FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4: 2003

TEST REPORT

For

Wireless USB Card

Model Number: SW902T

Brand Name: ETOP

Issued for

E-Top Network Technology Inc.

No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No. 8, Jiu Cheng Ling, Jiaokeng Village,Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.
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Testing Laboratory
1109

Total Page: 78

REVISION HISTORY

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		July 7, 2008		Initial Issue	ALL	Leah Peng

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1. TEST REPORT CERTIFICATION

Applicant	：E-Top Network Technology Inc.
Address	：No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.
Manufacture	：E-Top Network Technology Inc.
Address	：No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.
Equipment Under Test	：Wireless USB Card
Model Number	：SW902T
Brand Name	：ETOP
Date of Test	：May 14, 2008 ~ July 7, 2008

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C : 2004 AND ANSI C63.4 : 2003	No non-compliance noted

Approved by:

Jeter Wu
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Eric Yang
Senior Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	Wireless USB Card
Model Number	SW902T
Brand Name	ETOP
Frequency Range	IEEE 802.11b/g(DTS Band):2412MHz～2462MHz
Transmit Power (ERP)	IEEE 802.11b Mode : 13.35dBm (DTS Band) IEEE 802.11g Mode : 13.45dBm (DTS Band)
Average Power	IEEE 802.11b Mode : 10.53dBm IEEE 802.11g Mode : 10.05dBm
Channel Spacing	IEEE 802.11b/g: 5MHz
Channel Number	IEEE 802.11b/g:11 Channels
Transmit Data Rate	IEEE 802.11b:11, 5.5, 2, 1Mbps
	IEEE 802.11g : 54, 48 ,36, 24, 18, 12, 9, 6Mbps
Type of Modulation	IEEE 802.11b：DSSS (CCK, DQPSK, DBPSK)
	IEEE 802.11g：OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	**PIFA Antenna* 1** Manufacture: Ralink Technology Corp. Connector: Printed Antenna Gain: 3.48dBi ; Antenna Type: PIFA
Power Source	Powered from host device (5VDC)
Temperature Range	0 ~ +55°C

NOTE: 1.The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **U6A-SW902T** filing to comply with Section 15.207,15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
3. For more details, please refer to the User's manual of the EUT.
4. To add a series model is for business necessary. The different of the each model is shown as below:

Multiple List:

Company Name	Address	Brand name	Model name	Product Name
E-Top Network Technology Inc.	E-TOP Network Technology Inc. No. 82, Gongye 2nd Rd., Tainan City 70955, Taiwan, R.O.C.	ETOP	SW902T	Wireless USB Card
Motorola, Inc.	Motorola, Inc. 1303 East Algonquin Road Schaumburg, Illinois 60196 USA	Motorola	TER/GUSB3	Wireless USB Card
Amigo Technology Inc.	Amigo Technology Inc. 1F, No. 333, Sec. 1, Ti-Ding BLVD., NeiHu, Taipei 114, Taiwan	Amigo	FWG1	Wireless USB Card
Amigo Technology Inc.	Amigo Technology Inc. 1F, No. 333, Sec. 1, Ti-Ding BLVD., NeiHu, Taipei 114, Taiwan	Amigo	AFU-902T	Wireless USB Card
Amigo Technology Inc.	Amigo Technology Inc. 1F, No. 333, Sec. 1, Ti-Ding BLVD., NeiHu, Taipei 114, Taiwan	Amigo	WUF-11G	Wireless USB Card
Amigo Technology Inc.	Amigo Technology Inc. 1F, No. 333, Sec. 1, Ti-Ding BLVD., NeiHu, Taipei 114, Taiwan	Amigo	AWU-11G	Wireless USB Card
SAPIDO Technology Inc.	Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District Tainan 700, Taiwan, R.O.C.	Sapido	SUG1	Wireless USB Card
SAPIDO Technology Inc.	Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District Tainan 700, Taiwan, R.O.C.	Sapido	SUF-11G	Wireless USB Card
SAPIDO Technology Inc.	Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District Tainan 701, Taiwan, R.O.C.	Sapido	AUF-4000	Wireless USB Card
SAPIDO Technology Inc.	Sapido Technology Inc. No. 383., Sec. 2, Minsheng Rd., West Central District Tainan 701, Taiwan, R.O.C.	Sapido	AU-4100	Wireless USB Card

3. DESCRIPTION OF TEST MODES

The EUT is a wireless dongle. It has one transmitter chain and one receive chains (1x1 configurations). The 1x1 configuration is implemented with two outside chains (Chain 0).

The RF chipset is manufactured by Ralink Technology, Corp.

The antenna peak gain 3.48dBi (highest gain) were chosen for full testing.

IEEE 802.11 b ,802.11g mode (DTS Band)

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) were chosen for full testing.

IEEE 802.11g mode: 6Mbps 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, peak power 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.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No. 8, Jiu Cheng Ling, Jiaokeng Village,Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200627-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 455173 & TW-1037).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	455173 TW-1037
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	VCCI C-2882 R-2635
Taiwan	TAF	CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, CNS 13803, CISPR 14, EN 55014, CNS 13783-1, CISPR 22, EN 55022, VCCI, FCC, Method-47 CFR Part 15 Subpart B, CNS 13438	ilac-MRA TAF Testing Laboratory 1109
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13803, CNS13439	SL2-IS-E-0039 SL2-IN-E-0039 SL2-R1/R2-0039 SL2-A1-E-0039
Canada	Industry Canada	RSS210, Issue 7	Canada IC 6192

* No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

6. CALIBRATION AND UNCERTAINTY

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 MEASUREMENT UNCERTAINTY

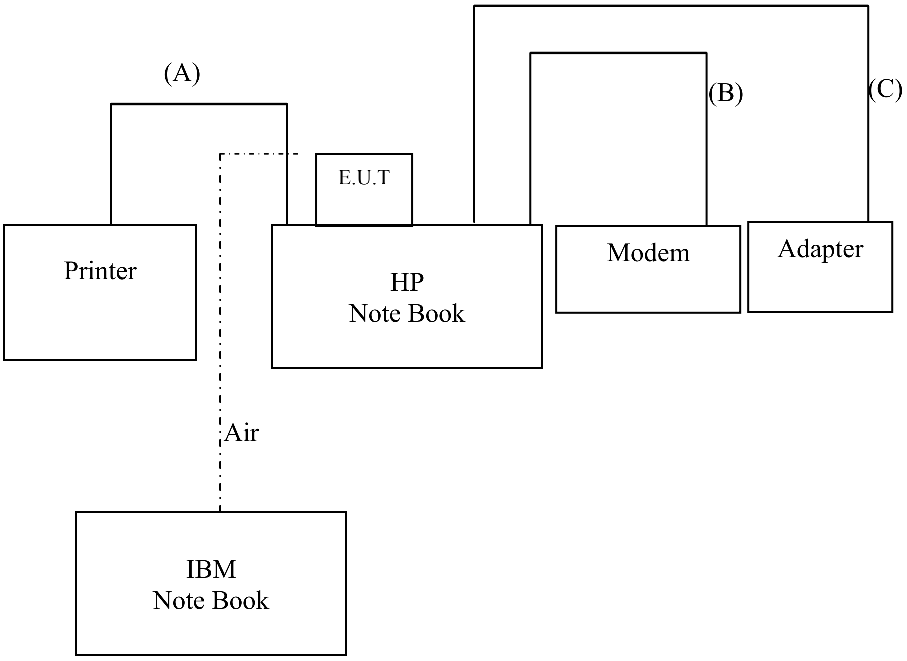
Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 1000 MHz	+/- 3.2 dB
Radiated Emission, 1 to 26.5 GHz	+/- 3.2 dB
Power Line Conducted Emission	+/- 2.1 dB

Uncertainty figures are valid to a confidence level of 95%

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT



7.2 SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	FCC ID	Signal Cable
1	Modem	LEMEL	MD-56K	DOC	RS232 cable, shd, 1.1m
2	Printer	EPSON	EPSON C43UX	DOC	Printer cable, shd, 1.8m
3	Note Book	HP	CNC 6000	DOC	Power cable, unshd, 1.6m
4	Note Book	IBM	T43	DOC	Power cable, unshd, 1.6m

No.	Signal cable description	
A	Printer cable	Shielded, 1.8m, 1pcs.
B	RS232 cable	Shielded, 1.1m, 1pcs.
C	Power cable	Unshielded, 1.6m, 1pcs.

REMARK:
1. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7.3 EUT OPERATING CONDITION

RF Setup

1. Set up all computers like the setup diagram.
2. The "**Ralink QA Test Program for U2571W"** software was used for testing

   The EUT driver software installed in the host support equipment during testing was Ralink QA Test Program for U2571W Drive

   (1) **TX Mode:**
   - ⇨ **Tx Mode:CCK 、OFDM**
   - ⇨ **Tx Data Rate: 11Mbps long** (IEEE 802.11b mode ,chain 0 TX)
     6Mbps (IEEE 802.11g mode ,chain 0 TX)

   Power control mode

   Target Power: IEEE 802.11b Channel Low (2412MHz) = **C (Chain 0)**
   IEEE 802.11b Channel Middle (2437MHz) = **D (Chain 0)**
   IEEE 802.11b Channel High (2462MHz) = **D (Chain 0)**

   Target Power: IEEE 802.11g Channel Low (2412MHz) = **C (Chain 0)**
   IEEE 802.11g Channel Middle (2437MHz) = **D (Chain 0)**
   IEEE 802.11g Channel High (2462MHz) = **D (Chain 0)**

   (2) **RX Mode：**

   MAC Address: FFFFFFFFFFFF)

   Start RX

3. All of the function are under run.
4. Start test.

Normal Link Setup

1. Set up all computers like the setup diagram.
2. All of the function are under run.
3. Notebook PC (2) ping 192.168.0.10 –t to Notebook PC (1).
4. Notebook PC (1) ping 192.168.0.20 –t to Notebook PC (2).
5. Notebook PC (1) ping 192.168.0.50 –t to Wireless Access Point (3).
6. Start test.

8. APPLICABLE LIMITS AND TEST RESULTS

8.1 6DB BANDWIDTH

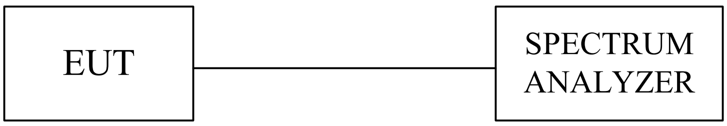
LIMIT

§ 15.207(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEM	829054/017	APR. 14, 2009

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 100 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

TEST RESULTS

No non-compliance noted.

IEEE 802.11b mode (One TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	12324	500	PASS
Middle	2437	12224	500	PASS
High	2462	12424	500	PASS

NOTE : 1. At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

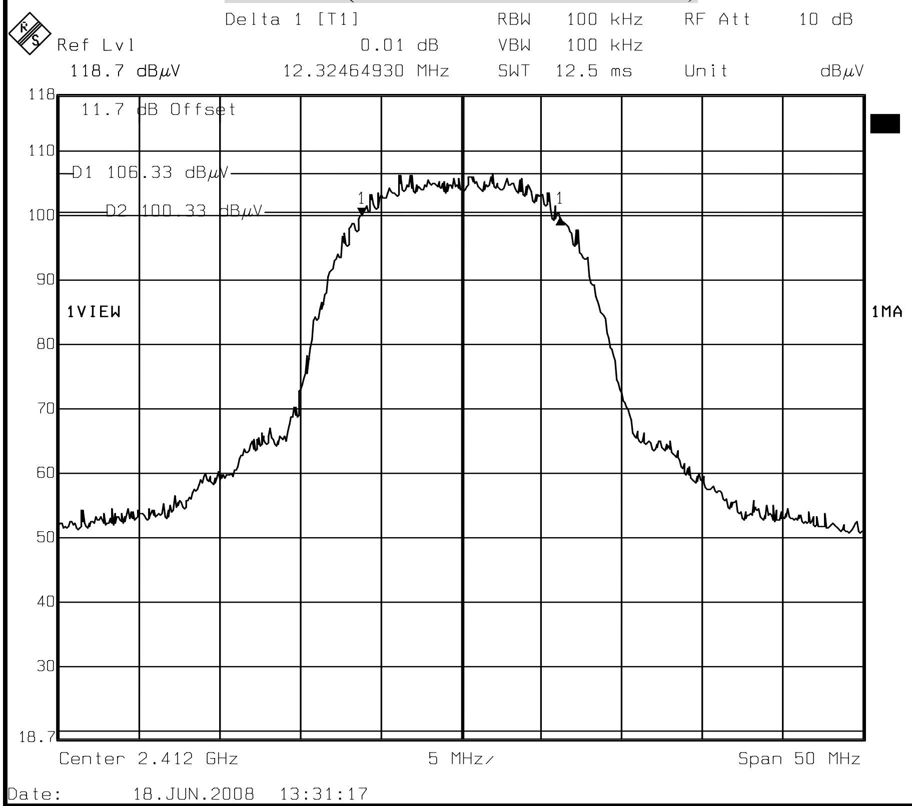
IEEE 802.11g mode (One TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16733	500	PASS
Middle	2437	16725	500	PASS
High	2462	16724	500	PASS

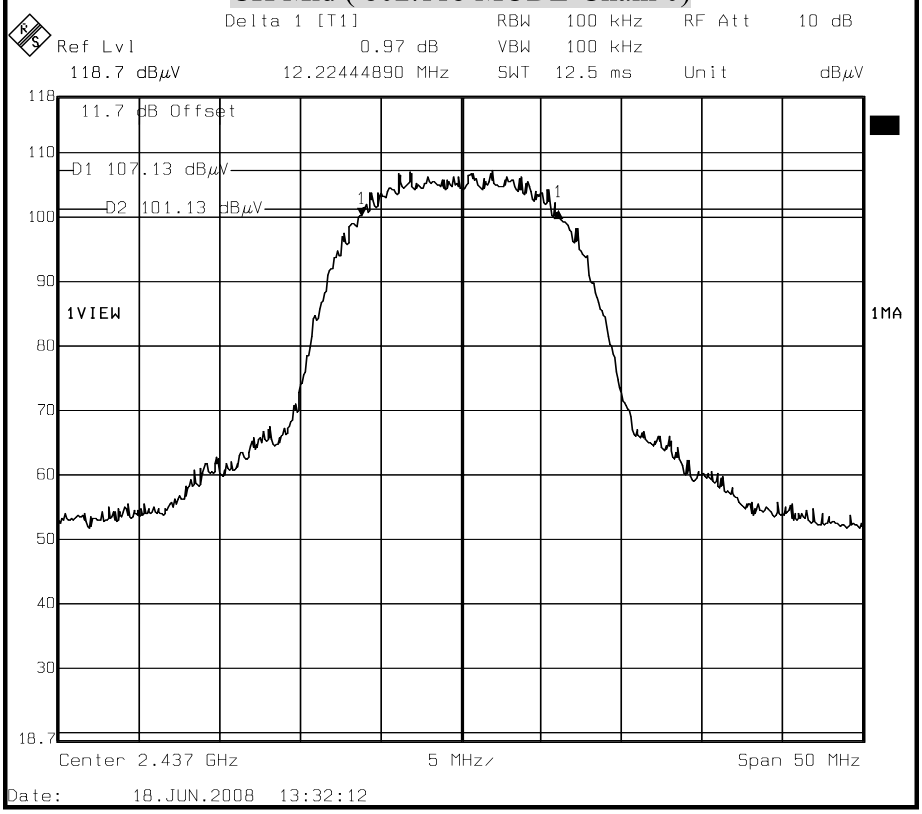
NOTE : 1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

6dB BANDWIDTH (802.11b MODE)

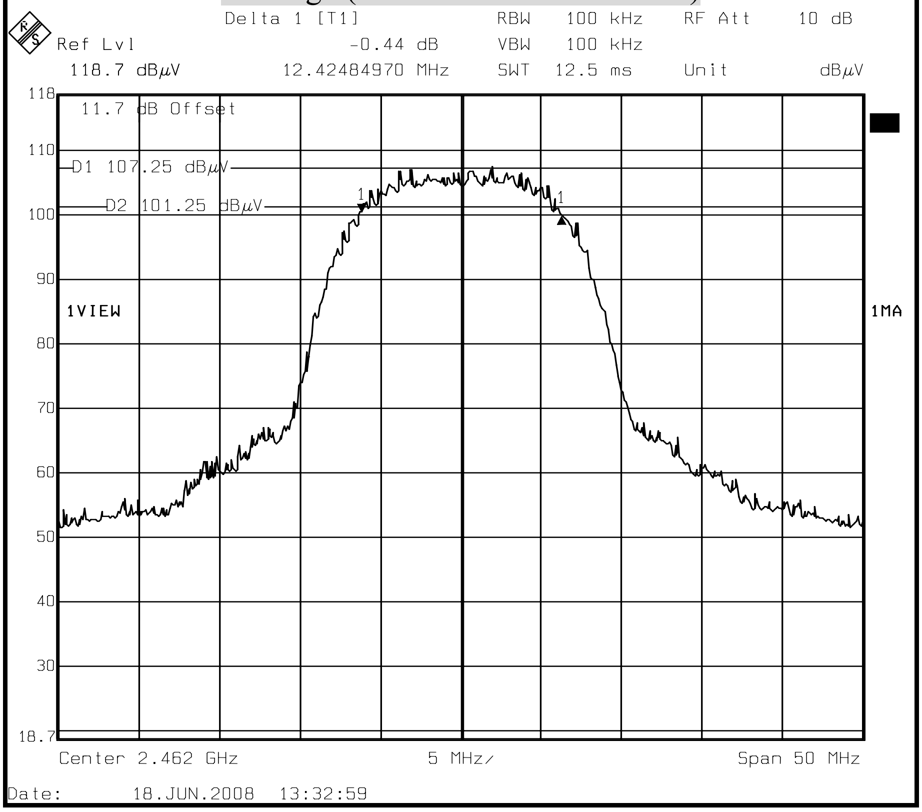
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

