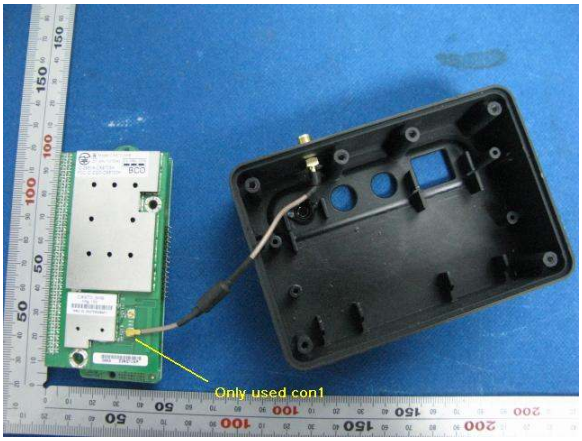
Applicant :	Hansong (Nanjing) Technology Ltd.
Applicant Address:	8th Kanping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China
Manufacturer:	Hansong (Nanjing) Technology Ltd.
Manufacturer Address:	8th Kanping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China

4.2 General Description of EUT (Equipment Under Test)

Product Name:	wireless network audio player
Model No.(EUT):	AWC02-AAP-NH1
Add Model No.:	N/A
Trade Mark:	aperionaudio

4.3 Details of E.U.T.

Technical Specifications:

Modulation Technique:	☒ 802.11b: DSSS ☒ 802.11g: OFDM
Modulation Type:	☒ 802.11b: DSSS(CCK, DQPSK, DBPSK) ☒ 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
Frequency Range / Channel Number:	☒ 802.11b/g: 2412-2462MHz / 11 Channels
Data Rate:	☒ 802.11b: 1Mbps,2Mbps, 5.5Mbps, 11Mbps, ☒ 802.11g: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 36Mbps, 48Mbps, 54Mbps
Equipment classification:	☒ equipment for fixed use
Antenna Type:	Dipole antenna Remark: The RF module have two antenna connector, EUT only used con1, con2 is empty. The antenna define like below figure. 

 	
Antenna Gain:	2.0 dBi

Power Supply:

Rated Input:	12VDC from AP2 Wireless Speaker through airplay card interface

4.4 Other Information Requested by the Customer

None.

4.5 Standards Applicable for Testing

The standard used were FCC PART 15 Subpart C: 2011, ANSI C63.10: 2009. RSS-210 Issue 8, RSS-Gen Issue 3.

4.6 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 5678

4.7 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-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

5 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESU40	100109	2012-03-15	2013-03-14
2	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-679	2012-03-15	2013-03-14
3	Horn Antenna	Rohde & Schwarz	HF906	100284	2012-03-15	2013-03-14
4	ANTENNA	SCHWARZBECK	VULB9168	9168-313	2012-03-15	2013-03-14
5	Ultra broadband antenna	Rohde & Schwarz	HL562	100227	2012-03-15	2013-03-14
4	Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170 373	2012-03-15	2013-03-14
7	Atmosphere pressure meter	Shanghai ZhongXuan Electronic Co;Ltd	BY－2009P	--	2012-10-15	2013-10-14
8	CLAMP METER	FLUKE	316	86080010	2012-03-15	2013-03-14
9	Thermo-Hygrometer	ZHICHEN	ZC1-2	01050033	2012-01-16	2013-01-14
10	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT1800.0/ 2000.0-0.2/40-5SSK	11	2012-03-15	2013-03-14
11	Tunable Notch Filter	Wainwright instruments Gmbh	WRCT800.0/8 80.0-0.2/40-5SSK	9	2012-03-15	2013-03-14
12	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2012-04-07	2013-04-06
13	Low nosie amplifier	TESEQ	LNA6900	70133	2012-04-07	2013-04-06
14	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2012-04-13	2013-04-12

15	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2012-03-15	2013-03-14

6 Test Procedure & Measurement Data

6.1 E.U.T. Operation

Input voltage: 120VAC 60Hz for AP2 Wireless Speaker

Operating Environment:

Temperature: 20.0 -25.0 °C

Humidity: 35-75 % RH

Atmospheric Pressure: 992 -1020 mbar

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

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

6.2 Conducted Emission Test

Test Requirement: FCC Part15 15.207

Test date: November 29, 2012

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.

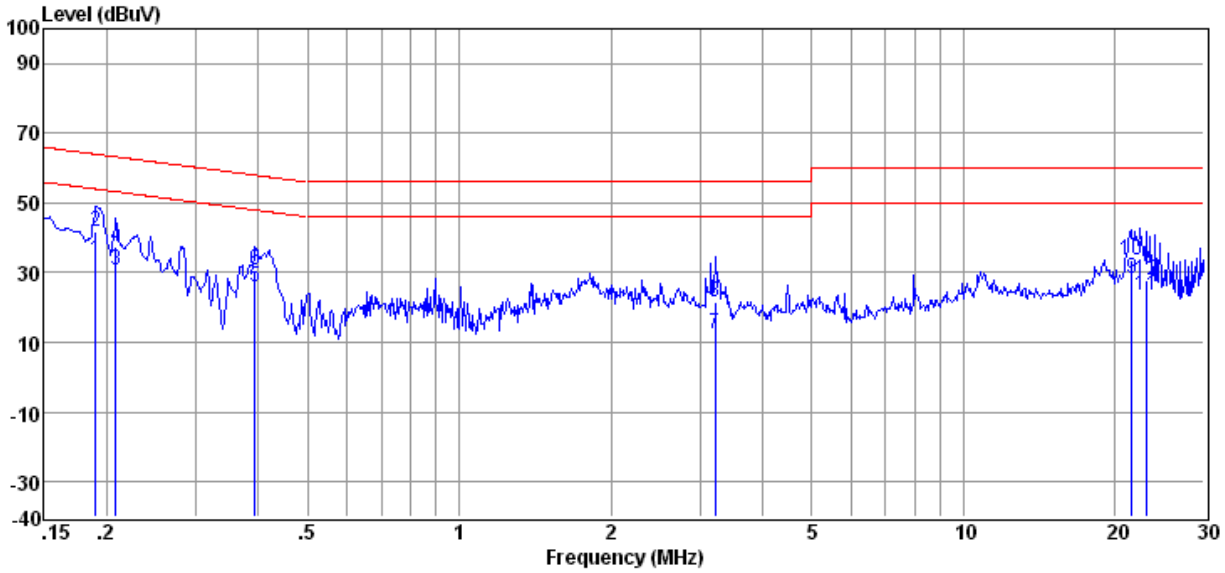
2.EUT is charged with AC/DC power adapter.The AC/DC Power adapter was plug-in LISN.The rear of the EUT and periphearals were placed flushed with the rear of the tabletop.

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

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

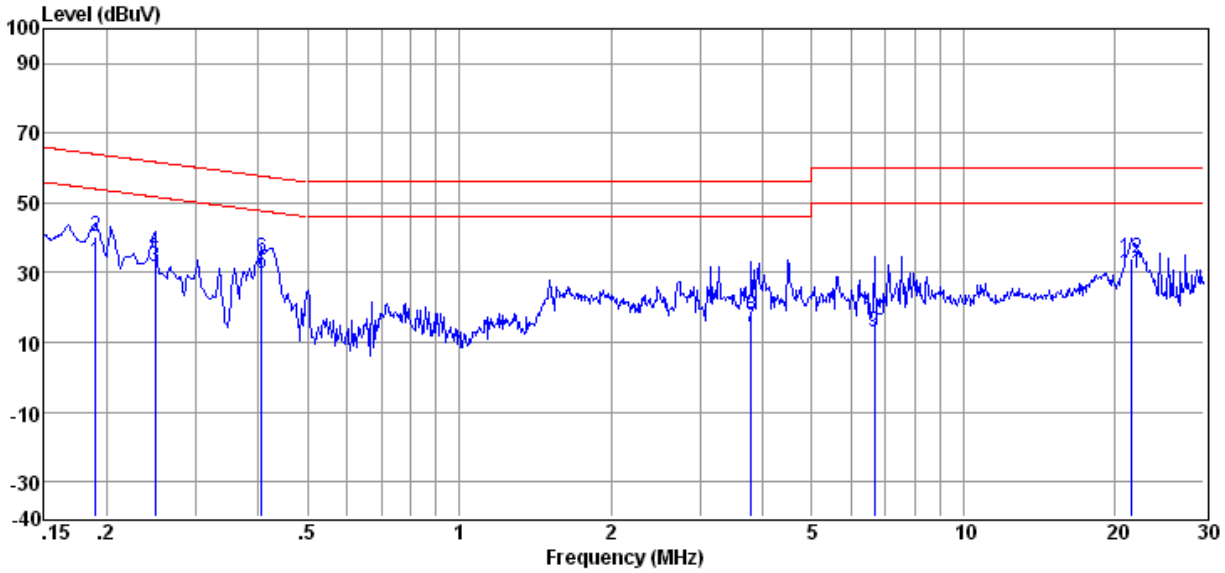
Note:All test modes have been tested.

L line:



Item (Mark)	Freq (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector
1	0.190	33.33	0.12	0.10	33.55	54.02	-20.47	Average
2	0.190	41.49	0.12	0.10	41.71	64.02	-22.31	QP
3	0.208	30.71	0.10	0.10	30.91	53.27	-22.36	Average
4	0.208	37.44	0.10	0.10	37.64	63.27	-25.63	QP
5	0.393	25.44	0.16	0.10	25.70	47.99	-22.29	Average
6	0.393	30.51	0.16	0.10	30.77	57.99	-27.22	QP
7	3.224	12.11	0.30	0.14	12.55	46.00	-33.45	Average
8	3.224	21.06	0.30	0.14	21.50	56.00	-34.50	QP
9	21.600	27.40	0.66	0.20	28.26	50.00	-21.74	Average
10	21.600	32.84	0.66	0.20	33.70	60.00	-26.30	QP
11	23.018	22.79	0.72	0.20	23.71	50.00	-26.29	Average
12	23.018	26.94	0.72	0.20	27.86	60.00	-32.14	QP

N Line:



Item (Mark)	Freq (MHz)	Read Level (dBμV)	LISN Factor (dB)	Cable Loss (dB)	Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Detector
1	0.190	33.12	0.12	0.10	33.34	54.02	-20.68	Average
2	0.190	40.36	0.12	0.10	40.58	64.02	-23.44	QP
3	0.249	31.57	0.12	0.10	31.79	51.78	-19.99	Average
4	0.249	35.72	0.12	0.10	35.94	61.78	-25.84	QP
5	0.406	29.63	0.17	0.10	29.90	47.73	-17.83	Average
6	0.406	33.73	0.17	0.10	34.00	57.73	-23.73	QP
7	3.799	13.73	0.30	0.16	14.19	46.00	-31.81	Average
8	3.799	17.49	0.30	0.16	17.95	56.00	-38.05	QP
9	6.662	12.40	0.30	0.20	12.90	50.00	-37.10	Average
10	6.662	15.93	0.30	0.20	16.43	60.00	-43.57	QP
11	21.486	28.67	0.66	0.20	29.53	50.00	-20.47	Average
12	21.486	33.15	0.66	0.20	34.01	60.00	-25.99	QP

6.3 6dB Bandwidth

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

Test date: November 29, 2012

Standard Applicable: According to section 15.247(a)(2),and 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=300KHz, 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:

Test mode: 802.11b

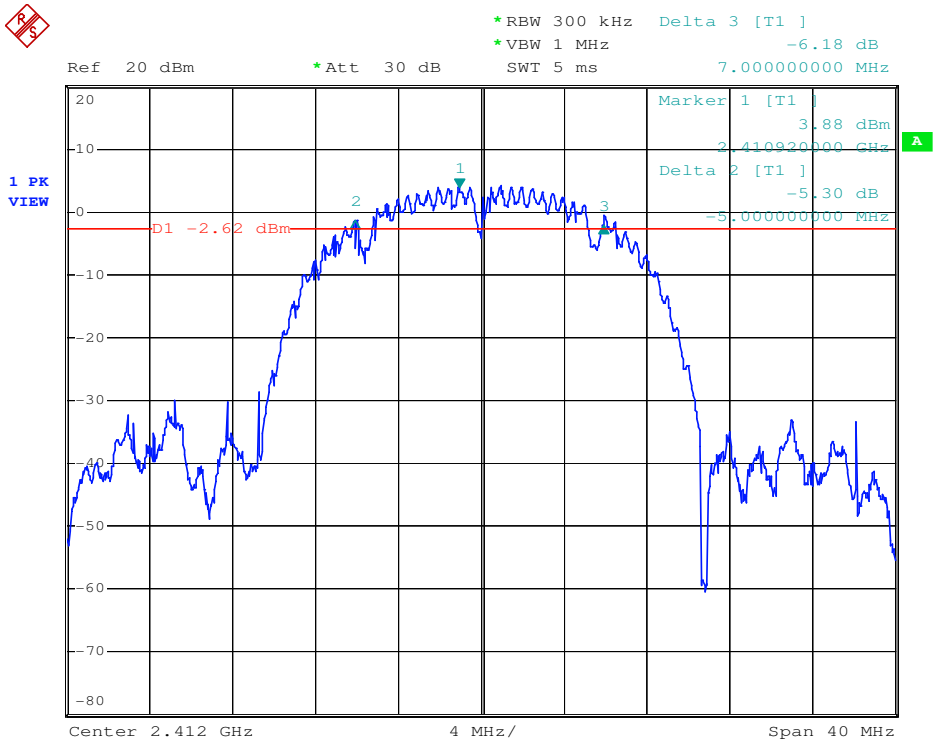
CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
Low	2412	12.00	500	PASS
Mid	2437	13.12	500	PASS
High	2462	11.86	500	PASS

Test mode: 802.11g

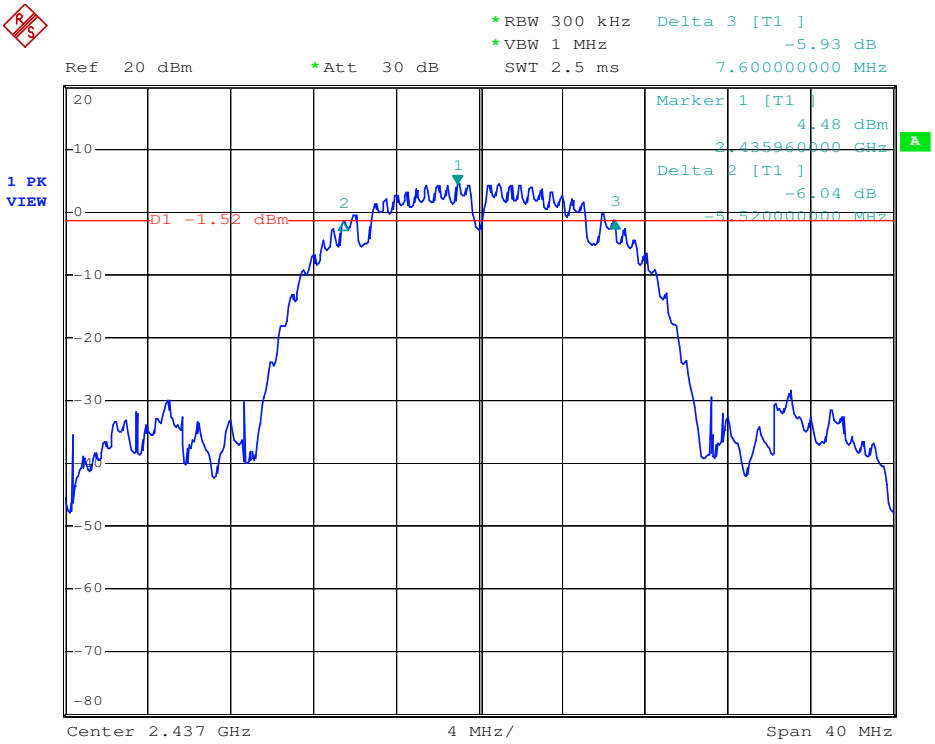
CH	Frequency (MHz)	Bandwidth (MHz)	Limit Bandwidth (KHz)	Result
Low	2412	16.40	500	PASS
Mid	2437	16.64	500	PASS
High	2462	16.48	500	PASS

Test Plots:

