TECHNICAL REPORT

ISO/IEC17025Accredited Lab.

Report No: FCC 1210004
File reference No: 2012-10-23

Applicant: King Golden Ltd. (Speed passion)

Product: Reventon "WiFi" wireless module

Model No: SP000009, HLK-WIFI-UA04

Trademark: N/A

Test Standards: FCC Part 15 Subpart C, Paragraph 15.247

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung
Manager

Dated: October 23, 2012

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Tel (755) 83448688 Fax (755) 83442996

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

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

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The 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 No.: 899988.

IC- Registration No.: IC5205A-02

The 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 IC No.: 5205A-02.

Test Report Conclusion

Content

1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Telephone: (755) 83448688

Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: King Golden Ltd. (Speed passion)

Address: 8/F D, Wing Hin Factory Building, 31-33 Ng Fong St, San Po Kong, Kowloon, Hong Kong

Telephone: 852-3586 2398

Fax: 852-3586 2148

1.3 Description of EUT

Product:	Reventon “WiFi” wireless module
Manufacturer:	Shenzhen Hi-Link Electronic Co., Ltd
Address:	509 QiuRui Building MinKang, MingZhi Road,Baoan, Shenzhen，China
Brand Name:	N/A
Model Number:	SP000009
Additional Model Number:	HLK-WIFI-UA04
Type of Modulation	IEEE 802.11b : DSSS (CCK, QPSK, BPSK)
	IEEE 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK)
Frequency range	IEEE 802.11b/g: 2412-2462MHz
Channel Spacing	IEEE 802.11b/g: 5MHz
Air Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps
	IEEE 802.11g : 54, 48,36, 24, 18, 12, 9, 6 Mbps
Frequency Selection	By software
Channel Number	IEEE 802.11b/g : 11 Channels
Antenna:	PCB Antenna with maximum gain 2.0dBi

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2012-10-08 to 2012-10-23

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by Terry Tang

Print Name: Terry Tang

2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2012-04-26	2013-04-25
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2012-04-26	2013-04-25
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2012-04-26	2013-04-25
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2012-04-26	2013-04-25
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2012-04-26	2013-04-25
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2012-04-26	2013-04-25
System Controller	CT	SC100	-	--	--
Printer	EPSON	PHOTO EX3	CFNH234850	--	--
Computer	IBM	8434	1S8434KCE99BLXLO*	--	--
Loop Antenna	EMCO	6502	00042960	2012-04-26	2013-04-25
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2012-04-26	2013-04-25
3m OATS	--	--	N/A	2012-04-26	2013-04-25
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2012-04-26	2013-04-25
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2012-04-26	2013-04-25
Power meter	Anritsu	ML2487A	6K00003613	2012-04-26	2013-04-25
Power sensor	Anritsu	MA2491A	32263	2012-04-26	2013-04-25
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2012-04-26	2013-04-25
LISN	AFJ	LS16C	10010947251	2012-04-26	2013-04-25
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2012-04-26	2013-04-25
9*6*6 Anechoic	--	--	N/A	2012-04-26	2013-04-25
EMI Test Receiver	RS	ESCS30	100139	2012-04-26	2013-04-25
LISN	AFJ	LS16C	10010947251	2012-04-26	2013-04-25
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2012-04-26	2013-04-25

2.1 Auxiliary Equipment

Name	Model No.	Serial No.	Manufacturer	Cable	FCC ID/DOC
Power Supply	HC716Q	--	--	--	FCC OC

3. DESCRIPTION OF TEST MODES

IEEE 802.11b, 802.11g mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 11Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode : 54Mbps data rate (worst case) were chosen for full testing.

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD and average power across all the data rates, bandwidths, modulations and spatial stream modes.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2437 MHz.

3.0 Technical Details

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 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 Test Standards

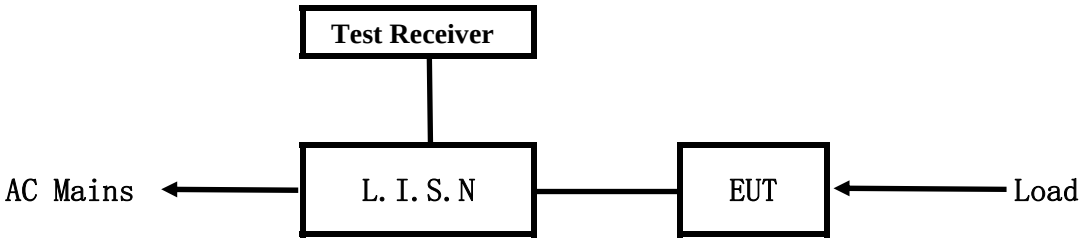
FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

5. Power Line Conducted Emission Test

5.1 Schematics of the test



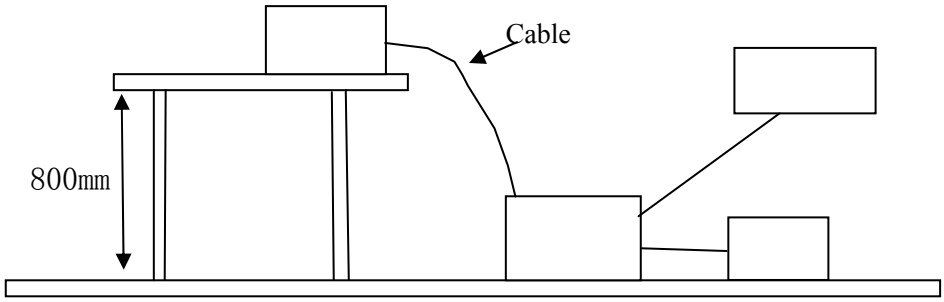
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003.The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
Reventon "WiFi" wireless module	Shenzhen Hi-Link Electronic Co., Ltd	SP000009, HLK-WIFI-UA04	YIU000009

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC

N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
Development Board	Shenzhen Hi-Link Electronic Co., Ltd	--	--	--

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ～ 0.50	79.0	66.0	66.0～56.0*	56.0～46.0*
0.50 ～ 5.00	73.0	60.0	56.0	46.0
5.00 ～ 30.00	73.0	60.0	60.0	50.0

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

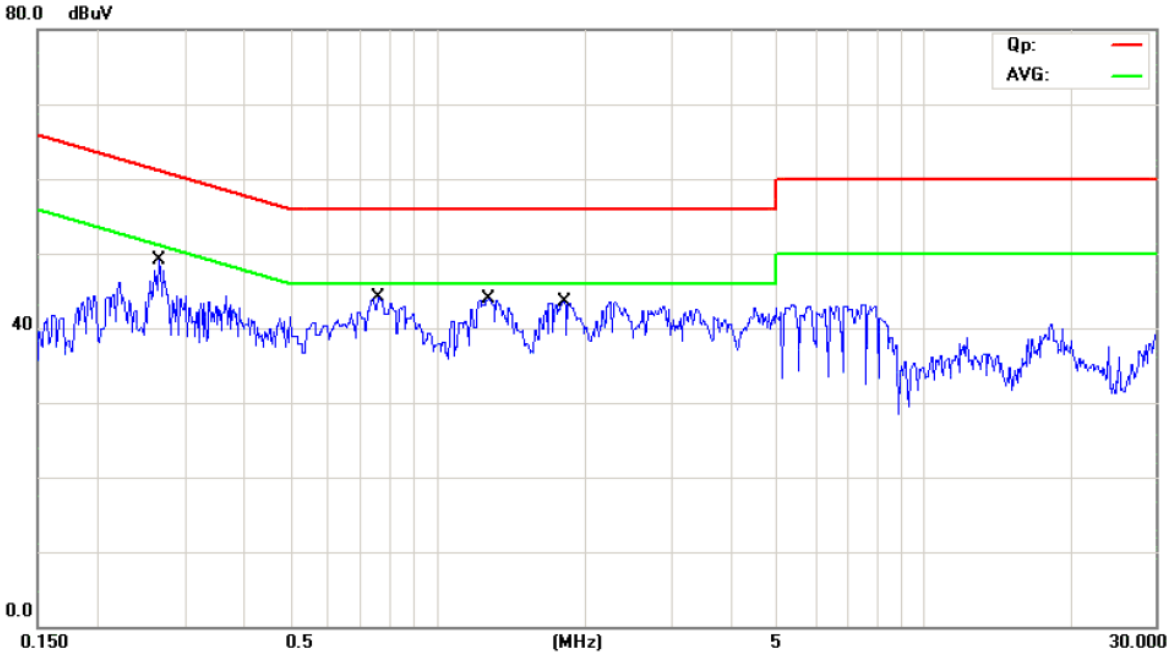
The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT set Condition: Keep WIFI Transmitting
Software

Results: **Pass**

Please refer to following diagram for individual



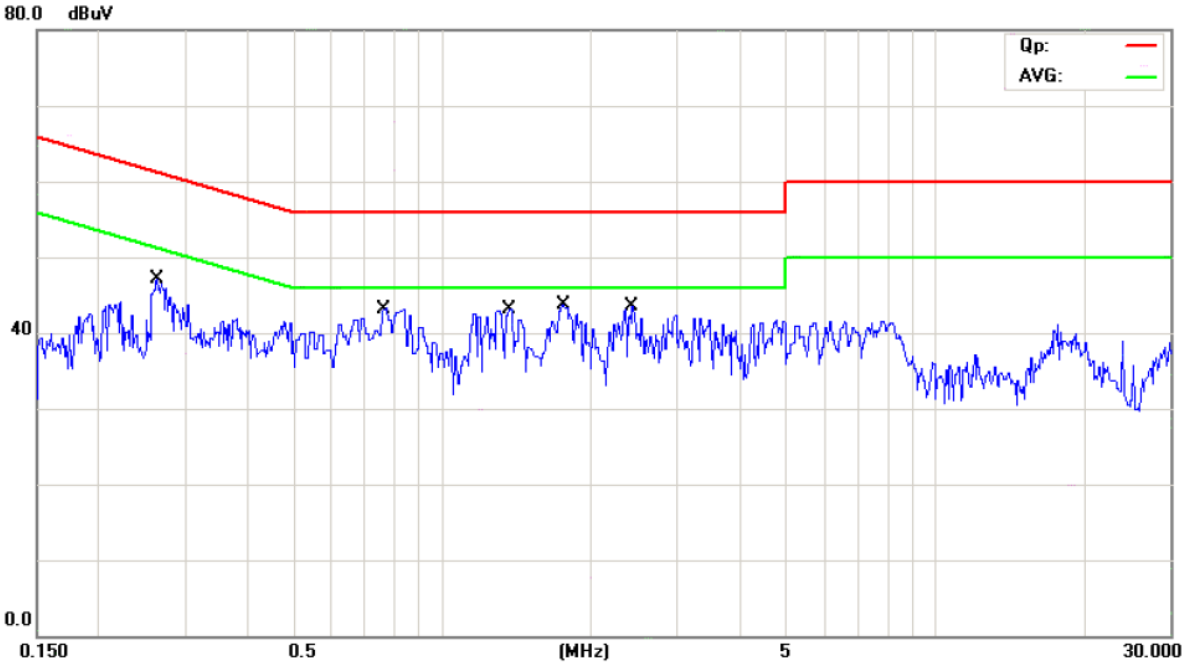
Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Line		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.265	46.73	29.03	--	--	61.26	51.26
0.758	41.13	29.83	--	--	56.00	46.00
1.276	40.97	28.17	--	--	56.00	46.00
1.816	41.45	28.75	--	--	56.00	46.00

B **Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)**

EUT set Condition: Keep WIFI Transmitting
Software

Results: **Pass**

Please refer to following diagram for individual



Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0.262	--	--	44.96	30.76	61.34	51.34
0.770	--	--	41.20	26.80	56.00	46.00
1.366	--	--	39.67	26.57	56.00	46.00
1.748	--	--	41.19	27.89	56.00	46.00
2.423	--	--	40.54	28.24	56.00	46.00

6 Radiated Emission Test

6.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988

(2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.

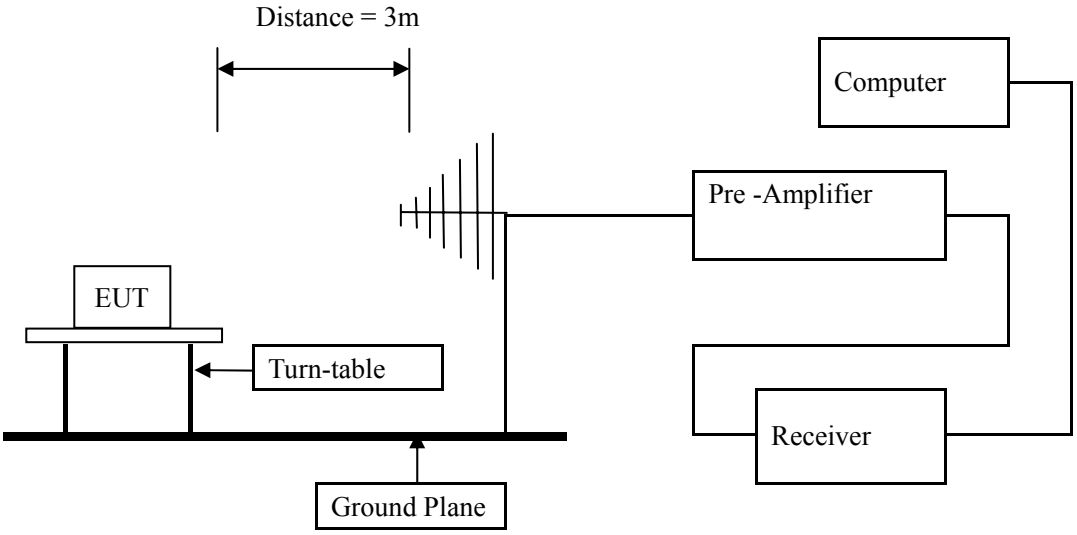
(3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.

(4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

(5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.

(6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the higher limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep WIFI Transmitting
Software

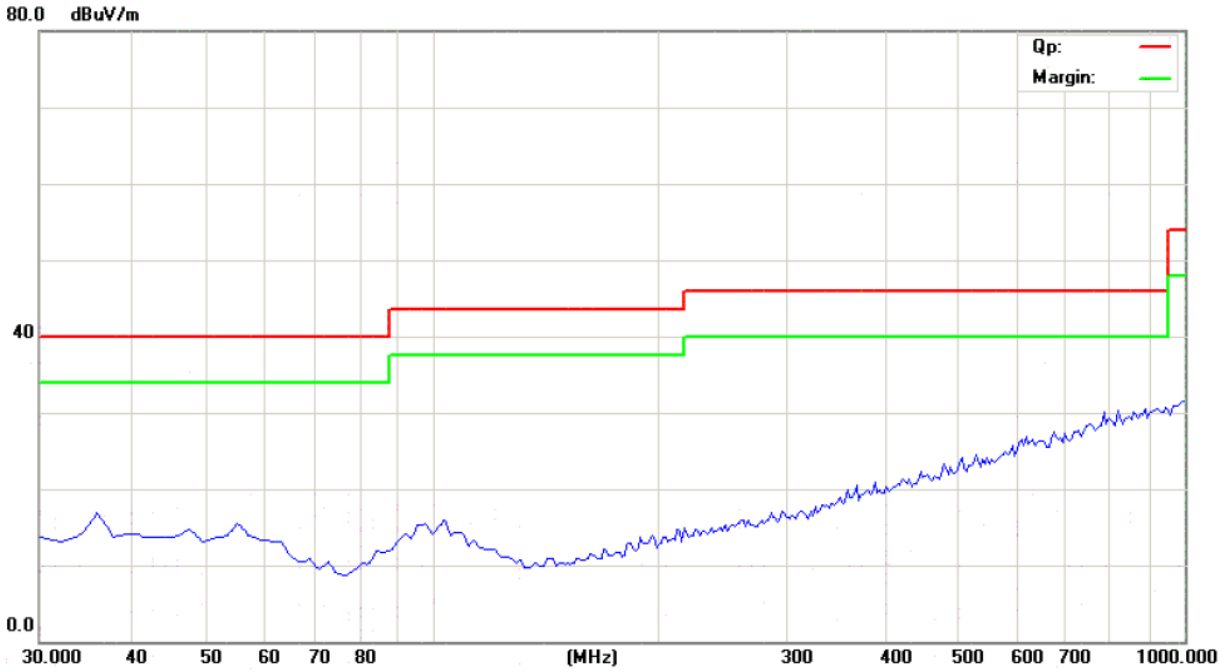
Results: **Pass**

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
--	--	H	--
--	--	V	--

The test data shows much less than the limit, no necessary take down the results.

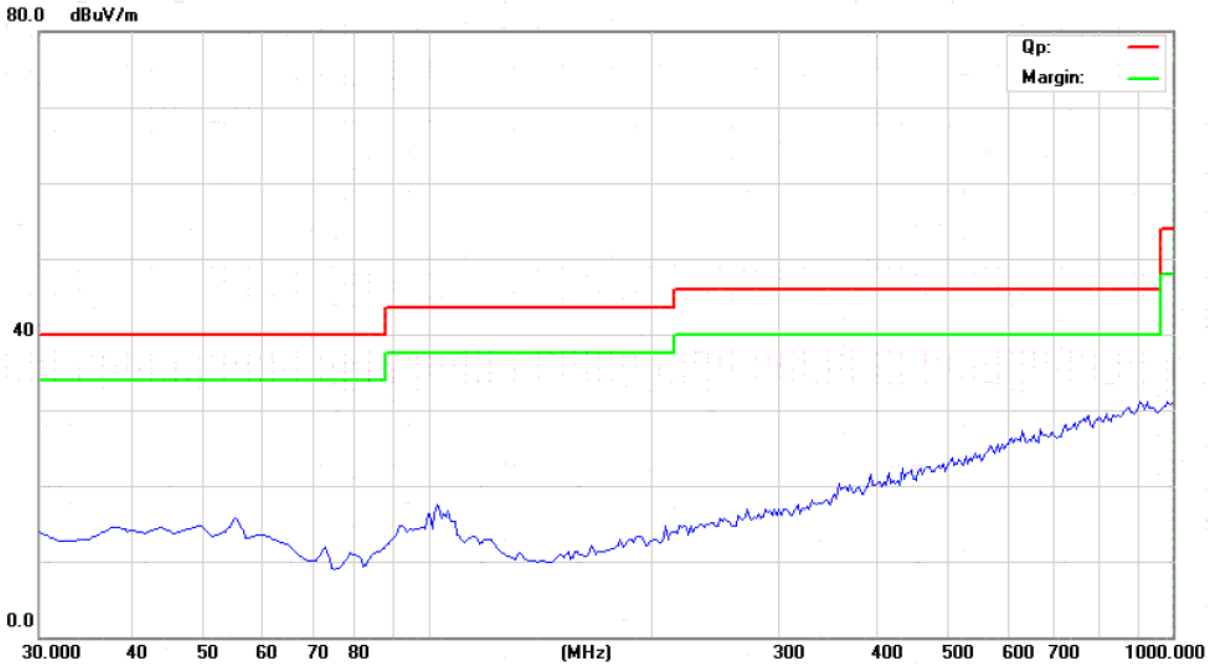
Test Figure:

H



Test Figure:

V



Operation Mode: Transmitting & Receiving under CH01 at 54Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2412.00	96.39（PK）)	H	Fundamental Frequency
2412.00	97.68（PK）	V	
4824.00	49.78（PK）	H	74(Peak)/ 54(AV)
4824.00	48.82（PK）	V	74(Peak)/ 54(AV)
7236.00	--	H	74(Peak)/ 54(AV)
7236.00	--	V	74(Peak)/ 54(AV)
9648.00	--	H/V	74(Peak)/ 54(AV)
12060	--	H/V	74(Peak)/ 54(AV)
14472	--	H/V	74(Peak)/ 54(AV)
16884	--	H/V	74(Peak)/ 54(AV)
19296	--	H/V	74(Peak)/ 54(AV)
21708	--	H/V	74(Peak)/ 54(AV)
24120	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark “---” means that the emissions level is too low to be measured

3. For 802.11g mode 54Mbps

Operation Mode: Transmitting & Receiving under CH06 at 54Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2437.00	91.97（PK）	H	Fundamental Frequency
2437.00	95.94（PK）	V	
4874.00	48.47（PK）	H	74(Peak)/ 54(AV)
4874.00	50.70（PK）	V	74(Peak)/ 54(AV)
7311.00	--	H/V	74(Peak)/ 54(AV)
9748.00	--	H/V	74(Peak)/ 54(AV)
12185	--	H/V	74(Peak)/ 54(AV)
14622	--	H/V	74(Peak)/ 54(AV)
17059	--	H/V	74(Peak)/ 54(AV)
19496	--	H/V	74(Peak)/ 54(AV)
21933	--	H/V	74(Peak)/ 54(AV)
24370	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark “---” means that the emissions level is too low to be measured
3. For 802.11g mode 54Mbps

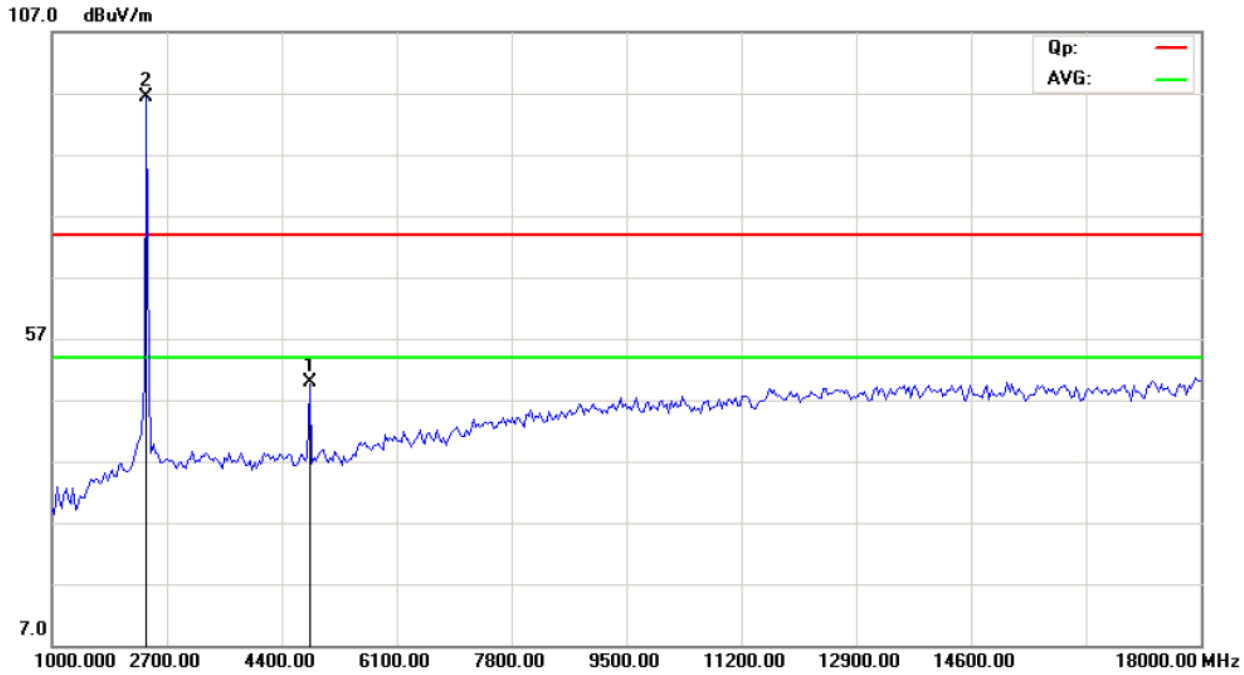
Operation Mode: Transmitting & Receiving under CH11 at 54Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2462.00	94.93（PK）	H	Fundamental Frequency
2462.00	96.86（PK）	V	
4924	49.58（PK）	H	74(Peak)/ 54(AV)
4924	49.64（PK）	V	74(Peak)/ 54(AV)
7368	--	H/V	74(Peak)/ 54(AV)
9848	--	H/V	74(Peak)/ 54(AV)
12310	--	H/V	74(Peak)/ 54(AV)
14772	--	H/V	74(Peak)/ 54(AV)
17234	--	H/V	74(Peak)/ 54(AV)
19696	--	H/V	74(Peak)/ 54(AV)
22158	--	H/V	74(Peak)/ 54(AV)
24650	--	H/V	74(Peak)/ 54(AV)