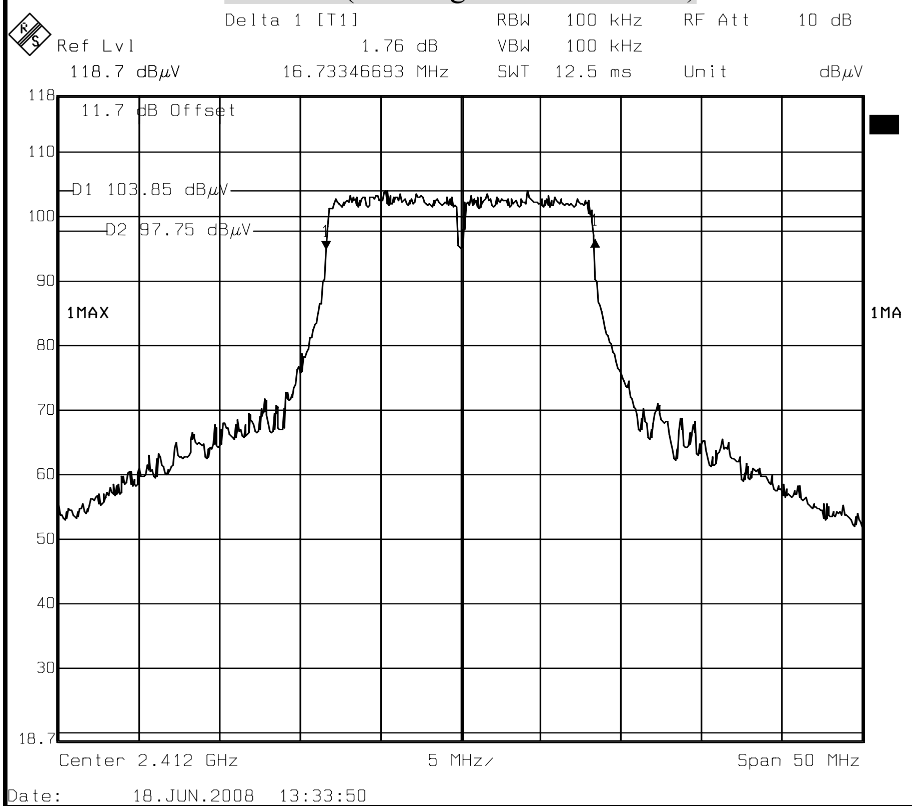


CH High (802.11b MODE-Chain 0)

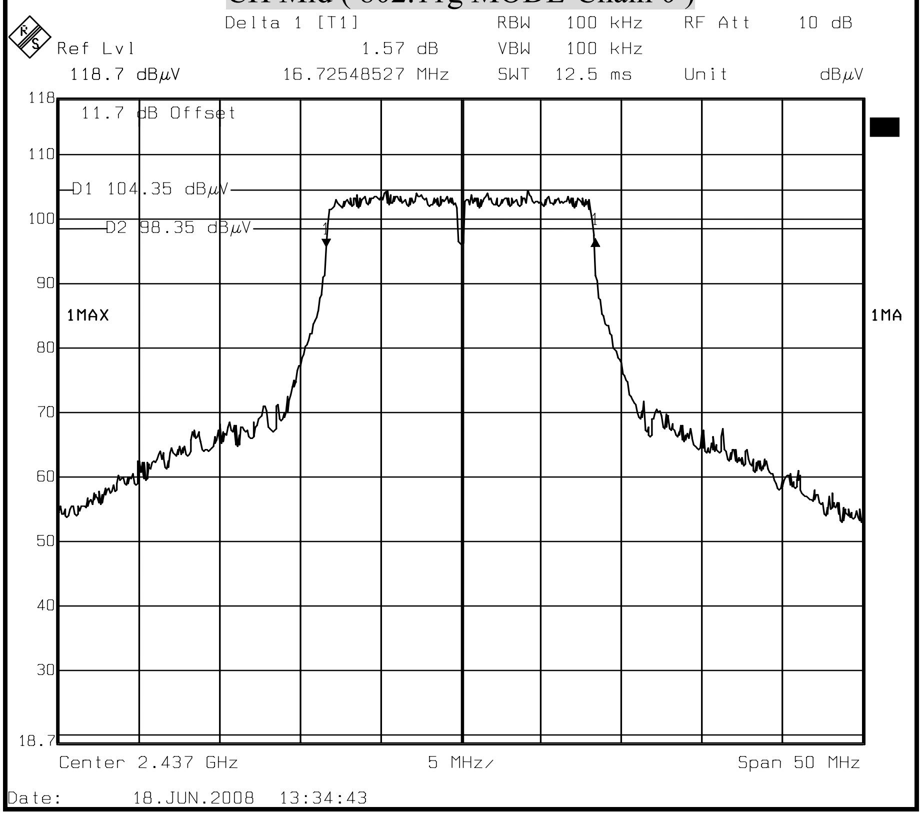


6dB BANDWIDTH (802.11g MODE)

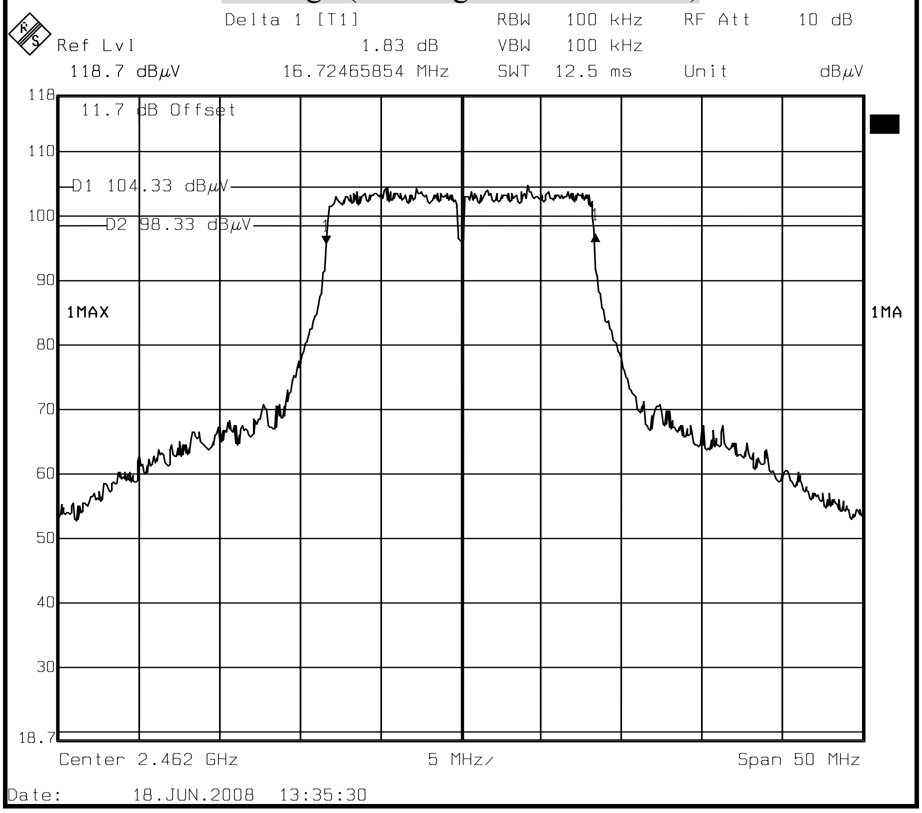
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)



CH High (802.11g MODE-Chain 0)



8.2 99% BANDWIDTH

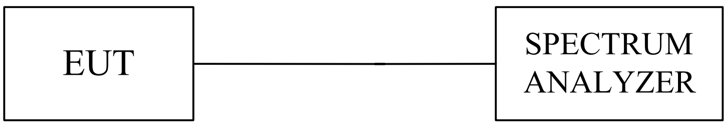
LIMIT

None for reporting purposes only.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY 43360132	June 23, 2009

TEST SETUP



TEST PROCEDURE

1. The spectrum shall be set as follows :
   Span : The minimum span to fully display the emission and approximately 20dB below peak level.
   RBW : The set to 1% to 3% of the approximate emission width.
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The 99% BW is the bandwidth between the right and left markers.

TEST RESULTS

No non-compliance noted

IEEE 802.11b mode (One TX)

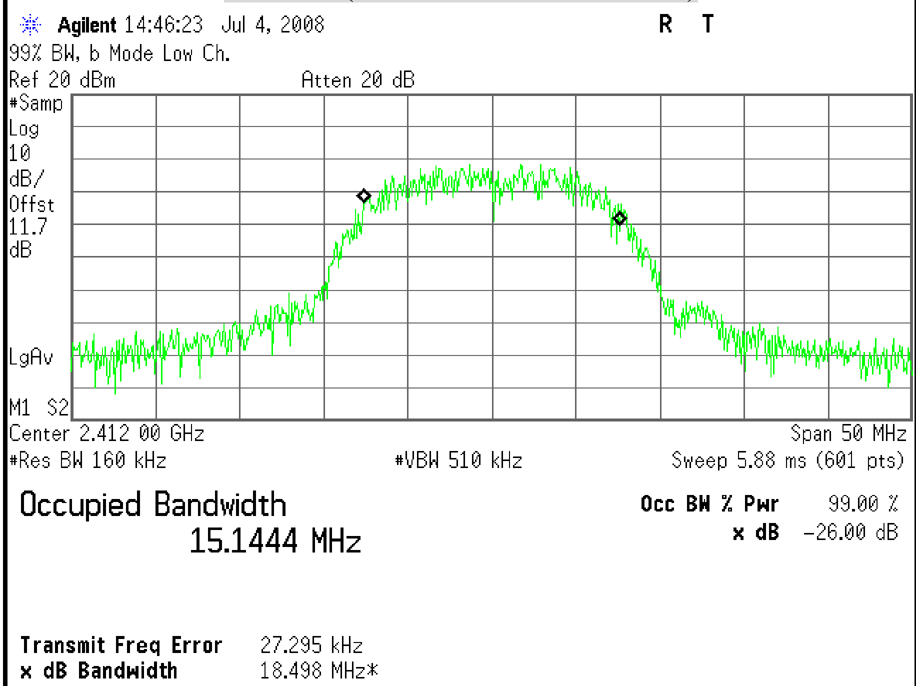
Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)
		Chain 0
Low	2412	15.144
Middle	2437	15.091
High	2462	14.994

IEEE 802.11g mode (One TX)

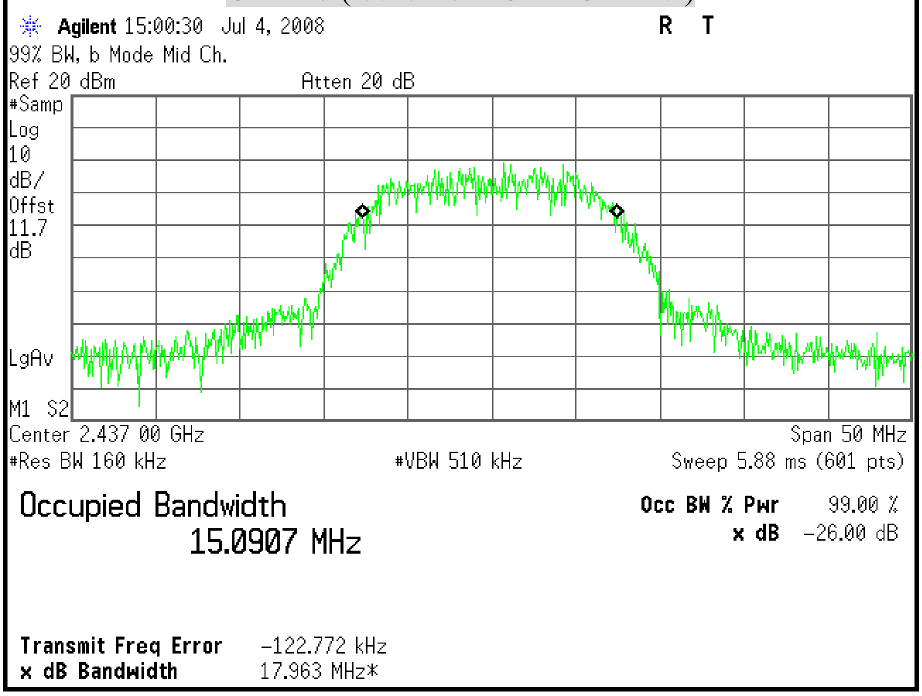
Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)
		Chain 0
Low	2412	16.435
Middle	2437	16.437
High	2462	16.324

99% BANDWIDTH (802.11b MODE)

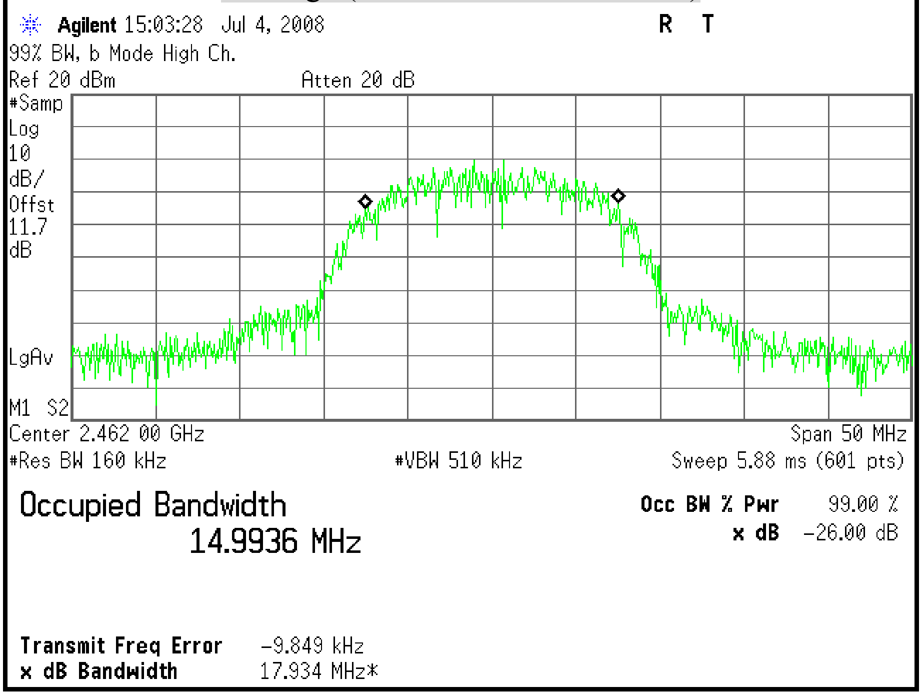
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

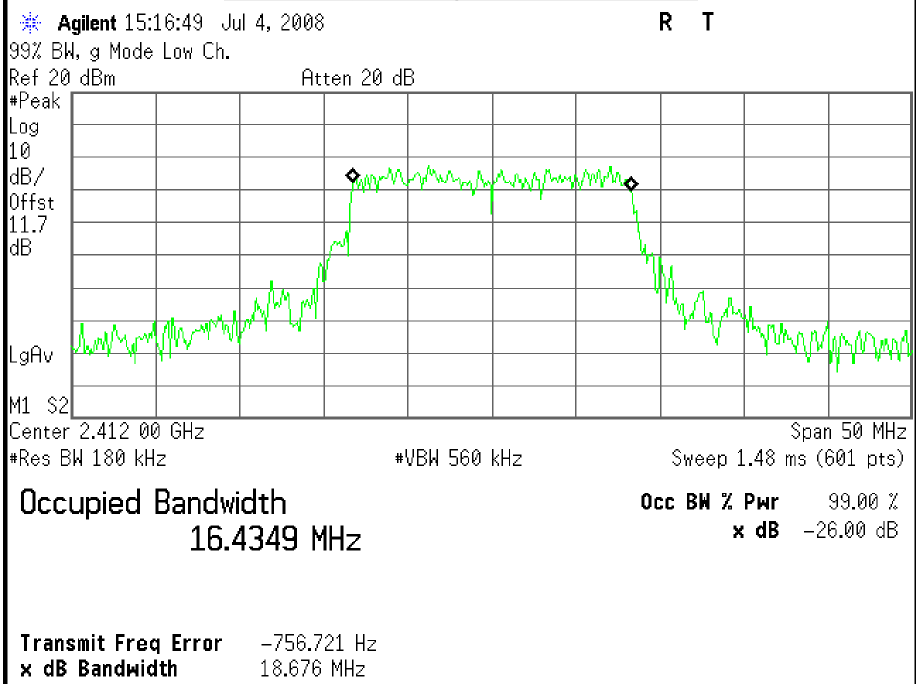


CH High (802.11b MODE-Chain 0)

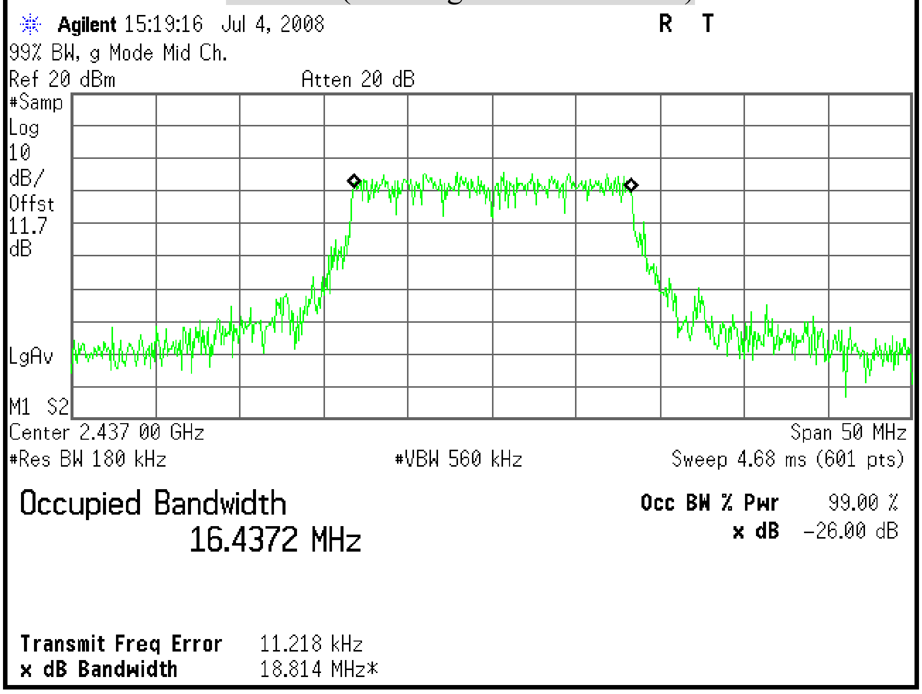


99% BANDWIDTH (802.11g MODE)