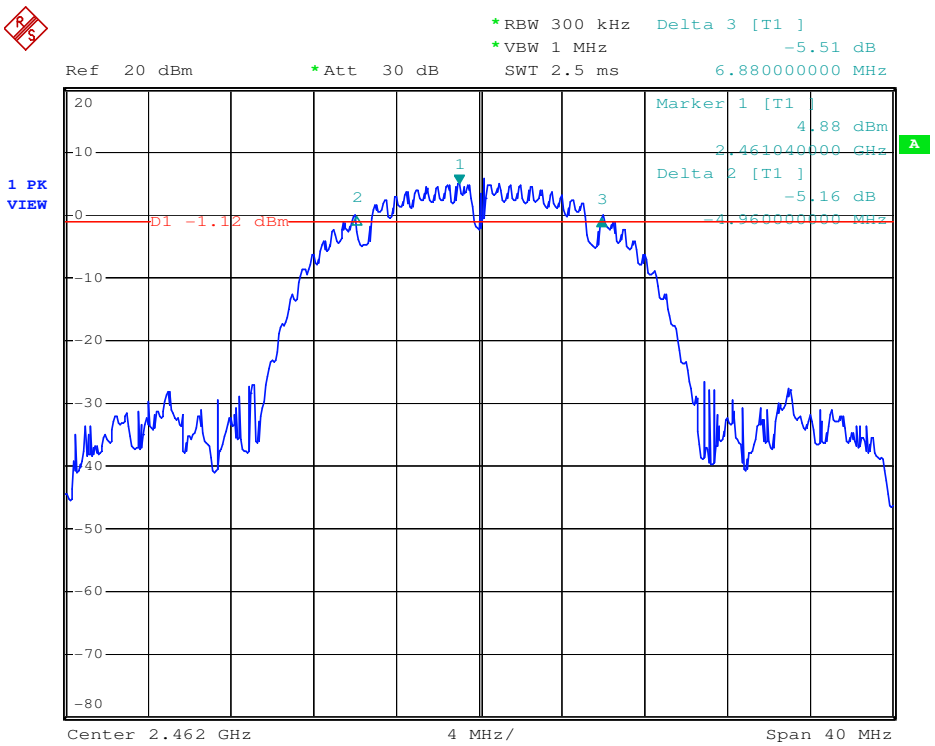
Lowest Channel **Test mode:** 802.11b



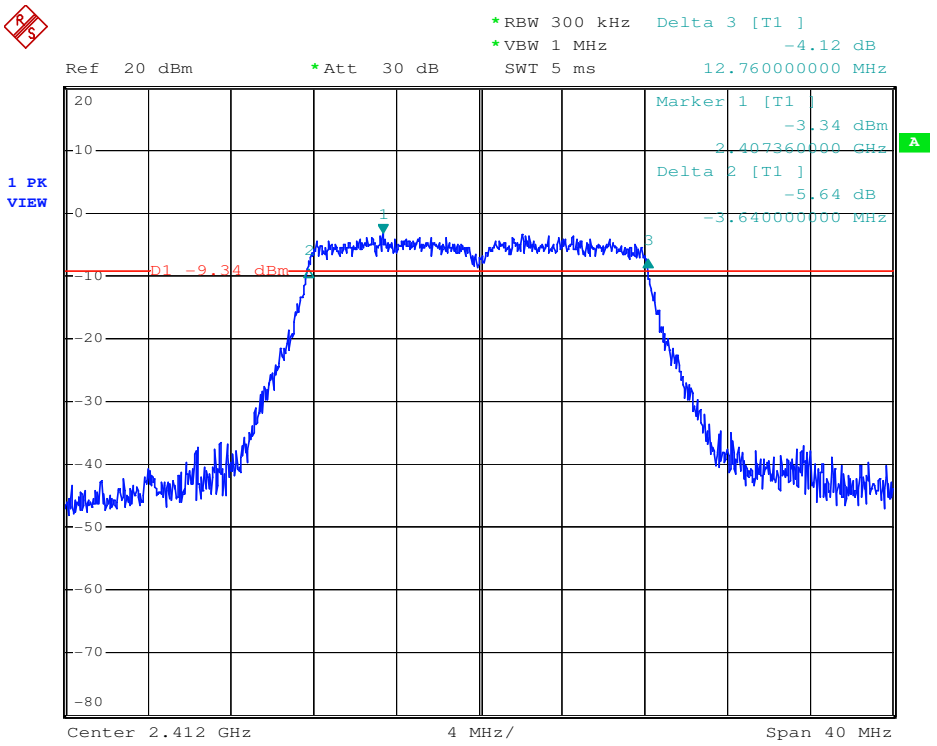
Middle Channel **Test mode:** 802.11b



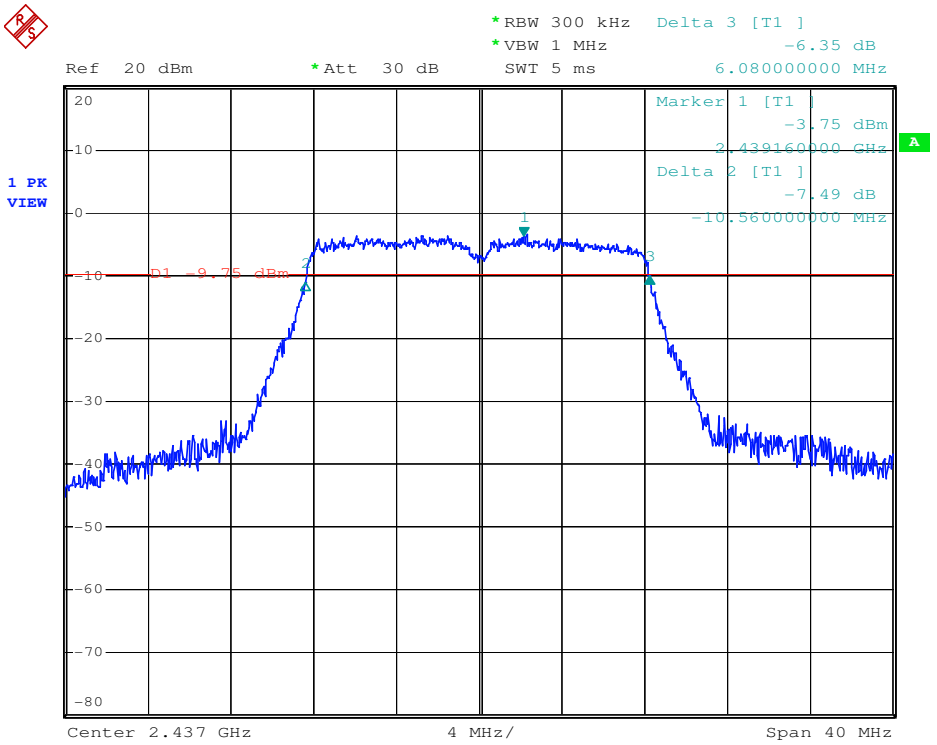
Highest Channel **Test mode:** 802.11b



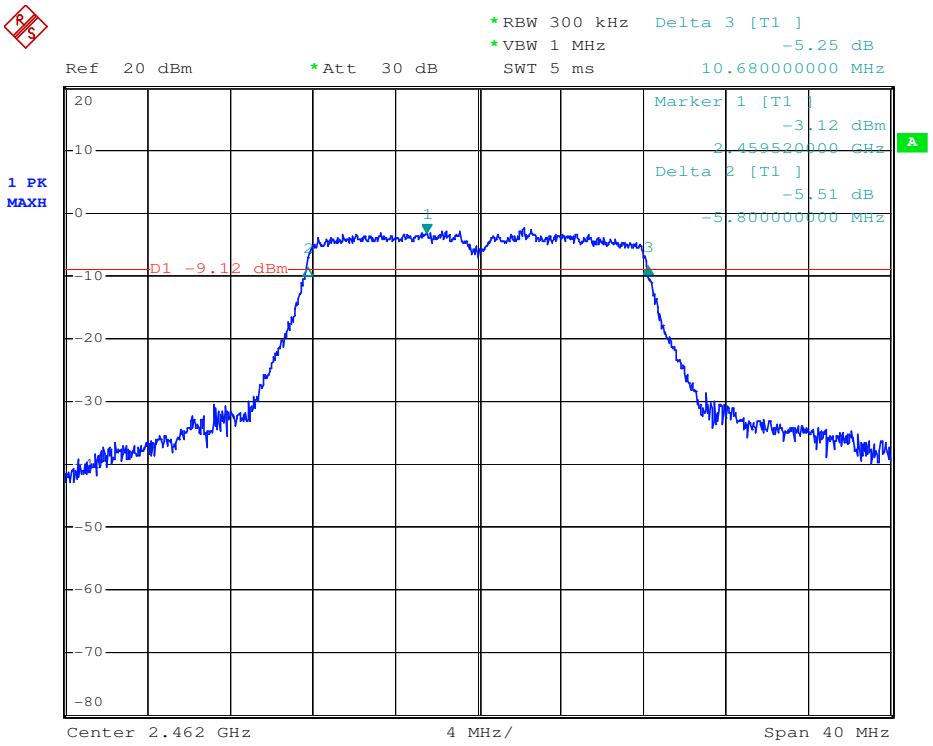
Lowest Channel **Test mode:** 802.11g



Middle Channel **Test mode:** 802.11g



Highest Channel **Test mode:** 802.11g



6.4 Peak Output Power Measurement

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

Test date November 29, 2012

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 transmit power delivered to 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 antenna 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 26dB bandwitdth of the signal.
4. Record the max.channel power reading

   Repeat above procedures until all the frequency measured were complete.

Measurement Result:

Pre-scan under all rate at lowest channel 1(2412MHz)

Mode	802.11b			
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps
Power (dBm)	17.09	16.92	16.86	16.82

Mode	802.11g							
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Power (dBm)	13.89	13.77	13.74	13.72	13.69	13.65	13.63	13.6

Worst case was found at the 802.11b 1Mbps and 802.11g 6Mbps.

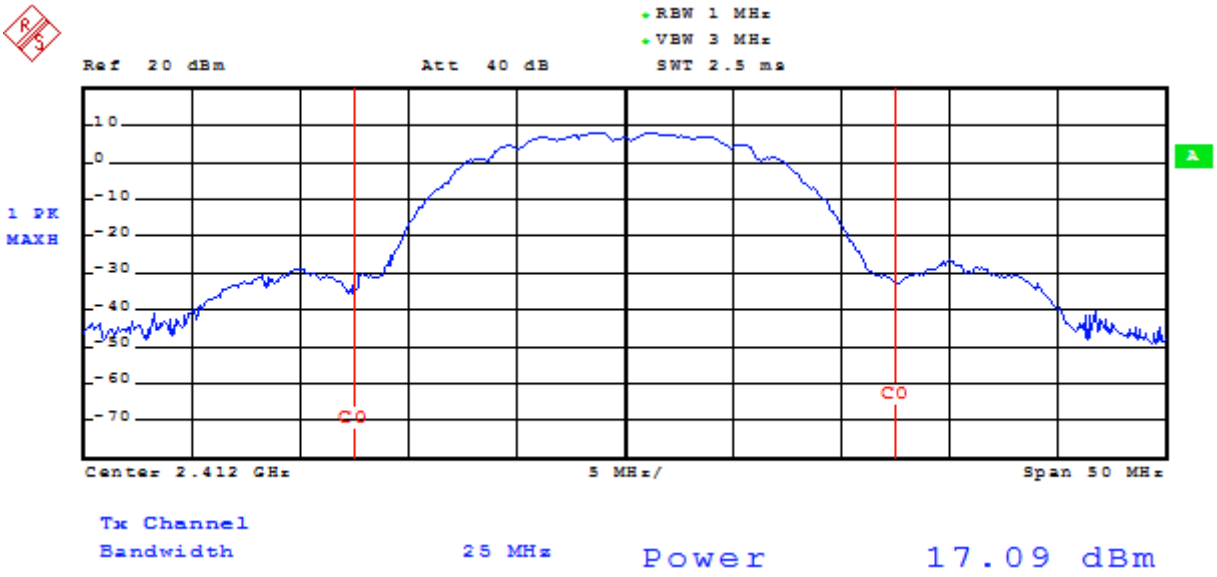
Test mode: 802.11b

CH	Frequency (MHz)	Reading Peak Power (dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Output Peak Power (mW)	Peak Power Limit (dBm)	Result
Low	2412	17.09	0.5	17.59	57.41	30	PASS
Mid	2437	16.91	0.5	17.41	55.08	30	PASS
High	2462	18.18	0.5	18.68	73.79	30	PASS

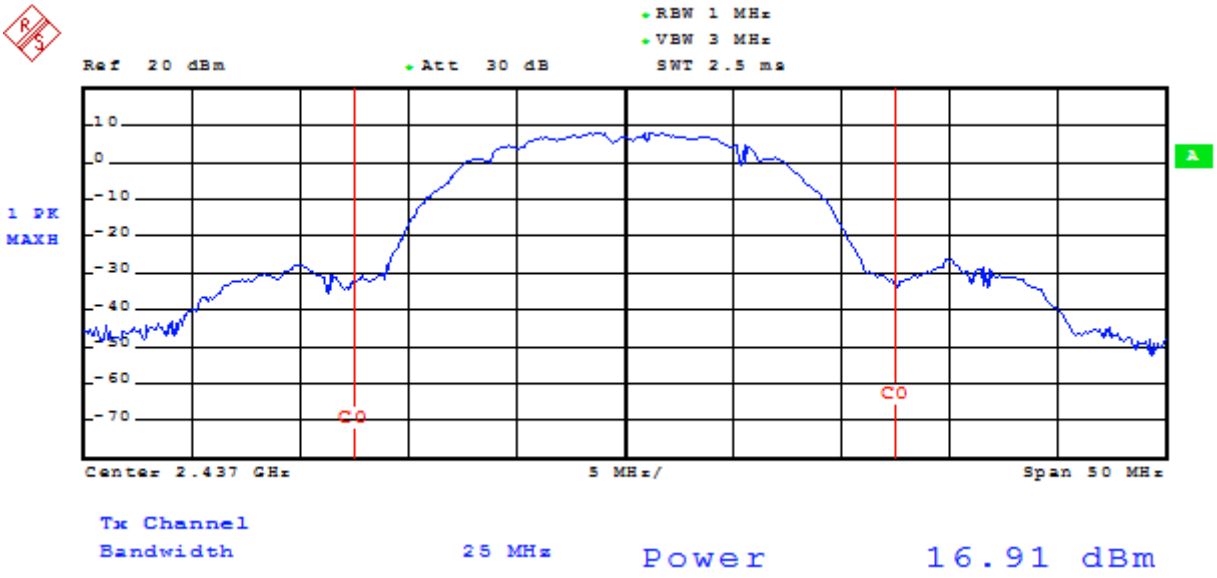
Test mode: 802.11g

CH	Frequency (MHz)	Reading Peak Power (dBm)	Cable Loss (dB)	Output Peak Power (dBm)	Output Peak Power (mW)	Peak Power Limit (dBm)	Result
Low	2412	13.89	0.5	14.39	27.48	30	PASS
Mid	2437	13.10	0.5	13.60	22.91	30	PASS
High	2462	13.30	0.5	13.80	23.99	30	PASS