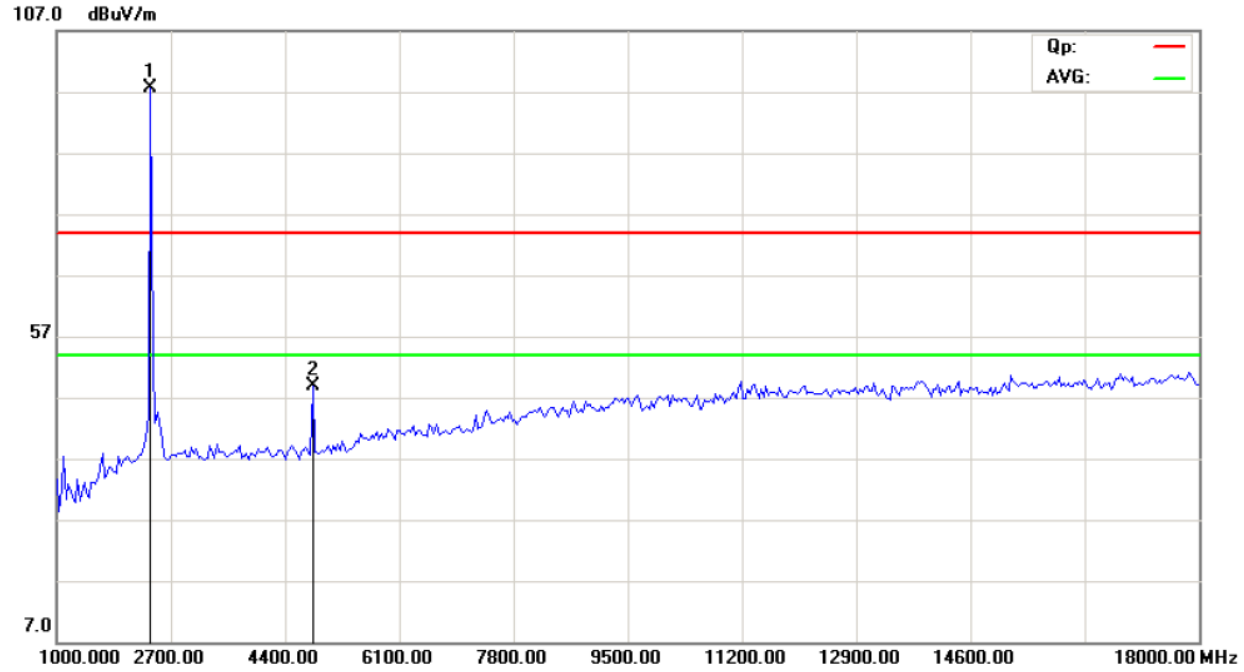
Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark “---” means that the emissions level is too low to be measured
3. For 802.11g mode at 54Mbps

Please refer to the following test plots for details:

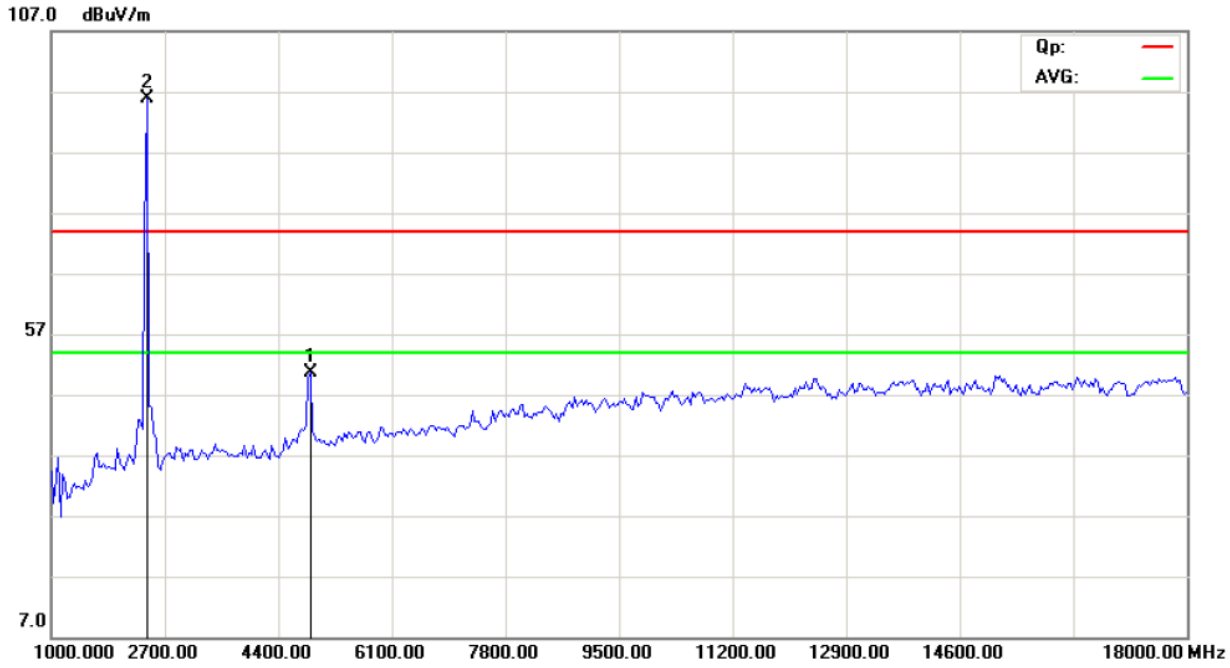
CH01 at 54Mbps: Horizontal



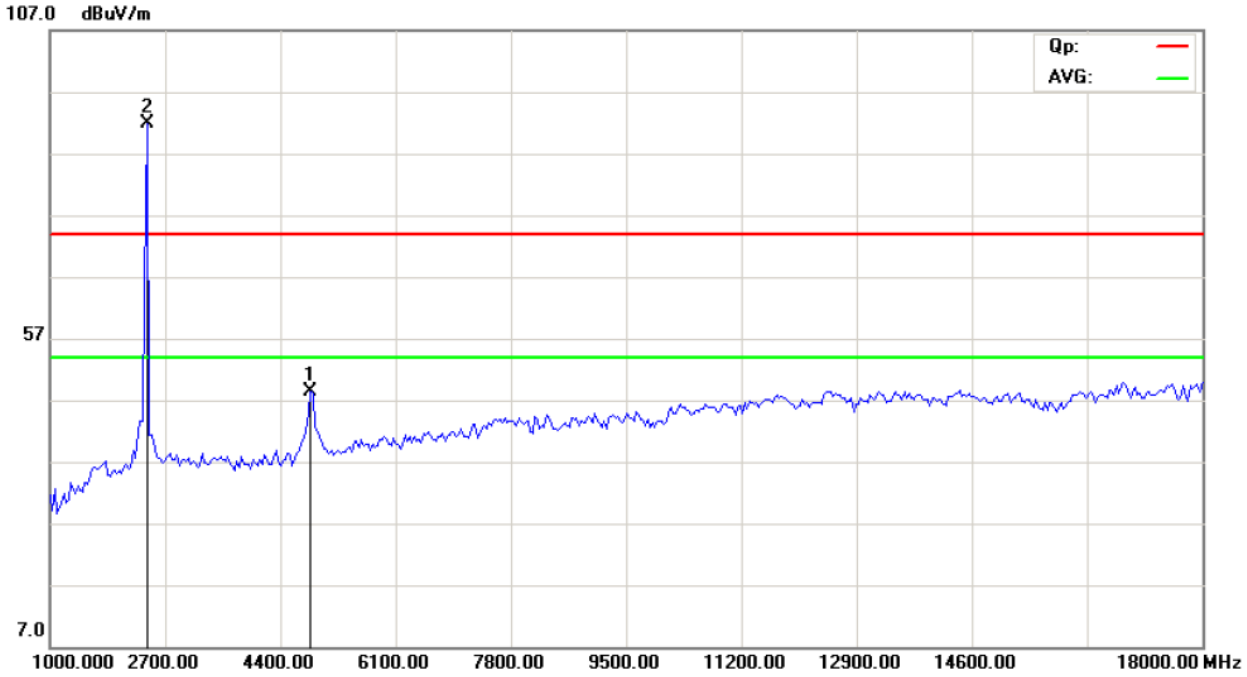
CH01 at 54Mbps: Vertical



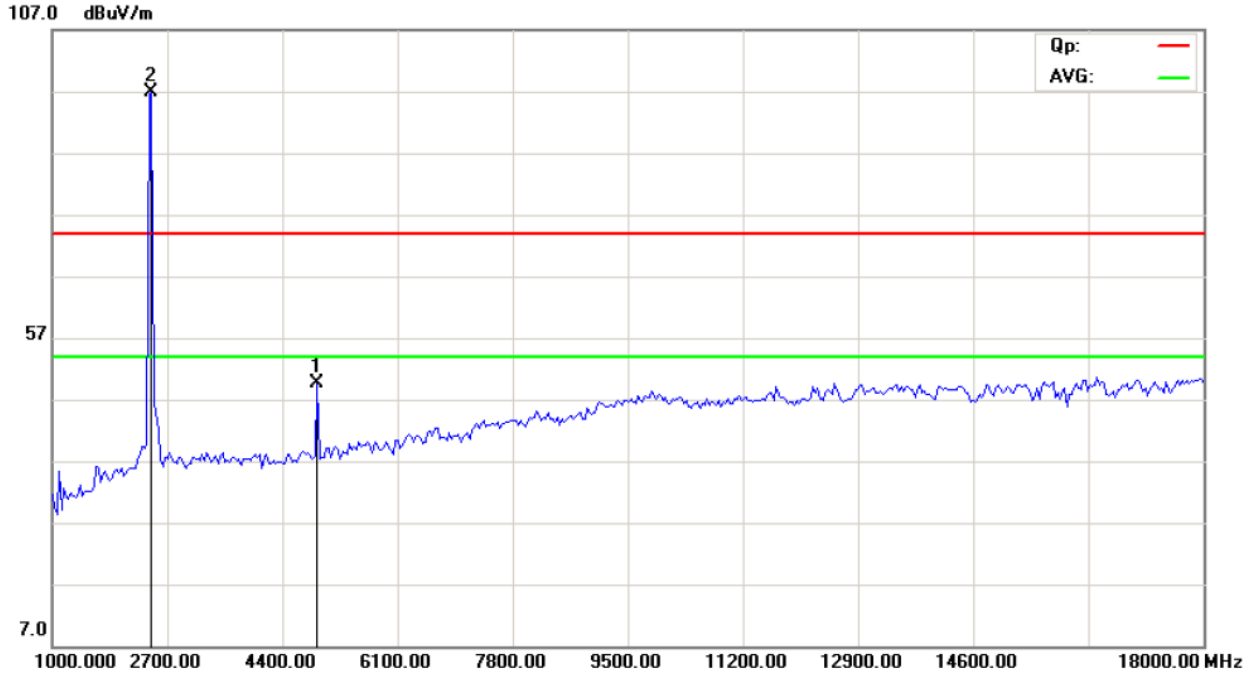
CH06 at 54Mbps: Vertical



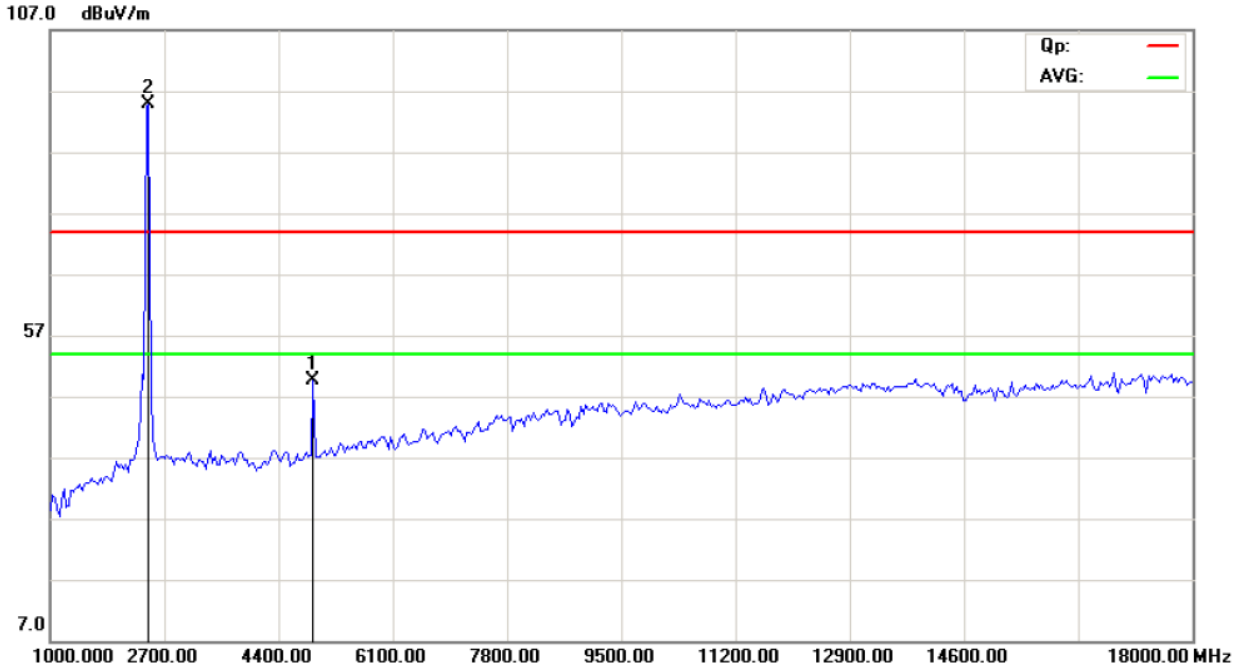
CH06 at 54Mbps: Horizontal



CH11 at 54Mbps: Vertical



CH11at 54Mbps: Horizontal



Note: For radiated Emissions from 18-25GHz, it is only the floor noise.

Operation Mode: Transmitting & Receiving under CH01 at 11Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2412.00	97.26 (PK)	H	Fundamental Frequency
2412.00	98.26 (PK)	V	
4824.00	47.82(PK)	H	74(Peak)/ 54(AV)
4824.00	49.59(PK)	V	74(Peak)/ 54(AV)
7236.00	--	H/V	74(Peak)/ 54(AV)
9648.00	--	H/V	74(Peak)/ 54(AV)
12060	--	H/V	74(Peak)/ 54(AV)
14472	--	H/V	74(Peak)/ 54(AV)
16684	--	H/V	74(Peak)/ 54(AV)
19296	--	H/V	74(Peak)/ 54(AV)
21708	--	H/V	74(Peak)/ 54(AV)
24120	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11b mode 11Mbps

Operation Mode: Transmitting & Receiving under CH06 at 11Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2437.00	96.13(PK)	H	Fundamental Frequency
2437.00	95.15(PK)	V	
4874.00	49.01(PK)	H	74(Peak)/ 54(AV)
4874.00	46.50(PK)	V	74(Peak)/ 54(AV)
7311.00	--	H/V	74(Peak)/ 54(AV)
9748.00	--	H/V	74(Peak)/ 54(AV)
12185	--	H/V	74(Peak)/ 54(AV)
14622	--	H/V	74(Peak)/ 54(AV)
17059	--	H/V	74(Peak)/ 54(AV)
19496	--	H/V	74(Peak)/ 54(AV)
21933	--	H/V	74(Peak)/ 54(AV)
24370	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11b mode 11Mbps

Operation Mode: Transmitting & Receiving under CH11 at 11Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2462.00	96.38 (PK)	H	Fundamental Frequency
2462.00	97.67(PK)	V	
4924	43.79(PK)	H	74(Peak)/ 54(AV)
4924	50.63(PK)	V	74(Peak)/ 54(AV)
7368	--	H/V	74(Peak)/ 54(AV)
9848	--	H/V	74(Peak)/ 54(AV)
12310	--	H/V	74(Peak)/ 54(AV)
14772	--	H/V	74(Peak)/ 54(AV)
17234	--	H/V	74(Peak)/ 54(AV)
19696	--	H/V	74(Peak)/ 54(AV)
22158	--	H/V	74(Peak)/ 54(AV)
24650	--	H/V	74(Peak)/ 54(AV)

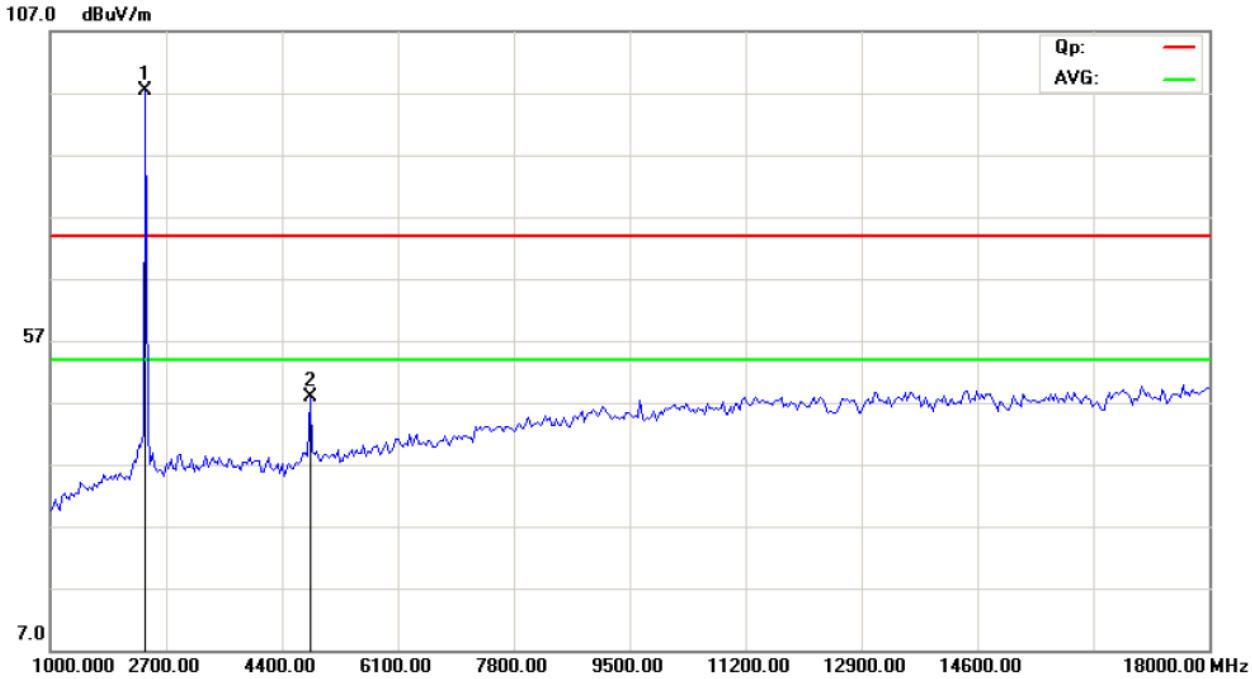
Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

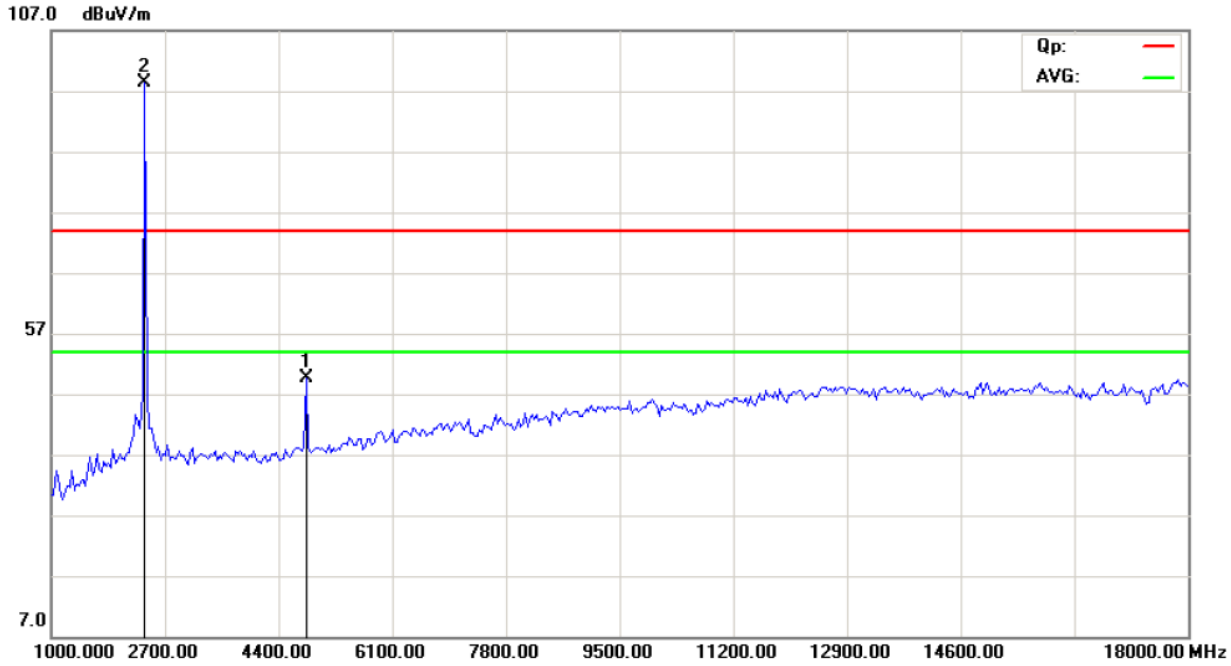
3. For 802.11b mode at 11Mbps

Please refer to the following test plots for details:

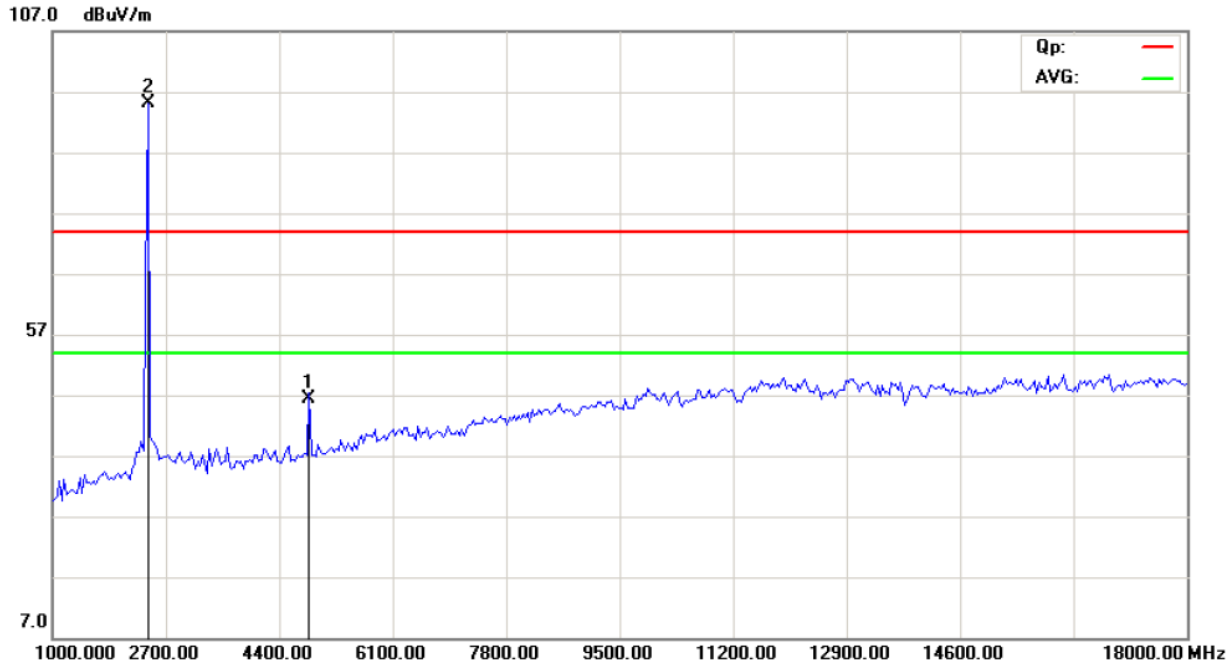
CH01 at 11Mbps: Horizontal



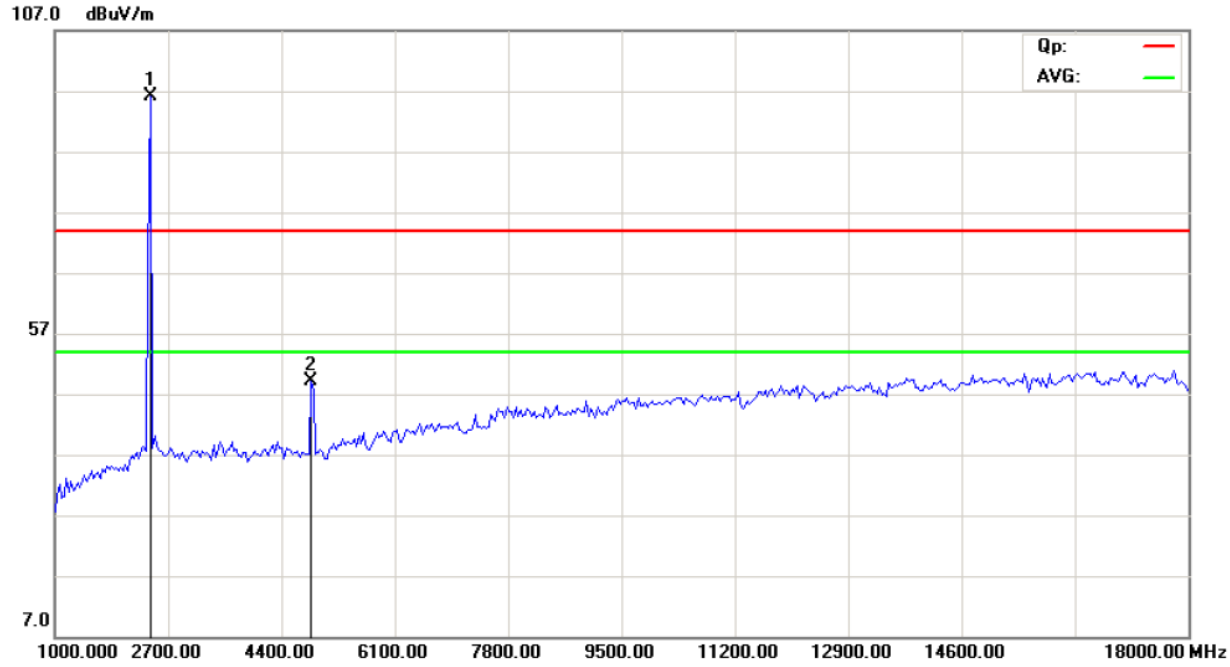
CH01 at 11Mbps: Vertical



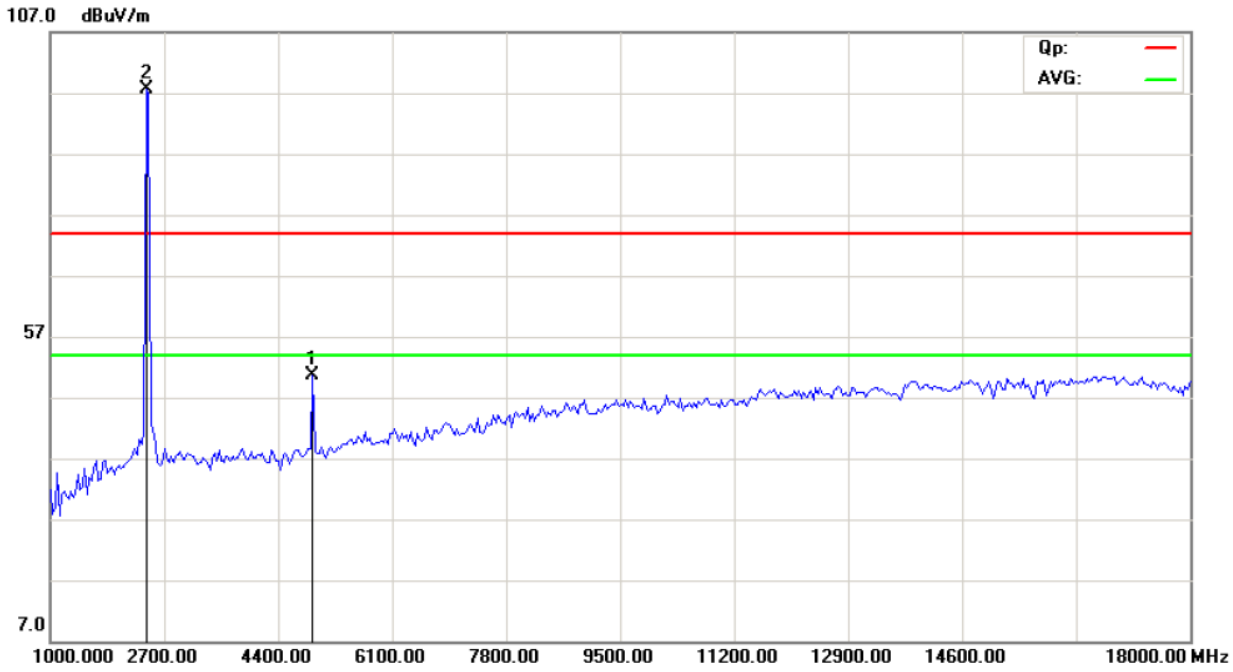
CH06 at 11Mbps: Vertical



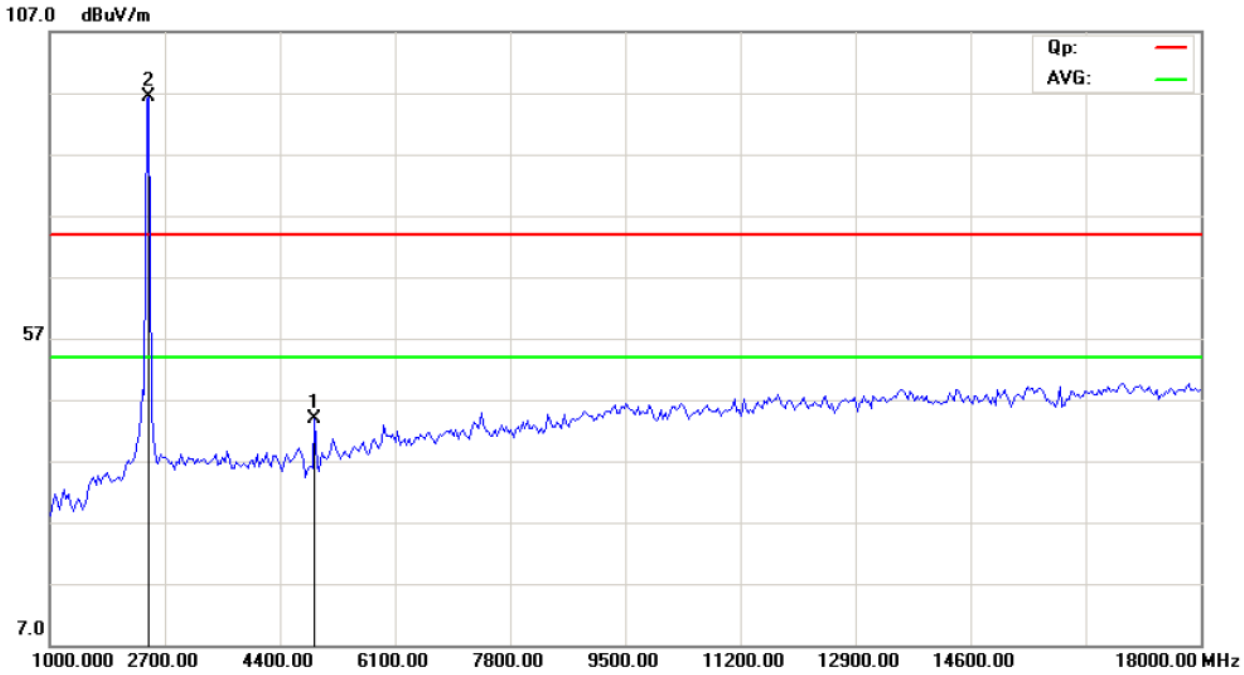
CH06 at 11Mbps: Horizontal



CH11 at 11Mbps: Vertical



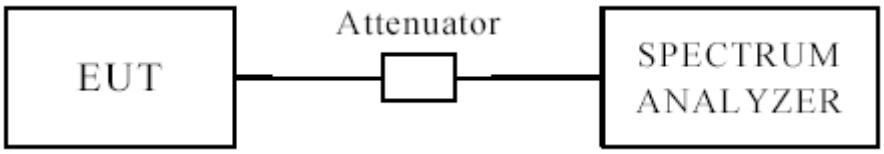
CH11 at 11Mbps: Horizontal



Note: For radiated Emissions from 18-25GHz, it is only the floor noise.

7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500kHz

7.3 Test Procedure

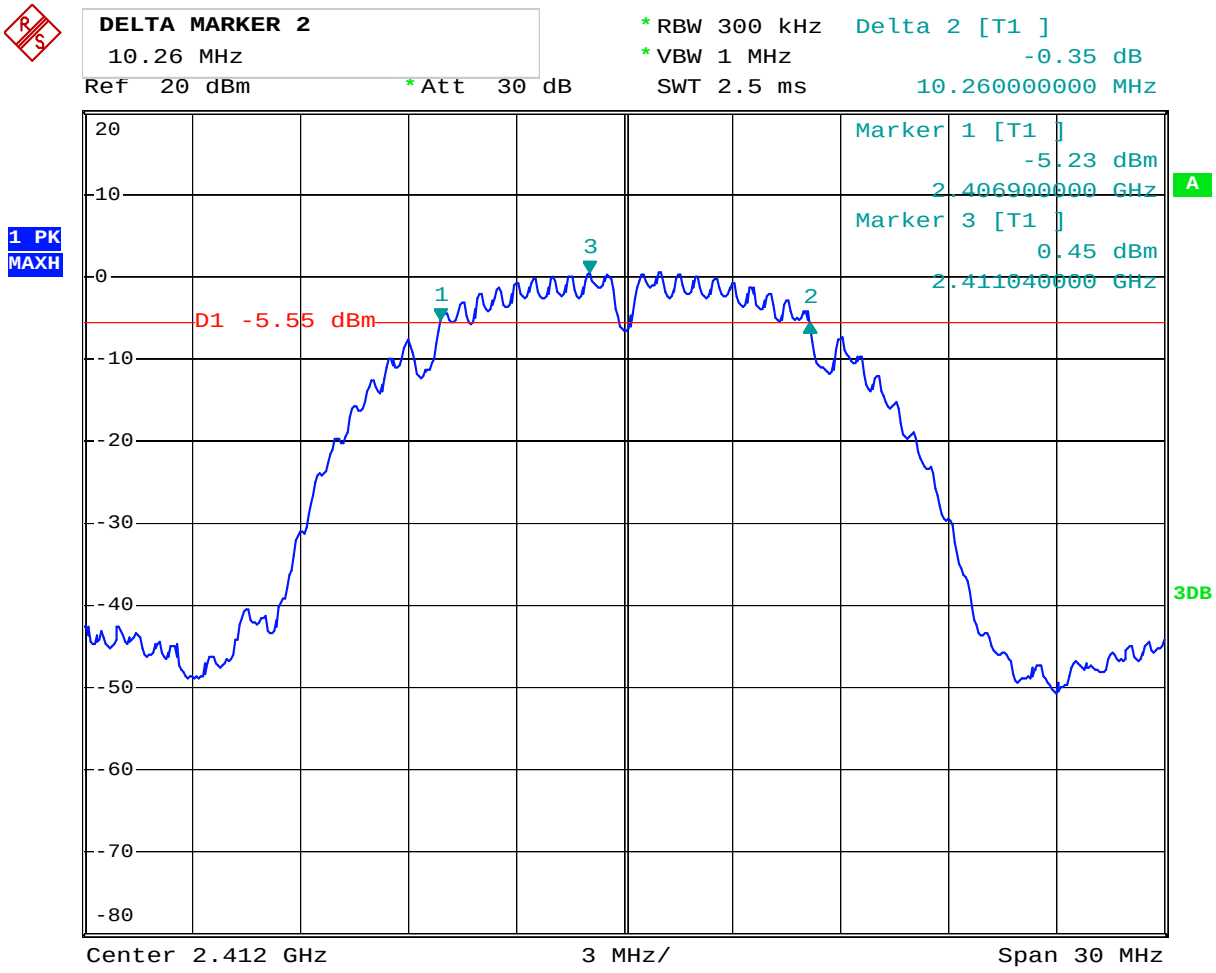
1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

7.4 Test Result

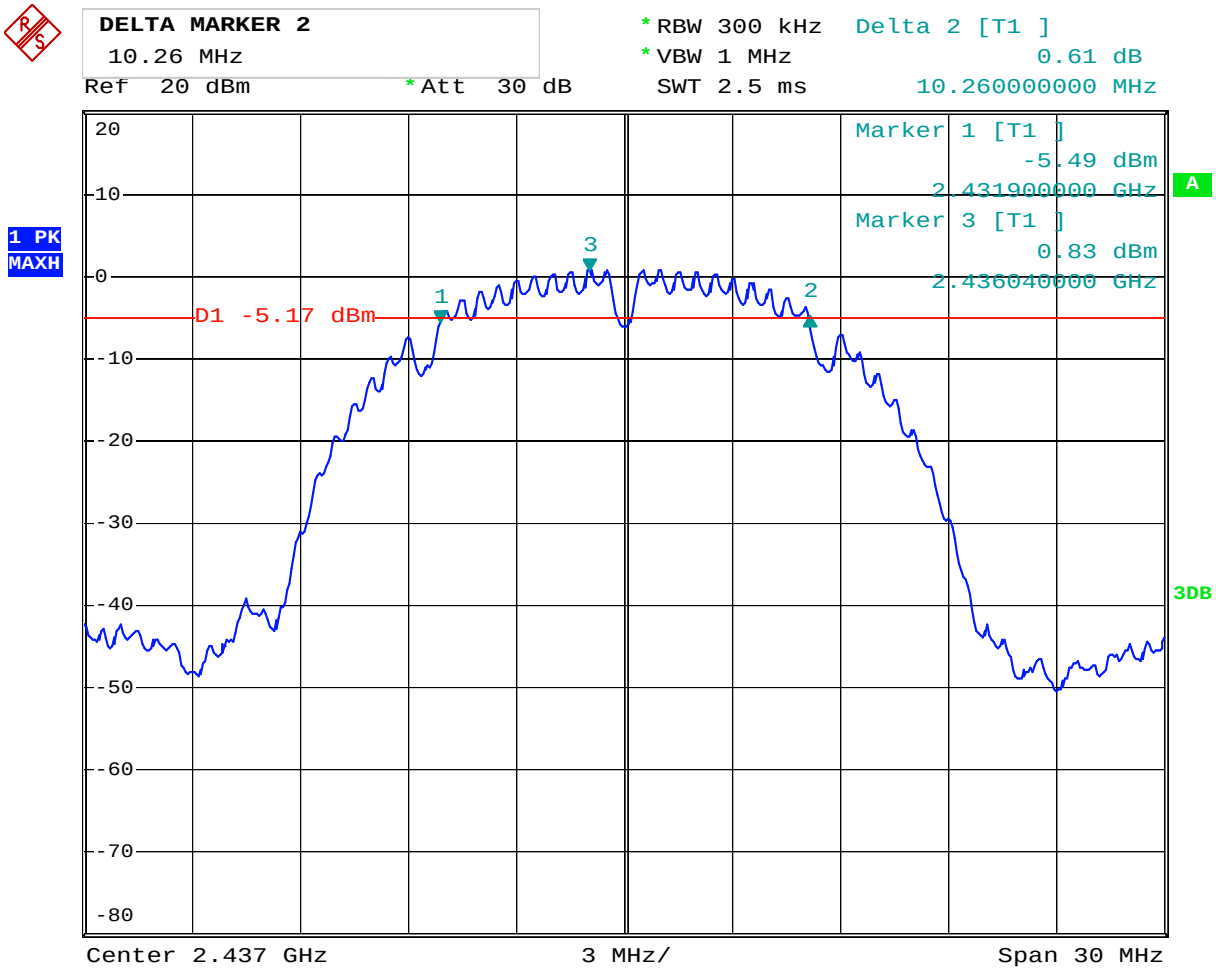
EUT	Reventon “WiFi” wireless module	Model	SP000009, HLK-WIFI-UA04
Mode	802.11b	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	1	10.26	0.5	Pass
6	2437	1	10.26	0.5	Pass
11	2462	1	10.26	0.5	Pass
1	2412	11	10.26	0.5	Pass
6	2437	11	10.26	0.5	Pass
11	2462	11	10.20	0.5	Pass