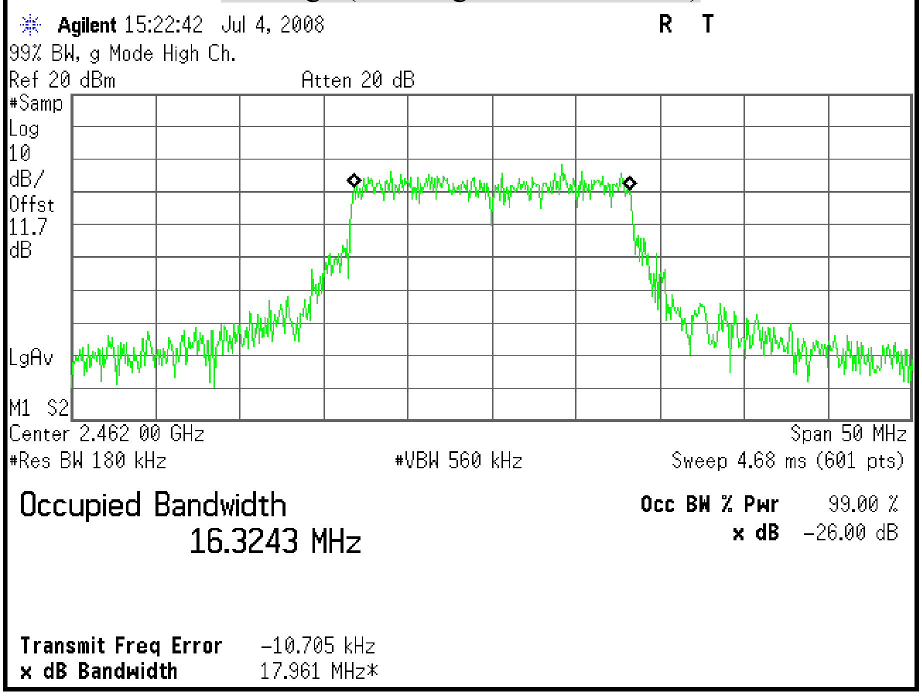
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)



CH High (802.11g MODE-Chain 0)



8.3 MAXIMUM PEAK OUTPUT POWER

LIMIT

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

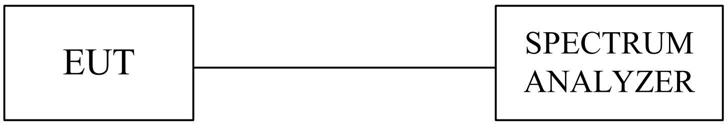
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY 43360132	June 23, 2009

TEST SETUP



TEST PROCEDURE

Connect the EUT to spectrum analyzer, set the center frequency of the spectrum analyzer to the channel center frequency. Set the RBW to 1MHz and VBW to 3MHz. Using the Channel Power Function of the spectrum analyzer and set the measuring bandwidth to 6MHz. Record the measure channel power.

Measurement of Digital Transmission Systems Operating under Section 15.247
Power Output Option 2
Method #1

1 Set span to encompass the entire emission bandwidth (EBW) of the signal.
2 Set RBW = 1 MHz.
3 Set VBW ≥ 3 MHz.
4 Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode.
5 Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to ôhichfree runöhich.
6 Trace average 100 traces in power averaging mode.
7 Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer's band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

TEST RESULTS

No non-compliance noted

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10)).

The maximum antenna gain is 3.48dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm. In the legacy mode, the effective antenna gain is
10 x Log (10^ (Chain 0 / 10)) = 3.48dBi.

IEEE 802.11b mode (One TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	2412	13.35	30	PASS
Middle	2437	13.28	30	PASS
High	2462	12.85	30	PASS

NOTE : 1. At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

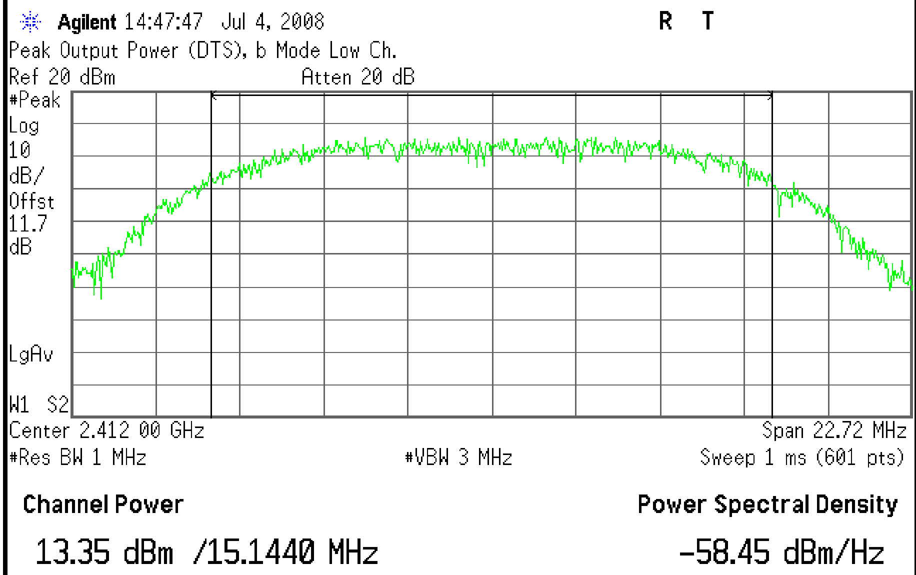
IEEE 802.11g mode (One TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	2412	13.40	30	PASS
Middle	2437	13.45	30	PASS
High	2462	13.37	30	PASS

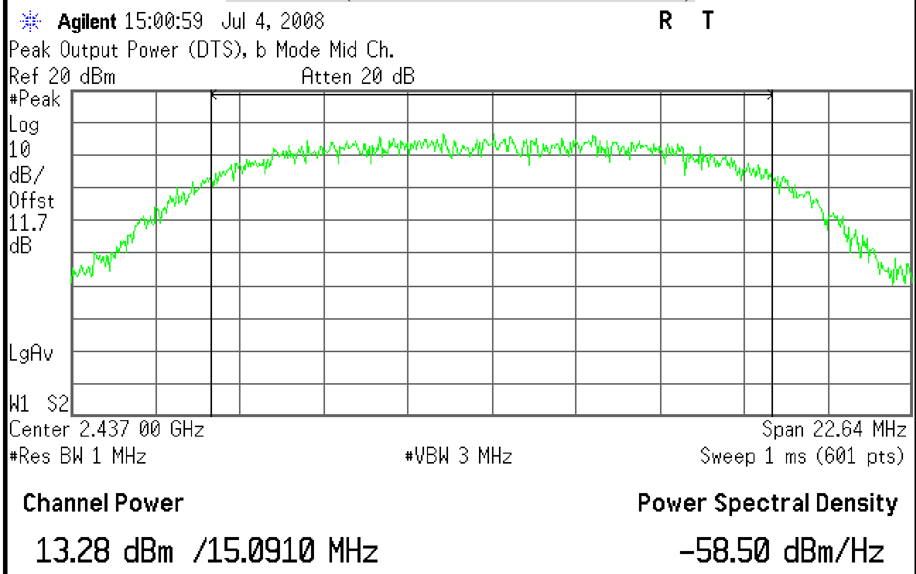
NOTE : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

MAXIMUM PEAK OUTPUT POWER (802.11b MODE)

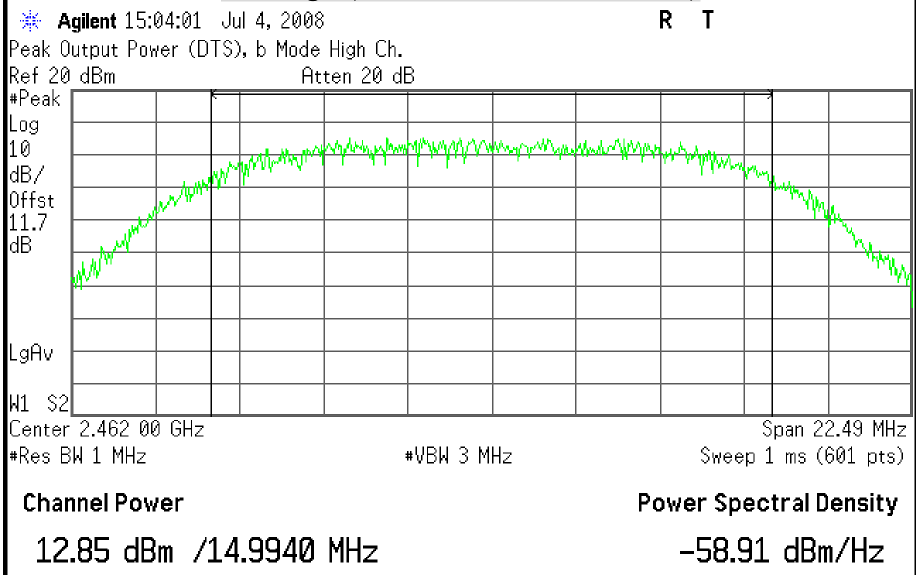
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

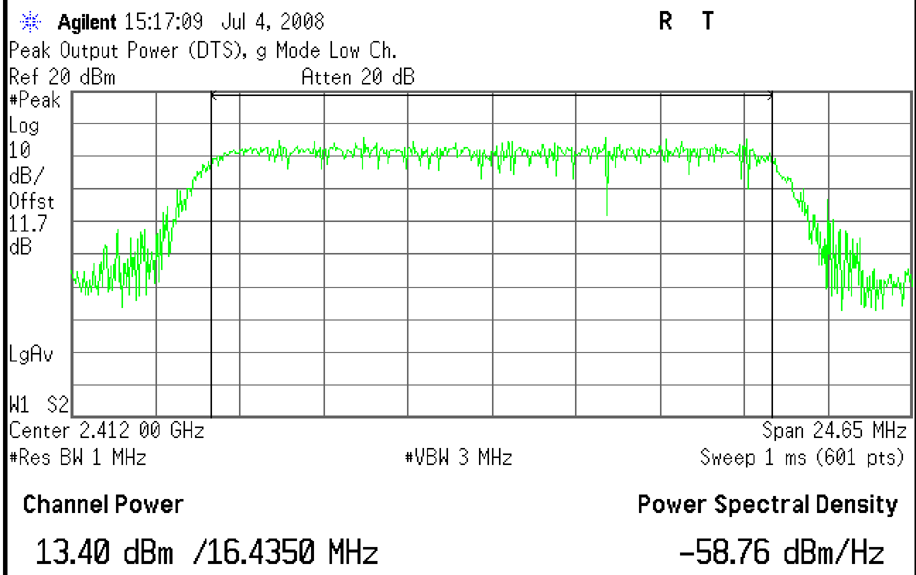


CH High (802.11b MODE-Chain 0)

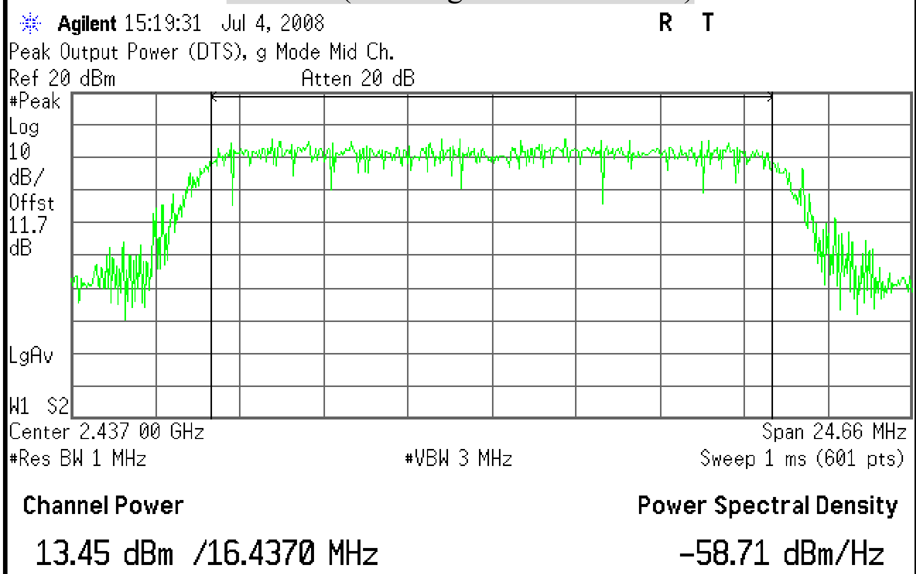


MAXIMUM PEAK OUTPUT POWER (802.11g MODE)

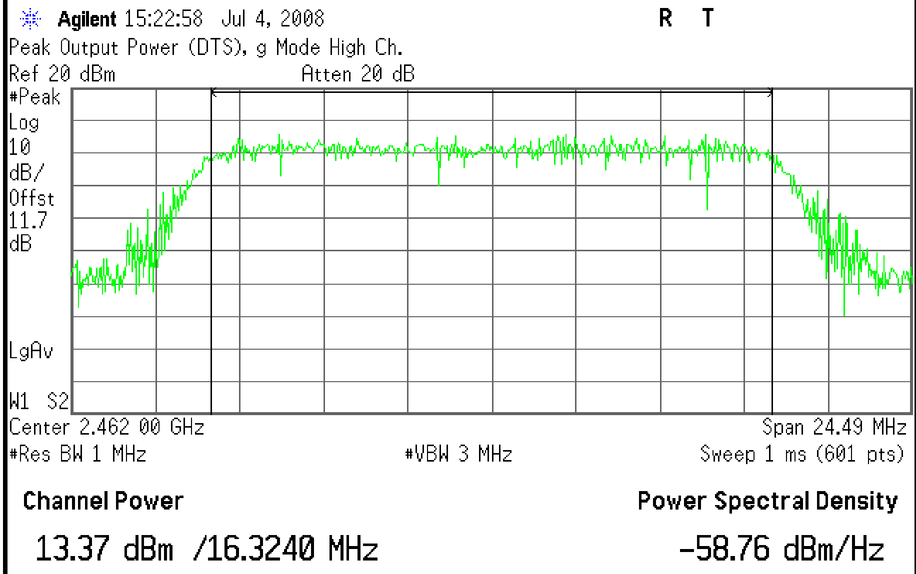
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)



CH High (802.11g MODE-Chain 0)



8.4 MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

Where *E = Field strength in Volts / meter*

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

P (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

Where *d = Distance in cm*

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm^2

LIMIT

Power Density Limit, S=1.0mW/cm^2

TEST RESULTS

No non-compliance noted.

Mode	Minimum separation distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	20.0	13.35	3.48	1	0.0095
IEEE 802.11g	20.0	13.45	3.48	1	0.0098

REMARK: For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.

8.5 AVERAGE POWER

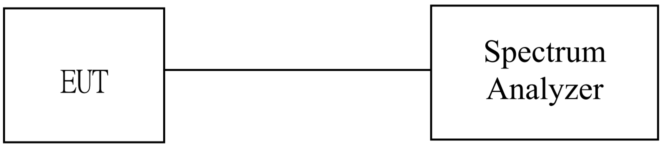
LIMIT

None; for reporting purposes only.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY 43360132	June 23, 2009

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a power meter.

TEST RESULTS

Total peak power calculation formula:
10 log (10^ (Chain 0 Power / 10)).

No non-compliance noted.

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
		Chain 0
Low	2412	10.53
Middle	2437	10.35
High	2462	10.05

IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Average Power (dBm)
		Chain 0
Low	2412	10.05
Middle	2437	9.97
High	2462	9.80

8.6 POWER SPECTRAL DENSITY

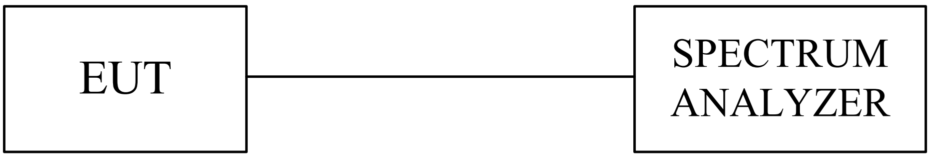
LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEM	829054/017	APR. 14, 2009

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW=3KHz and VBW≧RBW, set sweep time=span / 3KHz.
The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

TEST RESULTS

Total peak power calculation formula:
10 log (10^ (Chain 0 PPSD / 10)).

No non-compliance noted.