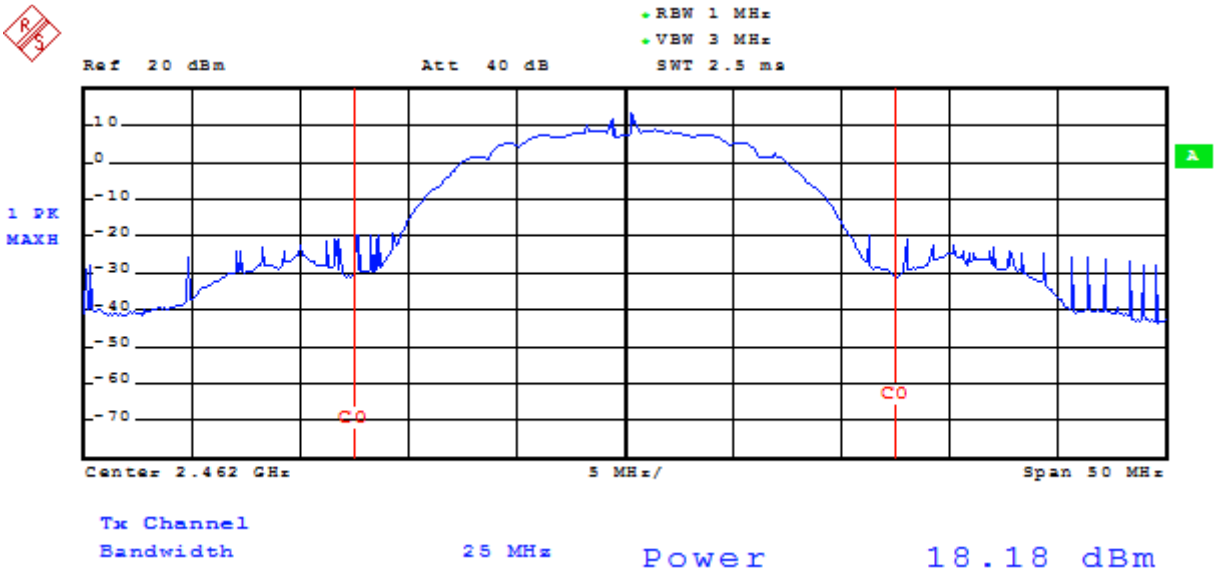
Low Channel **Test mode:** 802.11b



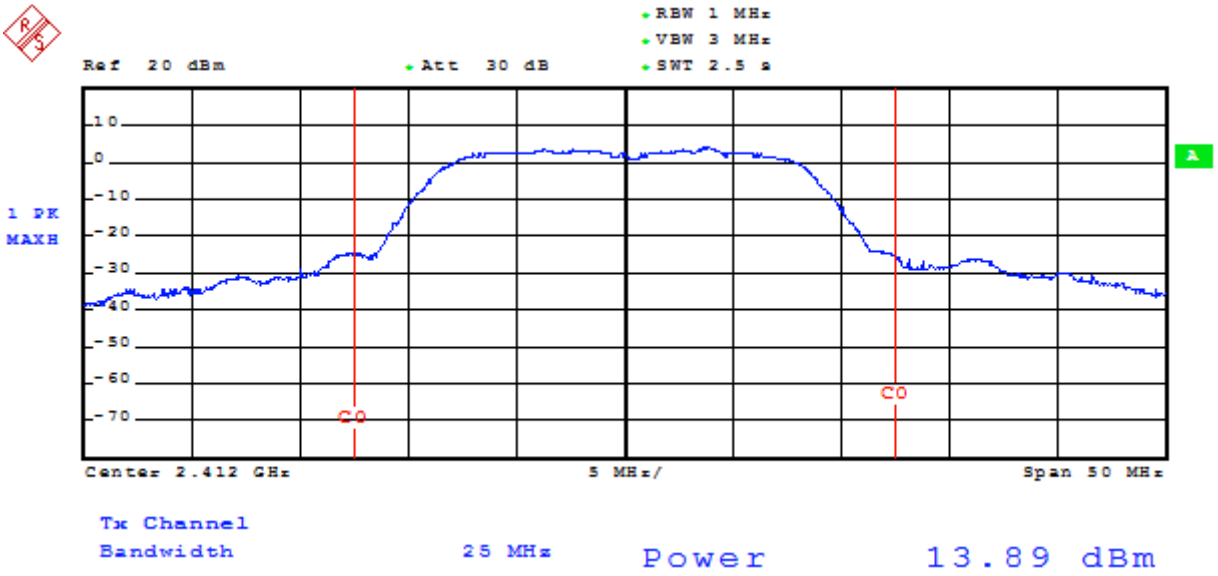
Mid Channel **Test mode:** 802.11b



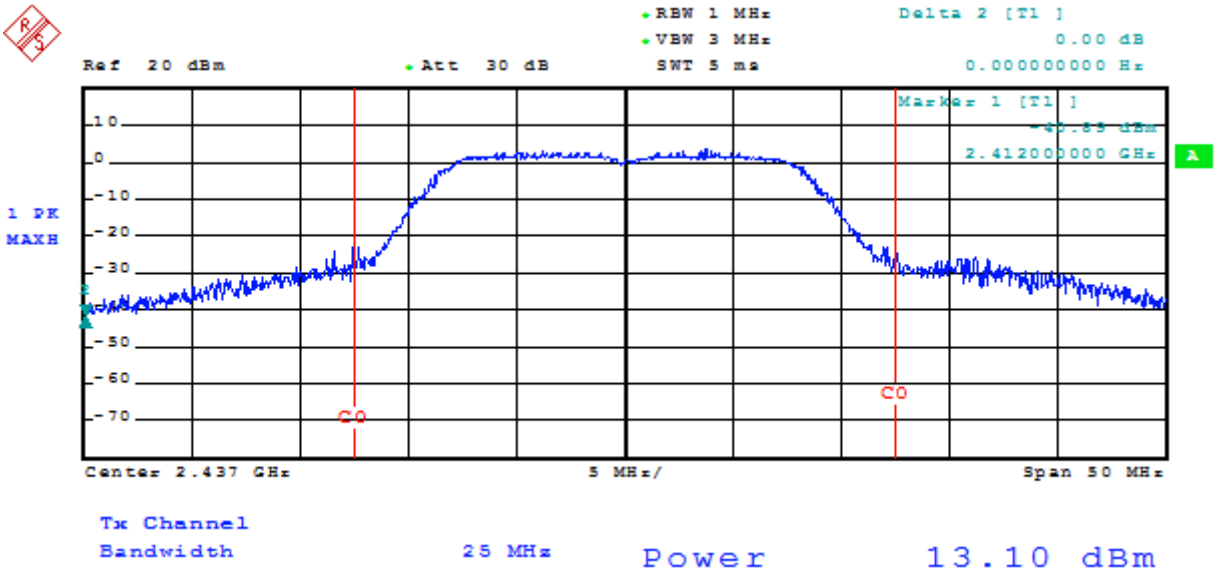
High Channel **Test mode:** 802.11b



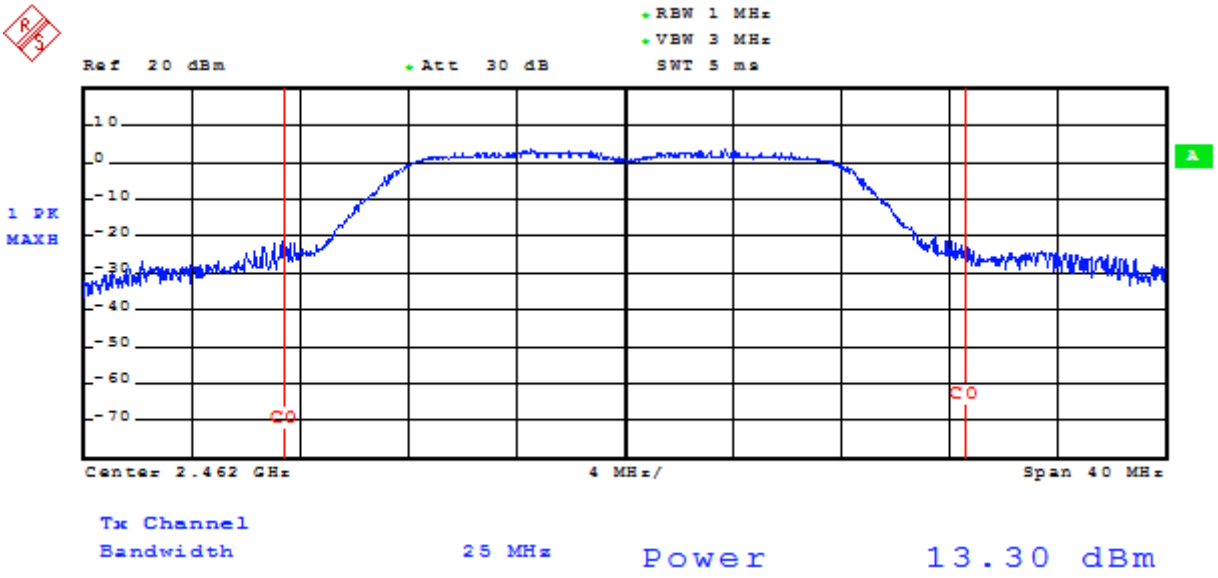
Low Channel **Test mode:** 802.11g



Mid Channel **Test mode:** 802.11g



High Channel **Test mode:** 802.11g



6.5 Peak Power Spectral Density

Test Requirement: FCC Part15 247(e)

Test date: November 30, 2012

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 ANSI C63.10,2009 Clause 6.11 for compliance to FCC 47CFR 15.247 requiremnts.

Measurement Result:

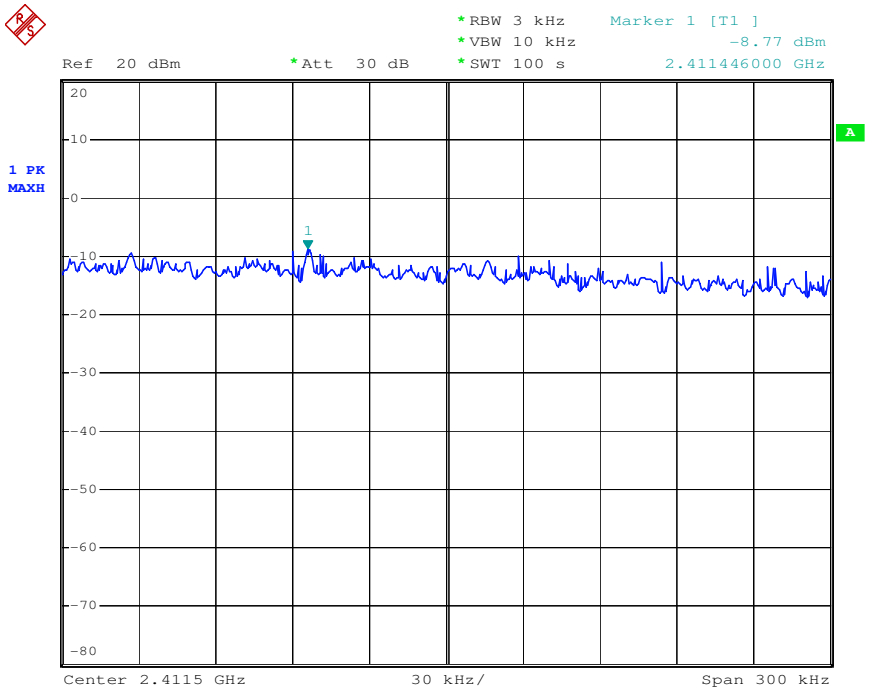
Test mode: 802.11b

CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2411.45	-8.77	0.5	-8.27	8	PASS
MID	2435.45	-8.20	0.5	-7.70	8	PASS
HIGH	2460.63	-9.25	0.5	-8.75	8	PASS

Test mode: 802.11g

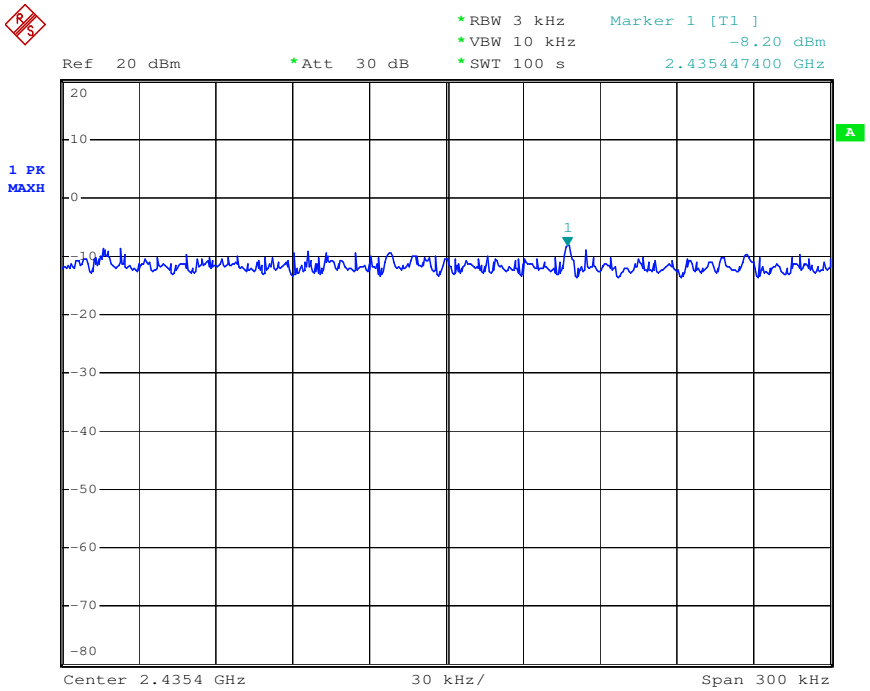
CH	Frequency (MHz)	Reading (dBm)	Cable Loss (dB)	RF Power Density (dBm)	Limit (dBm)	Result
LOW	2415.66	-19.44	0.5	-18.94	8	PASS
MID	2433.22	-19.85	0.5	-19.35	8	PASS
HIGH	2466.02	-20.41	0.5	-19.91	8	PASS

Low Channel **Test mode:** 802.11b



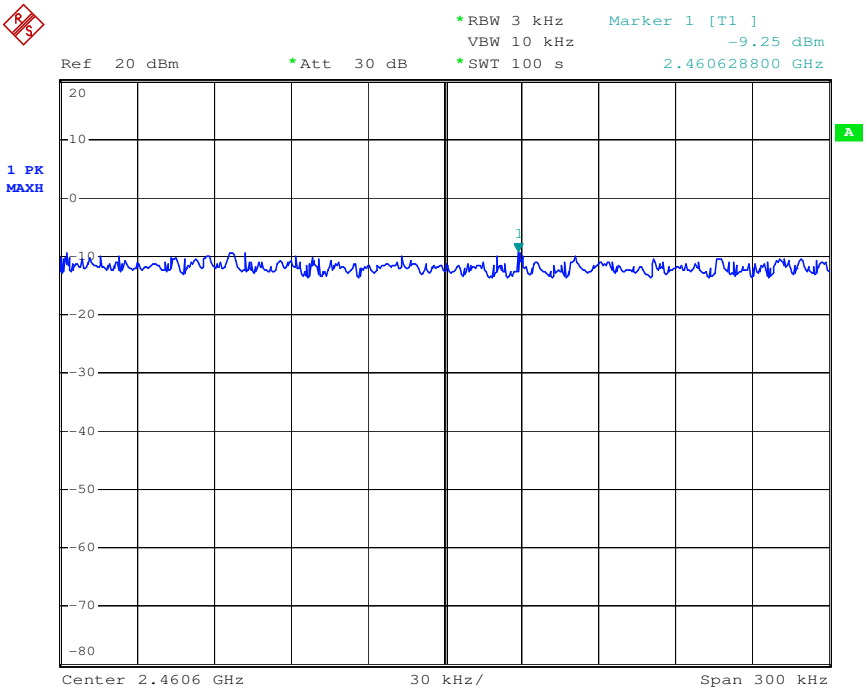
Date: 20.AUG.2012 15:53:29

Mid Channel **Test mode:** 802.11b



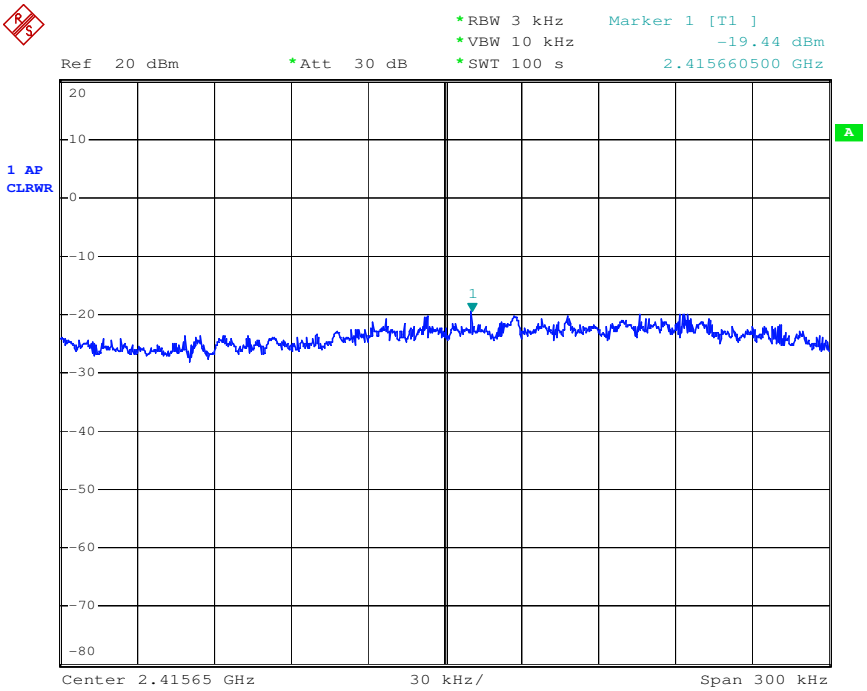
Date: 20.AUG.2012 16:37:07

High Channel **Test mode:** 802.11b



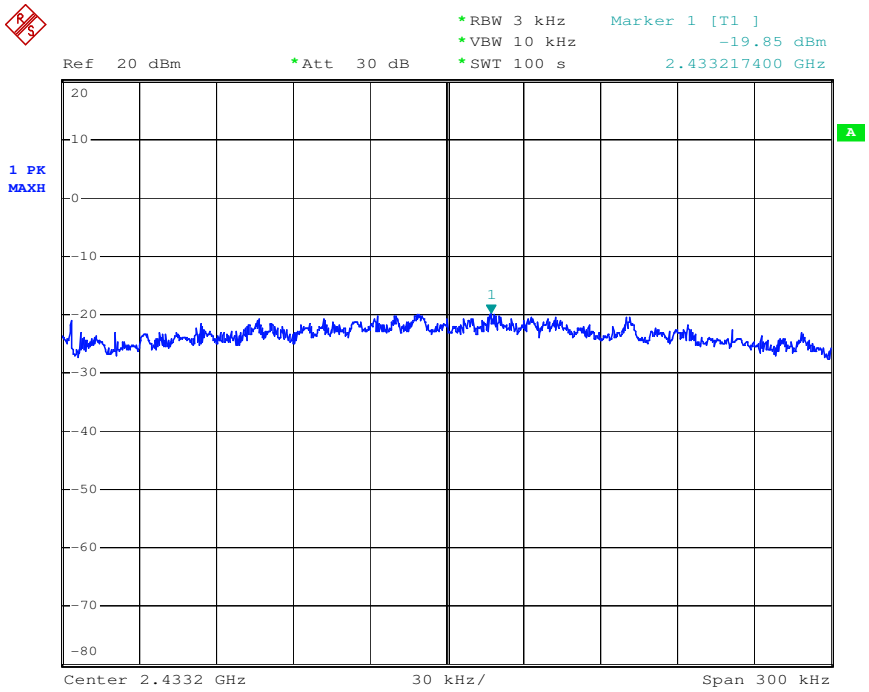
Date: 20.AUG.2012 17:14:10

Low Channel **Test mode:** 802.11g

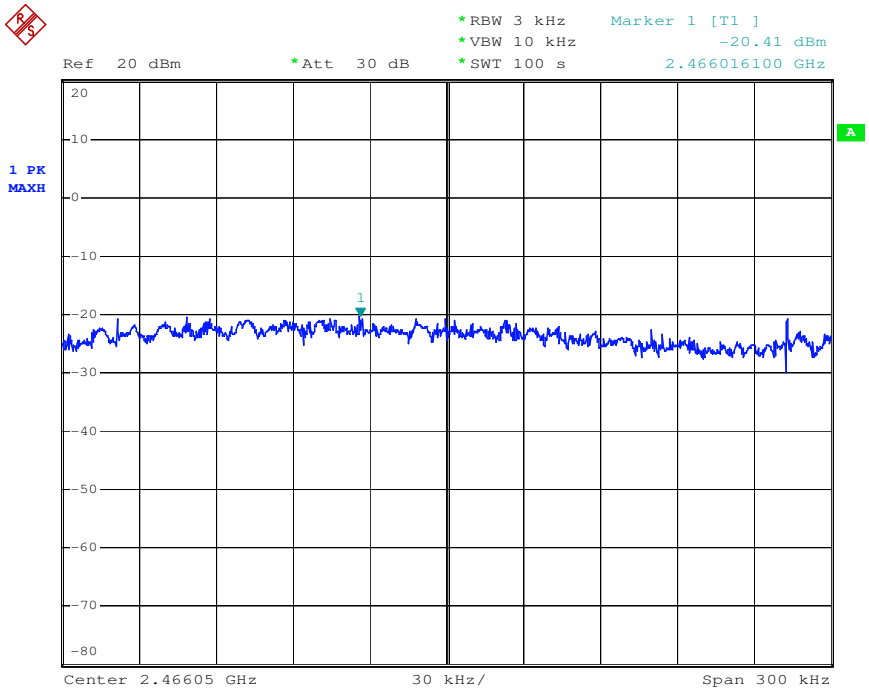


Date: 1.JAN.2000 18:35:52

Mid Channel **Test mode:** 802.11g



High Channel **Test mode:** 802.11g



6.6 Conducted Spurious Emission Test

Test Requirement: FCC Part15 247(c)