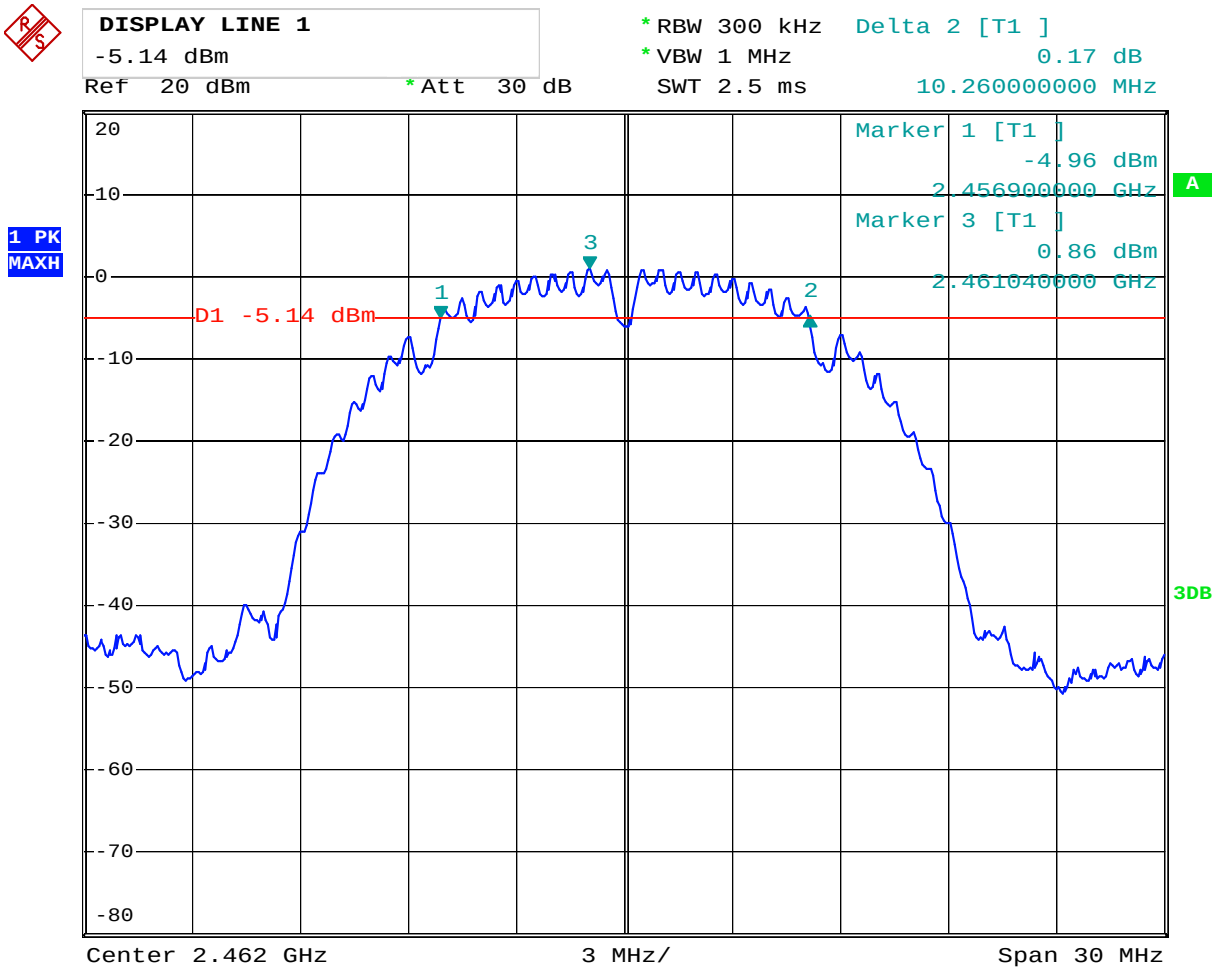
1. 802.11b at 1Mbps of CH01



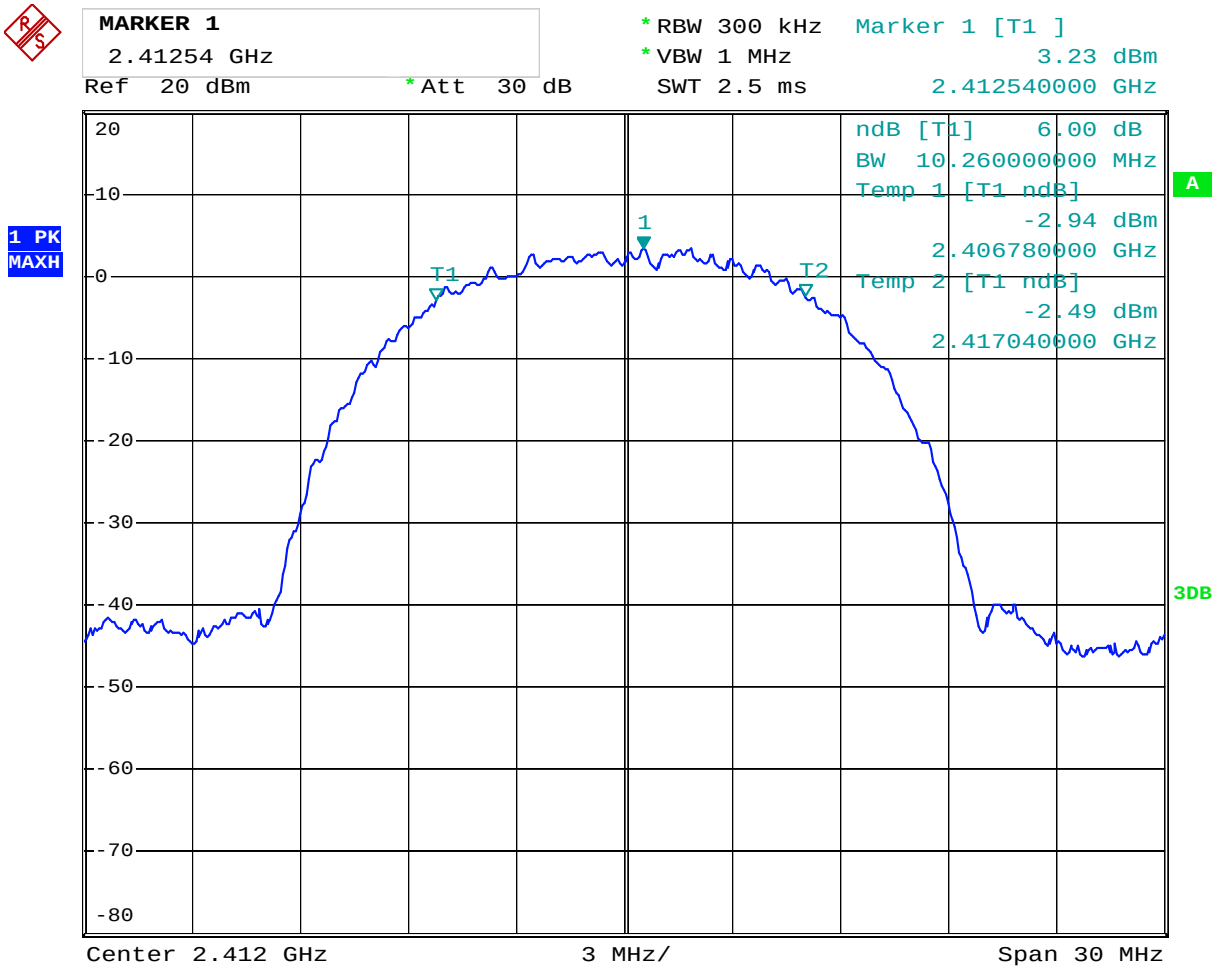
2. 802.11b at 1Mbps of CH06



3. 802.11b at 1Mbps of CH11

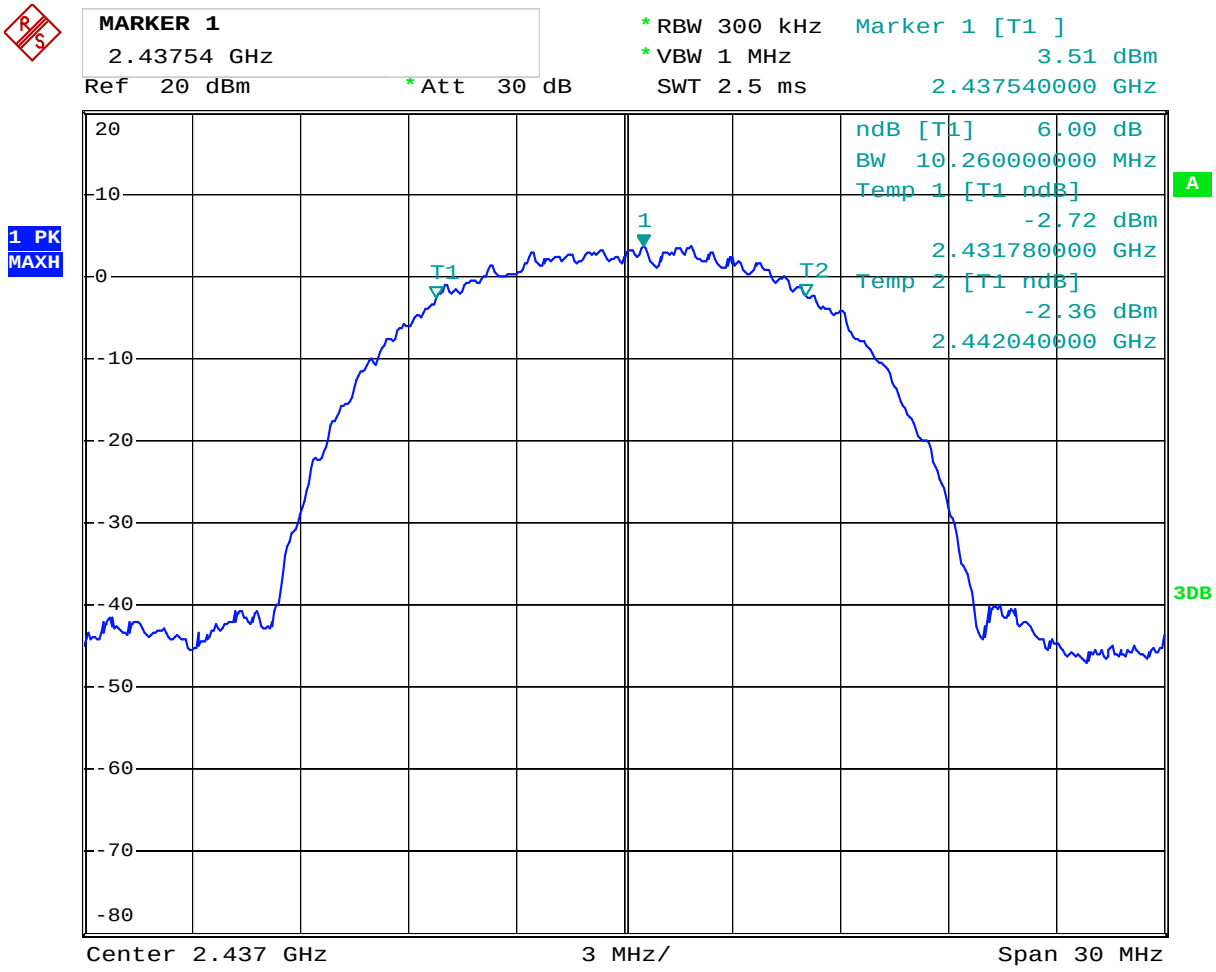


4. 802.11b at 11Mbps of CH01



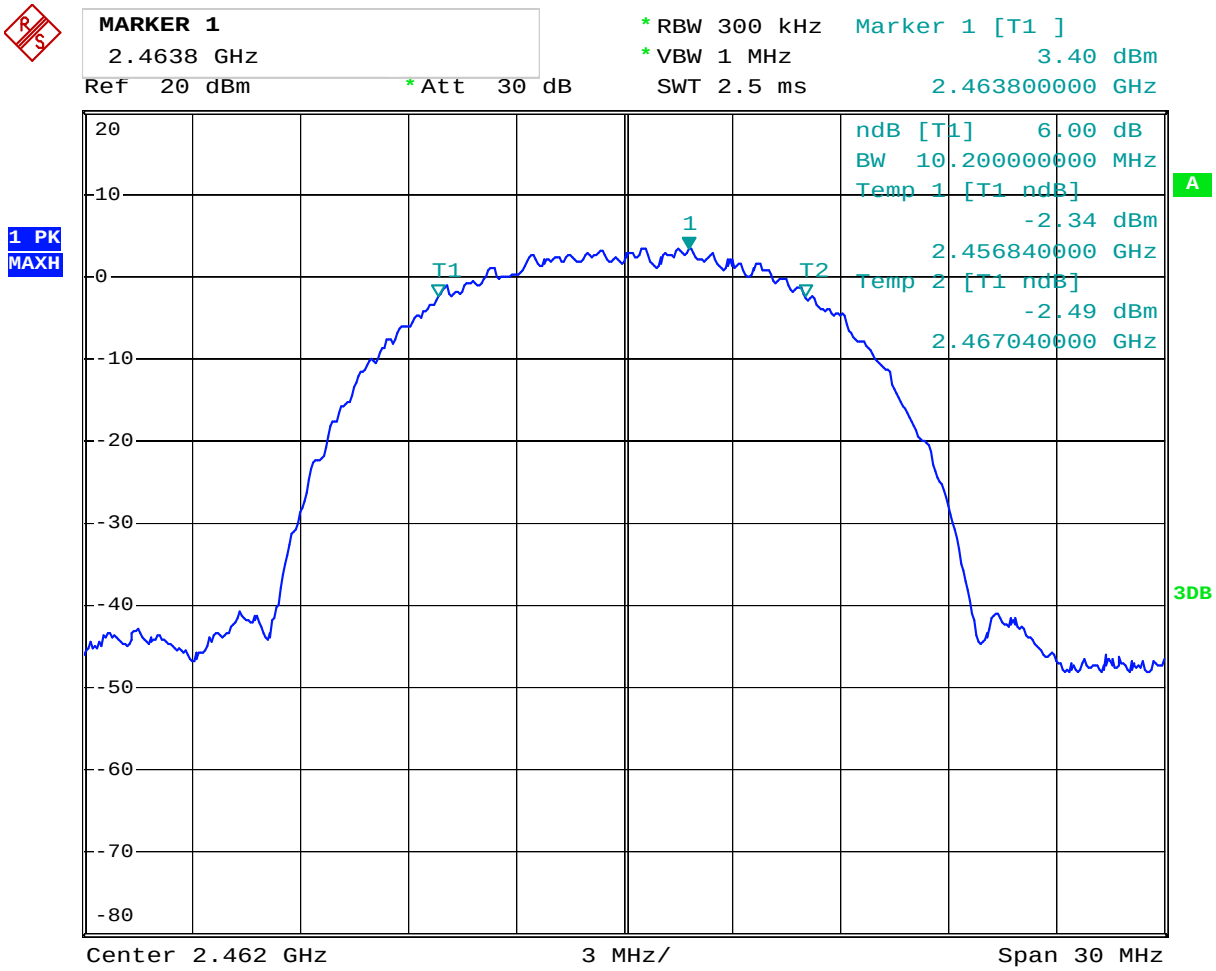
Date: 8.OCT.2012 14:23:40

5. 802.11b at 11Mbps of CH6



Date: 8.OCT.2012 14:19:39

6. 802.11b at 11Mbps of CH11

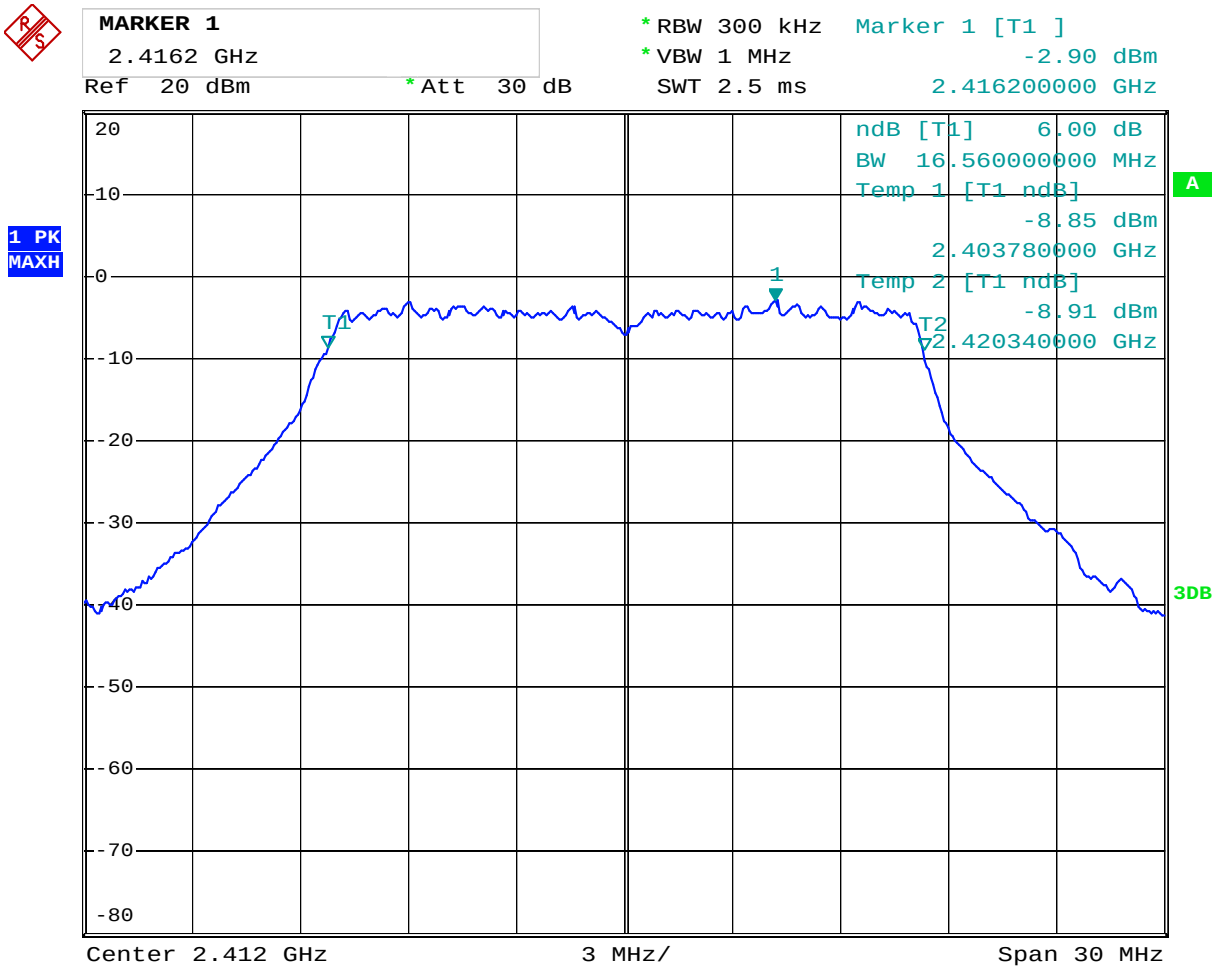


EUT	Reventon “WiFi” wireless module	Model	SP000009, HLK-WIFI-UA04
Mode	802.11g	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH

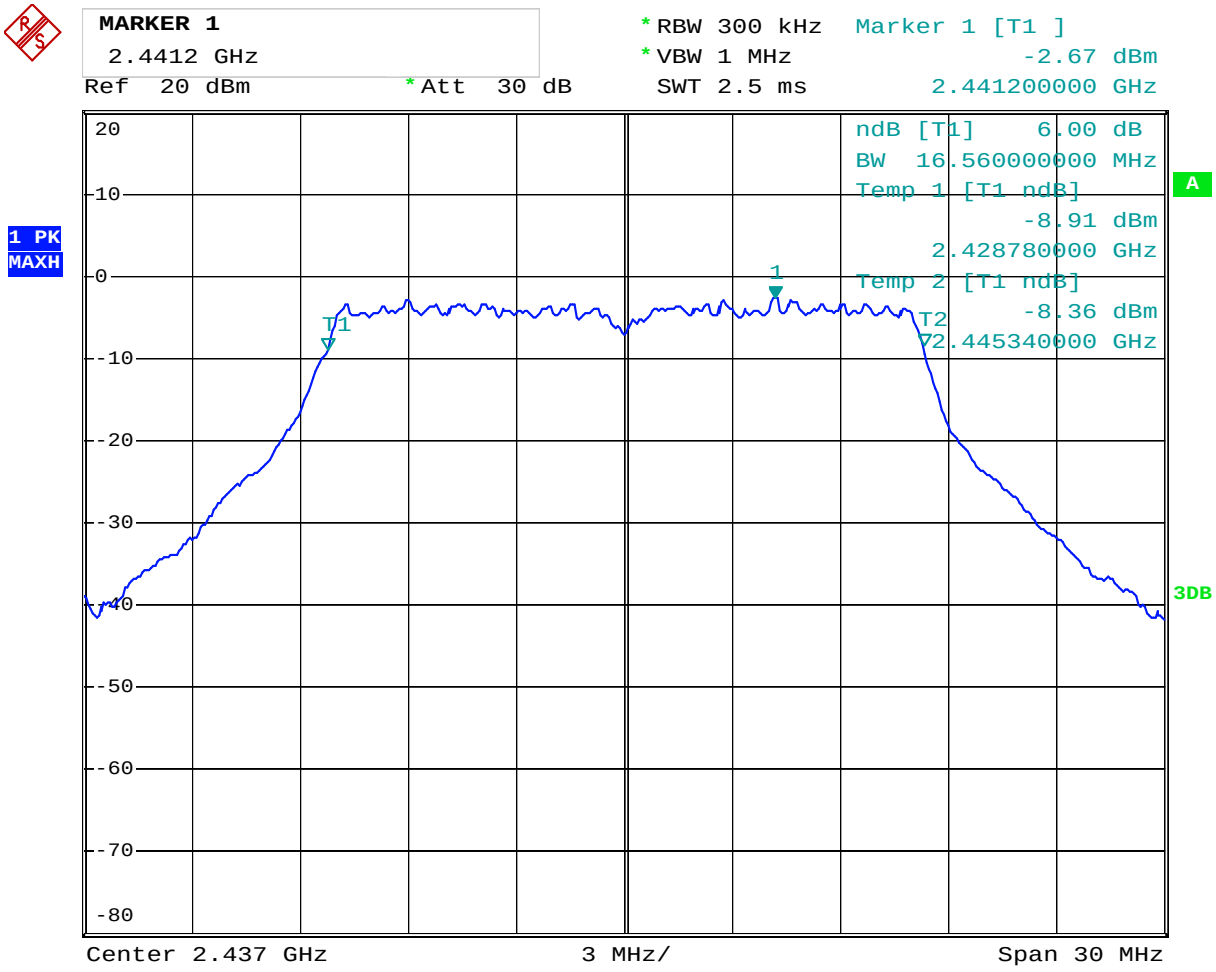
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	54	16.56	0.5	Pass
6	2437	54	16.56	0.5	Pass
11	2462	54	16.62	0.5	Pass

Test Plots:

1. 802.11g at 6Mbps of CH01

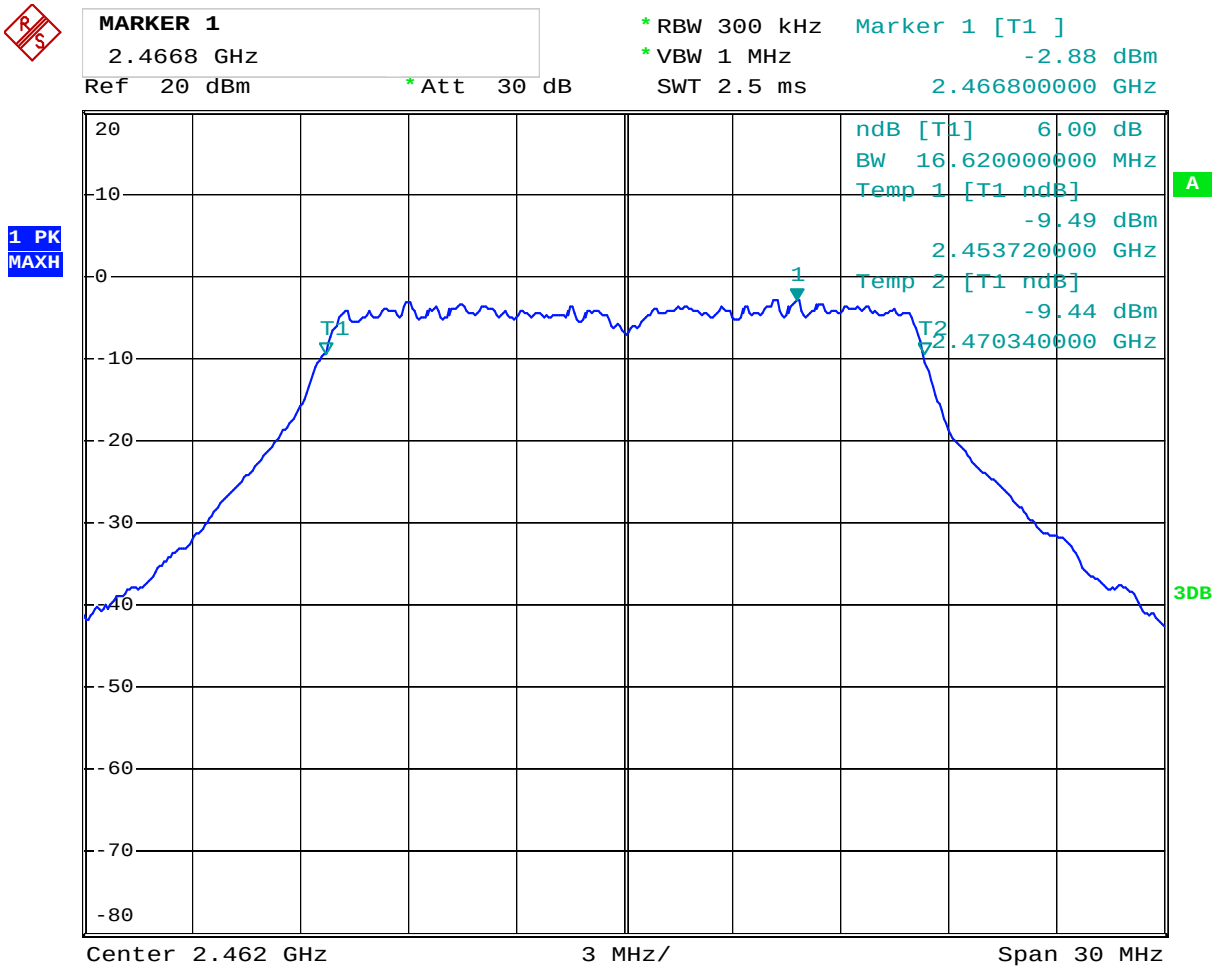


2. 802.11g at 6Mbps of CH6



Date: 8.OCT.2012 14:25:10

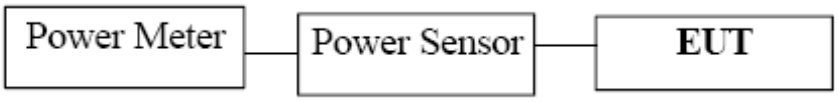
3. 802.11g at 6Mbps of CH11



Date: 8.OCT.2012 14:31:40

8. Maximum Peak Output Power

8.1 Test Setup



8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the peak power was measured

8.4Test Results

EUT	Reventon “WiFi” wireless module	Model	SP000009, HLK-WIFI-UA04
Mode	802.11b	Input Voltage	See Below
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Test Voltage:120V~				
1	2412	15.12	30	Pass
6	2437	15.33	30	Pass
11	2462	15.23	30	Pass
Test Voltage:138V~				
1	2412	15.10	30	Pass
6	2437	15.31	30	Pass
11	2462	15.28	30	Pass
Test Voltage: 102V~				
1	2412	15.15	30	Pass
6	2437	15.35	30	Pass
11	2462	15.20	30	Pass

Note: 1. At finial test to get the worst-case emission at 11Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

EUT	Reventon “WiFi” wireless module	Model	SP000009, HLK-WIFI-UA04
Mode	802.11g	Input Voltage	See Below
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
Test Voltage:120V~				
1	2412	13.94	30	Pass
6	2437	15.04	30	Pass
11	2462	14.83	30	Pass
Test Voltage:138V~				
1	2412	13.92	30	Pass
6	2437	**15.05**	30	Pass
11	2462	14.80	30	Pass
Test Voltage:102V~				
1	2412	13.95	30	Pass
6	2437	15.03	30	Pass
11	2462	14.85	30	Pass

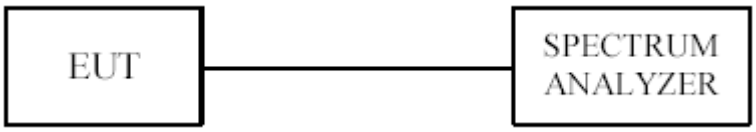
Note: 1. At finial test to get the worst-case emission at 54Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW ≥ 300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. The resulting peak PSD level must be ≤ 8 dBm.

9.4Test Result

EUT	Reventon "WiFi" wireless module		Model	SP000009, HLK-WIFI-UA04
Mode	802.11b		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Maximum Limit (dBm)	Pass/ Fail
1Mbps				
1	2412	-1.26	8	Pass
6	2437	-1.10	8	Pass
11	2462	-1.19	8	Pass

Note: At finial test to get the worst-case emission at 1Mbps for CH01, CH06 and CH11

EUT	Reventon "WiFi" wireless module		Model	SP000009, HLK-WIFI-UA04
Mode	802.11b		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Maximum Limit (dBm)	Pass/ Fail
11Mbps				
1	2412	0.32	8	Pass
6	2437	0.41	8	Pass
11	2462	0.28	8	Pass

Note: At finial test to get the worst-case emission at 11Mbps for CH01, CH06 and CH11

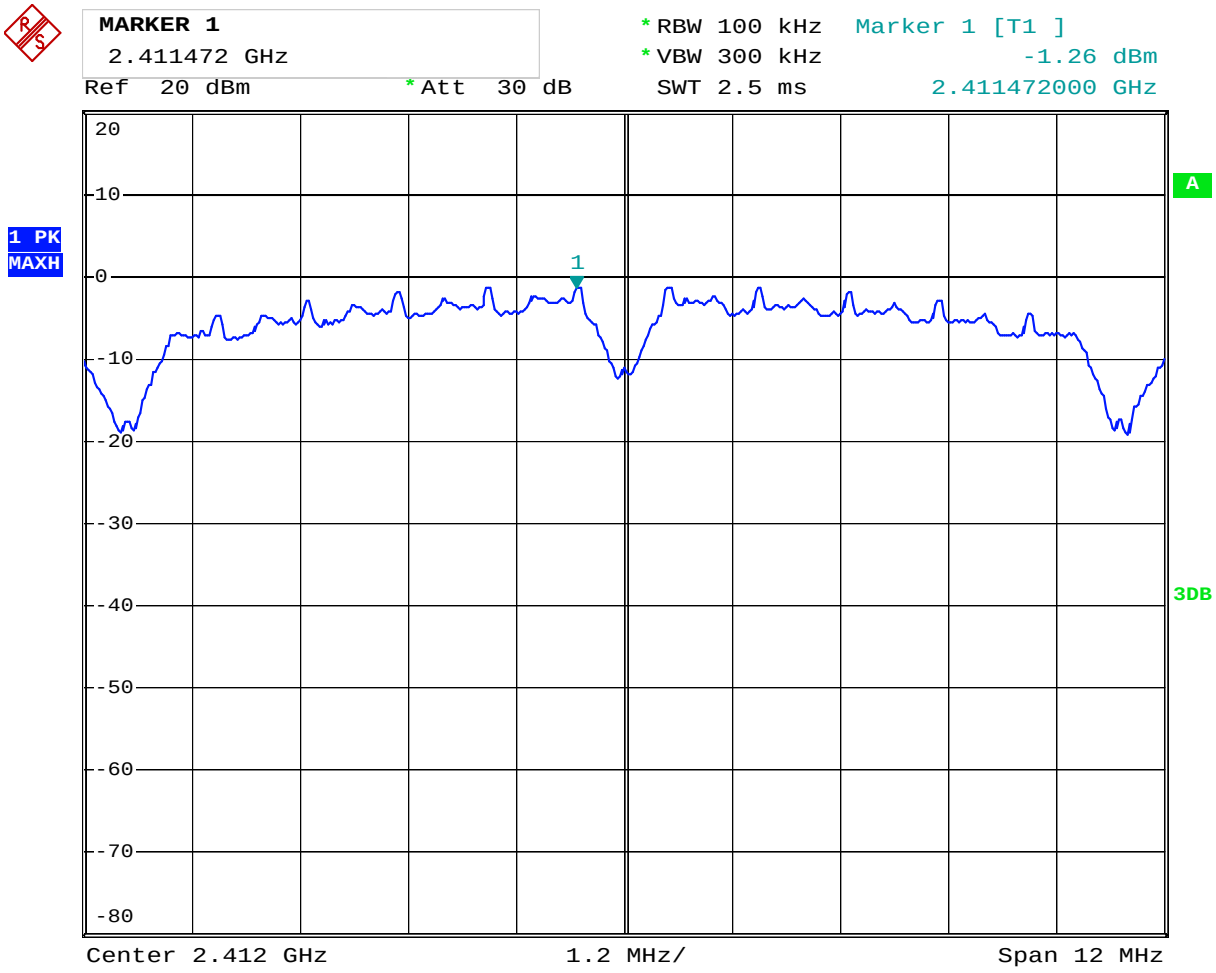
EUT	Reventon “WiFi” wireless module	Model	SP000009, HLK-WIFI-UA04
Mode	802.11g	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH

Channel	Channel Frequency (MHz)	Final RF Power Level in 3kHz BW (dBm)	Maximum Limit (dBm)	Pass/ Fail
6Mbps				
1	2412	-9.11	8	Pass
6	2437	-8.40	8	Pass
11	2462	-9.07	8	Pass

Note: At finial test to get the worst-case emission at 54Mbps for CH01, CH06 and CH11

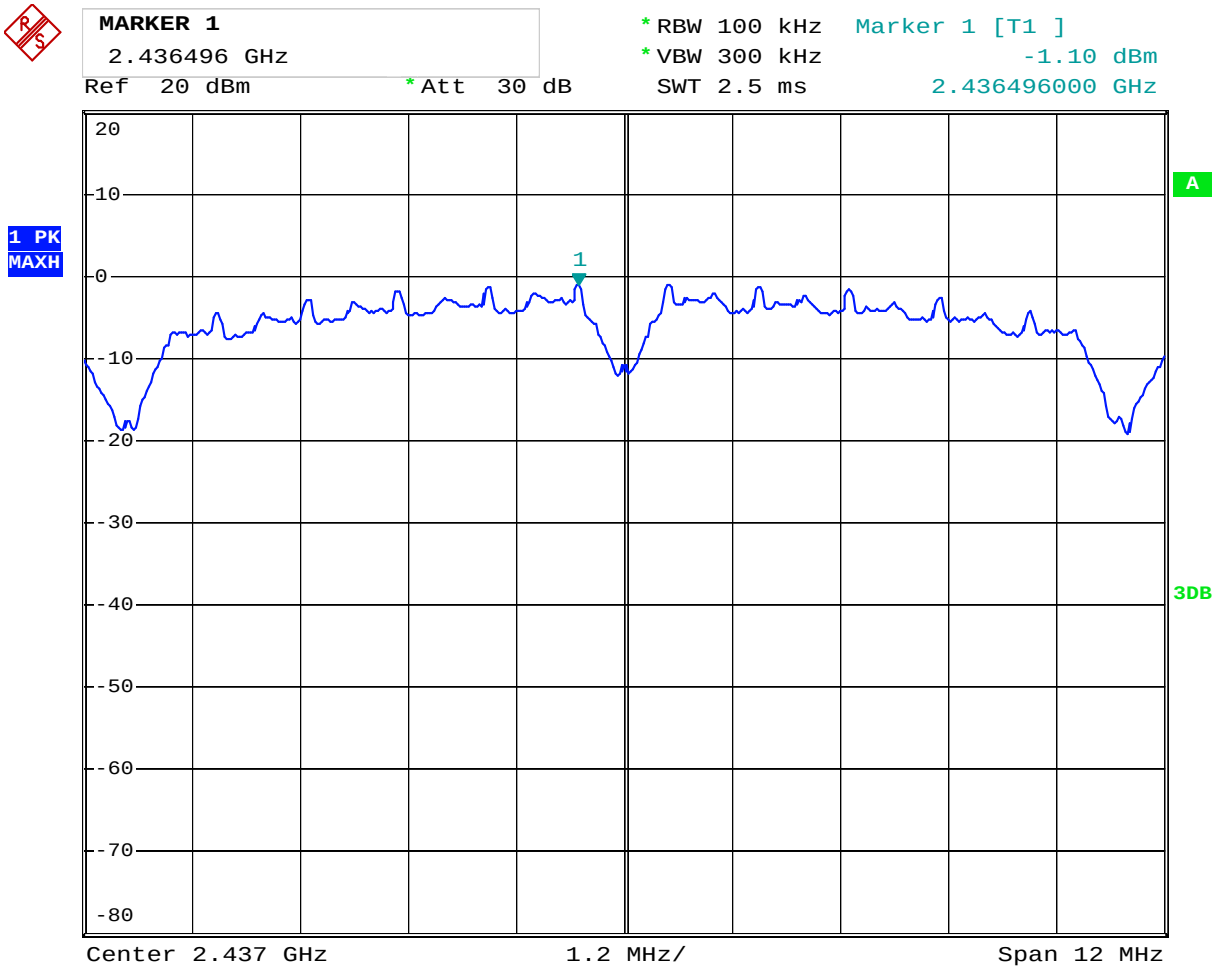
9.5 Photo of Power Spectral Density Measurement