IEEE 802.11b mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
		Chain 0		
Low	2412	-15.00	8	PASS
Middle	2437	-15.34	8	PASS
High	2462	-15.25	8	PASS

NOTE : 1. At finial test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

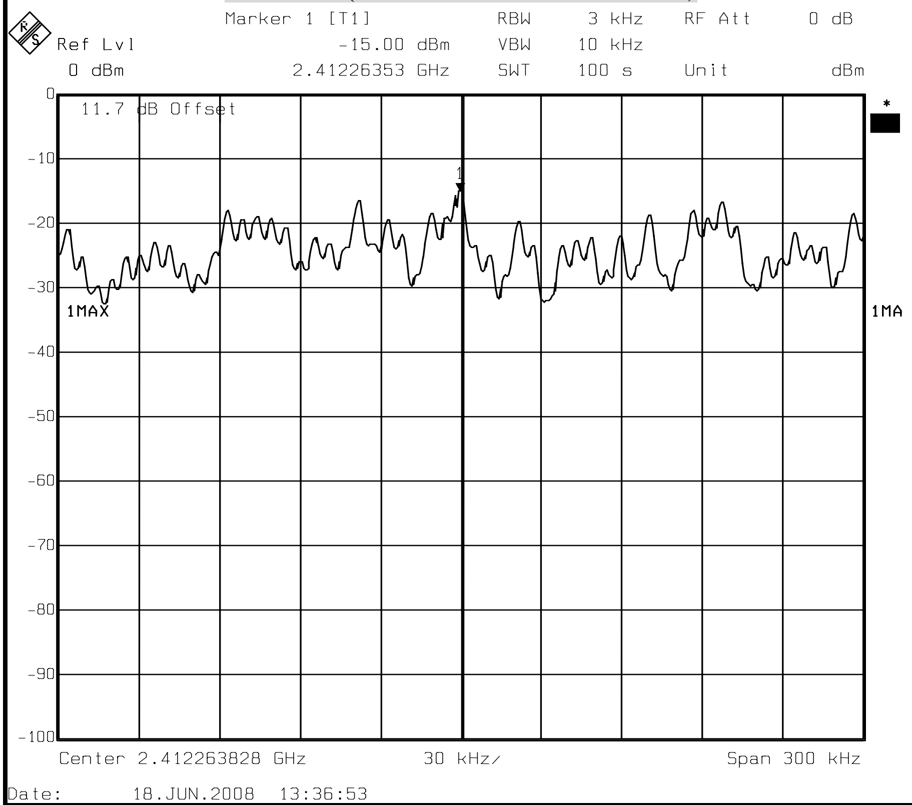
IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
		Chain 0		
Low	2412	-19.34	8	PASS
Middle	2437	-18.90	8	PASS
High	2462	-18.51	8	PASS

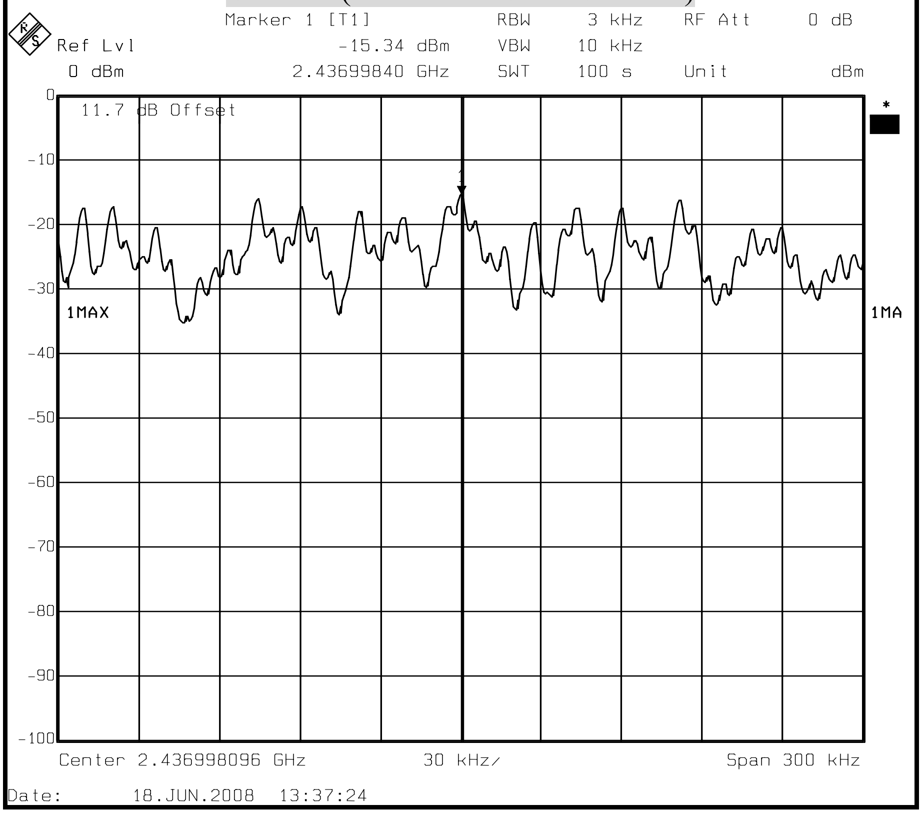
NOTE : 1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

POWER SPECTRAL DENSITY (IEEE 802.11b MODE)

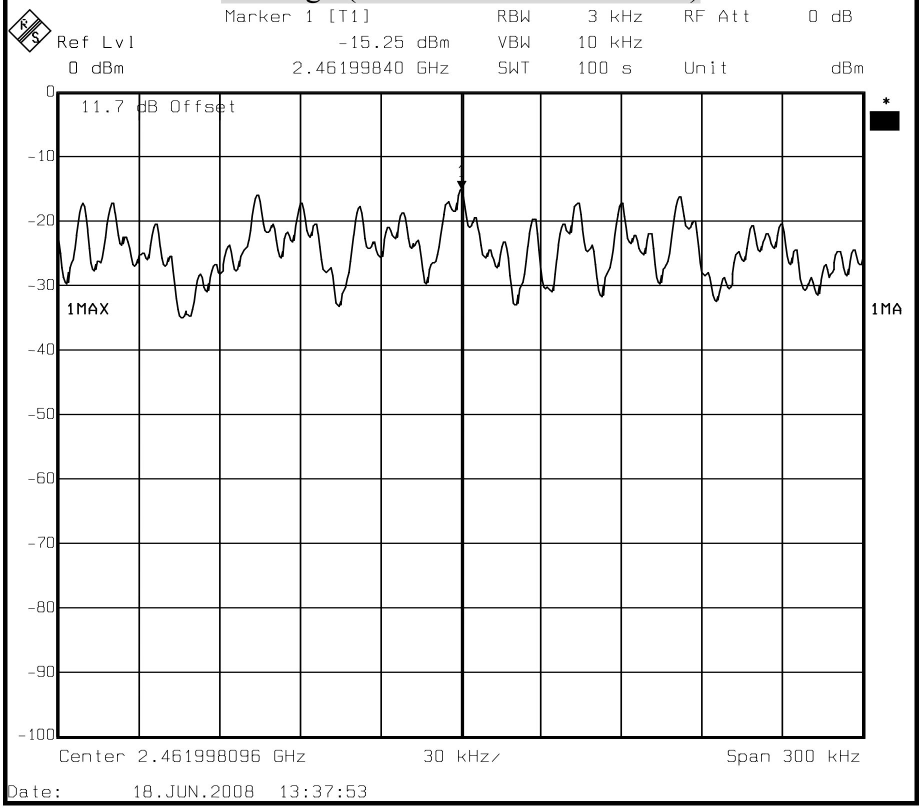
CH Low (802.11b MODE-Chain 0)



CH Mid (802.11b MODE-Chain 0)

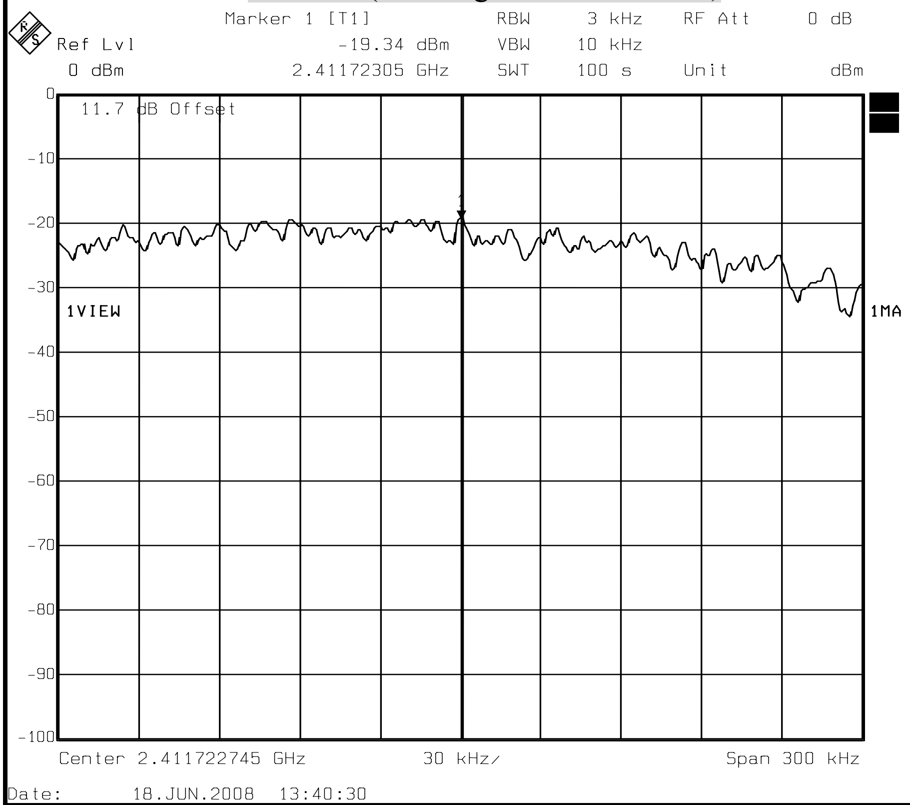


CH High (802.11b MODE-Chain 0)

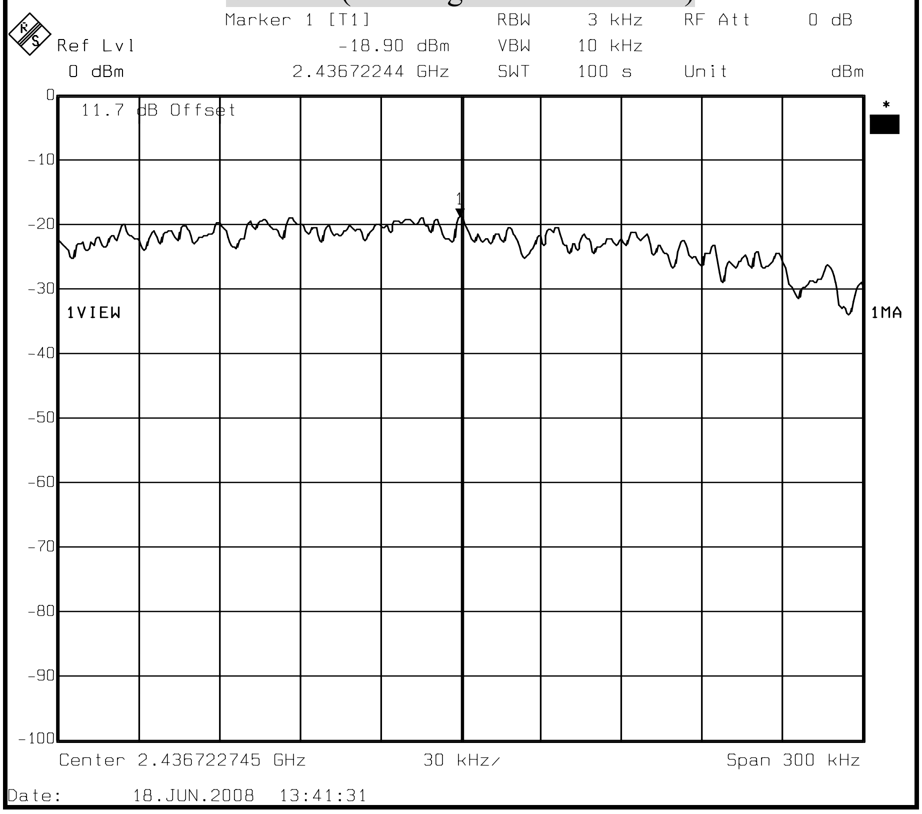


POWER SPECTRAL DENSITY (IEEE 802.11g MODE)

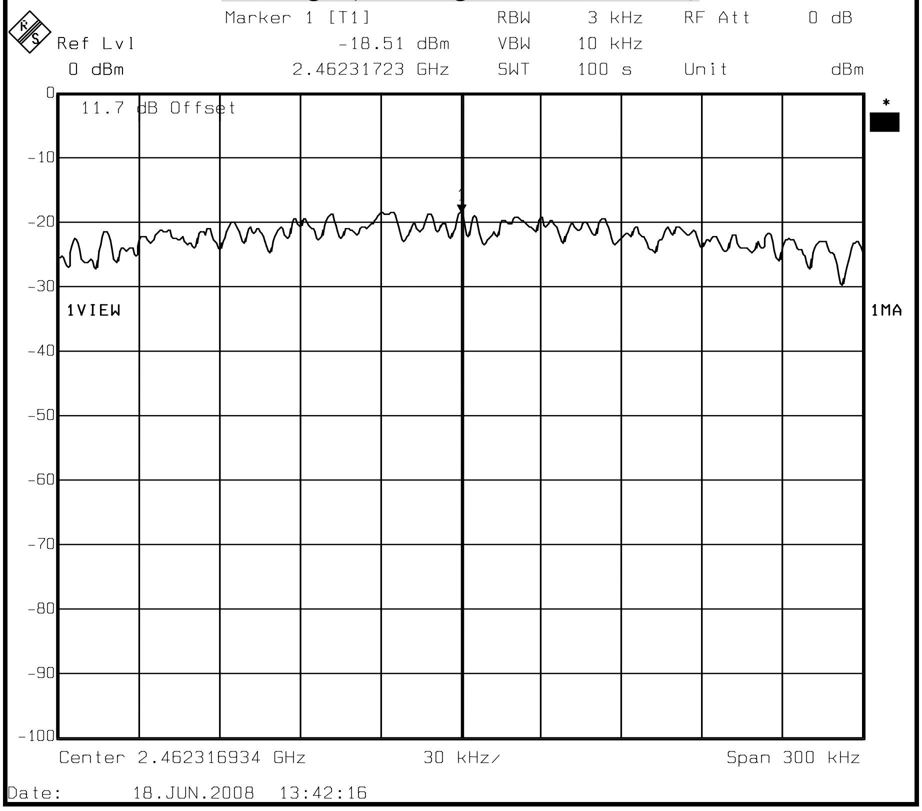
CH Low (802.11g MODE-Chain 0)



CH Mid (802.11g MODE-Chain 0)



CH High (802.11g MODE-Chain 0)



8.7 CONDUCTED SPURIOUS EMISSION

LIMITS

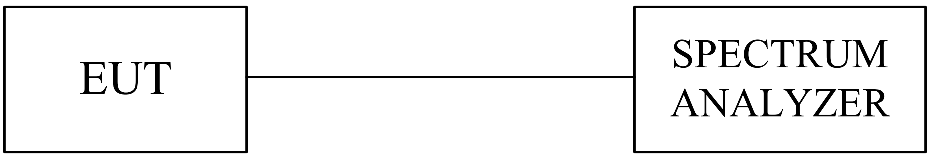
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

TEST SETUP



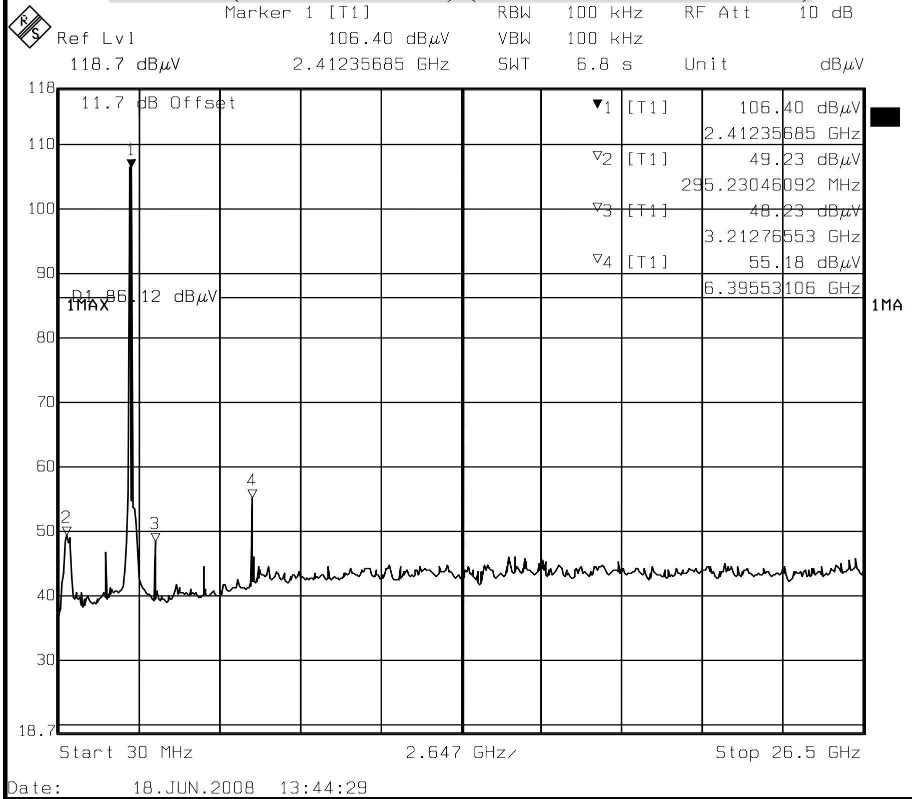
TEST RESULTS

No non-compliance noted.