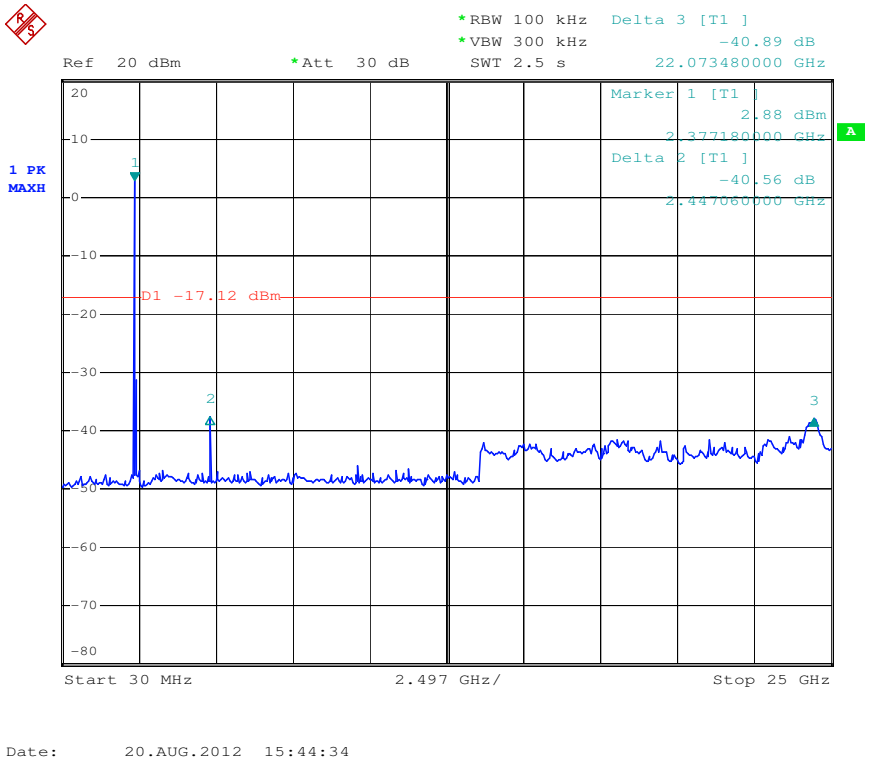
Test date: December 3, 2012

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.

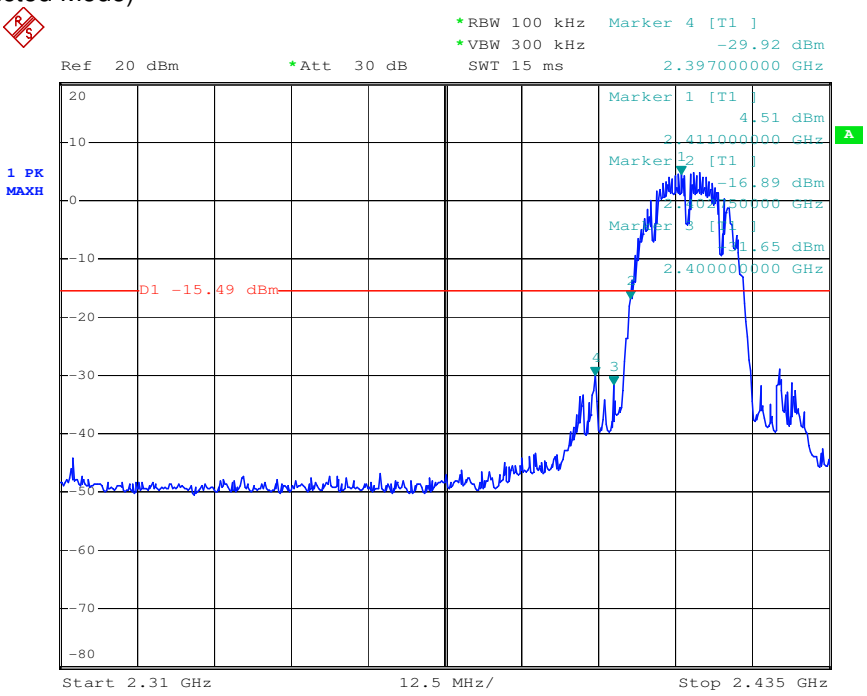
Measurement Result:

Low Channel **Test mode:** 802.11b



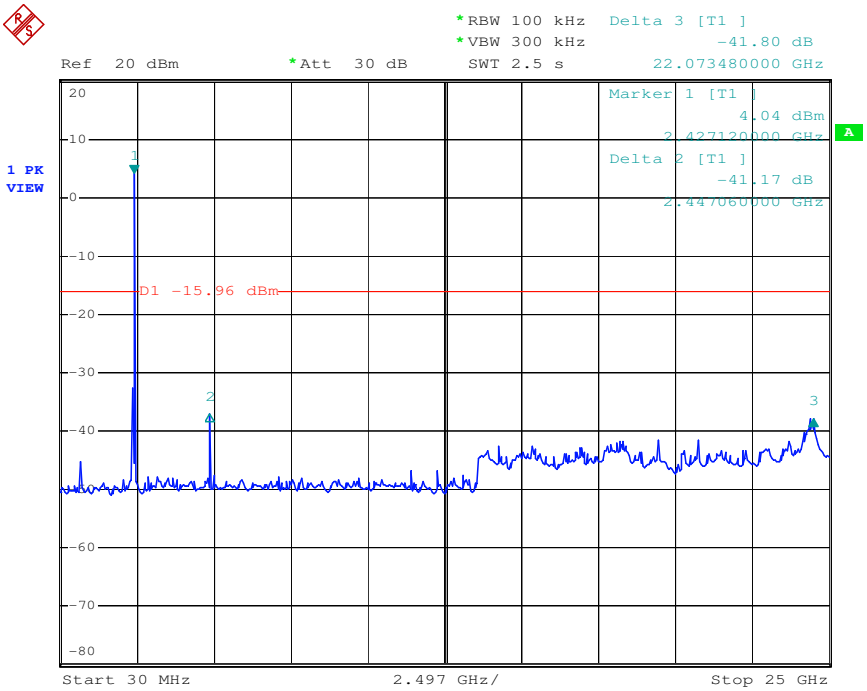
Date: 20.AUG.2012 15:44:34

Band Edge (Conducted Mode)



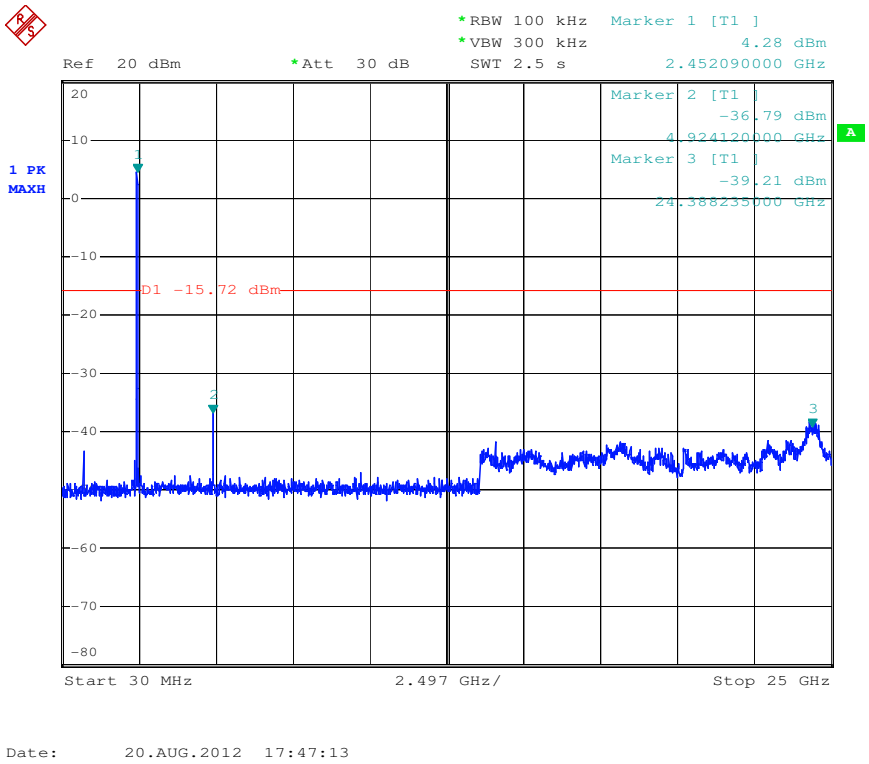
Date: 20.AUG.2012 16:05:30

Middle Channel **Test mode:** 802.11b

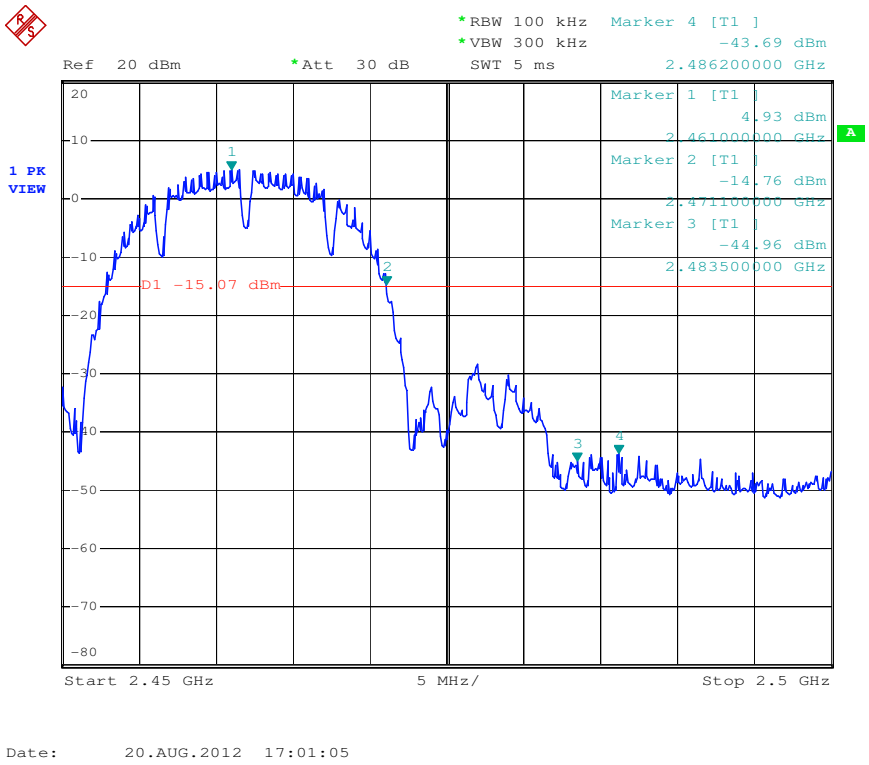


Date: 20.AUG.2012 16:25:43

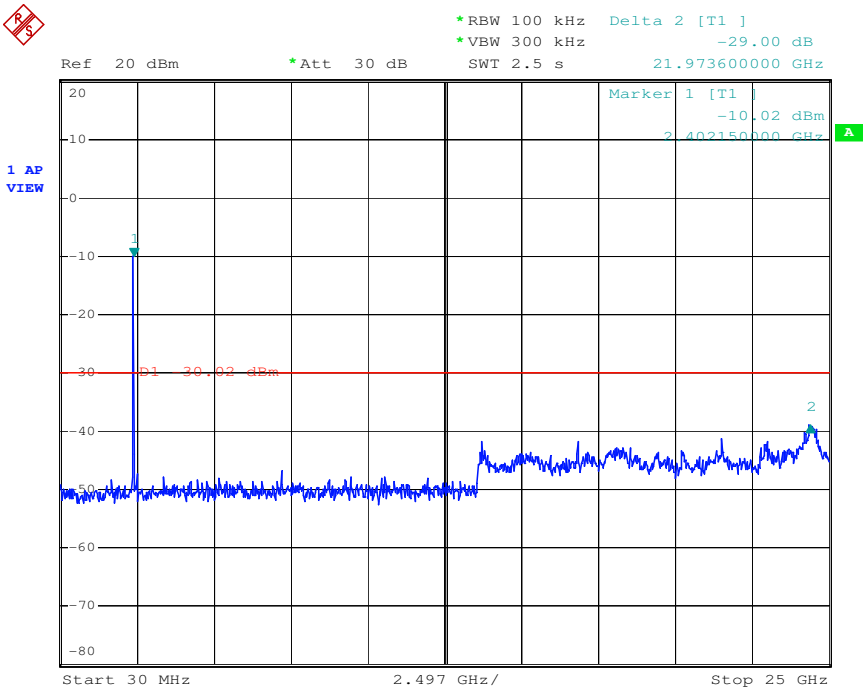
High Channel for **Test mode:** 802.11b



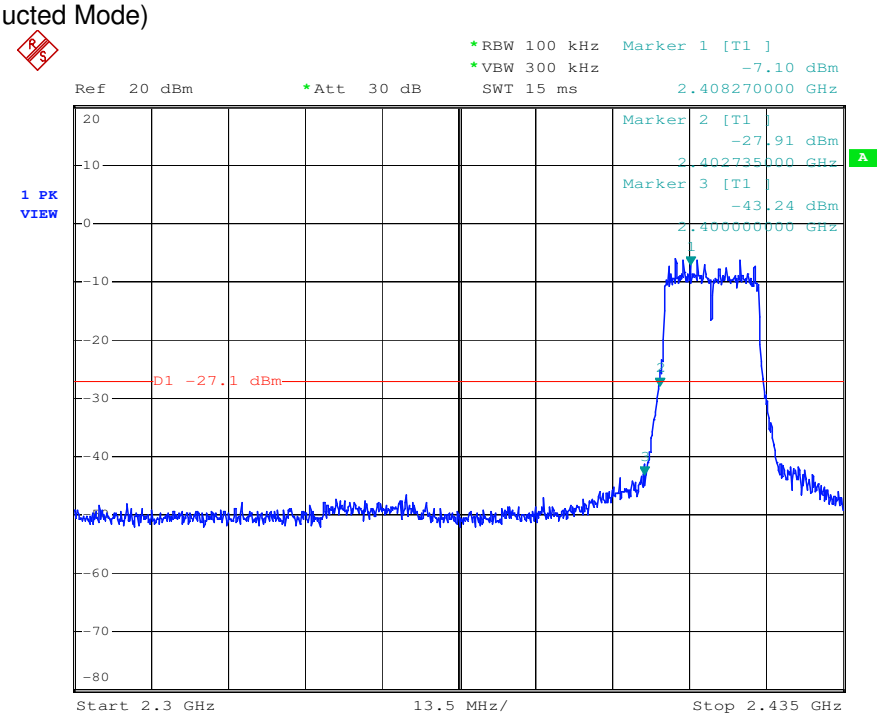
Band Edge (Conducted Mode)