1. 802.11b at 1Mbps of CH01

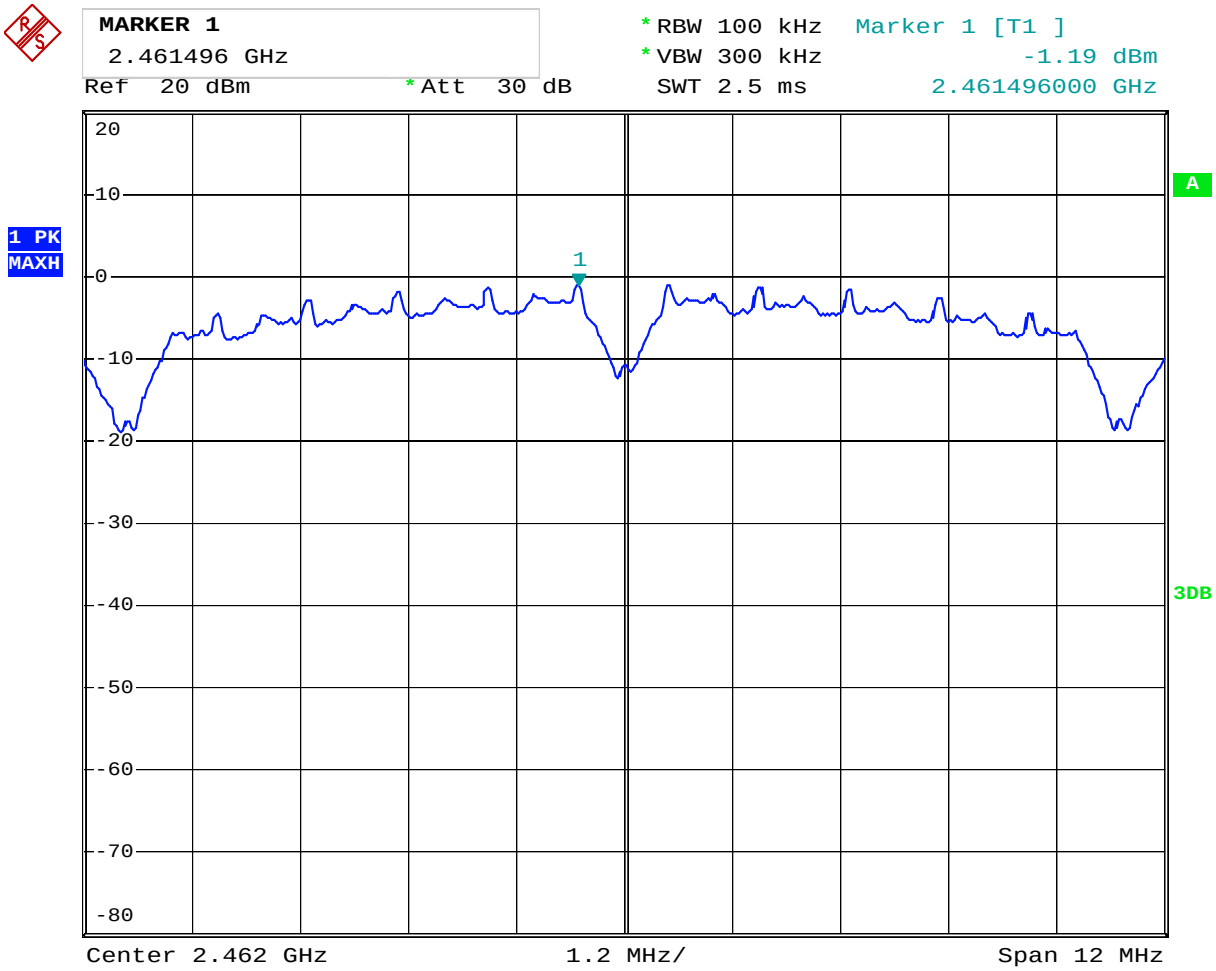


Date: 8.OCT.2012 14:43:58

2. 802.11b at 1Mbps of CH06

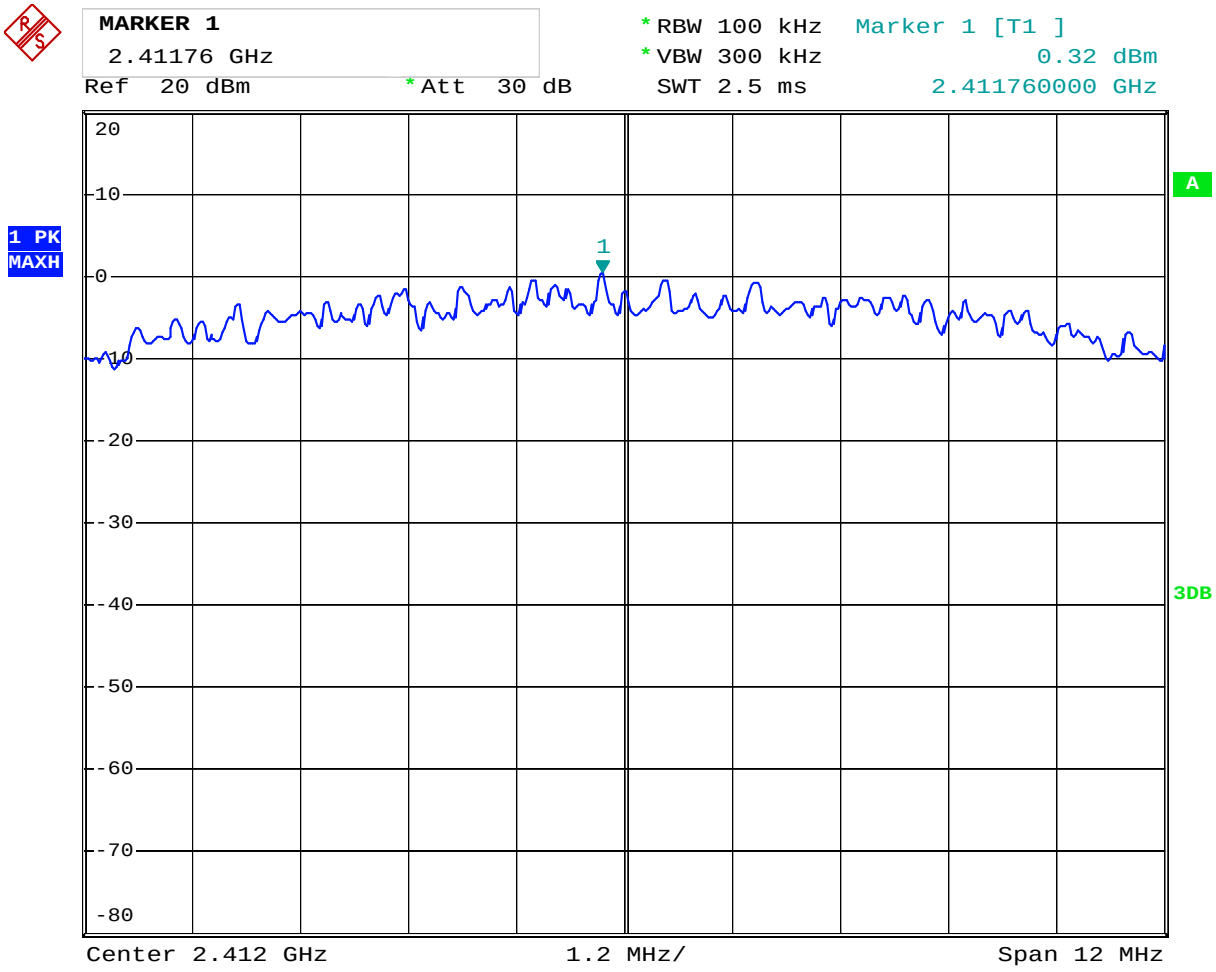


3. 802.11b at 1Mbps of CH11



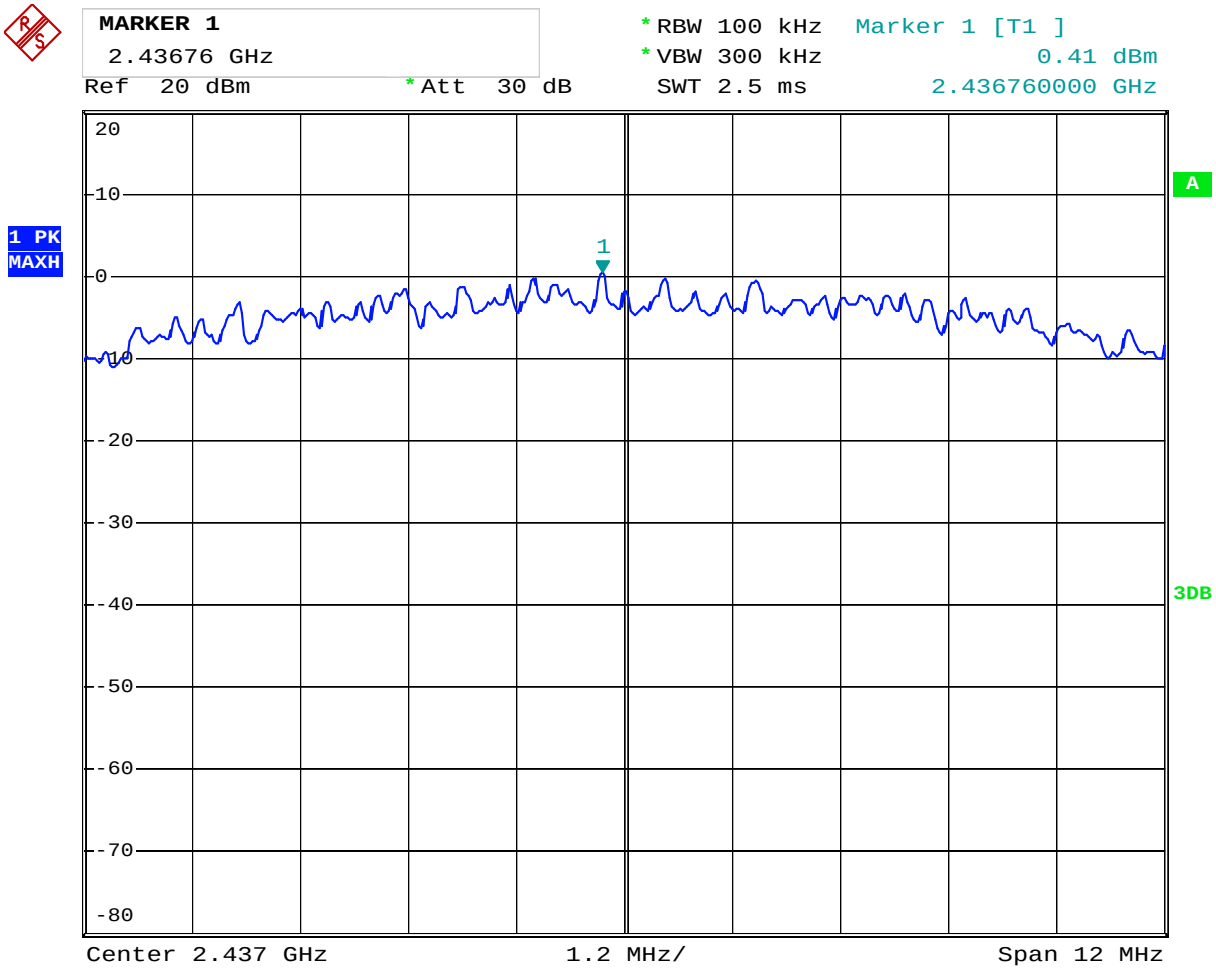
Date: 8.OCT.2012 14:45:27

4. 802.11b at 11Mbps of CH1



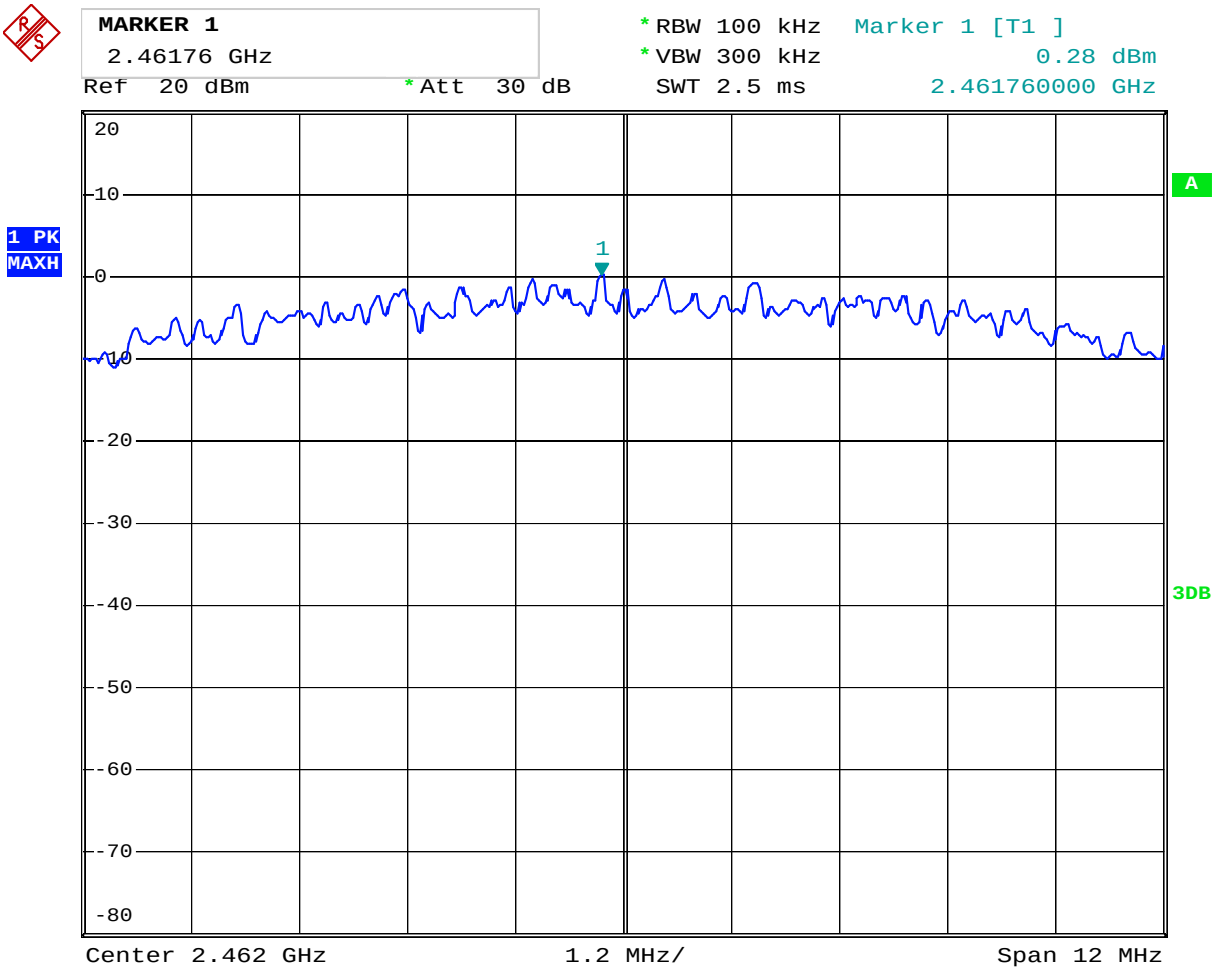
Date: 8.OCT.2012 14:47:41

5. 802.11b at 11Mbps of CH6



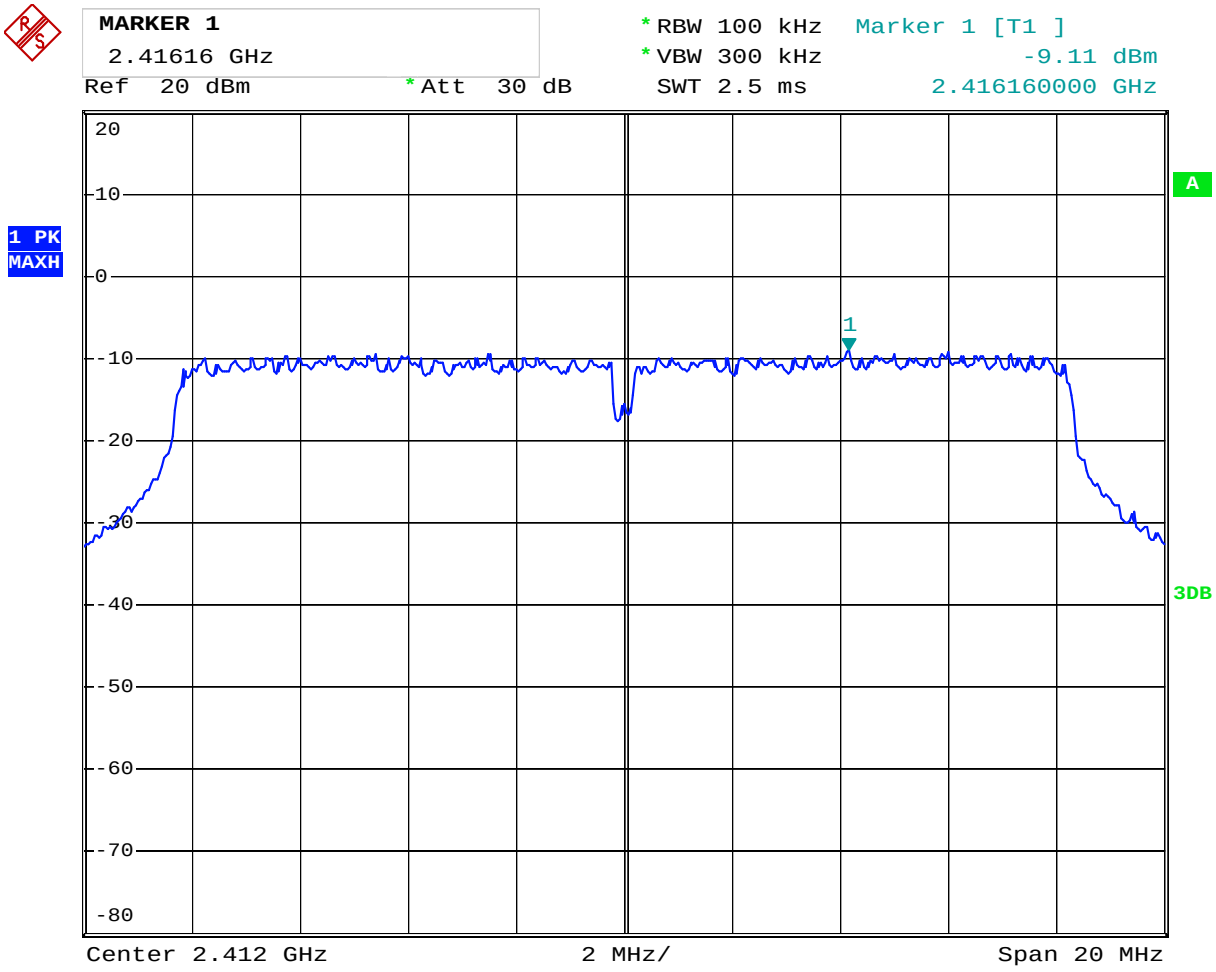
Date: 8.OCT.2012 14:46:43

6. 802.11b at 11Mbps of CH11

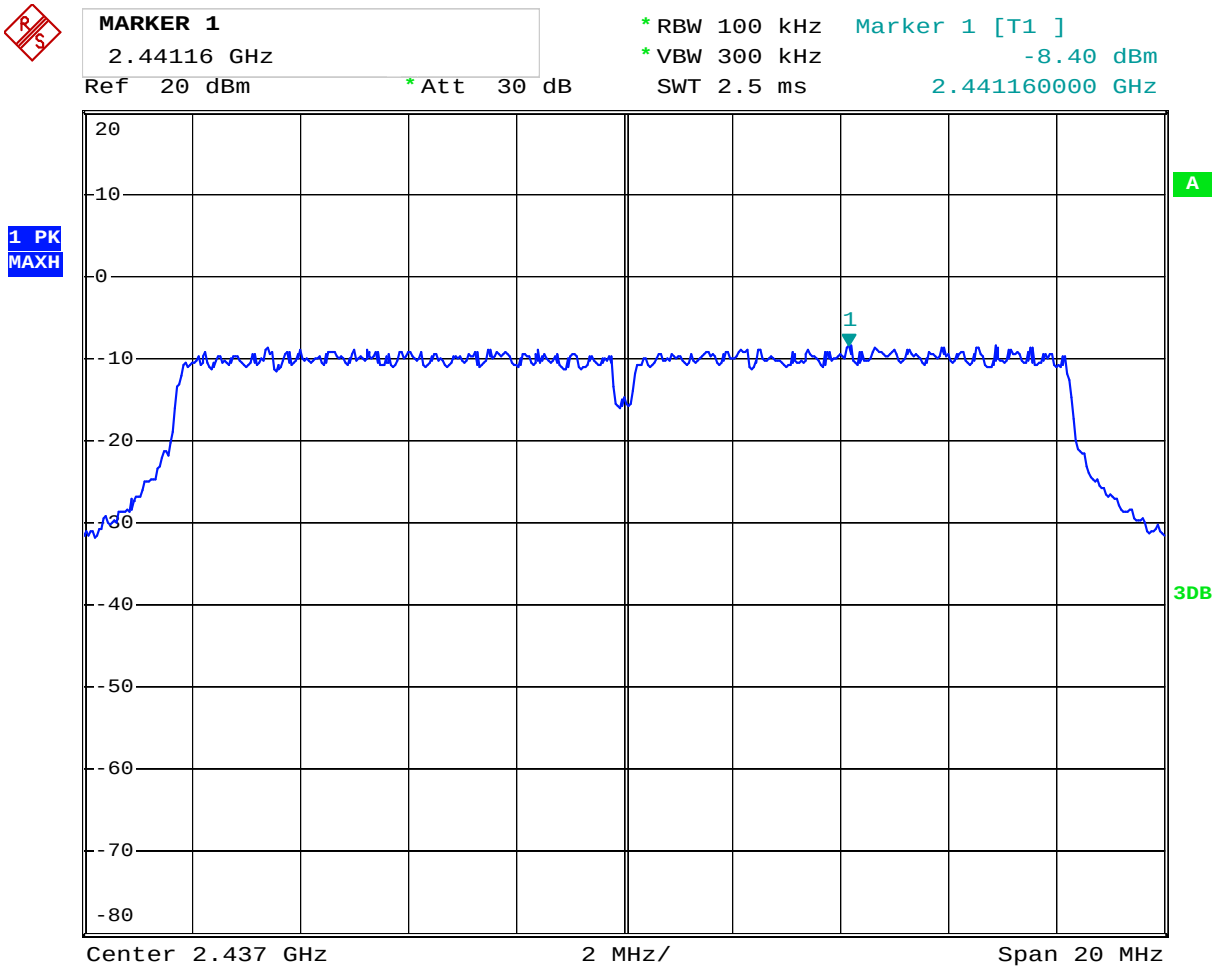


Date: 8.OCT.2012 14:46:08

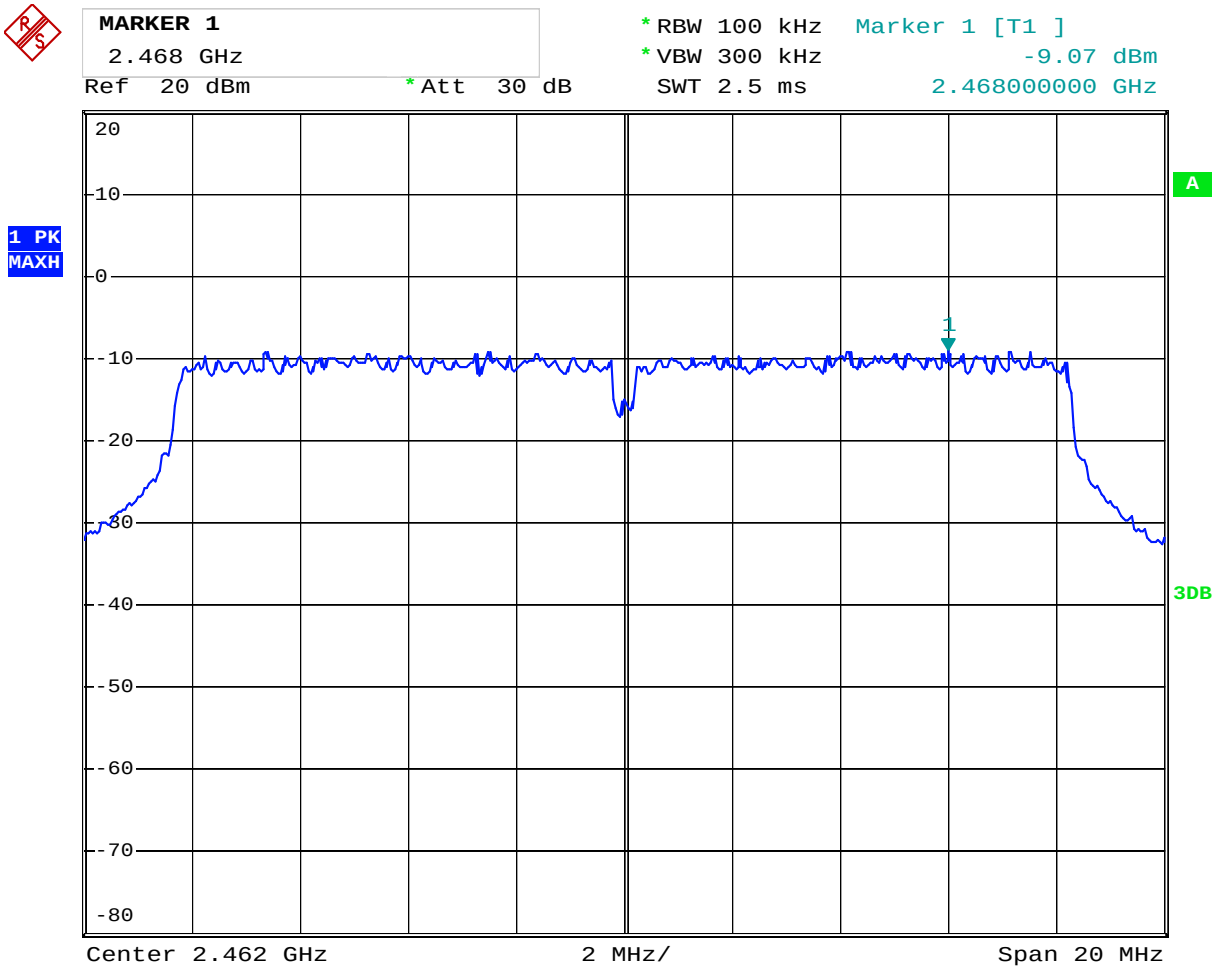
7. 802.11g at 6 Mbps of CH1



8. 802.11g at 6 Mbps of CH6

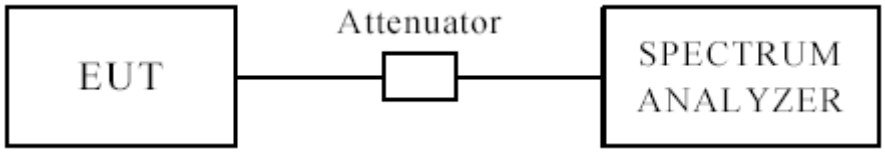


9. 802.11g at 6 Mbps of CH11



10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test.(Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=VBW=100 kHz. A conducted measurement used

10.4 Test Result

Please see next pages

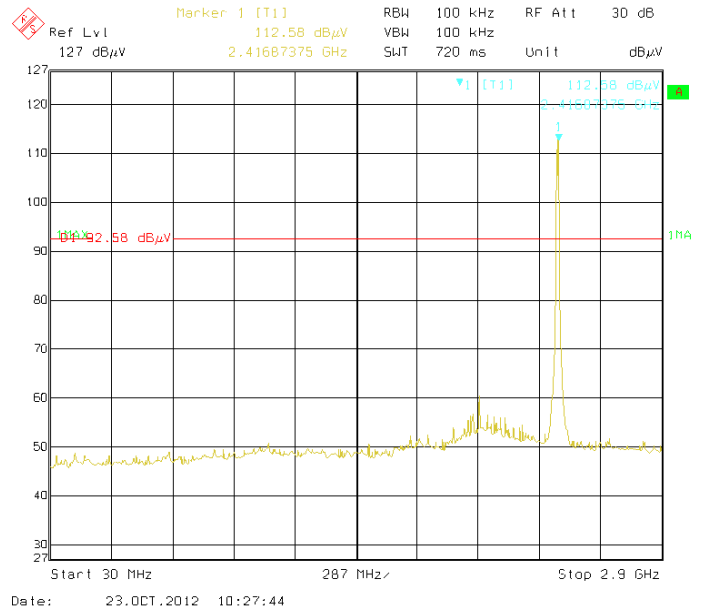
For 802.11b mode

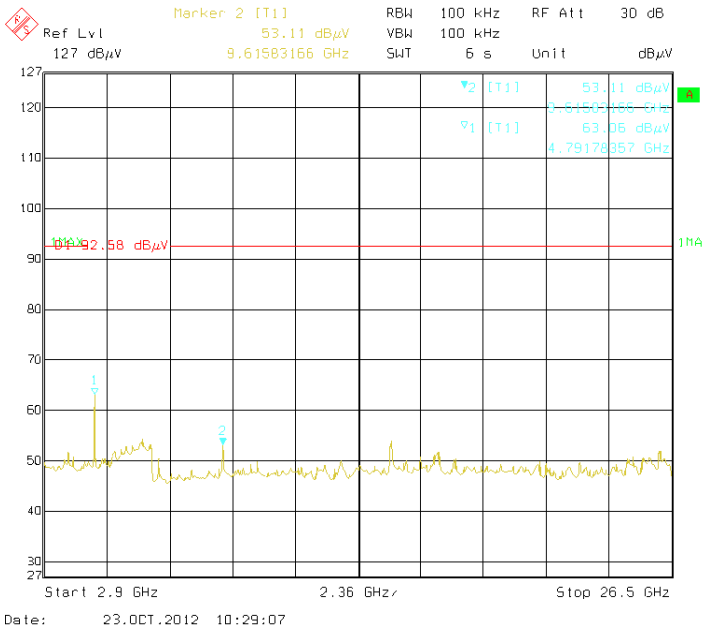
CH01 at 11Mbps

10.4 Band-edge Measurement

Product:	Reventon "WiFi" wireless module	Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



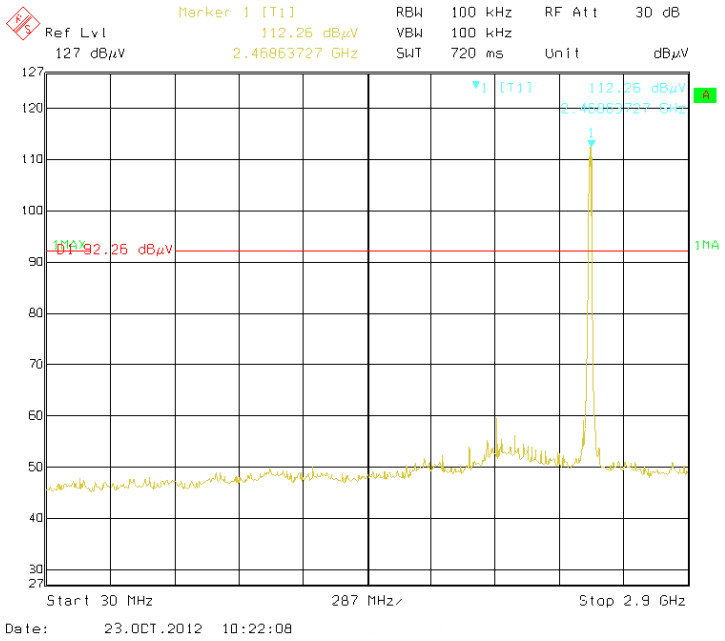


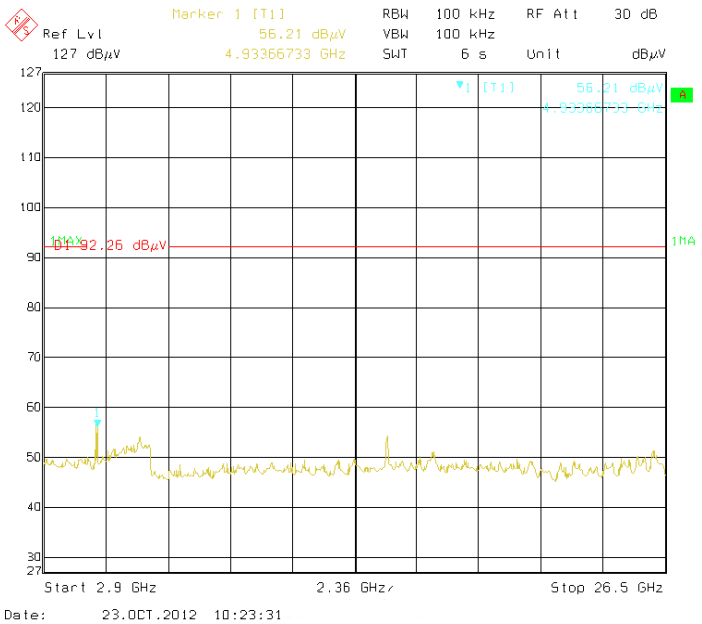
CH11 at 11Mbps

10.4 Band-edge Measurement

Product:	Reventon “WiFi” wireless module	Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:





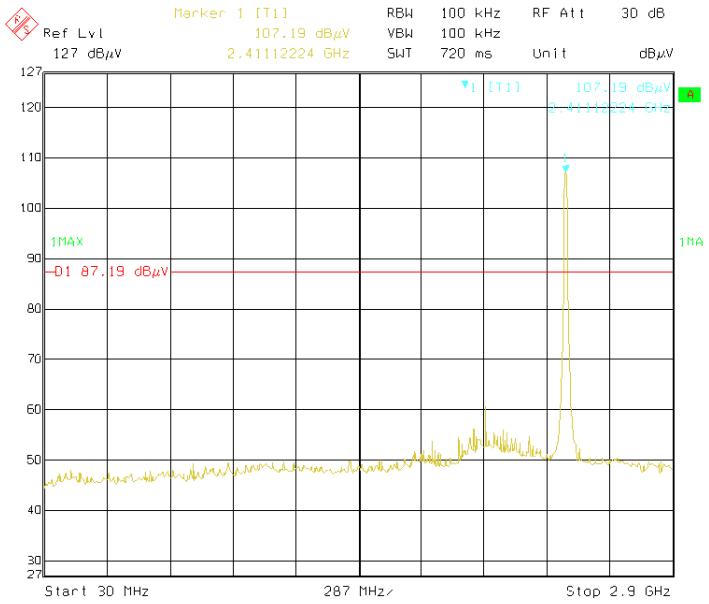
For 802.11g mode

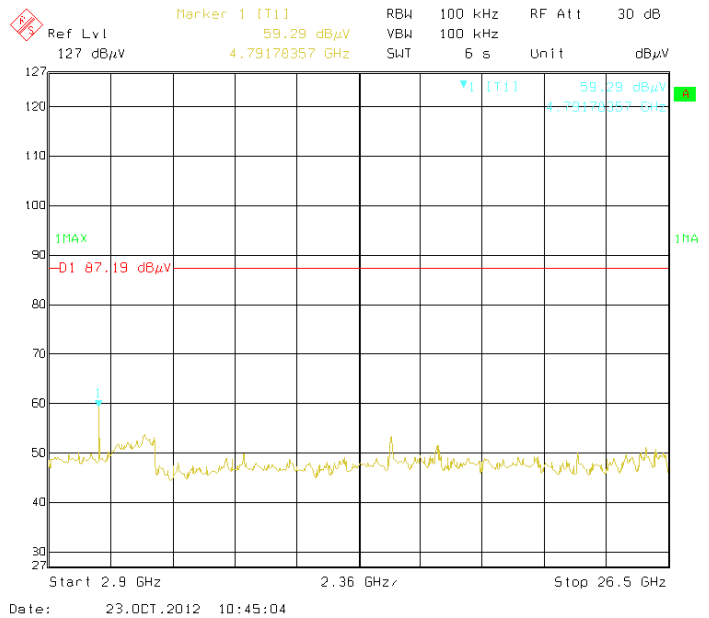
CH01 at 54Mbps

10.4 Band-edge Measurement

Product:	Reventon "WiFi" wireless module	Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



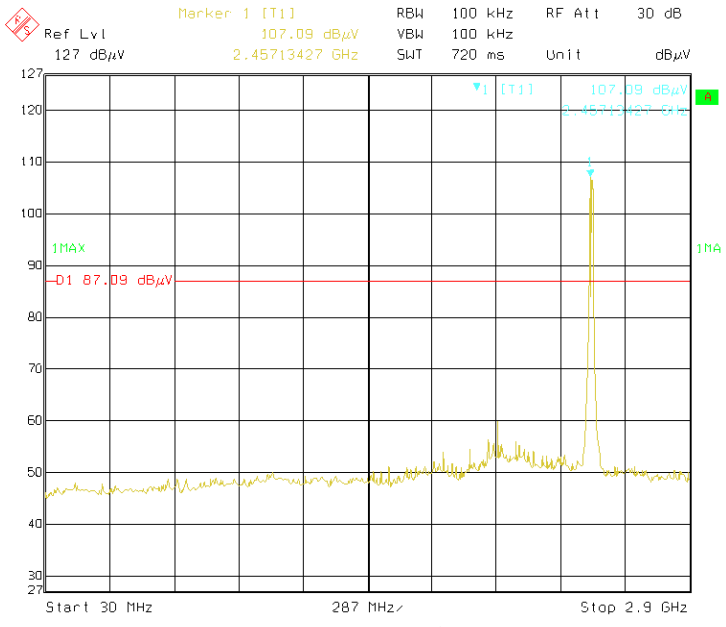


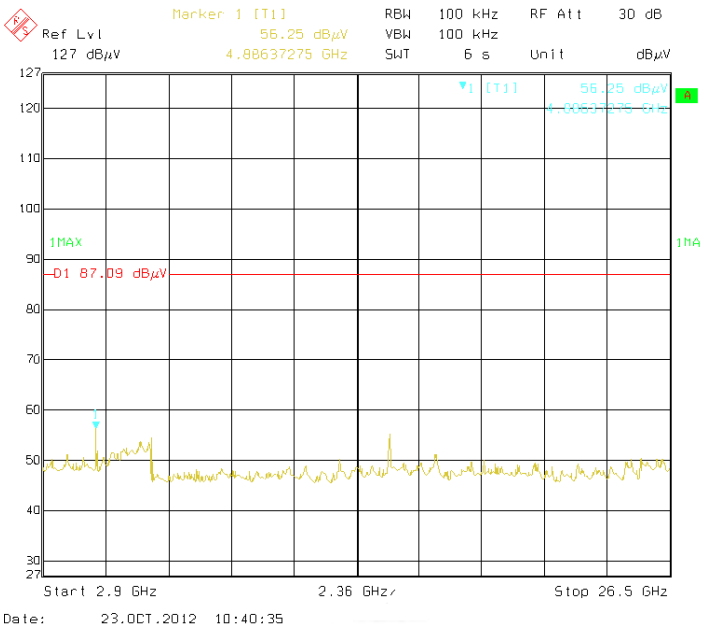
CH11 at 54Mbps

10.4 Band-edge Measurement

Product:	Reventon "WiFi" wireless module	Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting	Input Voltage	AC 120V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:





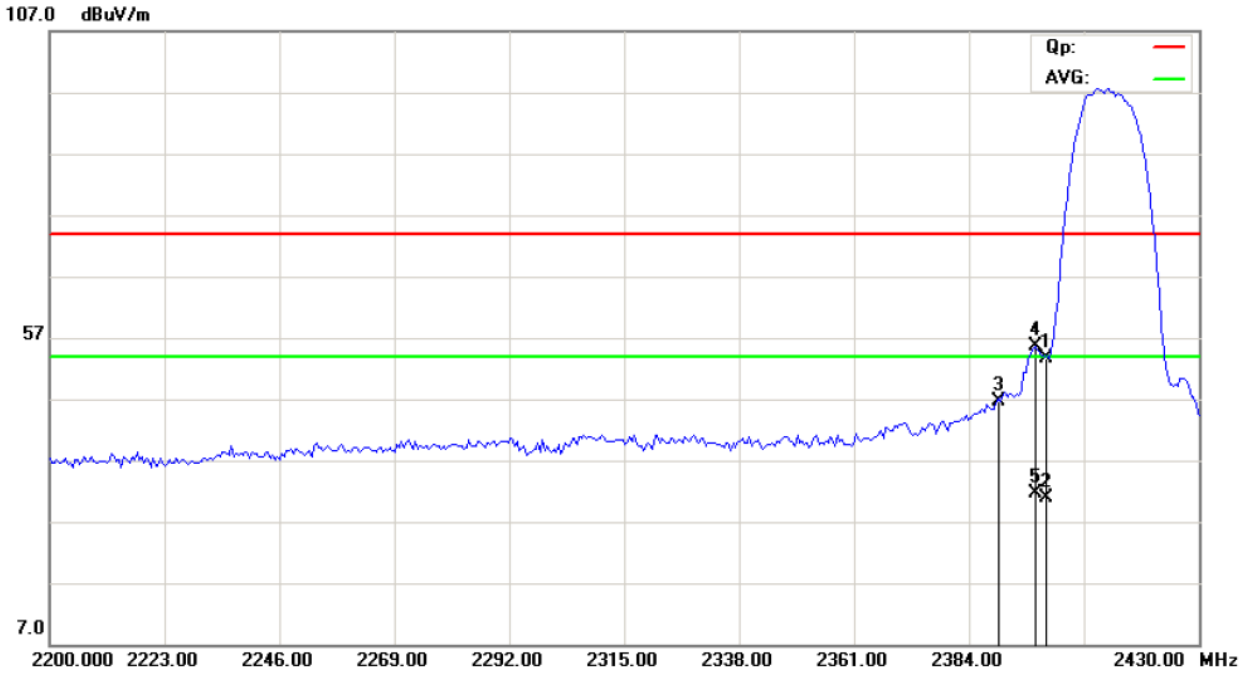
For 802.11b mode

CH01 at 11Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400	PK (dBμV/m)	53.66	Limit	74(dBμV/m)
	AV (dBμV/m)	30.79		54(dBμV/m)
2390	PK (dBμV/m)	46.68	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
2397.274	PK (dBμV/m)	55.53	Limit	74(dBμV/m)
	AV (dBμV/m)	31.60		54(dBμV/m)

Test Figure: Horizontal



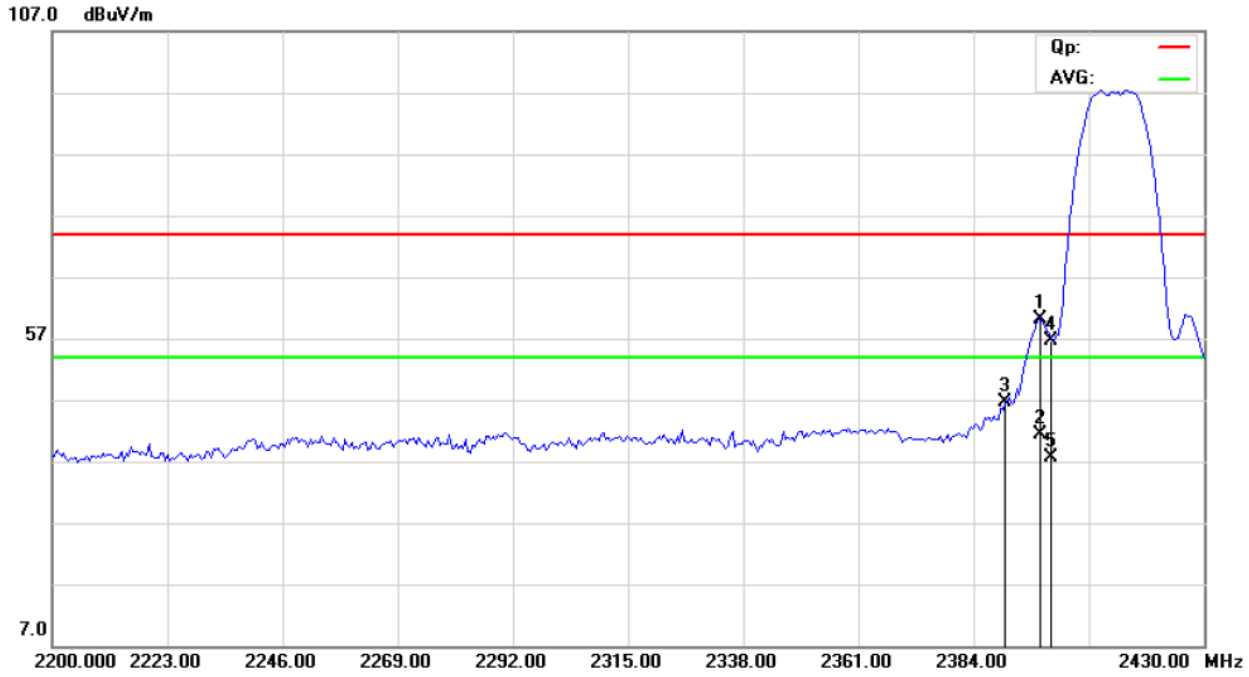
For 802.11b mode

CH01 at 11Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2400	PK (dBμV/m)	56.54	Limit	74(dBμV/m)
	AV (dBμV/m)	37.62		54(dBμV/m)
2390	PK (dBμV/m)	46.60	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
2397.275	PK (dBμV/m)	60.18	Limit	74(dBμV/m)
	AV (dBμV/m)	41.36		54(dBμV/m)

Test Figure: Vertical



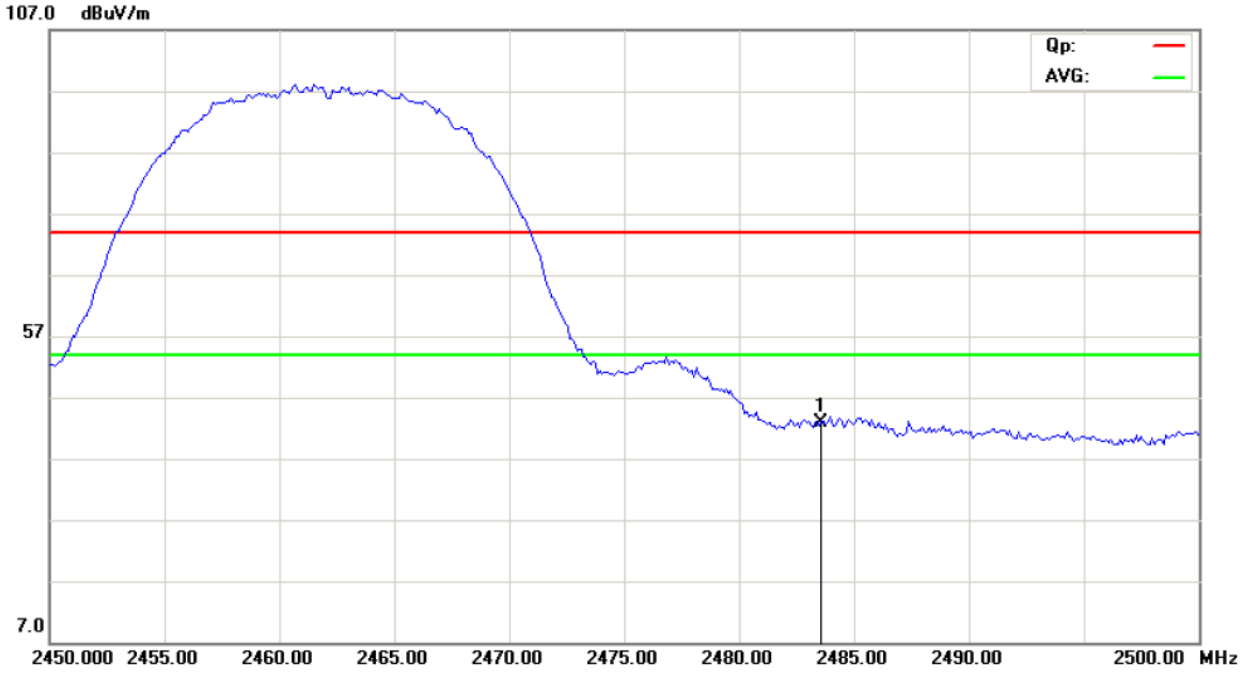
For 802.11b mode

CH11 at 11Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.500	PK (dBμV/m)	42.83	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

Test Figure: Vertical



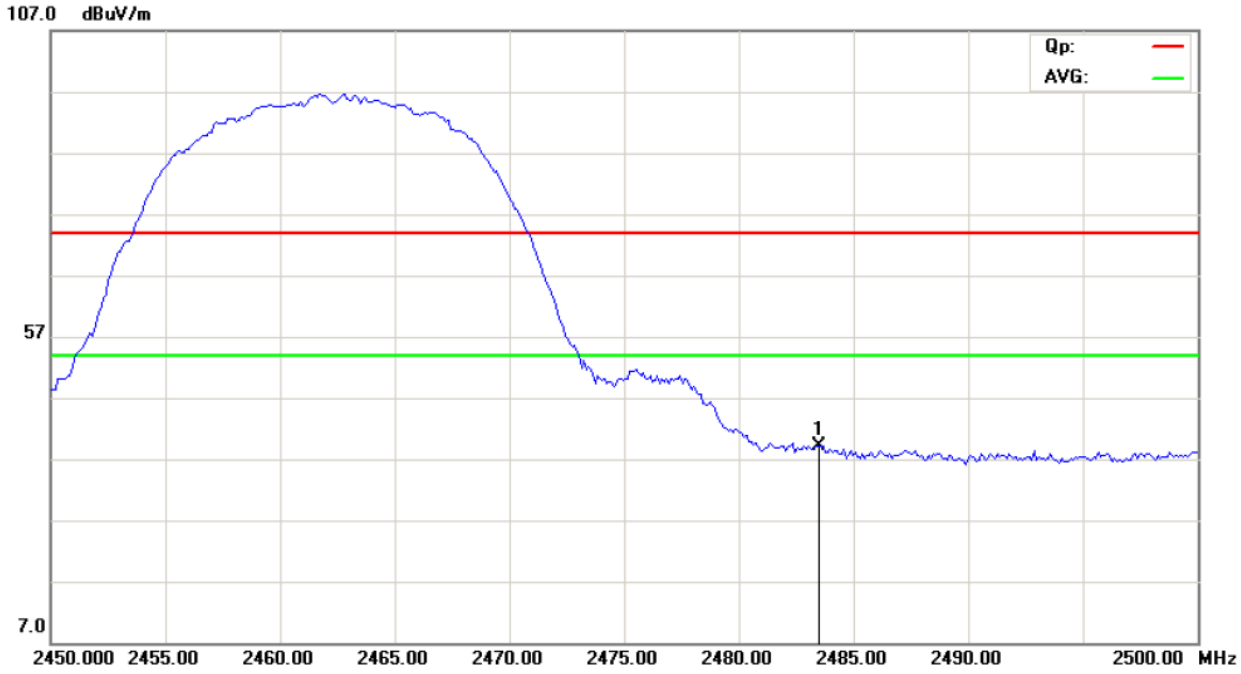
For 802.11b mode

CH11 at 11Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.500	PK (dBμV/m)	39.07	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

Test Figure: Horizontal



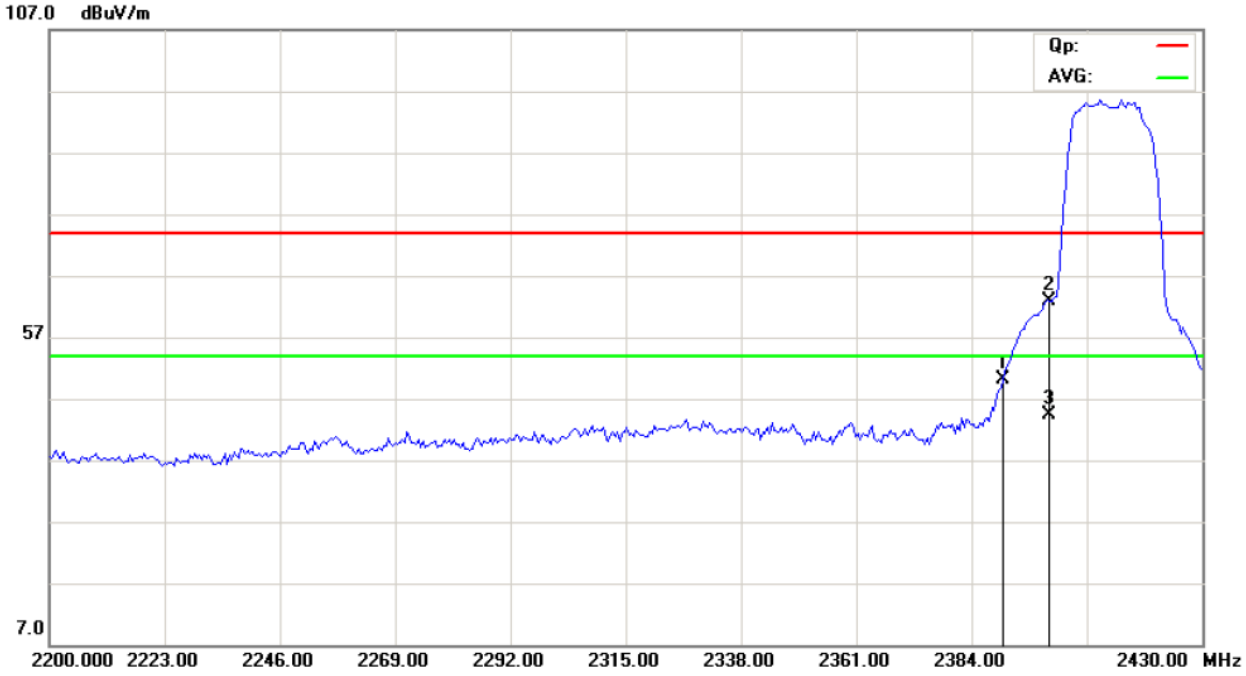
For 802.11g mode

CH01 at 54Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2390.000	PK (dBμV/m)	50.18	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
2400.000	PK (dBμV/m)	62.83	Limit	74(dBμV/m)
	AV (dBμV/m)	44.46		54(dBμV/m)