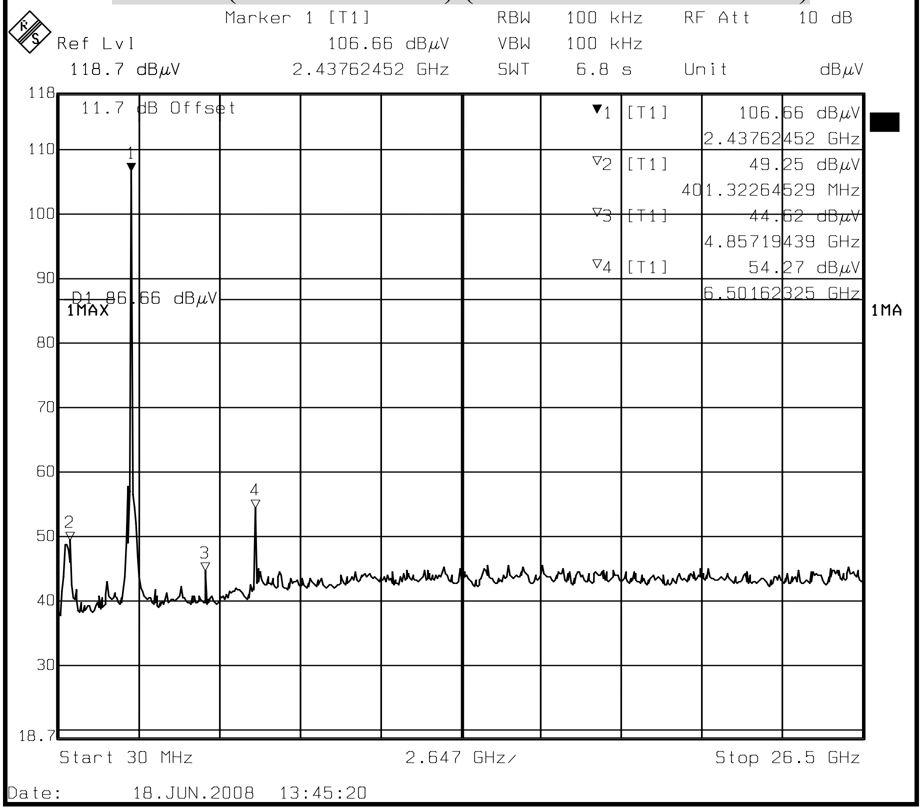
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11b MODE)

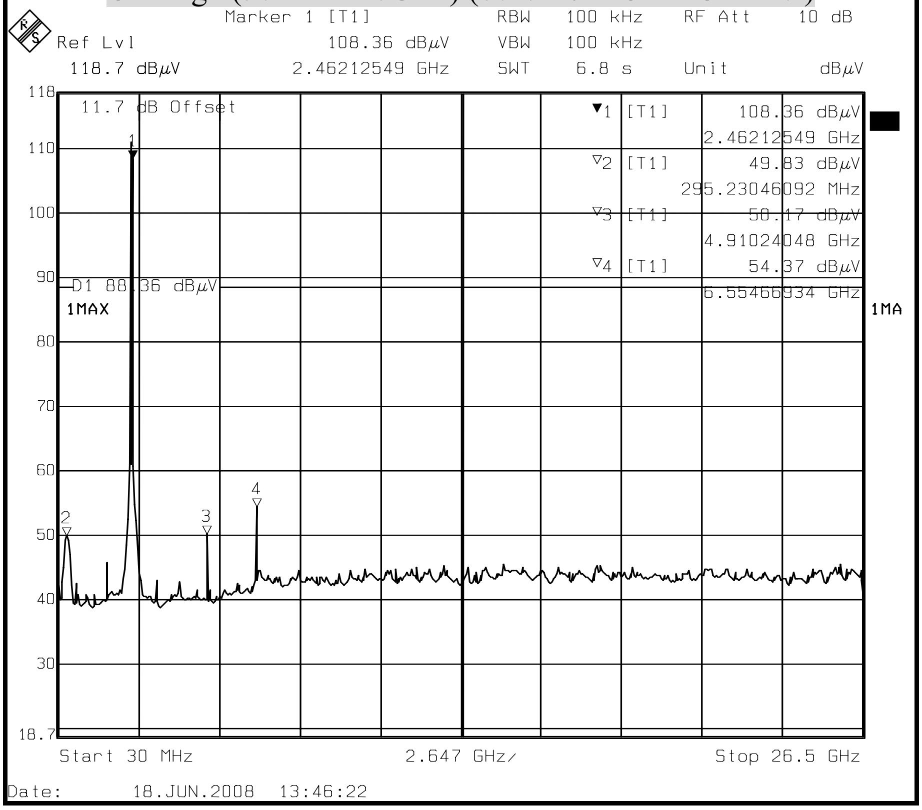
CH Low (30MHz~26GHz) (802.11b MODE-Chain 0)



CH Mid (30MHz~26GHz) (802.11b MODE-Chain 0)



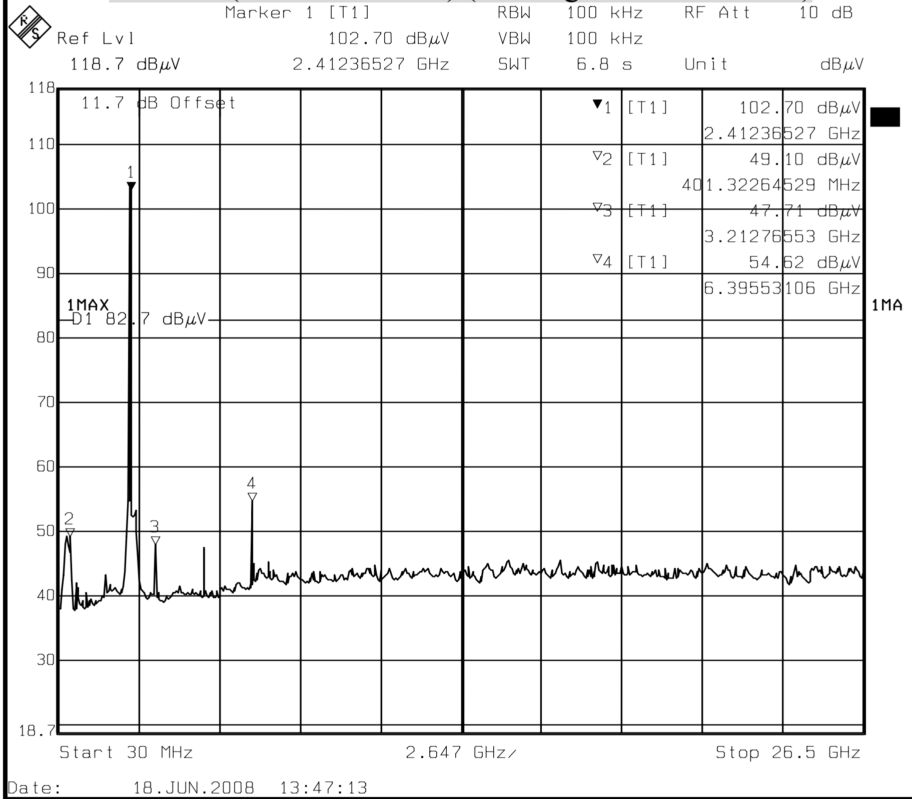
CH High (30MHz~26GHz) (802.11b MODE-Chain 0)



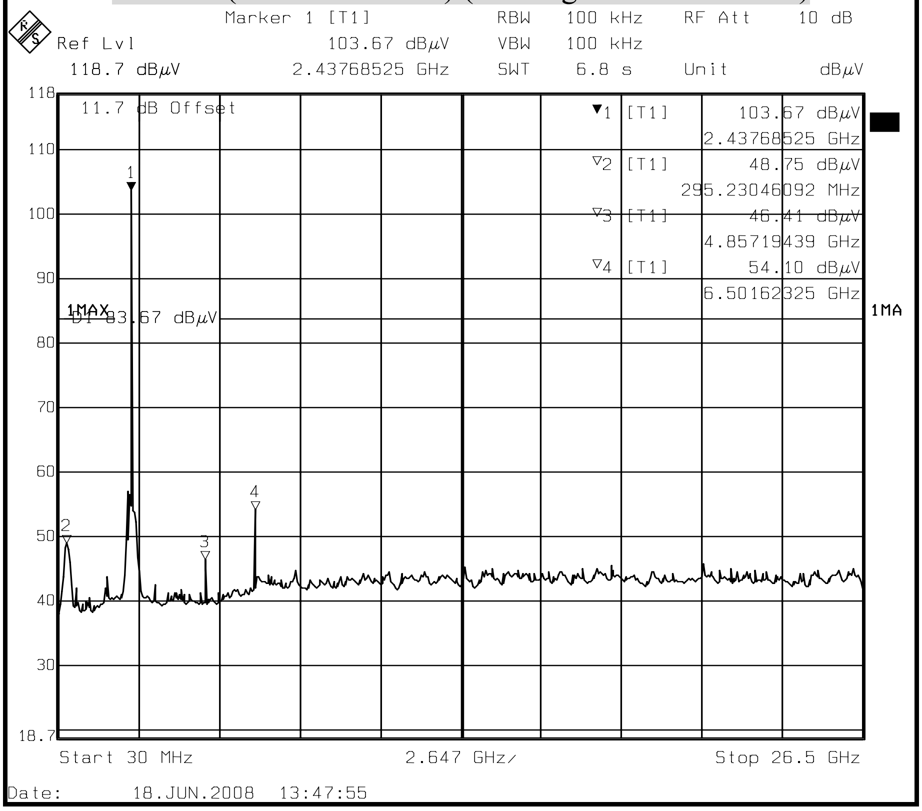
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11g MODE)

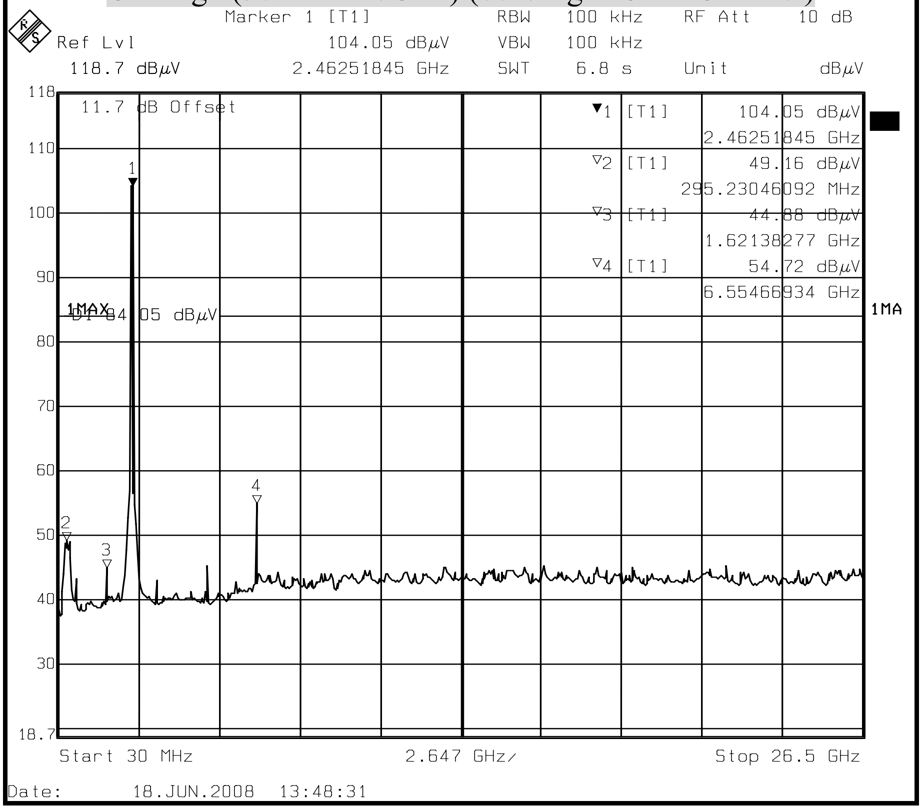
CH Low (30MHz~26GHz) (802.11g MODE-Chain 0)



CH Mid (30MHz~26GHz) (802.11g MODE-Chain 0)



CH High (30MHz~26GHz) (802.11g MODE-Chain 0)



8.8 RADIATED EMISSIONS

8.8.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

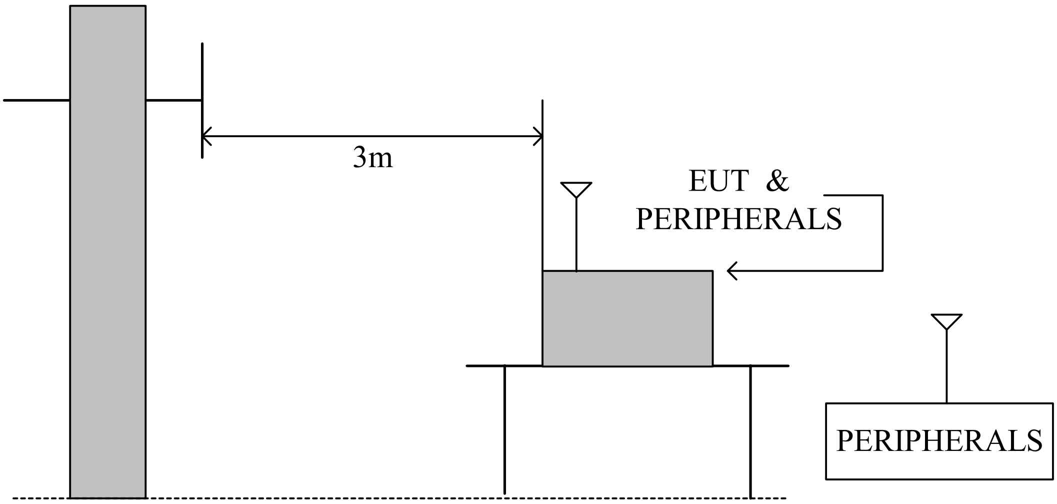
TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

Open Area Test Site # 6				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSEM	829054/017	APR. 14, 2009
Temp./Humidity Chamber	K.SON	THS-M1	242	JUN. 11, 2008
EMI Test Receiver	R&S	ESVS10	833206/012	APR. 15, 2009
Pre-Amplifier	HP	8447F	2944A03817	NOV. 01, 2008
Amplifier	MITEQ	AFSYY-00108650-42-10P-44	1205908	NOV. 05, 2008
Bilog Antenna	Sunol	JB1	A013105-1	NOV. 24, 2008
Horn Antenna	Com-Power	AH-118	071032	DEC. 20, 2008
Turn Table	YO Chen	001	N/A	N.C.R
Antenna Tower	AR	TP100A	N/A	N.C.R
Controller	CT	SC101	N/A	N.C.R
RF Swicth	E-INSTRUMENT TELH LTD	ERS-180-1-2	EC1204141	N.C.R
Site NSA	CCS	N/A	N/A	NOV. 22, 2008
Power Meter	Anritsu	ML2487A	6K00003888	APR. 15, 2009
Power Sensor	Anritsu	MA2491A	33265	MAR. 13, 2009
AC Power Source	T-POWER	TFC-3020	N930010	N.C.R
DC Power Source	LOKO	DSP-5050	L1507009282	N.C.R
Substituted Dipole	SCHWAZBECK	VHAP/UHAP	998+999/981+982	JUN. 22, 2008

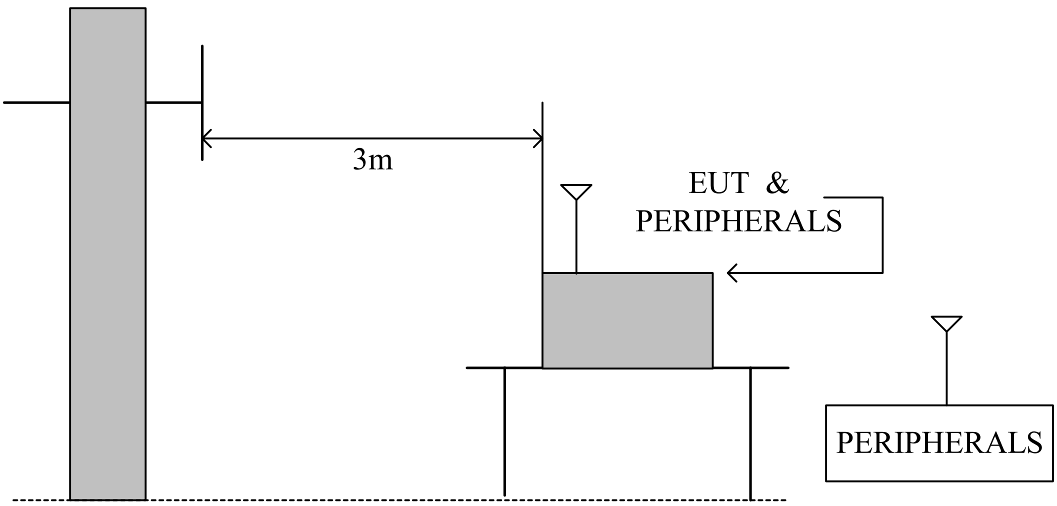
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. White measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. White measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4. No emission is found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)

TEST RESULTS

No non-compliance noted.

8.8.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	Normal operating (worst case)	TEMP& Humidity	32.5℃, 38%

Horizontal

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Level	Limits	Margin	Detector Mode
(MHz)	(dBµV)	(dB/M)	(dB)	(dBµV/M)	(dBµV/M)	(dB)	PK/QP
66.85	21.35	8.11	1.03	30.50	40.00	-9.50	QP
135.69	20.10	13.73	1.46	35.29	43.50	-8.21	QP
233.67	20.34	12.62	1.94	34.91	46.00	-11.09	QP
450.00	15.84	17.10	3.38	36.32	46.00	-9.68	QP
500.00	15.32	18.00	3.05	36.37	46.00	-9.63	QP
666.67	10.58	20.17	3.70	34.45	46.00	-11.55	QP
836.05	11.65	22.12	4.27	38.05	46.00	-7.95	QP
N/A	-----	-----	-----	-----	-----	-----	-----

Vertical

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Level	Limits	Margin	Detector Mode
(MHz)	(dBµV)	(dB/M)	(dB)	(dBµV/M)	(dBµV/M)	(dB)	PK/QP
66.73	20.50	8.10	1.03	29.64	40.00	-10.36	QP
166.64	18.50	12.20	1.64	32.34	43.50	-11.16	QP
312.48	15.80	14.27	2.62	32.70	46.00	-13.30	QP
450.00	12.43	17.10	3.38	32.91	46.00	-13.09	QP
596.82	8.60	19.26	3.54	31.40	46.00	-14.60	QP
666.67	8.40	20.17	3.70	32.27	46.00	-13.73	QP
839.85	7.60	22.16	4.29	34.05	46.00	-11.95	QP
N/A	-----	-----	-----	-----	-----	-----	-----

REMARK: Emission level (dBµV/m) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBµV).