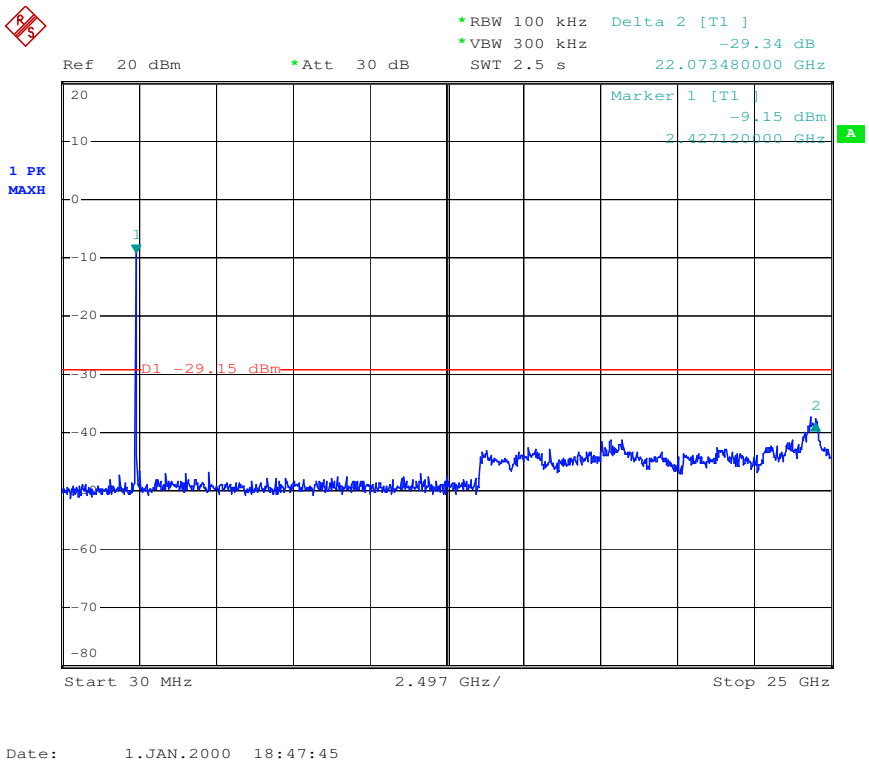
Low Channel **Test mode:** 802.11g



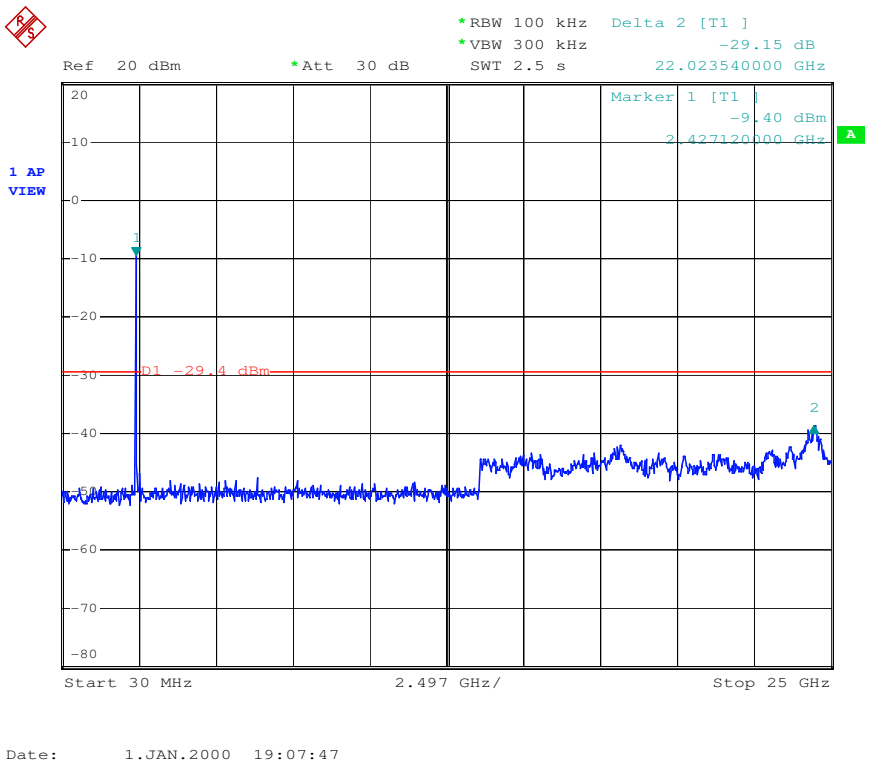
Band Edge (Conducted Mode)



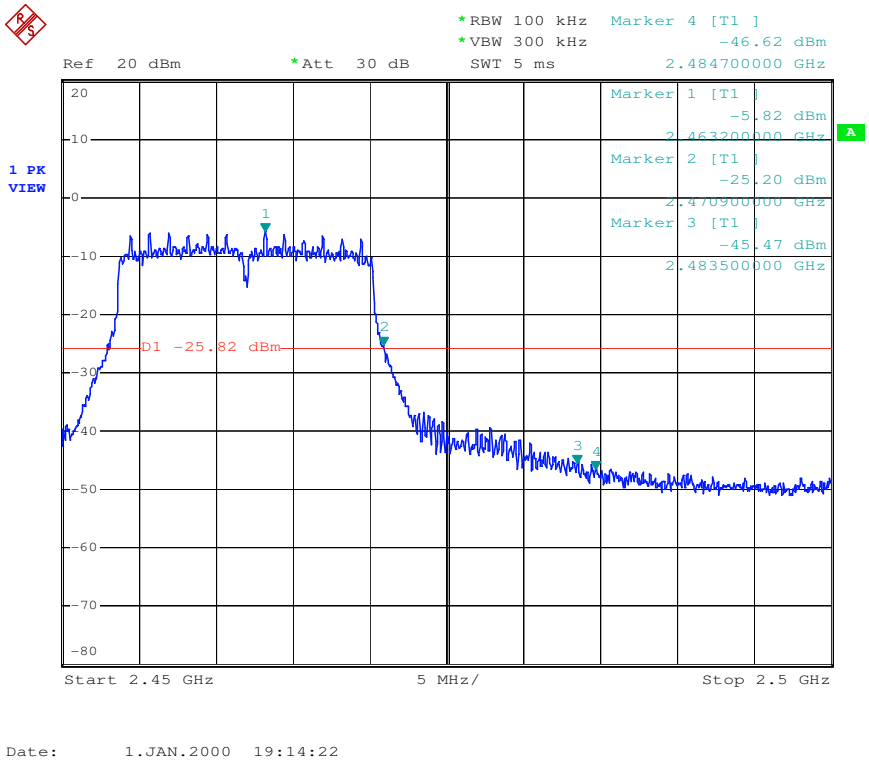
Middle Channel **Test mode:** 802.11g



High Channel **Test mode:** 802.11g



Band Edge (Conducted Mode)



6.7 Spurious Radiated Emission Test

Test Requirement: FCC Part15 247(d) and FCC Part 15.209

Test date: December 10, 2012

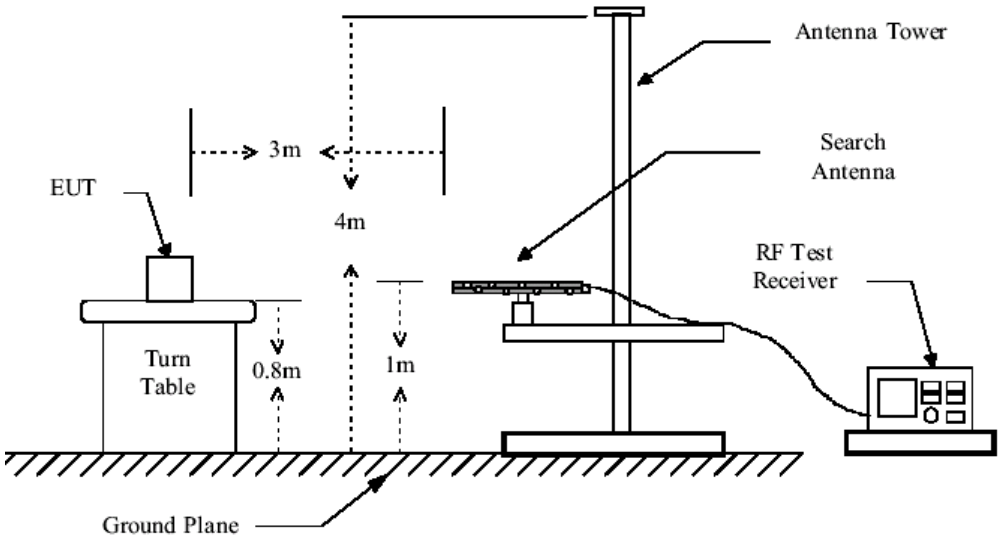
Standard Applicable: According to section 15.247(c),all other emissions outside these bands shall not exceed the general radiated emission limits specified in section15.209(a).And according to section 15.33(a)(1),for an intentional radiator operates below 10GHz,the frequency range of measurements:to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

Measurement Procedure:

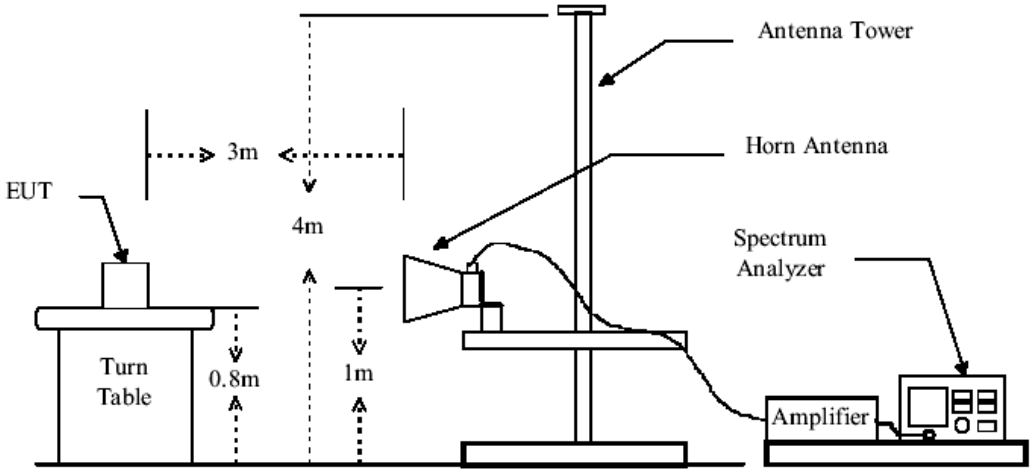
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Pre-test on 802.11b mode and 802.11g mode to find the worst status.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Radiated Test Set-up:

Radiated Emission Test Set-up,Frequency Below 1000MHz



Radiated Emission Test Set-up Frequency Over 1GHz



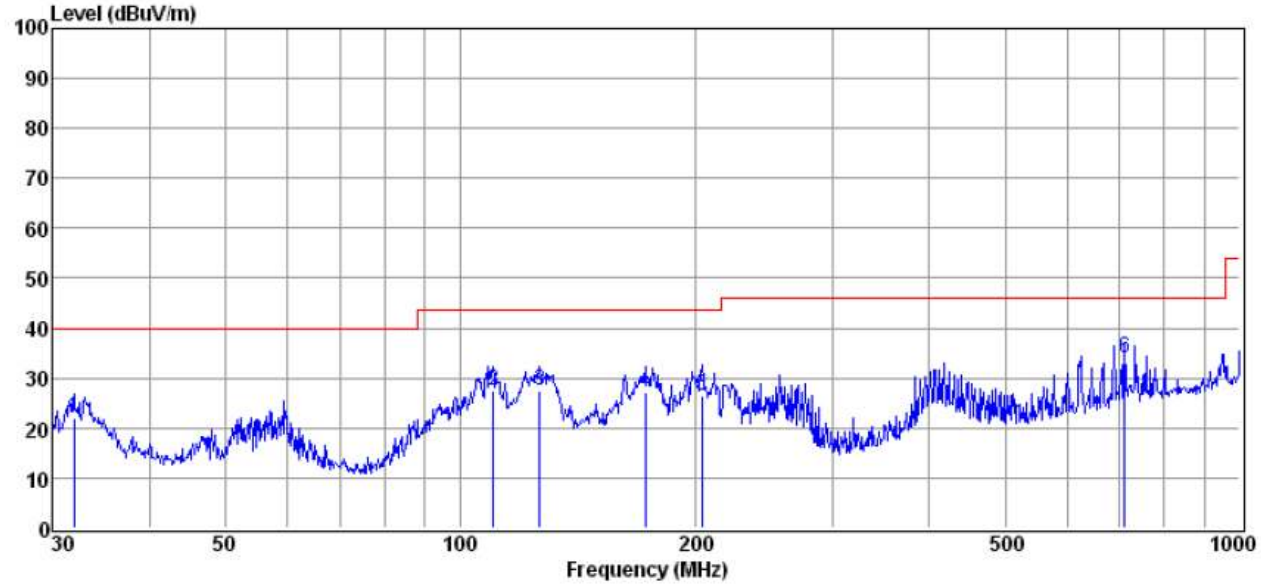
Low nosie amplifier was used below 1GHz,High pass Filter was used above 1GHz.

Tests results:

From the pre-test the worst status is on 802.11g 6Mbps data rate mode.

Below is the worst test results.

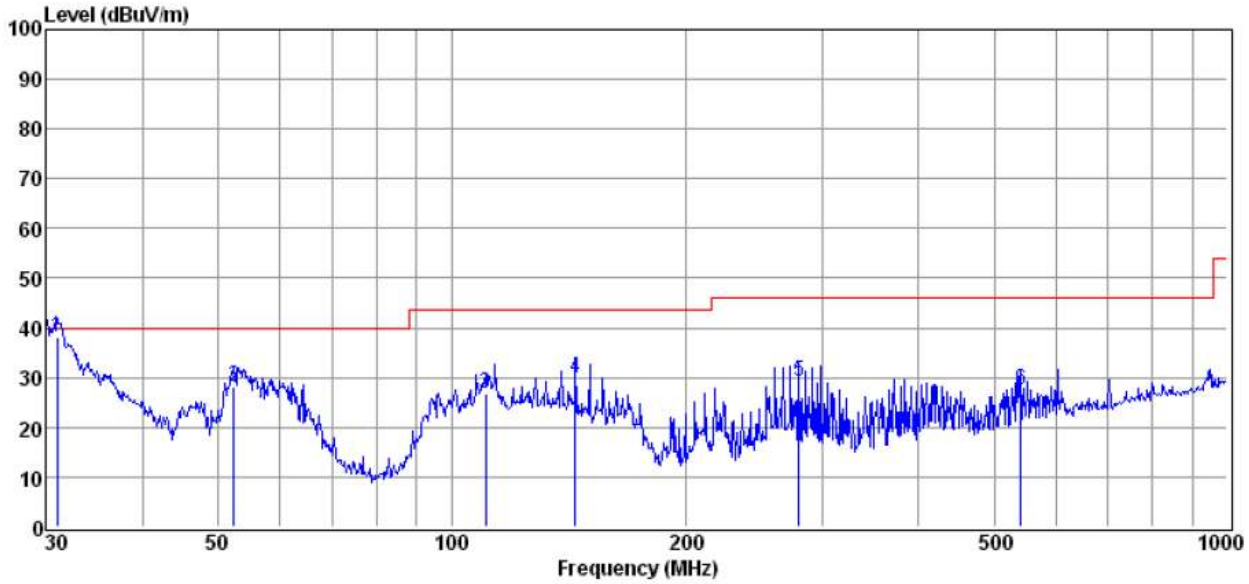
30MHz~1GHz Spurious Emissions .Quasi-Peak Measurement Horizontal



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	31.96	33.94	12.22	24.70	0.45	21.91	40.00	-18.09	QP	HORIZONTAL
2	110.18	40.86	10.12	24.70	1.09	27.37	43.50	-16.13	QP	HORIZONTAL
3	126.33	39.51	11.45	24.70	1.17	27.43	43.50	-16.07	QP	HORIZONTAL
4	172.60	38.41	11.99	24.60	1.37	27.17	43.50	-16.33	QP	HORIZONTAL
5	204.24	40.43	9.26	24.60	1.53	26.62	43.50	-16.88	QP	HORIZONTAL
6	711.67	34.34	20.73	24.10	3.19	34.16	46.00	-11.84	QP	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor
2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

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



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Preamp Factor (dB)	Cable Loss (dB)	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	30.96	50.12	12.16	24.70	0.43	38.01	40.00	-1.99	QP	VERTICAL
2	52.39	39.49	12.66	24.70	0.67	28.12	40.00	-11.88	QP	VERTICAL
3	110.57	40.41	10.16	24.70	1.09	26.96	43.50	-16.54	QP	VERTICAL
4	144.34	41.08	12.36	24.70	1.25	29.99	43.50	-13.51	QP	VERTICAL
5	280.02	40.01	11.84	24.50	1.86	29.21	46.00	-16.79	QP	VERTICAL
6	541.37	31.53	17.62	24.30	2.73	27.58	46.00	-18.42	QP	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss - Preamp Factor
2. If Peak Result comply with QP limit,QP Result is deemed to comply with QP limit

Operation Mode: TX Low Mid CH 2412MHz

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4824.0	31.0	1.2	0.5	43.4	51.27	40.57	54	Vertical
7236.0	35.5	1.7	0.6	43.1	41.55	36.25	54	Vertical
9648.0	37.7	2.1	0.9	43.3	41.49	38.89	54	Vertical
4824.0	31.0	1.2	0.5	43.4	50.06	39.36	54	Horizontal
7236.0	35.5	1.7	0.6	43.1	43.44	38.14	54	Horizontal
9648.0	37.7	2.1	0.9	43.3	43.75	41.15	54	Horizontal

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

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4876.0	31.1	1.3	0.5	43.5	48.79	38.19	54	Vertical
7314.0	35.7	1.7	0.6	43.1	43.88	38.78	54	Vertical
9752.0	37.8	2.1	0.9	43.0	42.08	39.88	54	Vertical
4876.0	31.1	1.3	0.5	43.5	46.29	35.69	54	Horizontal
7314.0	35.7	1.7	0.6	43.1	43.62	38.52	54	Horizontal
9752.0	37.8	2.1	0.9	43.0	42.78	40.58	54	Horizontal

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

1~25 GHz Harmonics & Spurious Emissions. **Peak Measurement:**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Filter (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	AV Limit (dBμV/m)	Antenna polarization
4928.0	31.4	1.4	0.5	43.9	48.24	37.64	54	Vertical
7392.0	35.8	1.7	0.6	43.1	46.57	41.57	54	Vertical
9856.0	38.0	2.2	0.9	42.8	44.47	42.77	54	Vertical
4928.0	31.4	1.4	0.5	43.9	50.83	40.23	54	Horizontal
7392.0	35.8	1.7	0.6	43.1	47.29	42.29	54	Horizontal
9856.0	38.0	2.2	0.9	42.8	45.87	44.17	54	Horizontal

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

6.8 Radiated Emission Band Edge

Test Requirement: FCC Part15 247(c)

Test date: December 15, 2012

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 Distance: 3m (Semi-Anechoic Chamber)

Limit: 40.0 dBμV/m between 30MHz & 88MHz;

43.5 dBμV/m between 88MHz & 216MHz;

46.0 dBμV/m between 216MHz & 960MHz;

AV 54.0 dBμV/m PK 74.0dBμV/m above 960MHz.