Test Figure: Horizontal



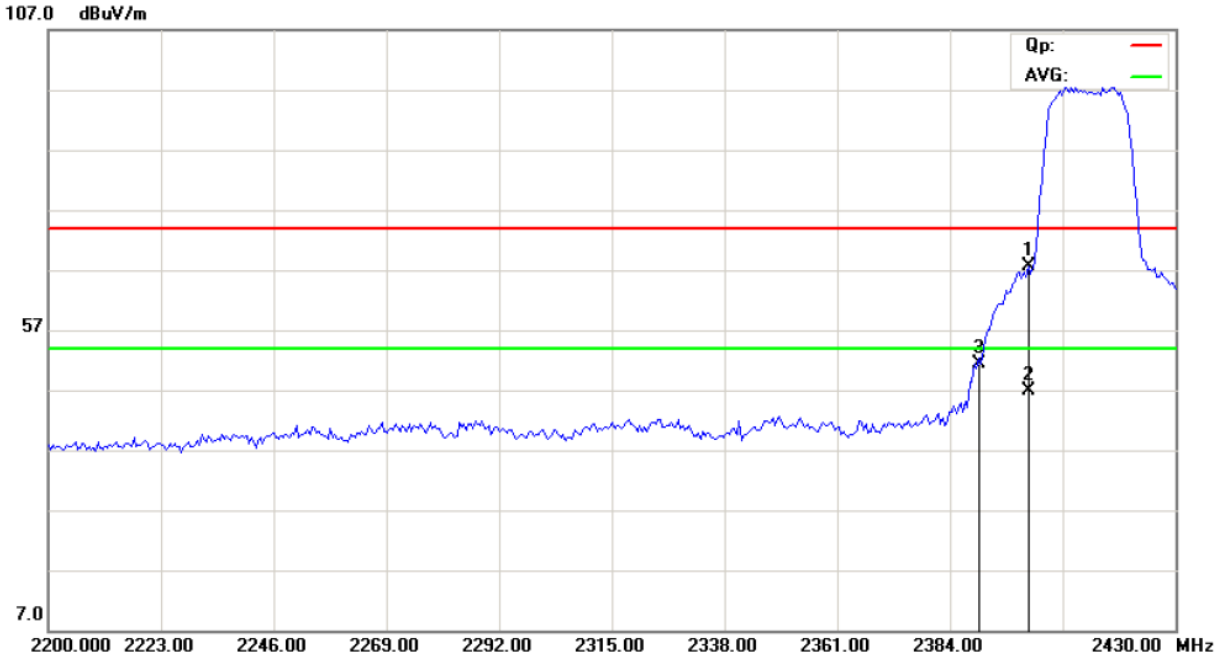
For 802.11g mode

CH01 at 54Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2390.000	PK (dBμV/m)	51.36	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)
2400.000	PK (dBμV/m)	67.70	Limit	74(dBμV/m)
	AV (dBμV/m)	46.86		54(dBμV/m)

Test Figure: Vertical



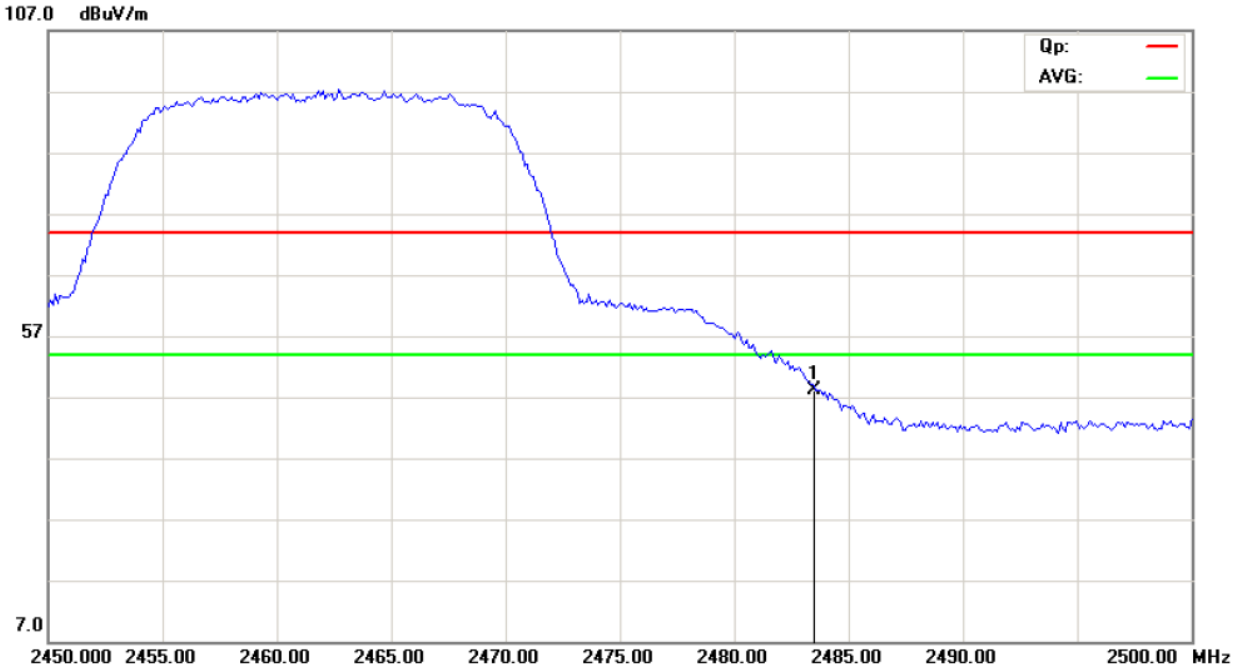
For 802.11g mode

CH11 at 54Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.500	PK (dBμV/m)	48.06	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

Test Figure: Vertical



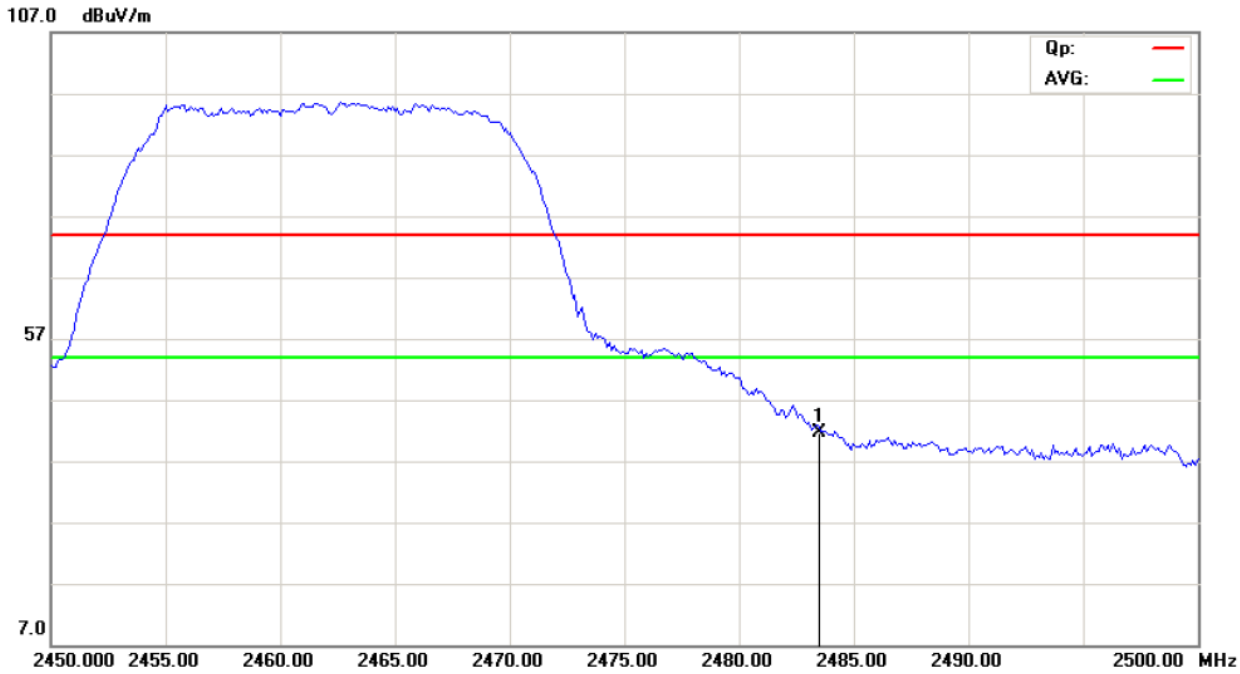
For 802.11g mode

CH11 at 54Mbps

10.4 Restricted band Measurement

Product:	Reventon "WiFi" wireless module		Model:	SP000009, HLK-WIFI-UA04
Mode	Keeping Transmitting		Input Voltage	AC 120V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
2483.500	PK (dBμV/m)	41.75	Limit	74(dBμV/m)
	AV (dBμV/m)	--		54(dBμV/m)

Test Figure: Horizontal



11.0 Antenna Requirement

11.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

PCB antenna used. The maximum Gain of the antennas is 2.0dBi.

12.0 Maximum Permissible Exposure

Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

MPE Calculation Method

E (V/m) = $(30*P*G)^{0.5}/d$ Power Density: Pd (W/m^2) = $E^2/377$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

Pd = $(30*P*G) / (377*d^2)$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

Calculated Result and Limit

Antenna Gain: 2.0dBi

Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm^2)	Limit of Power Density (S) (mW/cm^2)	Test Result
1.585	15.35	34.277	0.011	1	Compiles

Note: the worse case was recorded.

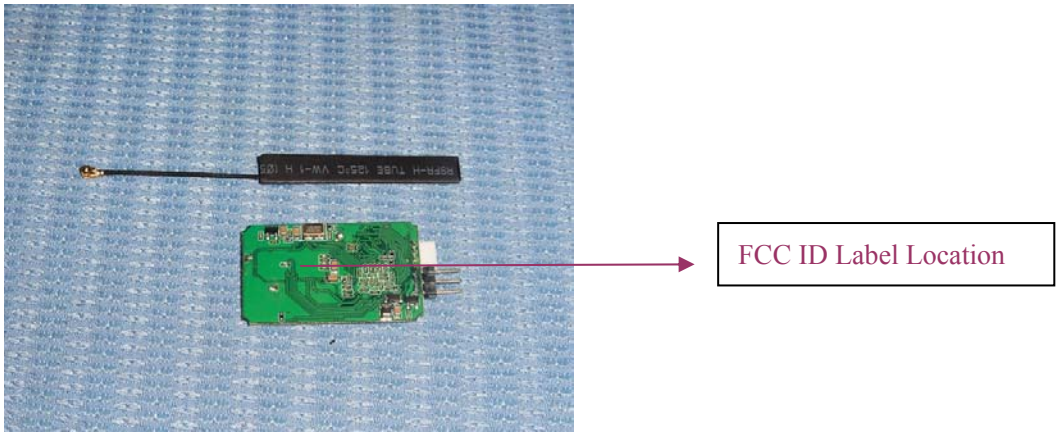
13.0 FCC ID Label

FCC ID: YIU000009

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

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:

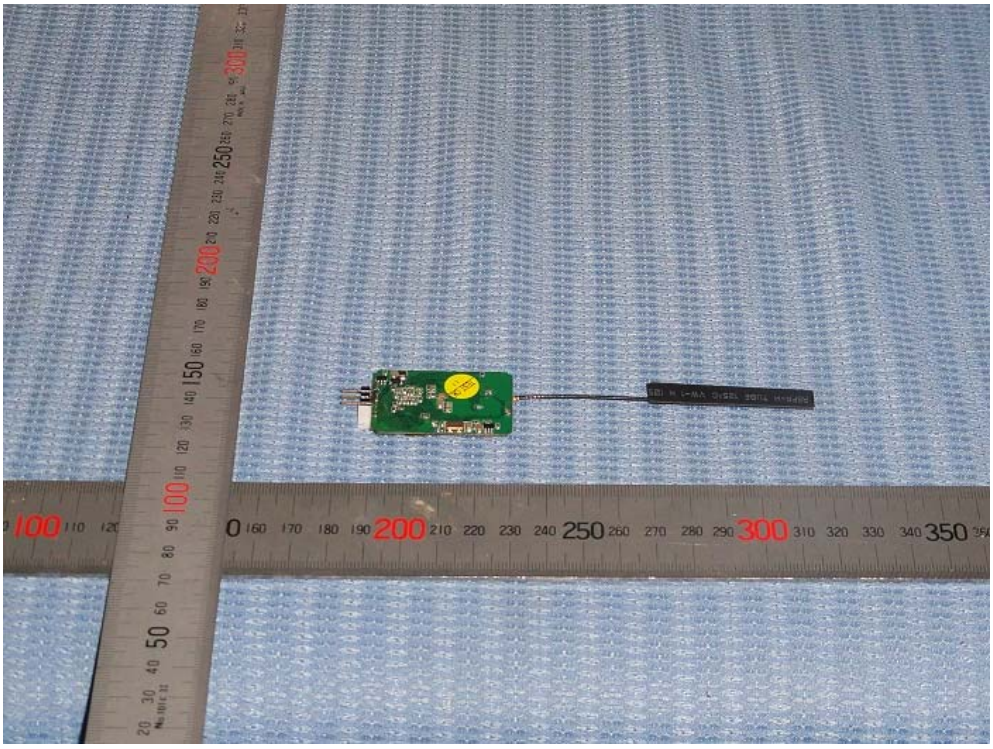


14.0 Photo of testing

Conducted Emissions

Radiated Emissions

Photo for the EUT



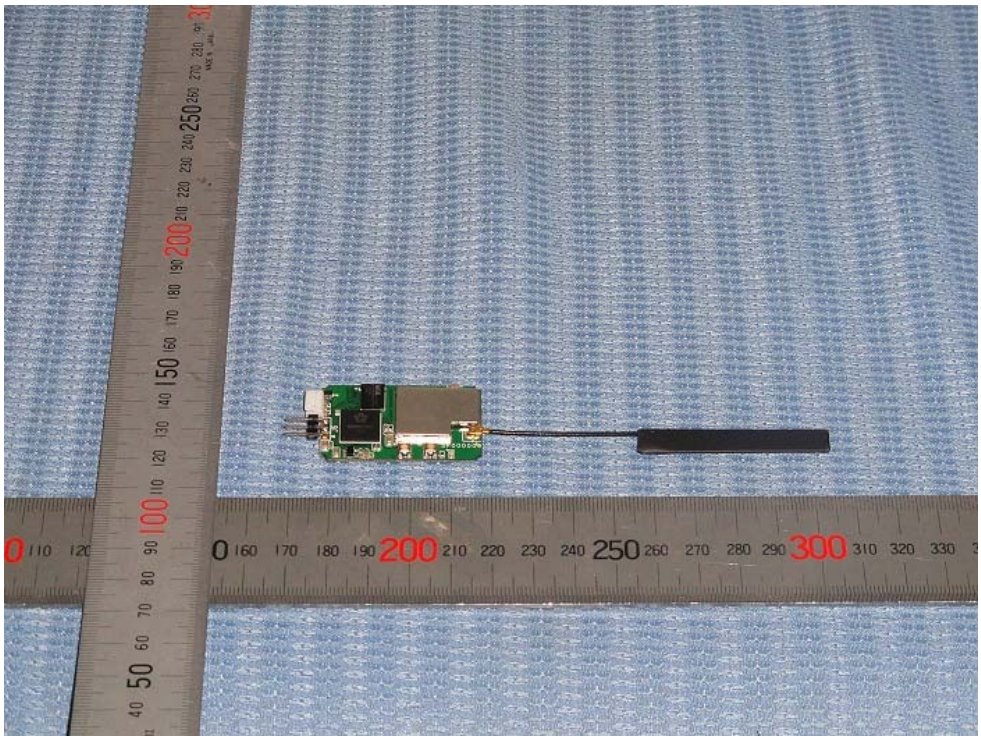


Photo for the EUT

Photo for the EUT

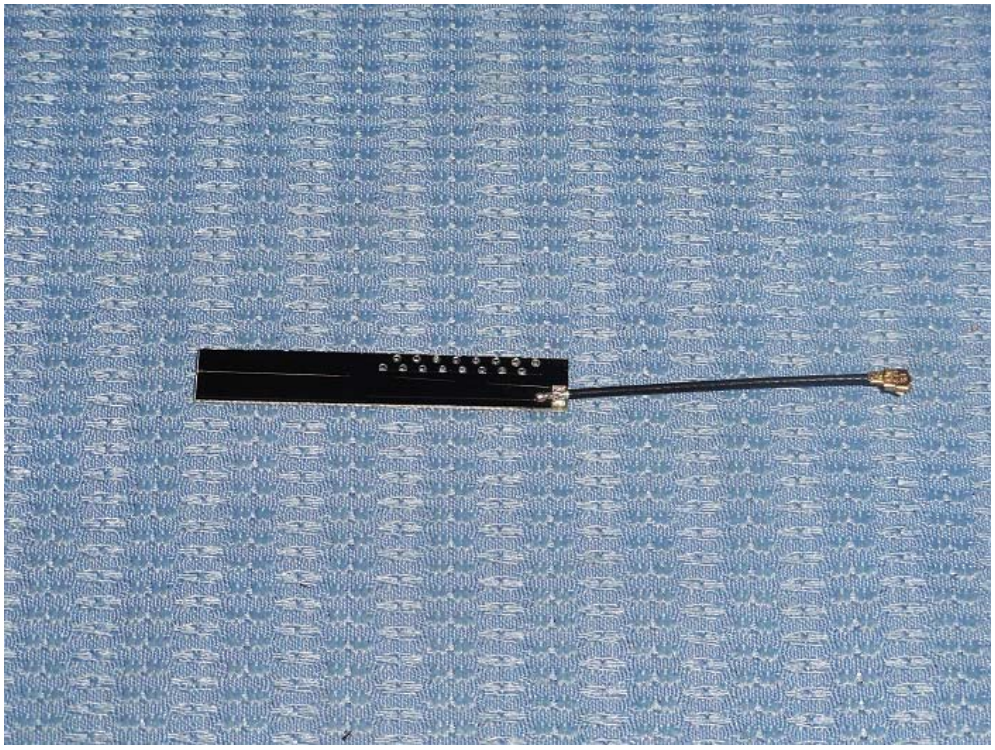
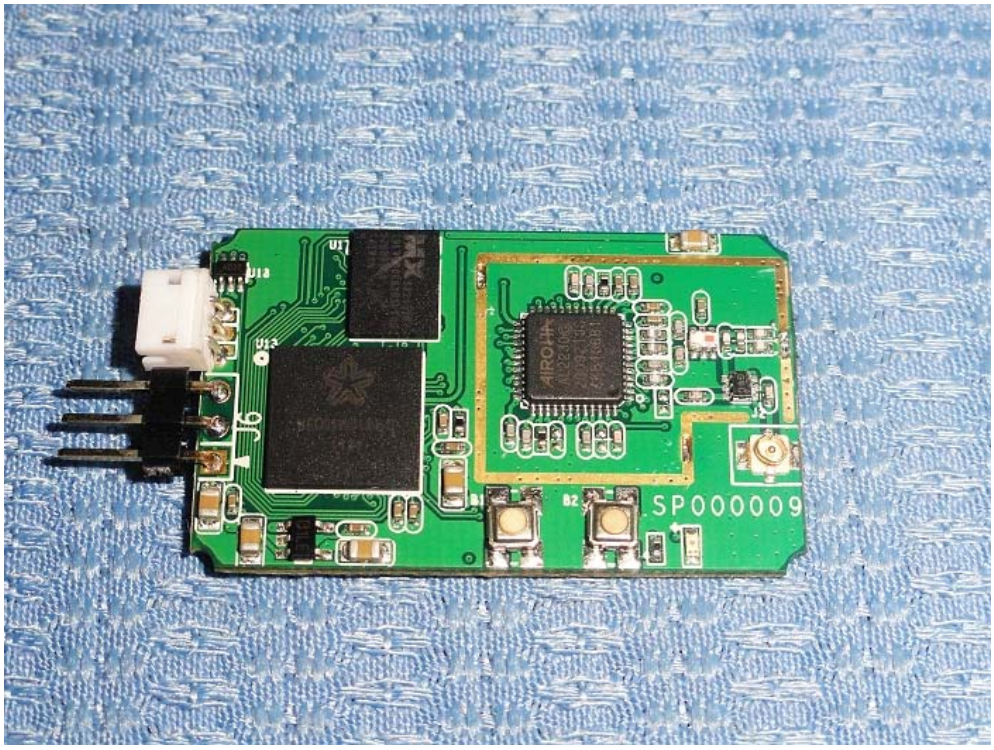
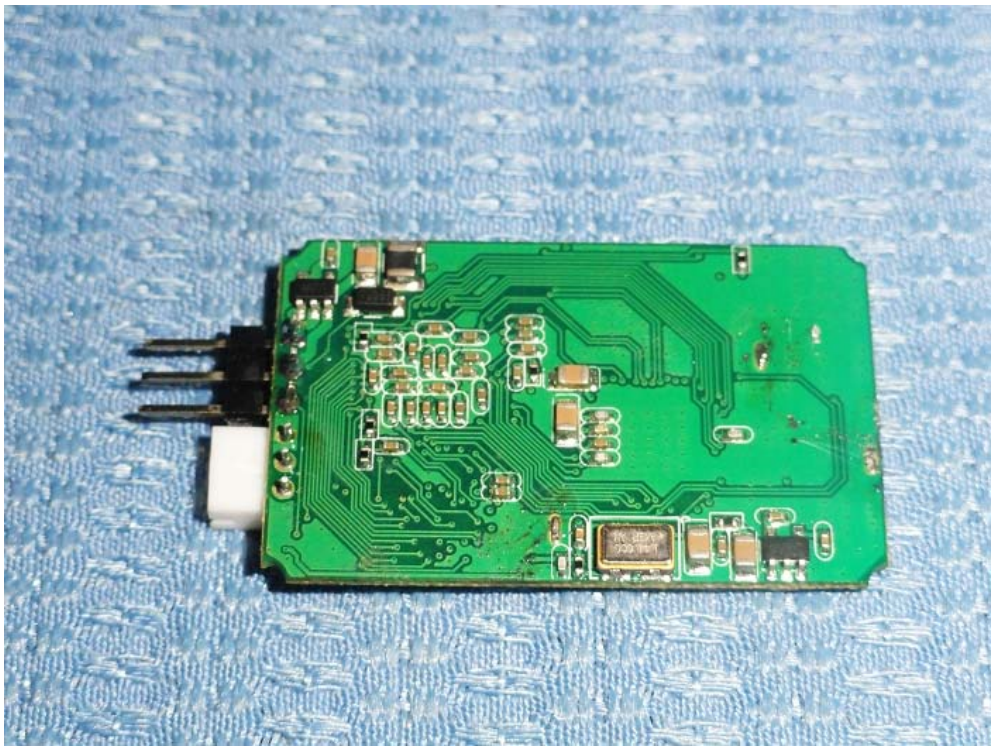


Photo for the EUT





End of the report