8.8.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Low)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11b mode / CH Low				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
	2410.85	108.54	30.21	2.34	41.85	0.00	99.24	Fundamental Frequency		P
	2410.85	102.35	30.21	2.34	41.85	0.00	93.05			A
	3215.99	47.95	30.53	2.77	42.51	1.26	40.00	79.24	-39.24	P
	3215.99	38.25	30.53	2.77	42.51	1.26	30.30	73.05	-42.75	A
*	4924.35	48.61	33.82	3.76	43.94	0.73	42.98	74.00	-31.02	P
*	4924.35	40.22	33.82	3.76	43.94	0.73	34.59	54.00	-19.41	A
	6432.05	51.22	36.11	4.56	43.81	0.77	48.85	79.24	-30.39	P
	6432.05	46.81	36.11	4.56	43.81	0.77	44.44	73.05	-28.61	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Low)	TEMP& Humidity	32.9℃, 41%

Vertical

	TX / IEEE 802.11b mode / CH Low				Measurement Distance at 3m Vertical polarity					
	Freq. (MHz)	Reading (dBμV)	AF (dB/m)	Cable Loss (dB)	Pre-amp (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)
	2413.65	107.84	30.20	2.34	41.85	0.00	98.53	Fundamental Frequency		P
	2413.65	100.98	30.20	2.34	41.85	0.00	91.67			A
	3215.98	47.65	30.53	2.77	42.51	1.26	39.70	78.53	-38.83	P
	3215.98	37.98	30.53	2.77	42.51	1.26	30.03	71.67	-41.64	A
*	4823.97	47.85	33.58	3.70	43.88	0.69	41.95	74.00	-32.05	P
*	4823.97	39.81	33.58	3.70	43.88	0.69	33.91	54.00	-20.09	A
	6431.97	50.22	36.11	4.56	43.81	0.77	47.85	78.53	-30.68	P
	6431.97	44.86	36.11	4.56	43.81	0.77	42.49	71.67	-29.18	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11b mode / CH Middle				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
	2435.81	108.74	30.18	2.34	41.85	0.00	99.40	Fundamental Frequency		P
	2435.81	102.03	30.18	2.34	41.85	0.00	92.69			A
	3248.97	47.36	30.55	2.82	42.53	1.22	39.41	79.40	-39.99	P
	3248.97	39.82	30.55	2.82	42.53	1.22	31.87	72.69	-40.82	A
*	4872.64	48.93	33.69	3.73	43.91	0.71	43.16	74.00	-30.84	P
*	4872.64	40.22	33.69	3.73	43.91	0.71	34.45	54.00	-19.55	A
	6498.33	52.11	36.30	4.59	43.80	0.78	49.97	79.40	-29.43	P
	6498.33	48.37	36.30	4.59	43.80	0.78	46.23	72.69	-26.46	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	32.9℃, 41%

Vertical

	TX / IEEE 802.11b mode / CH Middle				Measurement Distance at 3m Vertical polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
	2436.75	107.96	30.18	2.34	41.85	0.00	98.62	Fundamental Frequency		P
	2436.75	101.84	30.18	2.34	41.85	0.00	92.50			A
	3249.67	47.35	30.55	2.82	42.53	1.22	39.40	78.62	-39.22	P
	3249.67	38.62	30.55	2.82	42.53	1.22	30.67	72.50	-41.83	A
*	4873.66	48.21	33.70	3.73	43.91	0.71	42.44	74.00	-31.56	P
*	4873.66	39.61	33.70	3.73	43.91	0.71	33.84	54.00	-20.16	A
	6498.27	50.39	36.30	4.59	43.80	0.78	48.25	78.62	-30.37	P
	6498.27	47.26	36.30	4.59	43.80	0.78	45.12	72.50	-27.38	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11b mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
	2461.35	109.35	30.15	2.34	41.86	0.00	99.98	Fundamental Frequency		P
	2461.35	103.04	30.15	2.34	41.86	0.00	93.67			A
	3282.16	48.06	30.57	2.87	42.56	1.17	40.11	79.98	-39.87	P
	3282.16	39.22	30.57	2.87	42.56	1.17	31.27	73.67	-42.40	A
*	4923.71	48.67	33.82	3.76	43.94	0.73	43.04	74.00	-30.96	P
*	4923.71	39.27	33.82	3.76	43.94	0.73	33.64	54.00	-20.36	A
	6565.22	52.16	36.73	4.62	43.76	0.80	50.55	79.98	-29.43	P
	6565.22	47.03	36.73	4.62	43.76	0.80	45.42	73.67	-28.25	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	**Test Date**	2008/6/18
Model	SW902T	**Test By**	Eric Yang
Test Mode	IEEE 802.11b TX (CH High)	**TEMP& Humidity**	32.9℃, 41%

Vertical

	TX / IEEE 802.11b mode / CH High				**Measurement Distance at 3m Vertical polarity**					
	Freq.	**Reading**	**AF**	Cable Loss	**Pre-amp**	**Filter**	**Level**	**Limit**	**Margin**	**Mark**
	(MHz)	**(dBμV)**	**(dB/m)**	**(dB)**	**(dB)**	**(dB)**	**(dBμV/m)**	**(dBμV/m)**	**(dB)**	**(P/Q/A)**
	2459.78	107.32	30.15	2.34	41.86	0.00	97.95	Fundamental Frequency		P
	2459.78	101.26	30.15	2.34	41.86	0.00	91.89			A
	3282.36	47.35	30.57	2.87	42.56	1.17	39.40	77.95	-38.55	P
	3282.36	38.61	30.57	2.87	42.56	1.17	30.66	71.89	-41.23	A
*	4922.81	47.33	33.81	3.76	43.94	0.73	41.69	74.00	-32.31	P
*	4922.81	38.25	33.81	3.76	43.94	0.73	32.61	54.00	-21.39	A
	6565.47	50.44	36.73	4.62	43.76	0.80	48.83	77.95	-29.12	P
	6565.47	45.61	36.73	4.62	43.76	0.80	44.00	71.89	-27.89	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11g mode / CH Low				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2408.36	108.52	30.21	2.34	41.85	0.00	99.22	Fundamental Frequency		P
	2408.36	100.24	30.21	2.34	41.85	0.00	90.94			A
	3215.97	48.11	30.53	2.77	42.51	1.26	40.16	79.22	-39.06	P
	3215.97	39.64	30.53	2.77	42.51	1.26	31.69	70.94	-39.25	A
*	4823.75	49.31	33.58	3.70	43.88	0.69	43.41	74.00	-30.59	P
*	4823.75	40.01	33.58	3.70	43.88	0.69	34.11	54.00	-19.89	A
	6432.05	51.22	36.11	4.56	43.81	0.77	48.85	79.22	-30.37	P
	6432.05	47.68	36.11	4.56	43.81	0.77	45.31	70.94	-25.63	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	32.9℃, 41%

Vertical

	TX / IEEE 802.11g mode / CH Low				Measurement Distance at 3m Vertical polarity					
	Freq. (MHz)	Reading (dBμV)	AF (dB/m)	Cable Loss (dB)	Pre-amp (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)
	2410.34	107.24	30.21	2.34	41.85	0.00	97.94	Fundamental Frequency		P
	2410.34	99.87	30.21	2.34	41.85	0.00	90.57			A
	3216.02	47.65	30.53	2.77	42.51	1.26	39.70	77.94	-38.24	P
	3216.02	38.54	30.53	2.77	42.51	1.26	30.59	70.57	-39.98	A
*	4824.11	48.03	33.58	3.71	43.88	0.69	42.13	74.00	-31.87	P
*	4824.11	38.75	33.58	3.71	43.88	0.69	32.85	54.00	-21.15	A
	6431.96	49.85	36.11	4.56	43.81	0.77	47.48	77.94	-30.46	P
	6431.96	45.33	36.11	4.56	43.81	0.77	42.96	70.57	-27.61	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11g mode / CH Middle				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2439.87	108.37	30.17	2.34	41.85	0.00	99.03	Fundamental Frequency		P
	2439.87	100.69	30.17	2.34	41.85	0.00	91.35			A
	3249.22	48.37	30.55	2.82	42.53	1.22	40.42	79.03	-38.61	P
	3249.22	39.65	30.55	2.82	42.53	1.22	31.70	71.35	-39.65	A
*	4874.25	49.31	33.70	3.73	43.91	0.71	43.54	74.00	-30.46	P
*	4874.25	38.65	33.70	3.73	43.91	0.71	32.88	54.00	-21.12	A
	6498.43	51.24	36.30	4.59	43.80	0.78	49.10	79.03	-29.92	P
	6498.43	48.29	36.30	4.59	43.80	0.78	46.15	71.35	-25.19	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	32.9℃, 41%

Vertical

	TX / IEEE 802.11g mode / CH Middle				Measurement Distance at 3m Vertical polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	(P/Q/A)
	2435.97	107.36	30.18	2.34	41.85	0.00	98.02	Fundamental Frequency		P
	2435.97	99.81	30.18	2.34	41.85	0.00	90.47			A
	3249.08	48.72	30.55	2.82	42.53	1.22	40.77	78.02	-37.25	P
	3249.08	39.25	30.55	2.82	42.53	1.22	31.30	70.47	-39.17	A
*	4874.95	48.13	33.70	3.73	43.91	0.71	42.36	74.00	-31.64	P
*	4874.95	37.84	33.70	3.73	43.91	0.71	32.07	54.00	-21.93	A
	6498.25	49.78	36.30	4.59	43.80	0.78	47.64	78.02	-30.38	P
	6498.25	47.62	36.30	4.59	43.80	0.78	45.48	70.47	-24.99	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	32.9℃, 41%

Horizontal

	TX / IEEE 802.11g mode / CH High				Measurement Distance at 3m Horizontal polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2459.74	108.64	30.15	2.34	41.86	0.00	99.27	Fundamental Frequency		P
	2459.74	100.37	30.15	2.34	41.86	0.00	91.00			A
	3282.12	48.75	30.57	2.87	42.56	1.17	40.80	79.27	-38.47	P
	3282.12	39.51	30.57	2.87	42.56	1.17	31.56	71.00	-39.44	A
*	4926.18	48.76	33.82	3.76	43.94	0.73	43.13	74.00	-30.87	P
*	4926.18	40.27	33.82	3.76	43.94	0.73	34.64	54.00	-19.36	A
	6565.27	51.22	36.73	4.62	43.76	0.80	49.61	79.27	-29.66	P
	6565.27	47.39	36.73	4.62	43.76	0.80	45.78	71.00	-25.22	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

Product Name	Wireless USB Card	Test Date	2008/6/18
Model	SW902T	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	32.9℃, 41%

Vertical

	TX / IEEE 802.11g mode / CH High				Measurement Distance at 3m Vertical polarity					
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
	2461.37	106.84	30.15	2.34	41.86	0.00	97.47	Fundamental Frequency		P
	2461.37	98.57	30.15	2.34	41.86	0.00	89.20			A
	3282.27	48.11	30.57	2.87	42.56	1.17	40.16	77.47	-37.31	P
	3282.27	38.65	30.57	2.87	42.56	1.17	30.70	69.20	-38.50	A
*	4925.75	47.81	33.82	3.76	43.94	0.73	42.18	74.00	-31.82	P
*	4925.75	39.22	33.82	3.76	43.94	0.73	33.59	54.00	-20.41	A
	6565.47	51.13	36.73	4.62	43.76	0.80	49.52	77.47	-27.95	P
	6565.47	45.86	36.73	4.62	43.76	0.80	44.25	69.20	-24.95	A
	N/A	------	------	------	------	------	------	------	------	P
	N/A	------	------	------	------	------	------	------	------	A

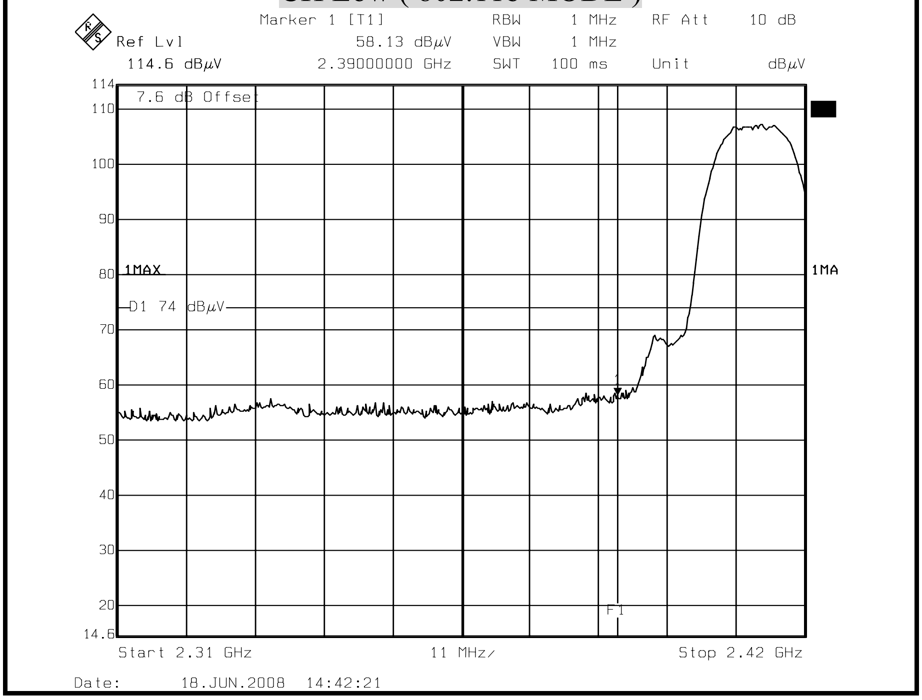
REMARK:

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. The result basic equation calculation is as follow:
   Level = Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
4. The other emission levels were 20dB below the limit
5. The test limit distance is 3M limit.

8.8.4 RESTRICTED BAND EDGES

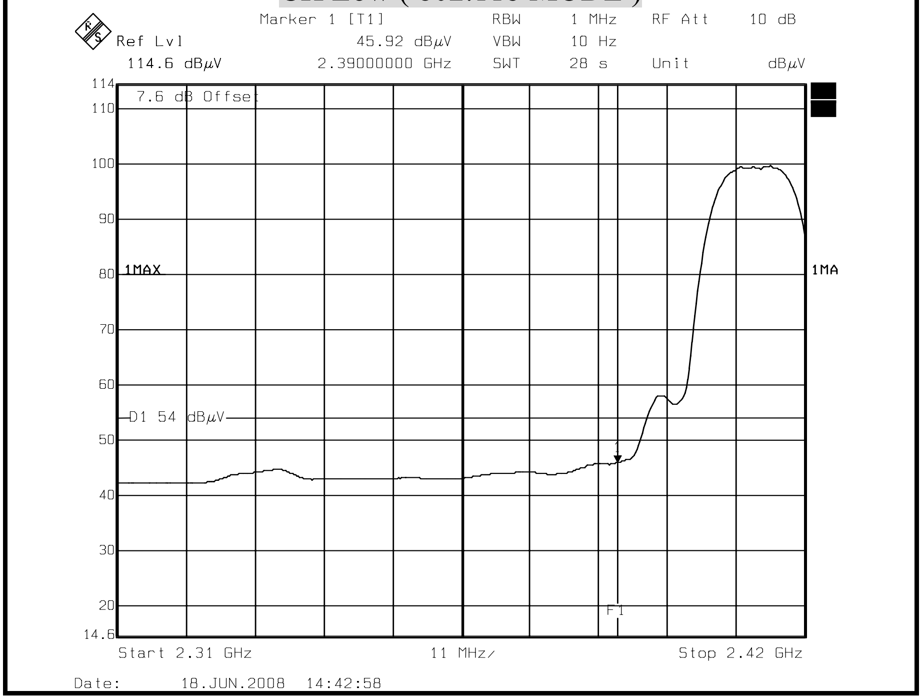
Detector mode : Peak **Polarity : Horizontal**

CH Low (802.11b MODE)



Detector mode : Average **Polarity : Horizontal**

CH Low (802.11b MODE)

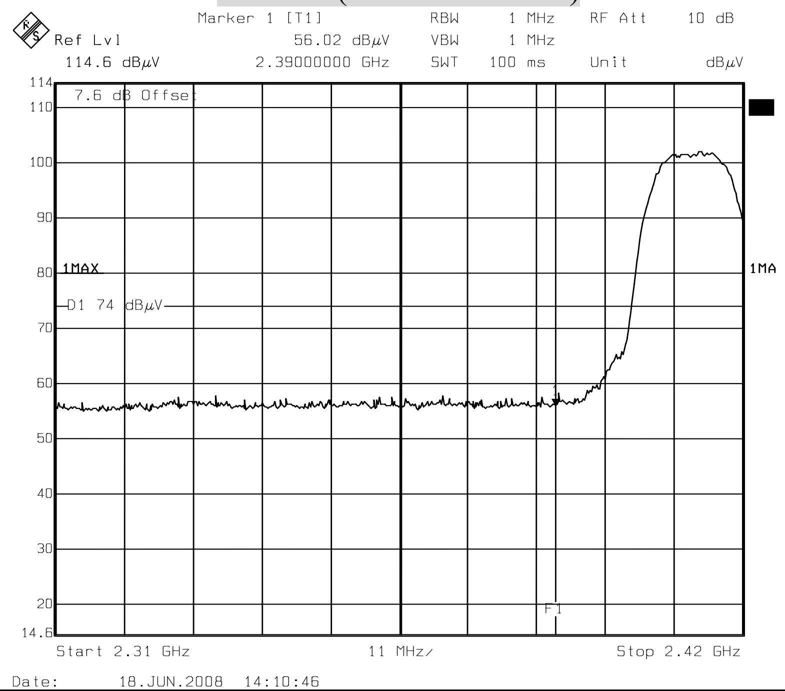


Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

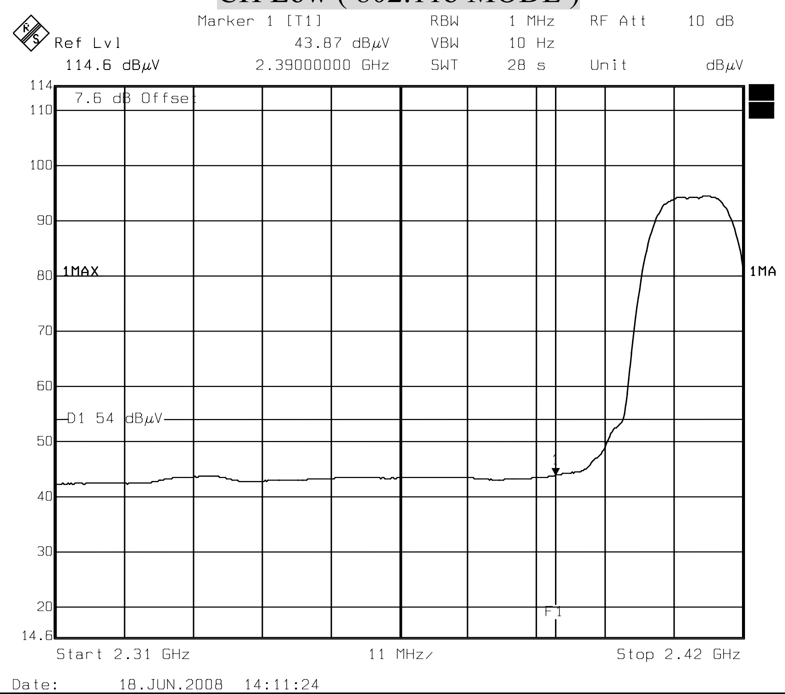
Detector mode : Peak **Polarity : Vertical**