Measurement Procedure: The EUT was setup according to ANSI 63.10,2009 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

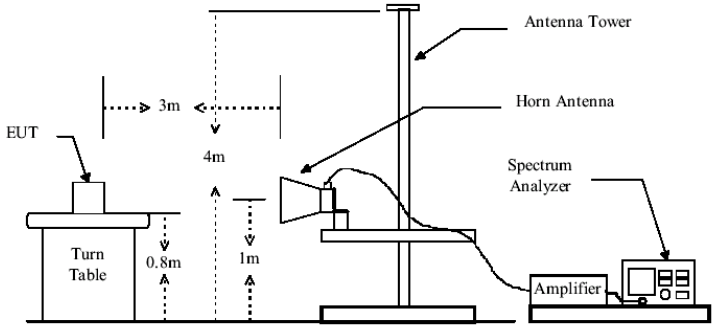
This is repeated for both horizontal and vertical polarization of the antenna.In order to find the maximum emission,all of the interface cables were manipulated according to ANSIC 63.10:2009 on radiated measurement.

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

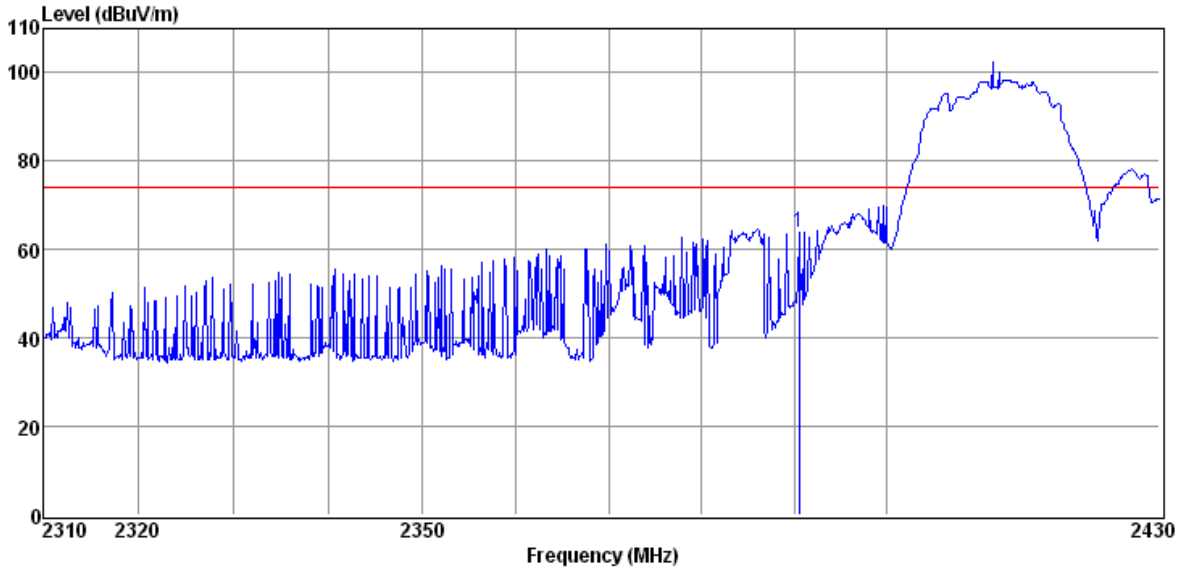


The field strength is calculated by adding the Antenna Factor,Preamplifier Factor&Cable Factor. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor

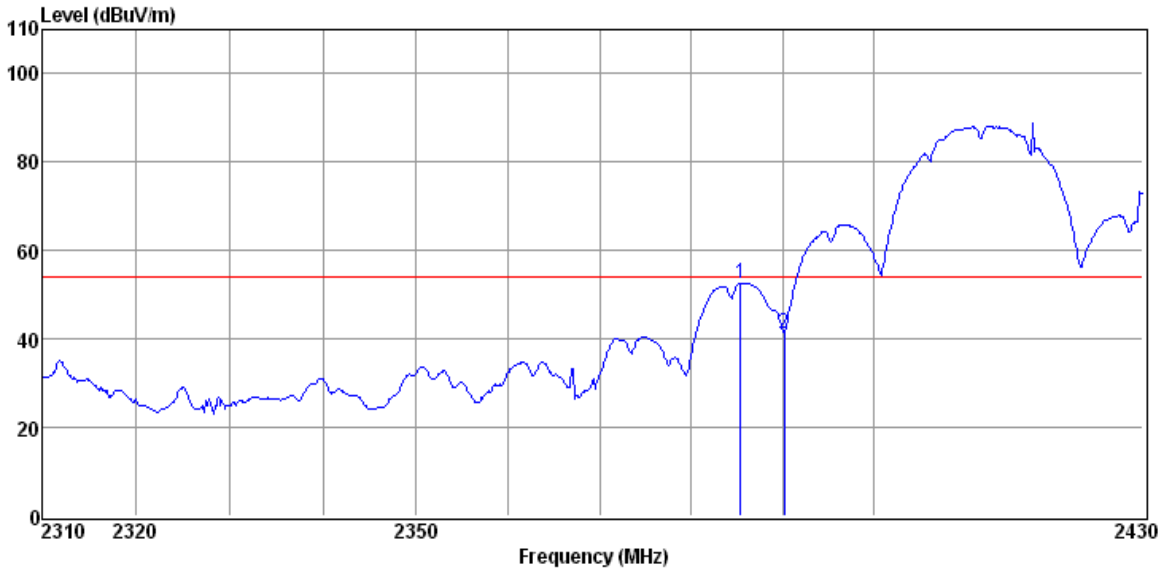
Radiated Bandedge Measurement Result:

802.11b Low Channel **Horizontal, Peak Detector:**



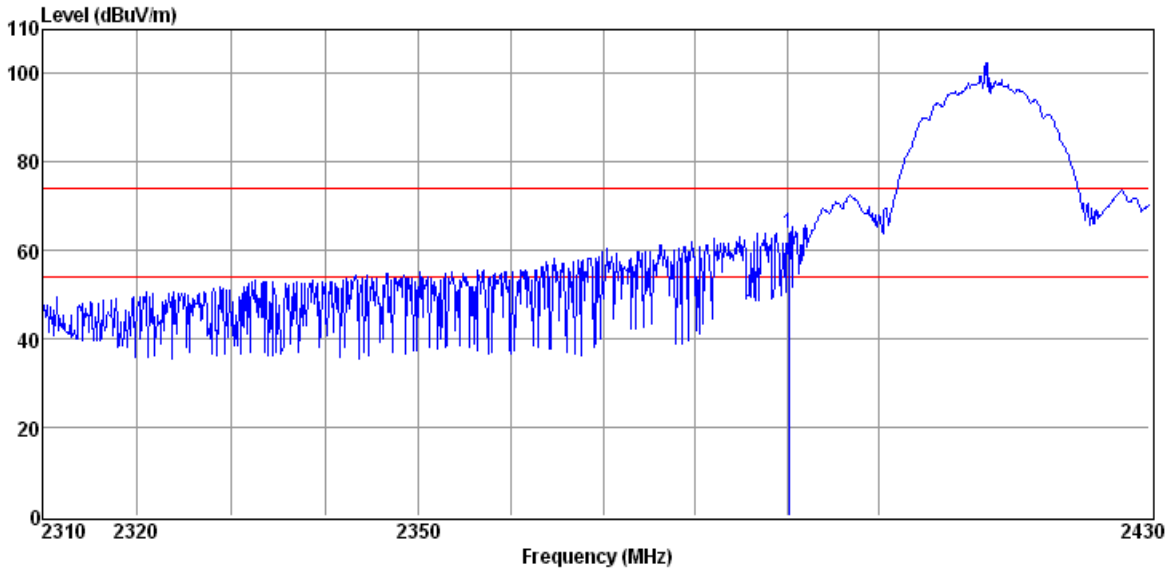
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2390.57	71.93	27.07	42.46	7.33	63.87	74.00	-10.13

802.11b Low Channel **Horizontal, Average Detector:**



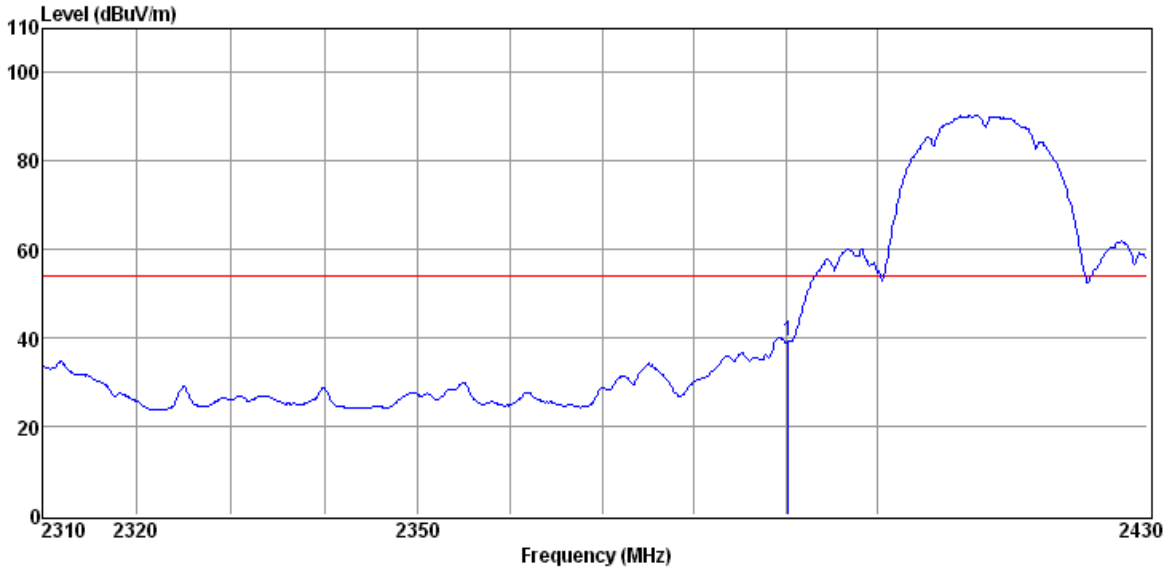
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2385.37	60.67	27.06	42.45	7.33	52.61	54.00	-1.39

802.11b Low Channel **Vertical, Peak Detector:**



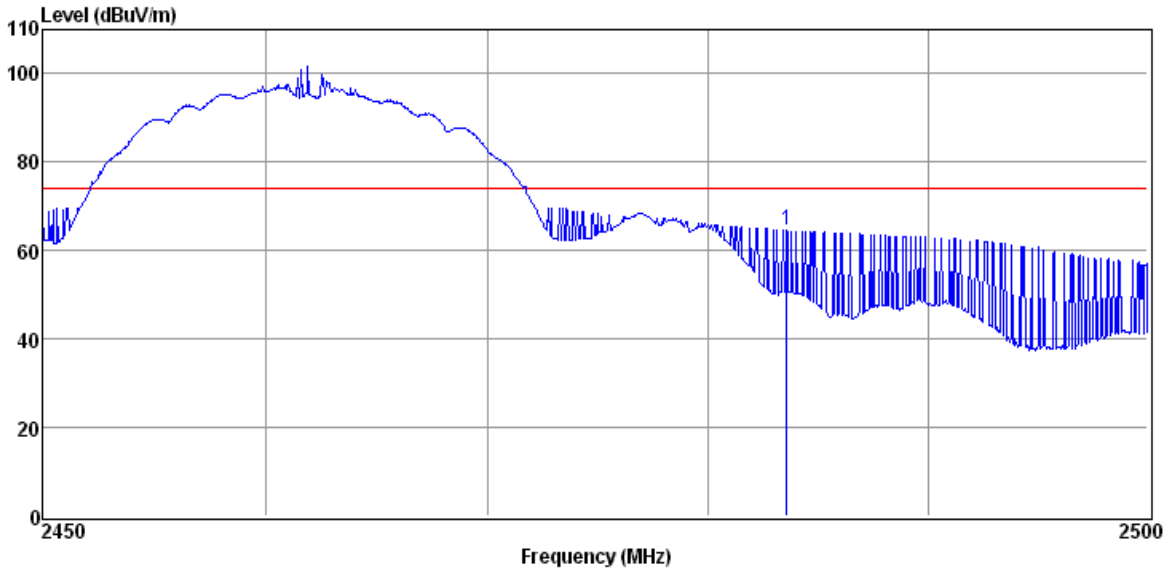
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2390.21	71.76	27.07	42.46	7.33	63.70	74.00	-10.30

802.11b Low Channel **Vertical, Average Detector:**



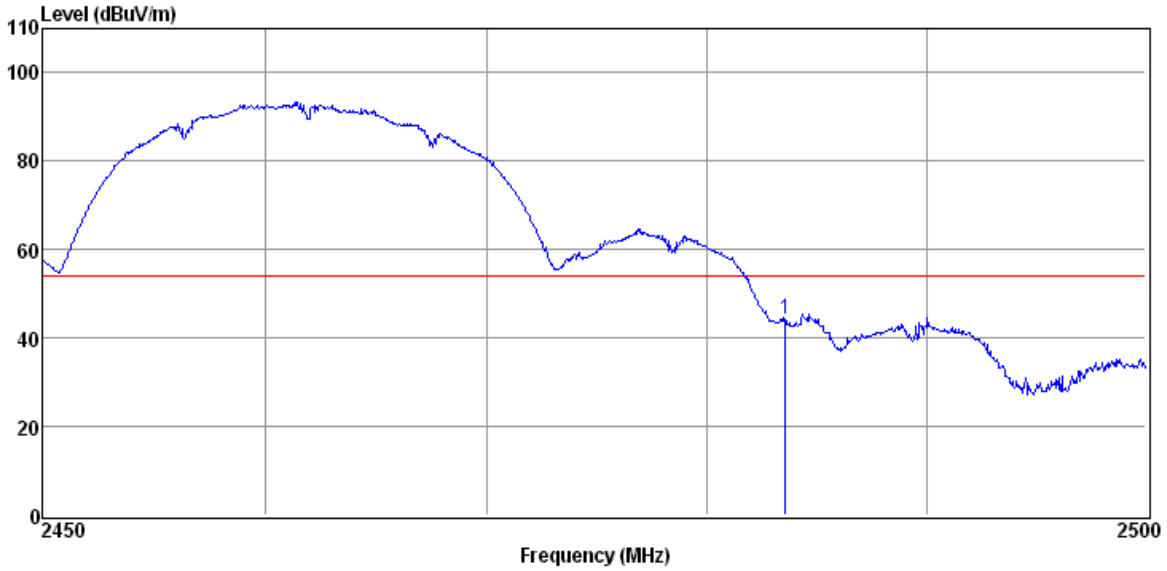
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2390.33	47.26	27.07	42.46	7.33	39.20	54.00	-14.80

802.11b High Channel **Horizontal, Peak Detector:**



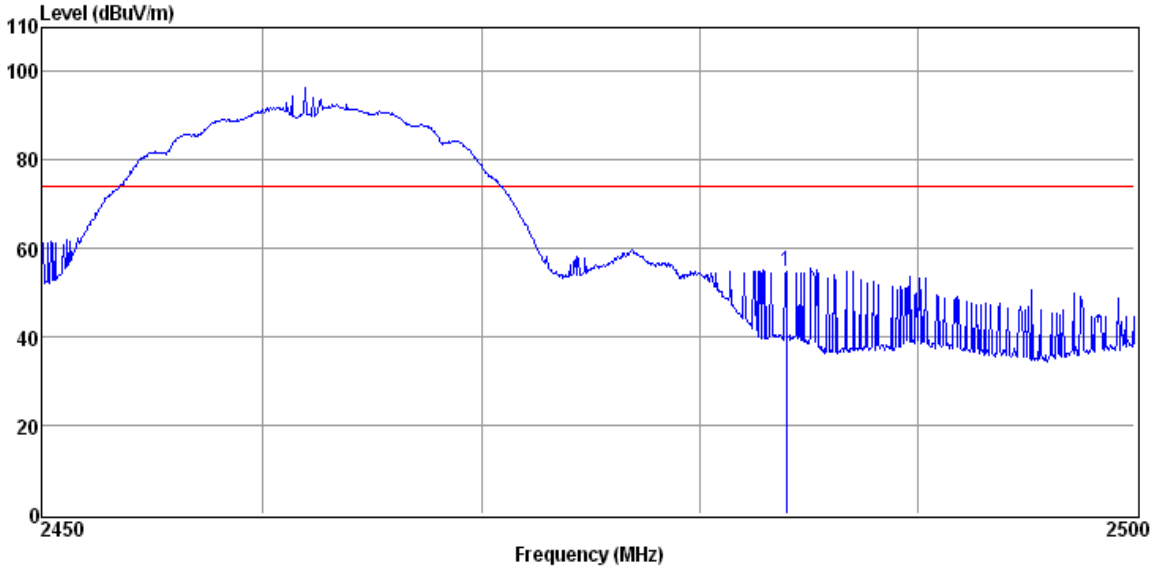
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2483.54	72.29	27.35	42.49	7.31	64.46	74.00	-9.54

802.11b High Channel **Horizontal, Average Detector:**



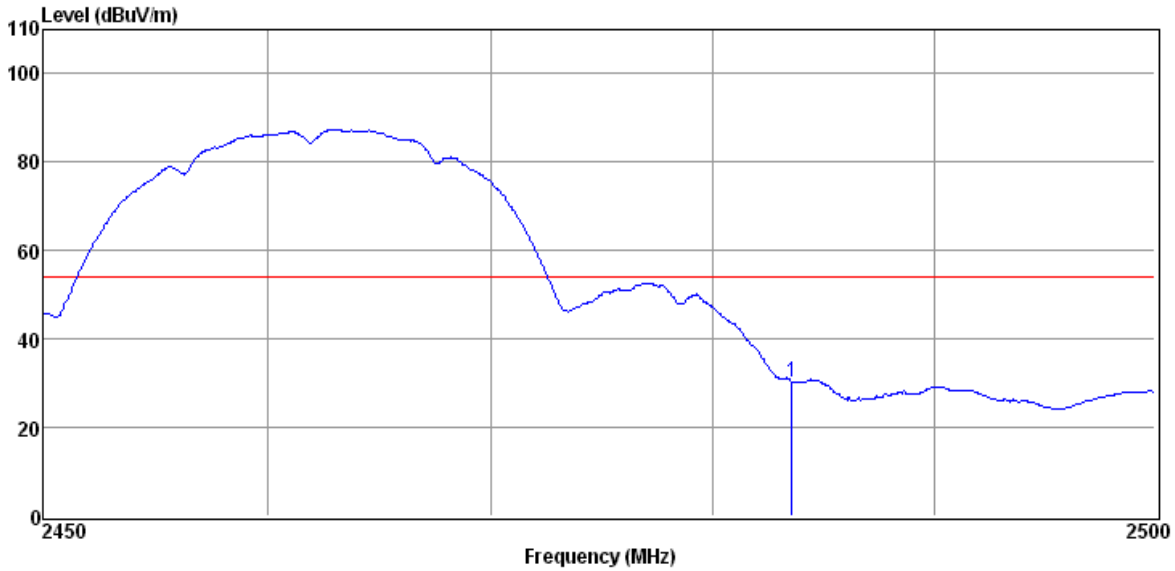
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2483.54	51.89	27.35	42.49	7.31	44.06	54.00	-9.94

802.11b High Channel **Vertical, Peak Detector:**



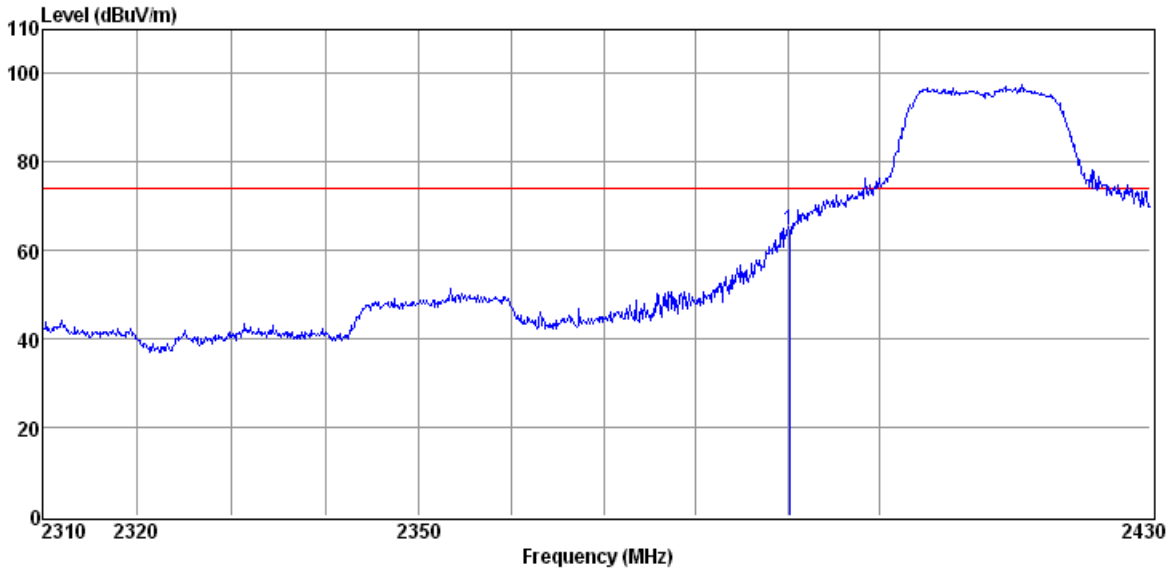
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2483.94	62.74	27.35	42.49	7.31	54.91	74.00	-19.09

802.11b High Channel **Vertical, Average Detector:**



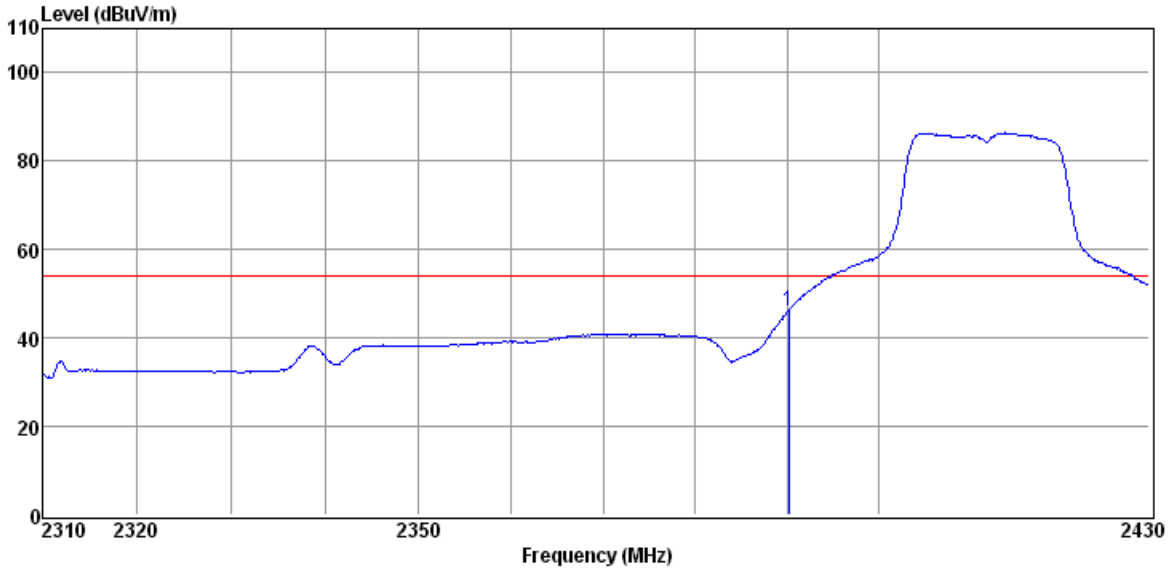
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2483.54	38.18	27.35	42.49	7.31	30.35	54.00	-23.65

802.11g Low Channel **Horizontal, Peak Detector:**



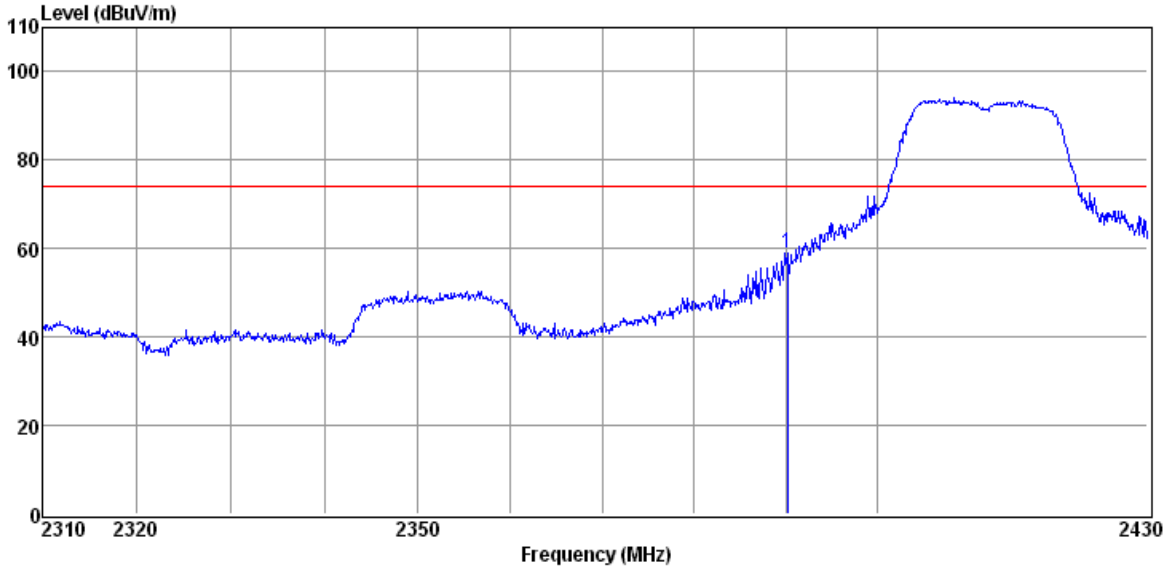
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2390.21	72.66	27.07	42.46	7.33	64.60	74.00	-9.40

802.11g Low Channel **Horizontal, Average Detector:**



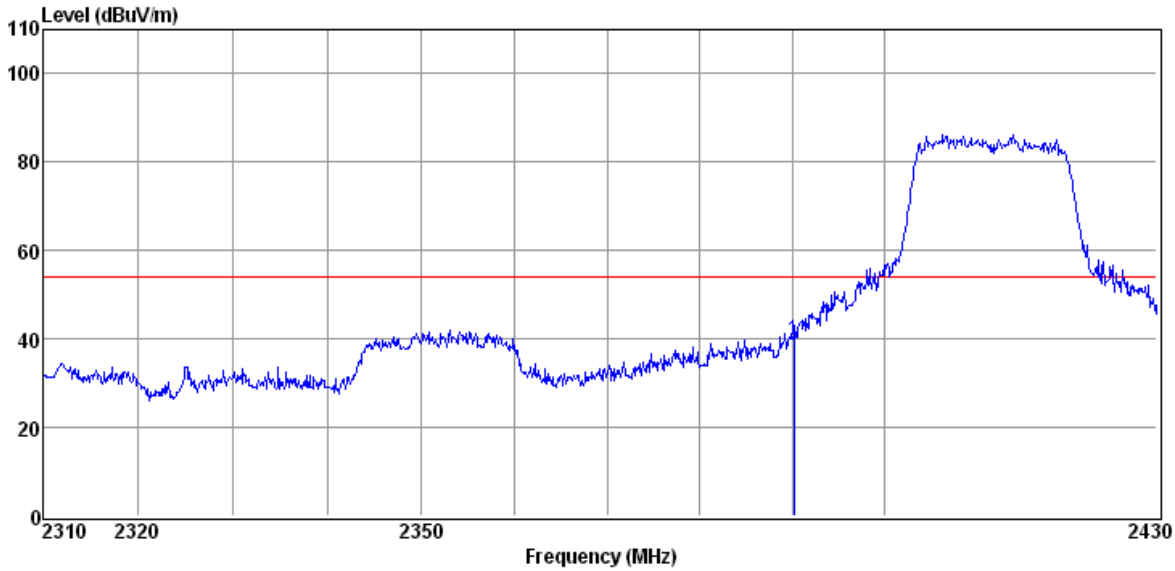
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2390.21	54.36	27.07	42.46	7.33	46.30	54.00	-7.70

802.11g Low Channel **Vertical, Peak Detector:**



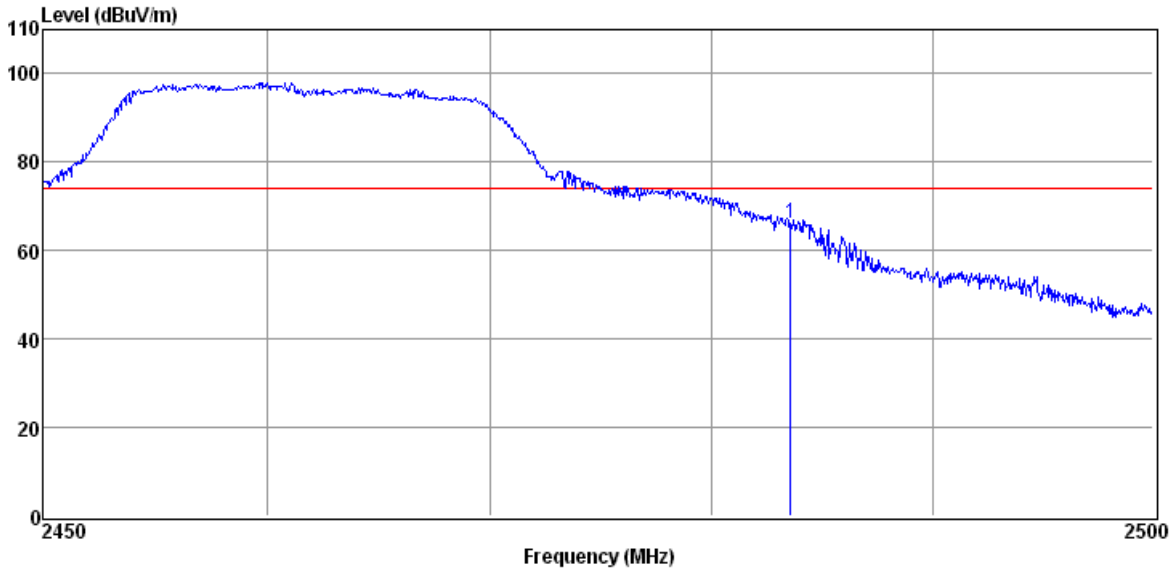
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2390.21	66.87	27.07	42.46	7.33	58.81	74.00	-15.19

802.11g Low Channel **Vertical, Average Detector:**



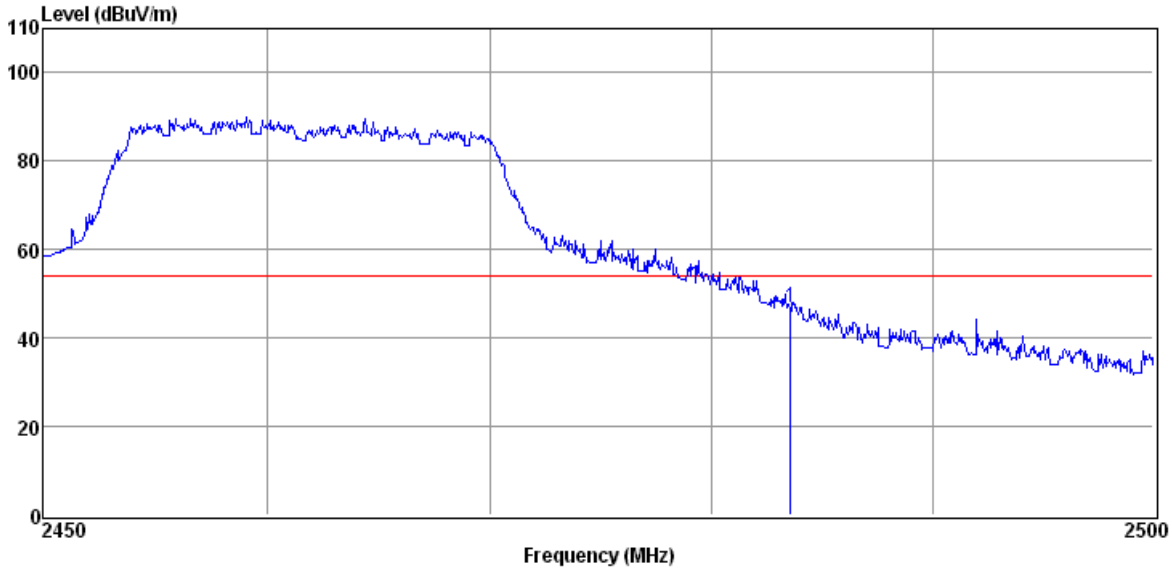
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2390.21	47.81	27.07	42.46	7.33	39.75	54.00	-14.25

802.11g High Channel **Horizontal, Peak Detector:**



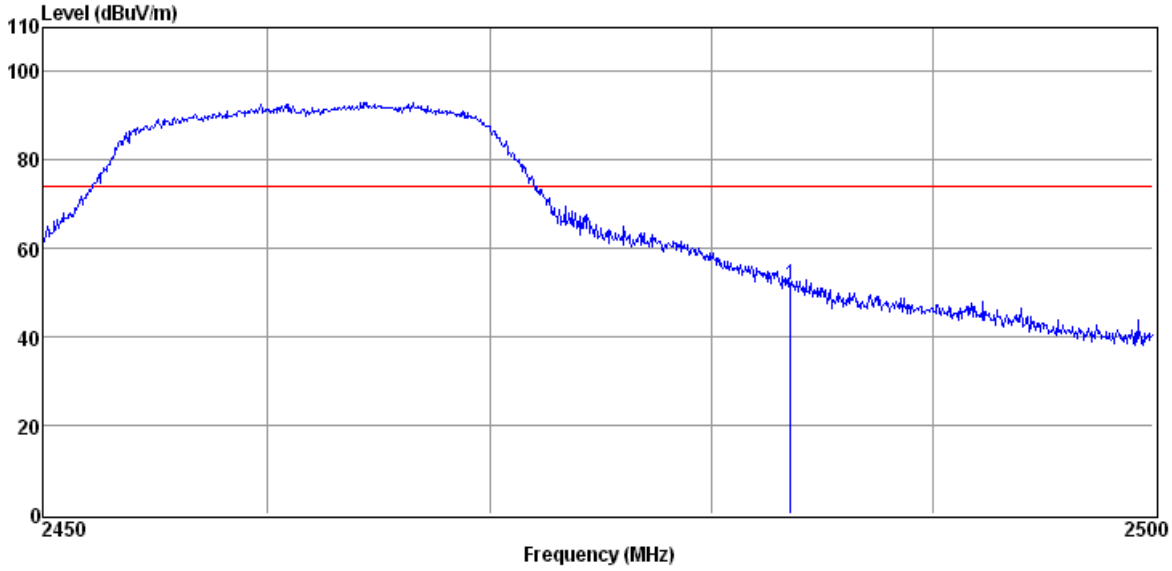
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2483.54	73.82	27.35	42.49	7.31	65.99	74.00	-8.01

802.11g High Channel **Horizontal, Average Detector:**



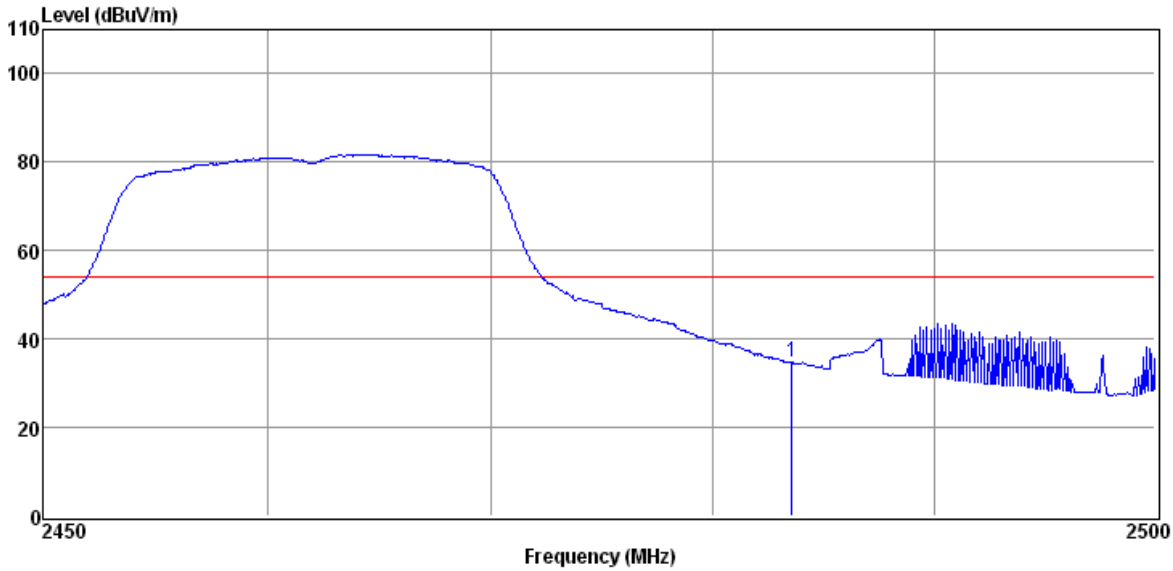
Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2483.54	54.62	27.35	42.49	7.31	46.79	54.00	-7.21

802.11g High Channel **Vertical, Peak Detector:**



Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Over Limit (dB)
2483.54	59.60	27.35	42.49	7.31	51.77	74.00	-22.23

802.11g High Channel **Vertical, Average Detector:**



Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	PreAmp (dB)	Cable Loss (dB)	AV Level (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)
2483.54	42.50	27.35	42.49	7.31	34.67	54.00	-19.33

Remark: 1. No any other emission which fall in restricted bands can be detected and be reported.