CH Low (802.11b MODE)



Detector mode : Average **Polarity : Vertical**

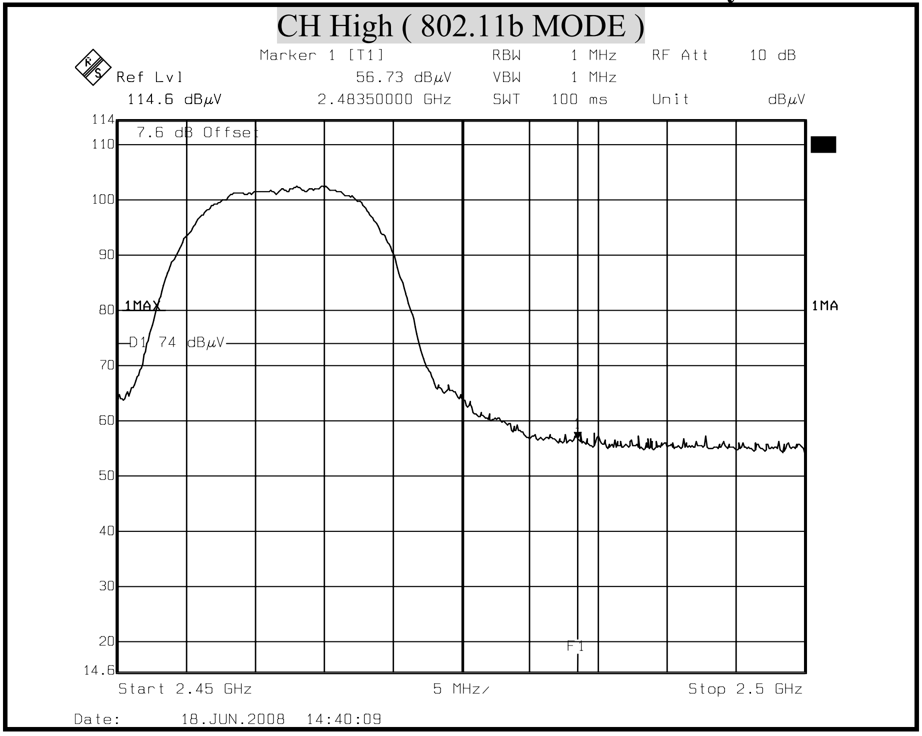
CH Low (802.11b MODE)



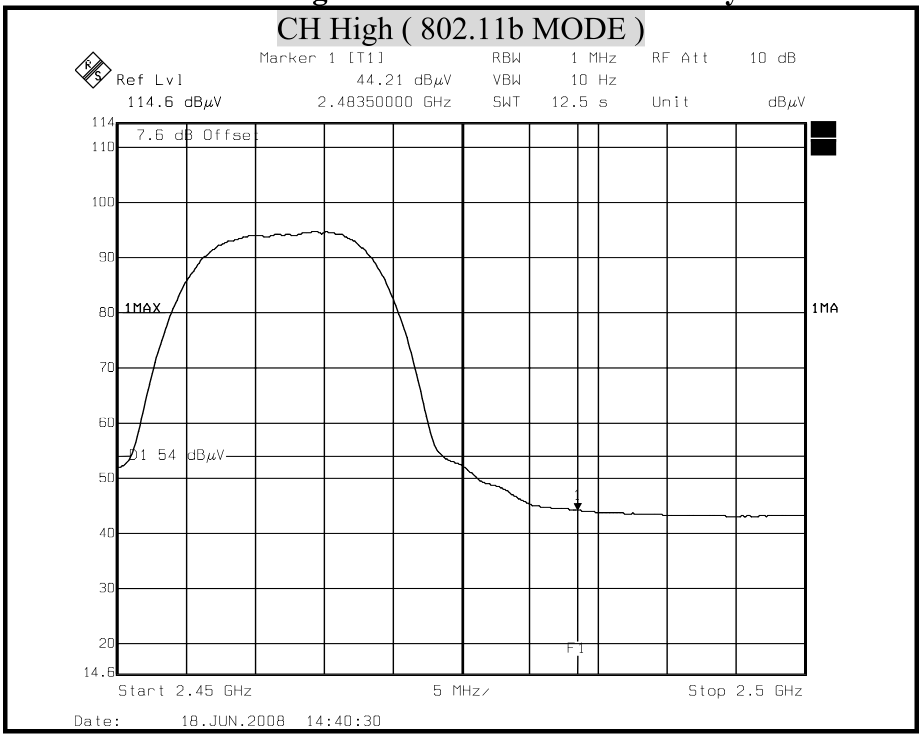
Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

Detector mode : Peak **Polarity : Horizontal**



Detector mode : Average **Polarity : Horizontal**

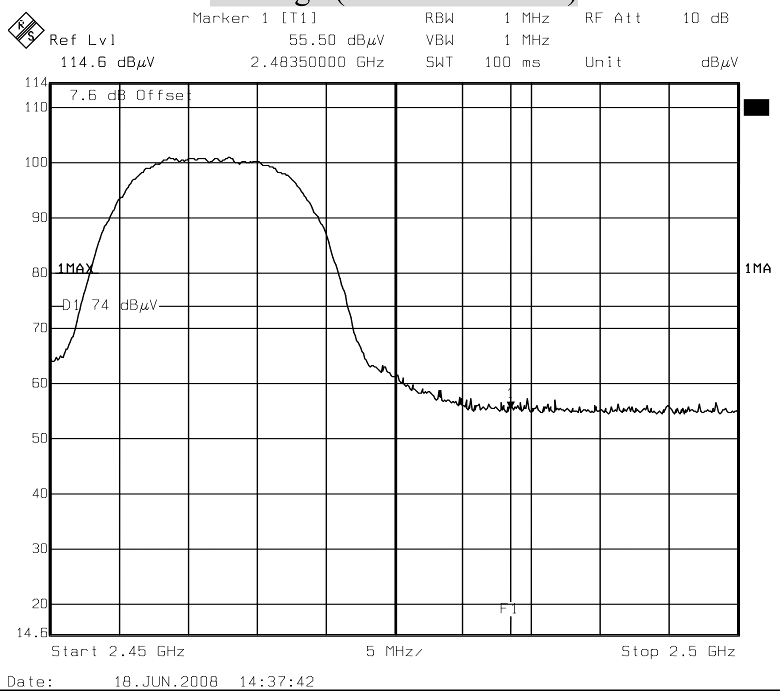


Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

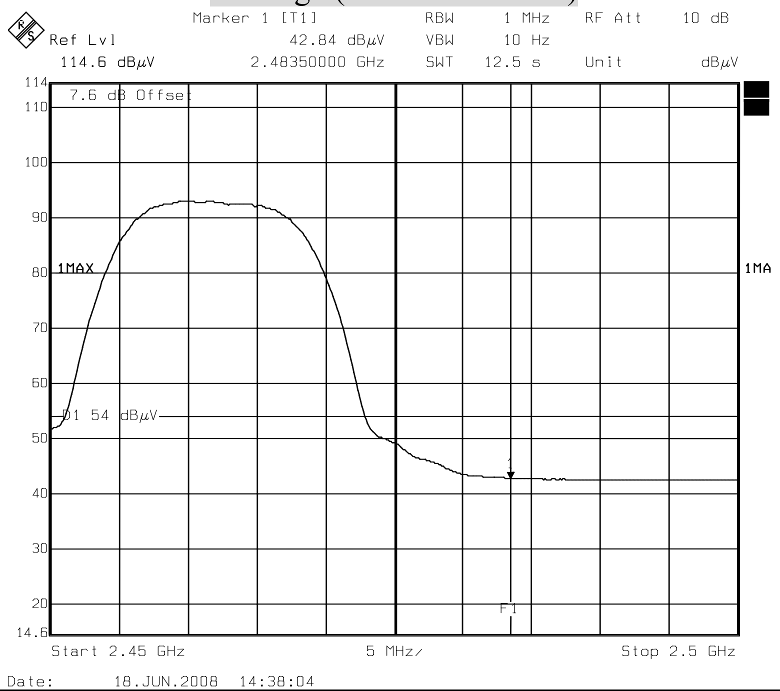
Detector mode : Peak **Polarity : Vertical**

CH High (802.11b MODE)



Detector mode : Average **Polarity : Vertical**

CH High (802.11b MODE)

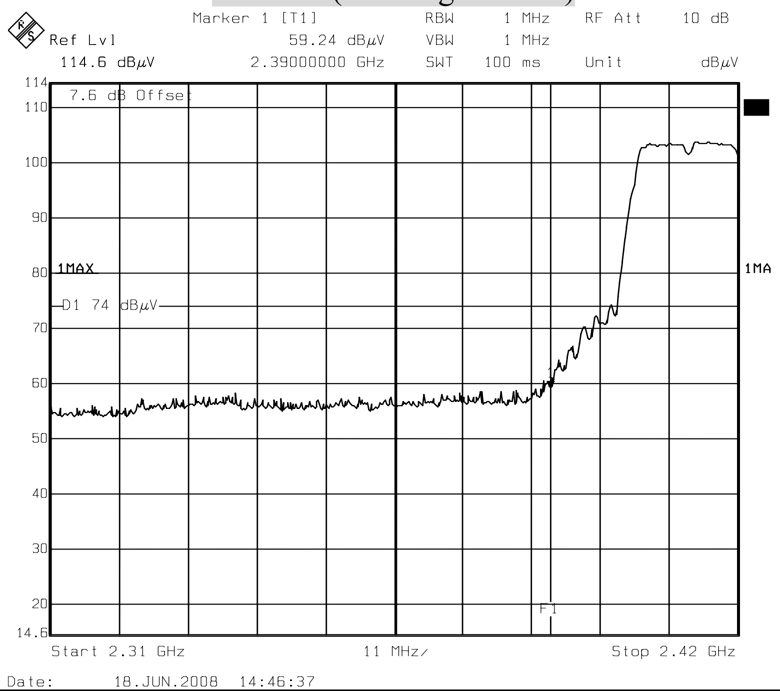


Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

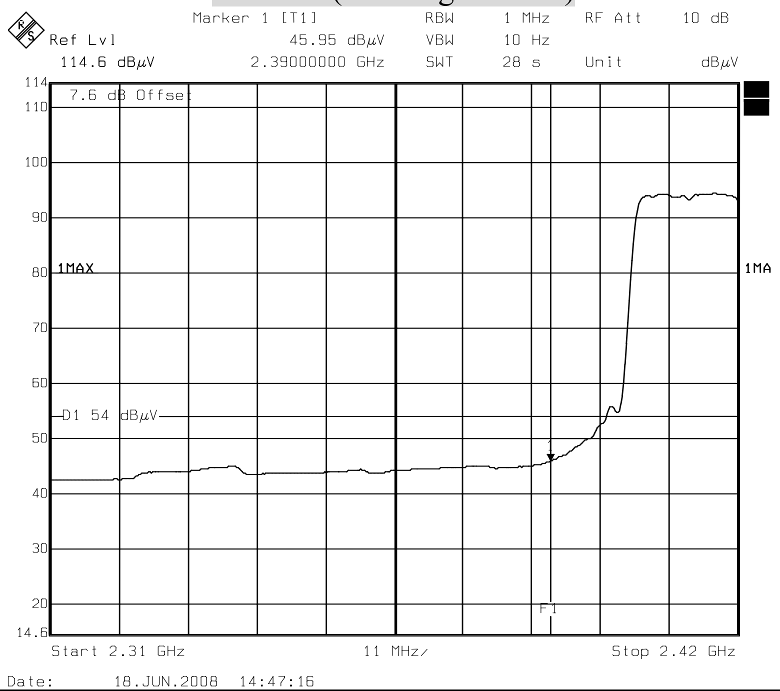
Detector mode : Peak **Polarity : Horizontal**

CH Low (802.11g MODE)



Detector mode : Average **Polarity : Horizontal**

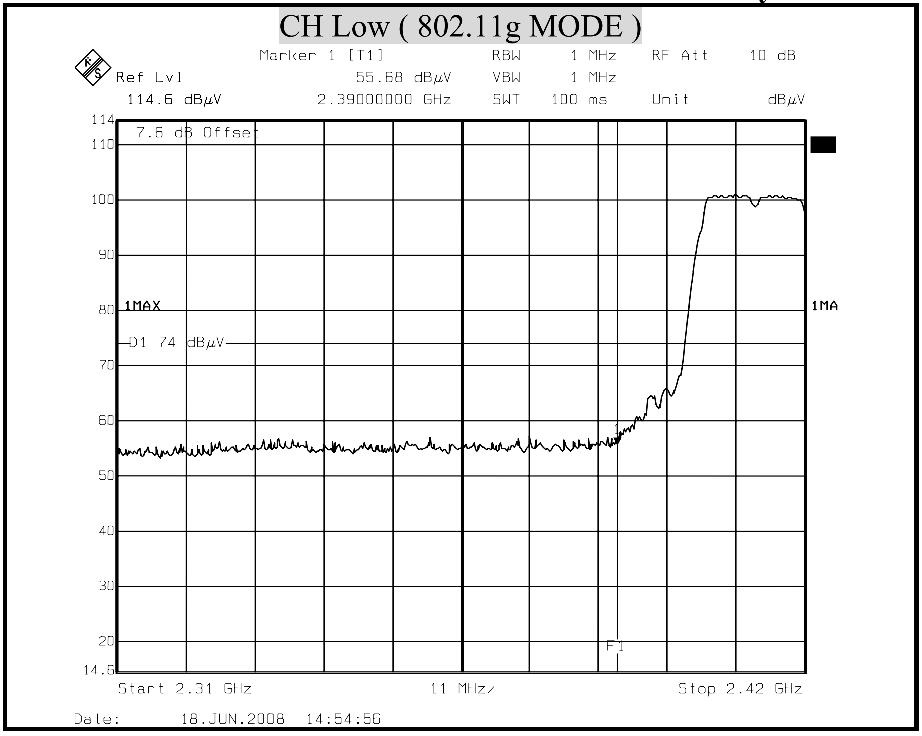
CH Low (802.11g MODE)



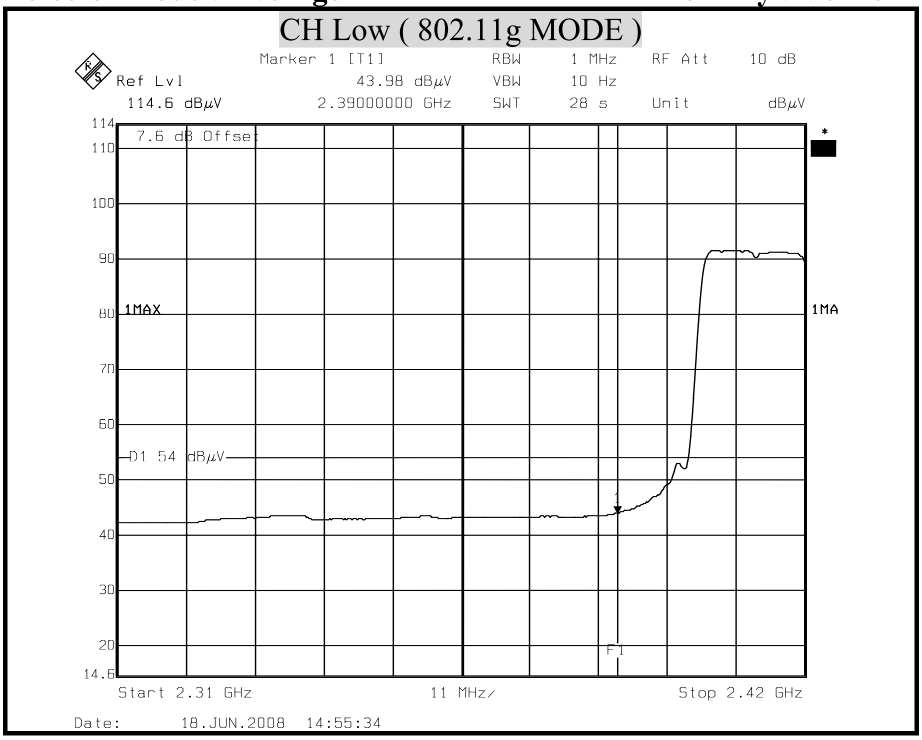
Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

Detector mode : Peak **Polarity : Vertical**



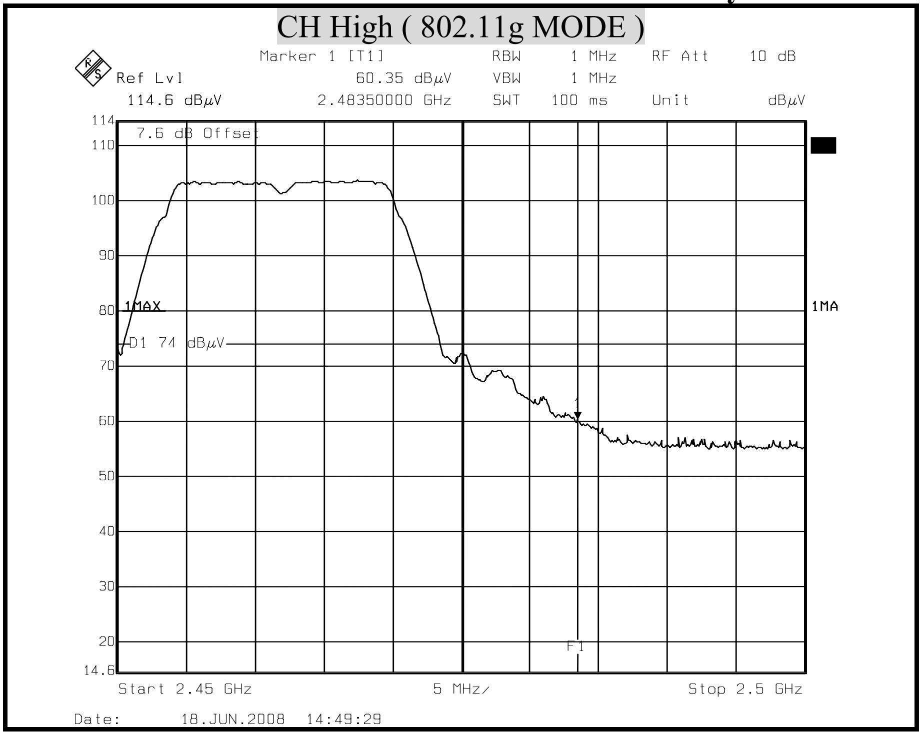
Detector mode : Average **Polarity : Vertical**