All frequencies within the “Restricted bands” have been evaluated to compliance. Section 15.205 Restricted bands of operation.

6.9 Occupied Bandwidth Test

Test Requirement: RSS-Gen Issue 3 Clause 4.6.1

Test date: December 16, 2012

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

EUT Setup The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer with the resolutions set at 1% of the span,the video bandwidth greater than or equal to the resolution.

Measurement Result:

Test mode: 802.11b

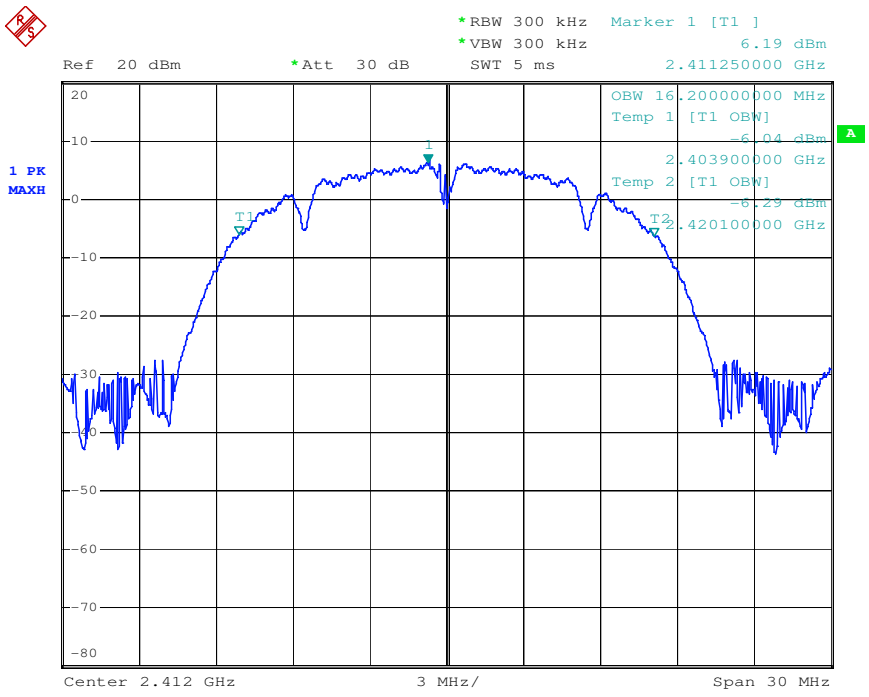
Channel	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	16.20
MID	2437	16.23
HIGH	2462	16.20

Test mode: 802.11g

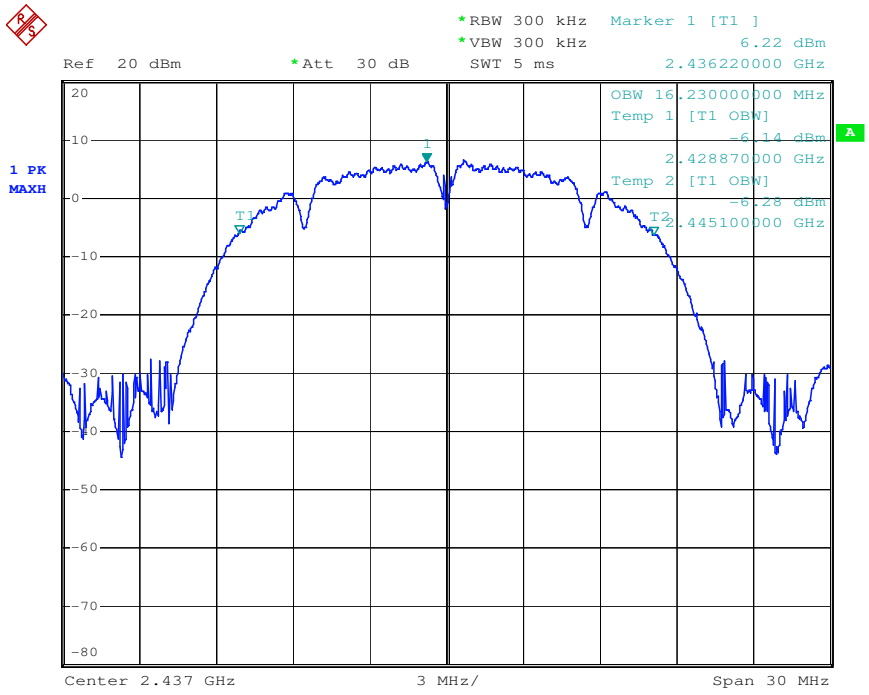
Channel	Frequency (MHz)	Bandwidth (MHz)
LOW	2412	16.74
MID	2437	16.74
HIGH	2462	16.74

Test Plots:

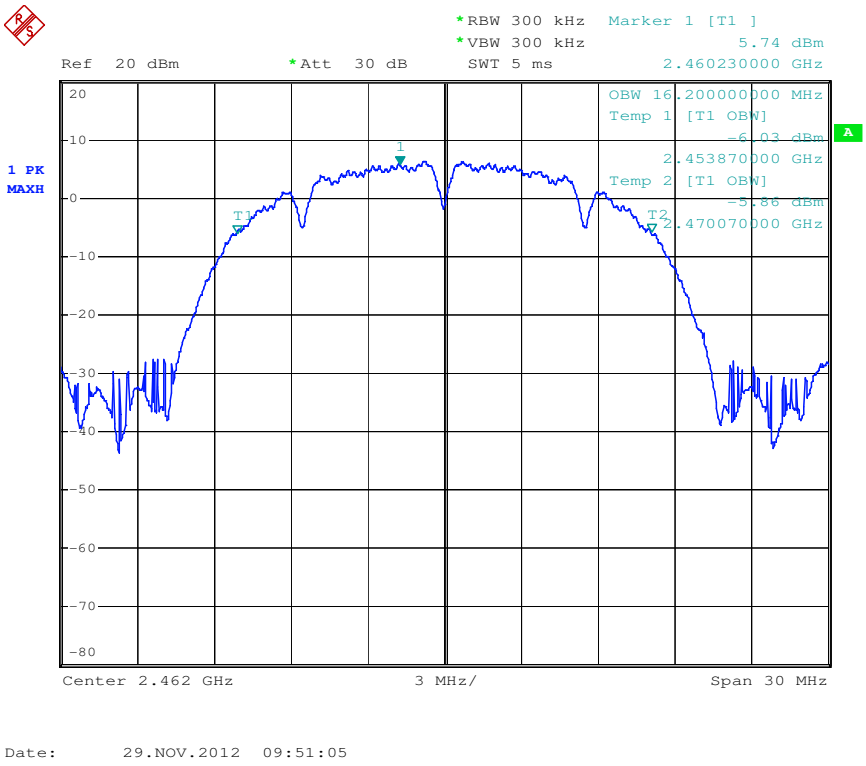
Low Channel **Test mode:** 802.11b



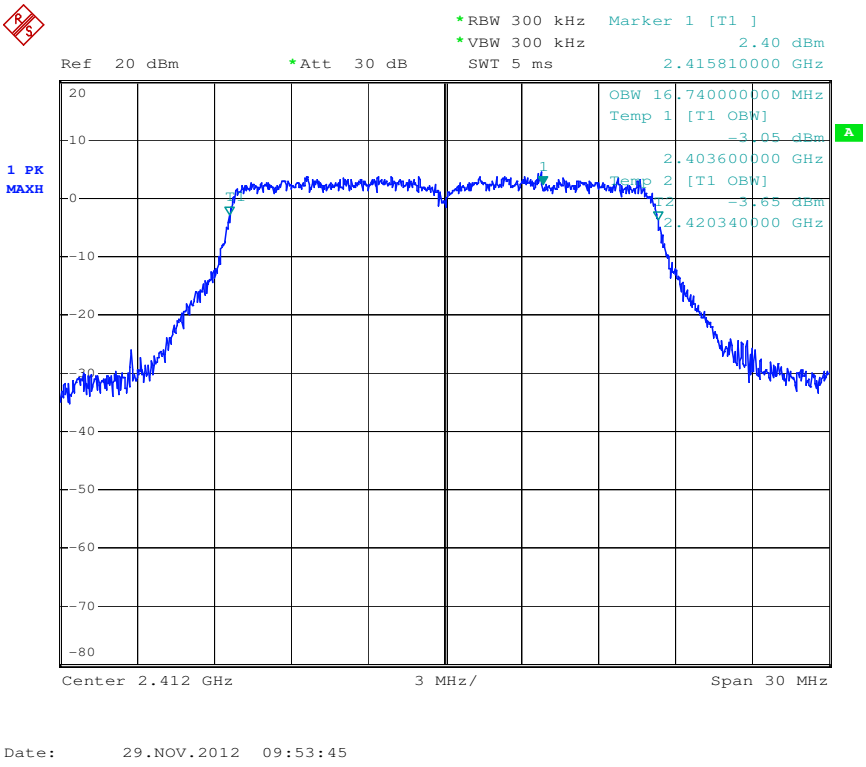
Middle Channel **Test mode:** 802.11b



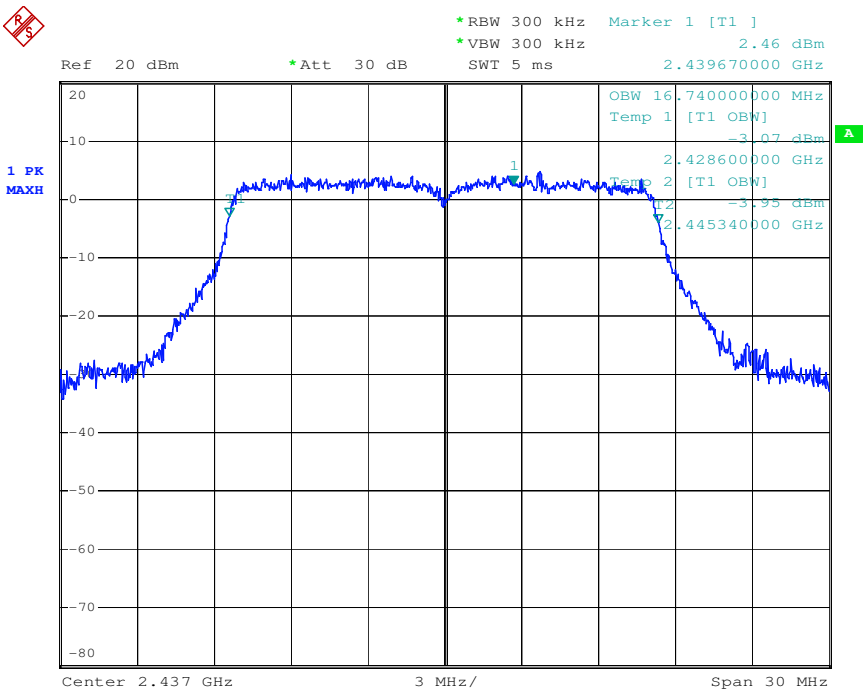
High Channel **Test mode:** 802.11b



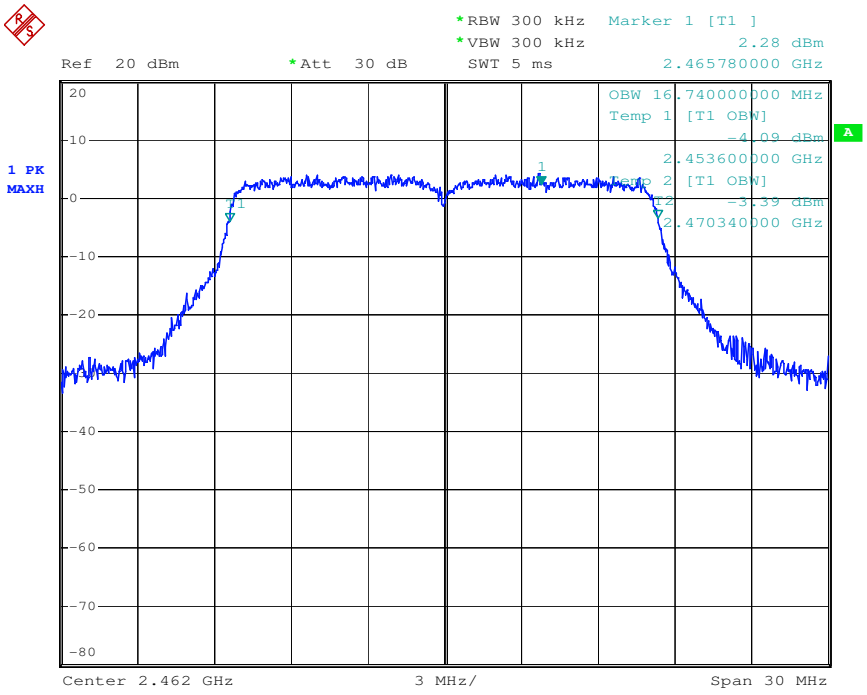
Low Channel **Test mode:** 802.11g



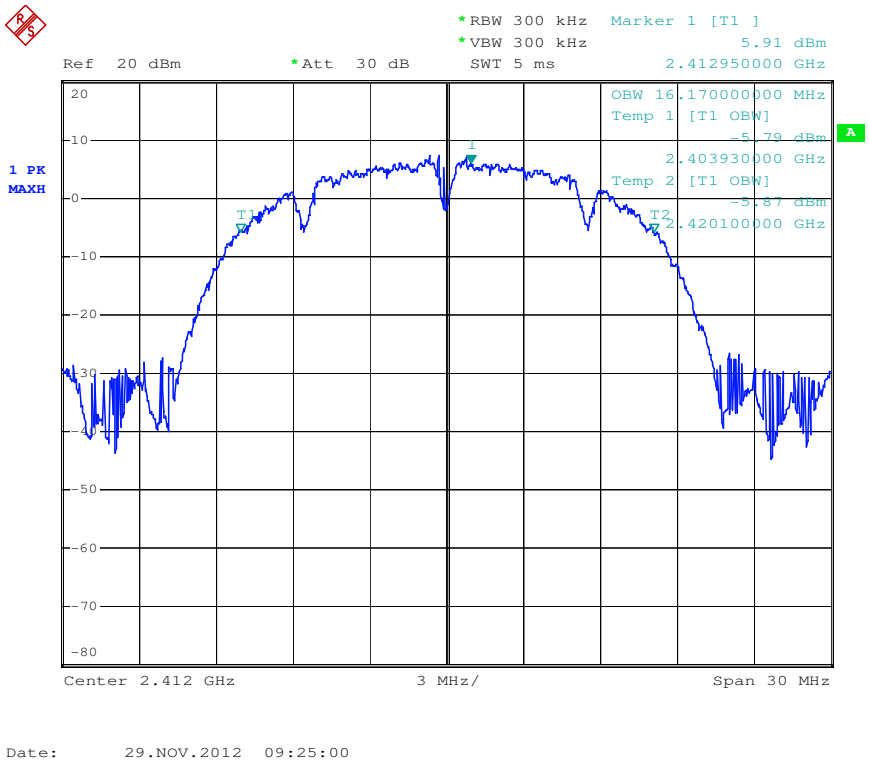
Middle Channel **Test mode:** 802.11g



High Channel **Test mode:** 802.11g



Low Channel **Test mode:** 802.11b



End of Report