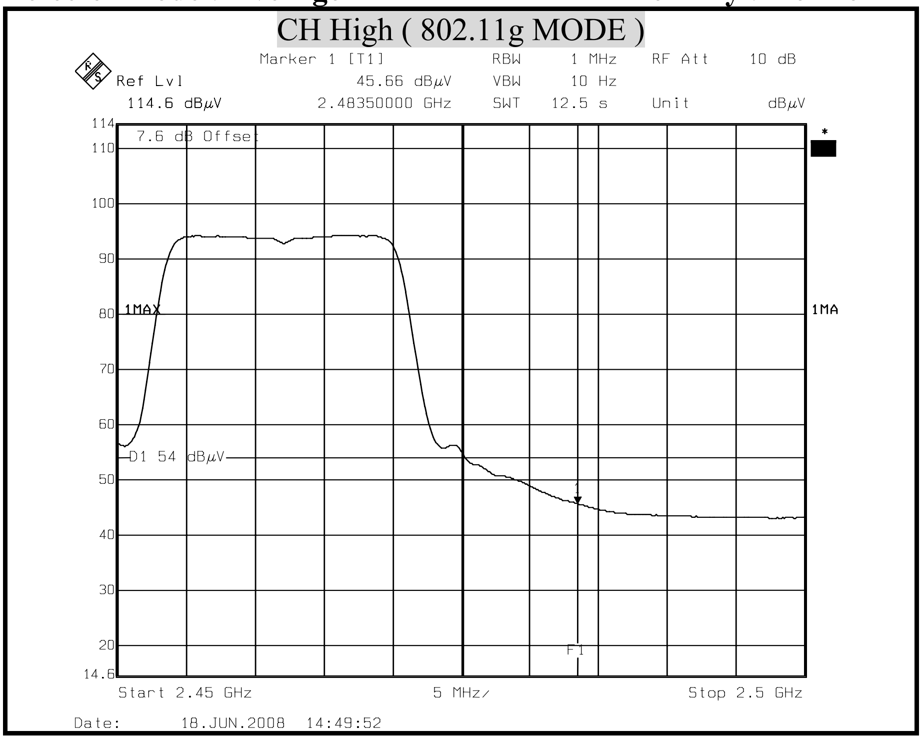
Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

Detector mode : Peak **Polarity : Horizontal**



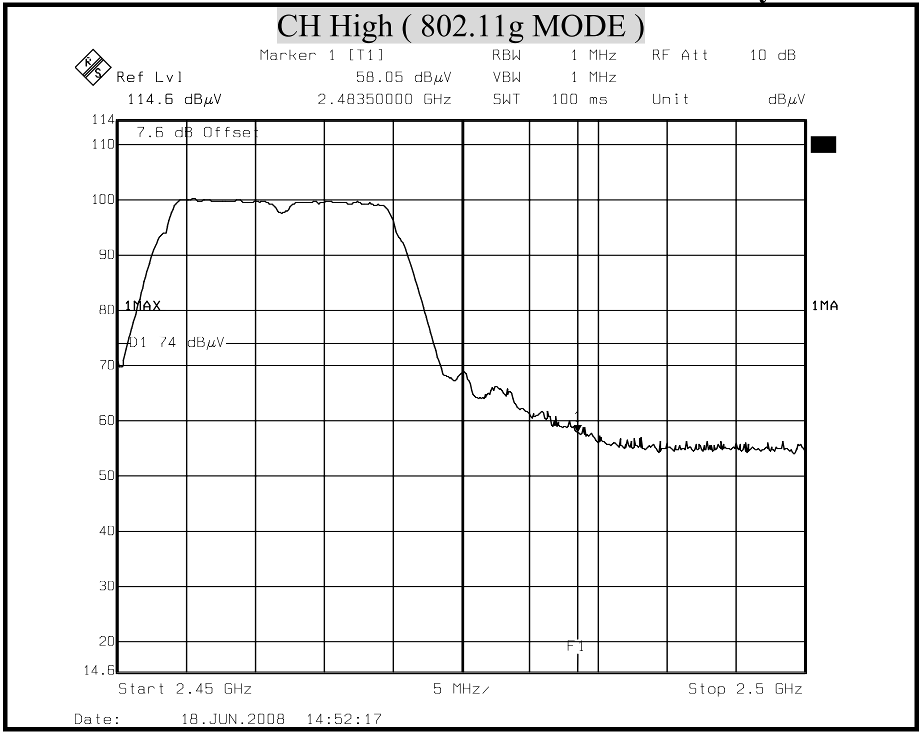
Detector mode : Average **Polarity : Horizontal**



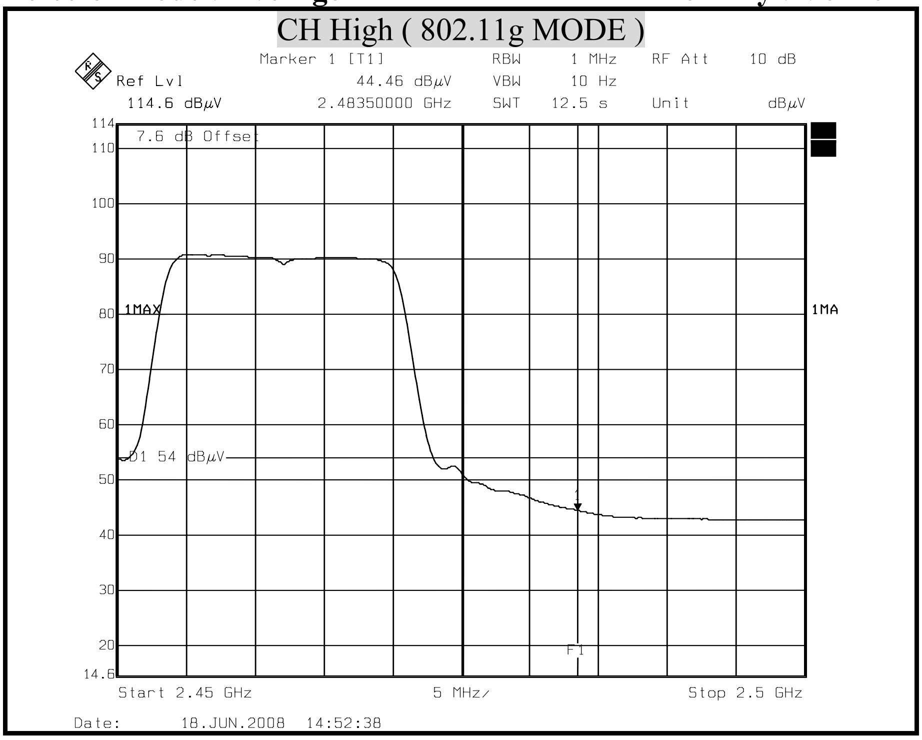
Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

Detector mode : Peak **Polarity : Vertical**



Detector mode : Average **Polarity : Vertical**



Remark:

1. Display Line = 54/74 dB μ V/m.
2. 2390MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.6(dB)
3. 2483.5MHz Offset(dB) = Antenna Factor(dB/m) + Cable Loss(dB) - Pre-Amplifier(dB) + Attenuator(dB)=7.62(dB)

8.9 POWERLINE CONDUCTED EMISSIONS

LIMITS

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

The lower limit applies at the boundary between the frequency ranges.

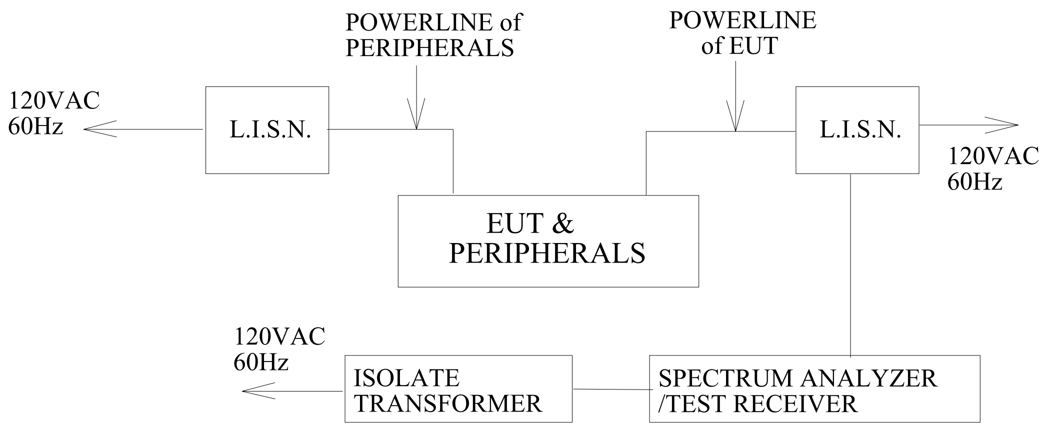
Frequency of Emission (MHz)	Conducted limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

TEST EQUIPMENTS

The following test equipments are used during the conducted power line tests：

Conducted Emission room				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
L.I.S.N.	SCHWARZBECK	NNLK 8121	8121-446	NOV. 14, 2008 For Insertion loss
	Rohde & Schwarz	ESH 3-Z5	840062/021	SEP. 28, 2008
TEST RECEIVER	Rohde & Schwarz	ESCS 30	100348	JUN. 27, 2008
TYPE N COAXIAL CABLE	SUHNER	--------	-----------	FEB. 26, 2009
Test S/W	e-3 (5.04211c) R&S (2.27)			

TEST SETUP



TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

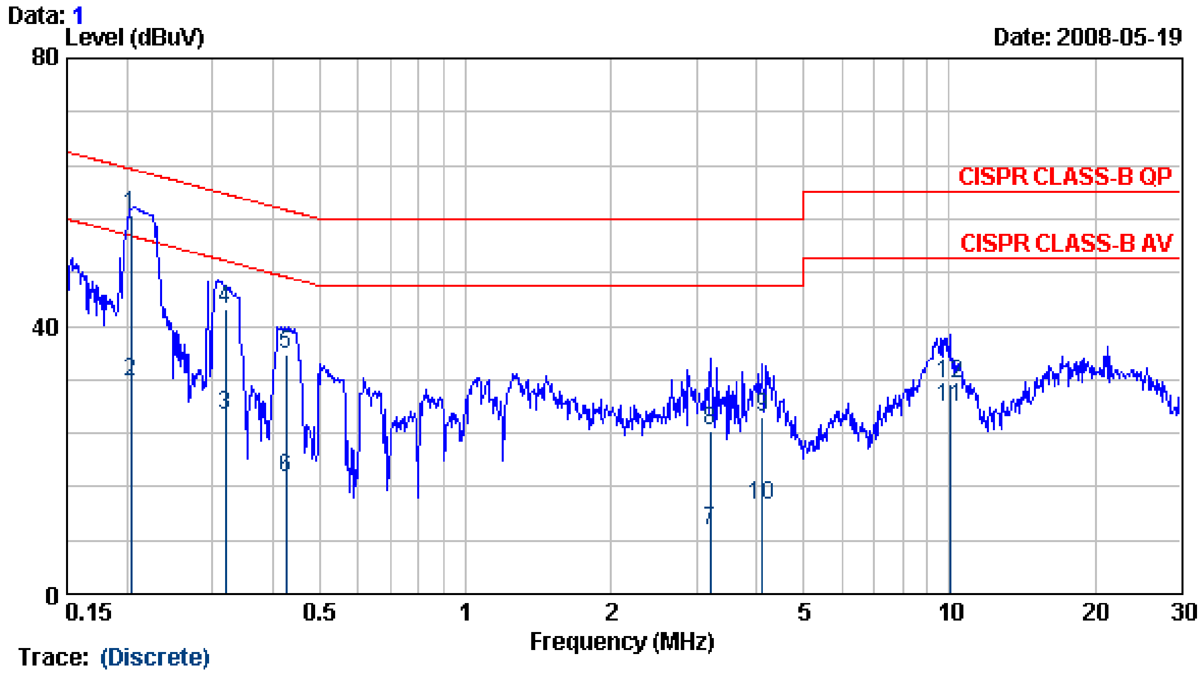
TEST RESULTS

No non-compliance noted.

CONDUCTED RF VOLTAGE MEASUREMENT

Product Name	Wireless USB Card	Test Date	2008/5/19
Model	SW902T	Test By	Eric Yang
Test Mode	Normal operating (worst case)	TEMP& Humidity	28.3°C, 55%

LINE

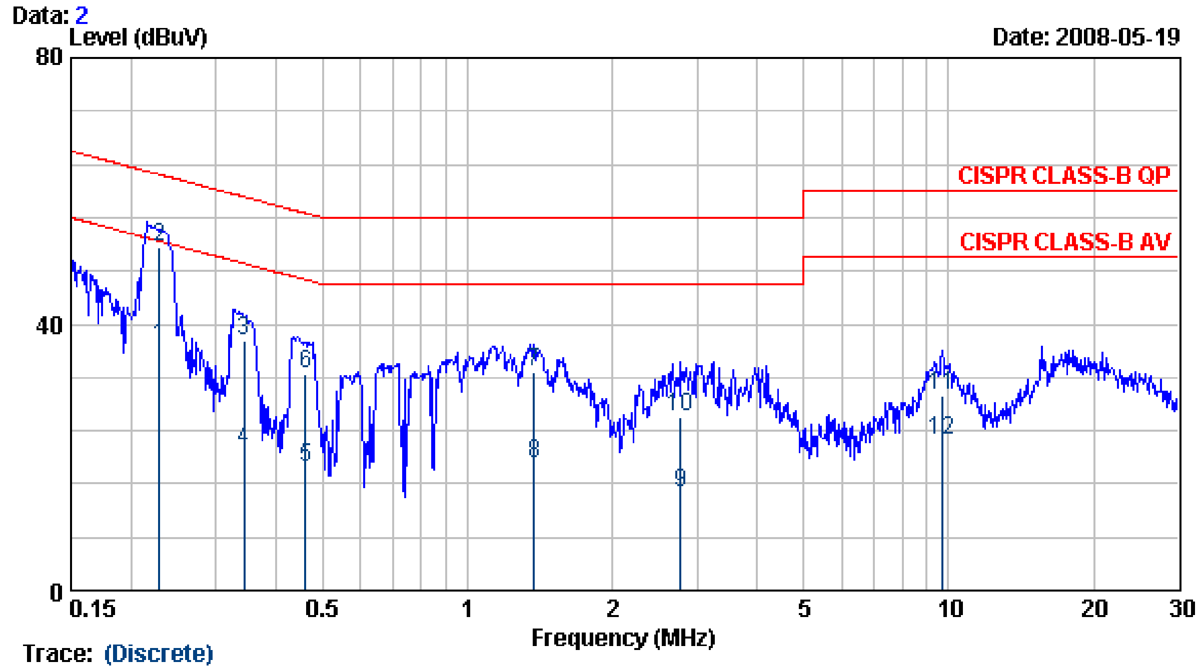


	Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
@	0.204	9.80	0.05	46.82	56.67	63.45	-6.78	QP
	0.204	9.80	0.05	21.70	31.55	53.45	-21.90	AVERAGE
	0.320	9.87	0.05	16.71	26.63	49.71	-23.09	AVERAGE
	0.320	9.87	0.05	32.63	42.55	59.71	-17.17	QP
	0.426	9.90	0.05	25.85	35.80	57.33	-21.53	QP
	0.426	9.90	0.05	7.47	17.42	47.33	-29.91	AVERAGE
	3.207	9.86	0.10	-0.53	9.43	46.00	-36.57	AVERAGE
	3.207	9.86	0.10	14.44	24.40	56.00	-31.60	QP
	4.114	9.80	0.13	16.36	26.30	56.00	-29.70	QP
	4.114	9.80	0.13	3.19	13.13	46.00	-32.87	AVERAGE
	10.019	9.90	0.63	17.42	27.95	50.00	-22.05	AVERAGE
	10.019	9.90	0.63	20.72	31.25	60.00	-28.75	QP

REMARK:
1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

Product Name	Wireless USB Card	Test Date	2008/5/19
Model	SW902T	Test By	Eric Yang
Test Mode	Normal operating (worst case)	TEMP& Humidity	28.3°C, 55%

NEUTRAL



	Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
	0.229	9.82	0.05	26.77	36.64	52.48	-15.84	AVERAGE
@	0.229	9.82	0.05	41.62	51.49	62.48	-10.99	QP
	0.344	9.88	0.05	27.55	37.48	59.10	-21.62	QP
	0.344	9.88	0.05	11.20	21.13	49.10	-27.97	AVERAGE
	0.462	9.90	0.05	8.64	18.59	46.65	-28.06	AVERAGE
	0.462	9.90	0.05	22.47	32.42	56.65	-24.23	QP
	1.374	9.95	0.04	22.88	32.87	56.00	-23.13	QP
	1.374	9.95	0.04	8.99	18.98	46.00	-27.02	AVERAGE
	2.779	9.91	0.08	4.80	14.79	46.00	-31.21	AVERAGE
	2.779	9.91	0.08	15.96	25.95	56.00	-30.05	QP
	9.654	9.90	0.61	18.93	29.44	60.00	-30.56	QP
	9.654	9.90	0.61	12.04	22.55	50.00	-27.45	AVERAGE

REMARK:

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value

9. ANTENNA REQUIREMENT

9.1 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 transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used for this product is a PIFA antenna.

The peak Gain of this antenna is 3.48 dBi at 2.4GHz.