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

TEST REPORT

For

NetComm 3G Wireless Router

Model Number: N3G007W

Brand Name: NetComm

Issued for

NetComm Limited

2-6 Orion Road,Lane Cove,NSW,Australia 2066

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No. 8, Jiu Cheng Ling, Jiaokeng Village,Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.
TEL: 886-6-580-2201
FAX: 886-6-580-2202

Testing Laboratory
1109

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REVISION HISTORY

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		June 28, 2009		Initial Issue	ALL	Leah Peng

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1. TEST REPORT CERTIFICATION

Applicant ：NetComm Limited

Address ：2-6 Orion Road,Lane Cove,NSW,Australia 2066

Equipment Under Test ：NetComm 3G Wireless Router

Model Number ：N3G007W

Brand Name ：NetComm

Date of Test ：June 15, 2009 ~ June 17, 2009

APPLICABLE STANDARD	
STANDARD	**TEST RESULT**
FCC Part 15 Subpart C : 2008 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	NetComm 3G Wireless Router
Model Number	N3G007W
Brand Name	NetComm
Frequency Range	IEEE 802.11b/g (DTS Band):2412MHz～2462MHz
Transmit Power	IEEE 802.11b Mode : 20.47dBm (DTS Band) (111.43 mW) IEEE 802.11g Mode : 22.33dBm (DTS Band) (171.00 mW)
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, 11, 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	One antenna RF Antenna Cable Assembly Manufacture: WHA YU GROUP Model: C381-510109-A Connector: SMA Plug Reverse Type: Dipole Antenna Gain: 2 dBi
Power source	Powered from SWITCHING ADAPTER Model: TESA1G-0503000 Input:100-240Vac, 50/60Hz, 0.45A Output:5Vdc, 3A
Temperature Range	0 ~ +55°C

REMARK : 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: **XIAN3G007W** 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 and external photo of the EUT.

3. DESCRIPTION OF TEST MODES

The EUT is a NetComm 3G Wireless Router.

The RF chipset is manufactured by Ralink technology.

The antenna peak gain 2dBi (highest gain) were chosen for full testing.

IEEE 802.11 b, IEEE 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 channel is determined as the channel with the highest output power.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 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 C63.7:1992, ANSI C63.4: 2003 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 **T**aiwan **A**ccreditation **F**oundation for the specific scope of accreditation under Lab Code: 1109 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 TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1037 and 455173).

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	C-2882 R-2635
Taiwan	TAF	CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, EN 60601-1-2, CISPR 22, CNS 13438, EN 55022, EN 55024, AS/NZS CISPR 22 CISPR 14, EN 55014-1, EN 55014-2, CNS 13783-1, CISPR 22, CNS 13439, EN 55013, FCC Method-47 CFR Part 15 Subpart B, IC ICES-003, VCCI V-3 & V-4 FCC Method-47 CFR Part 15 Subpart C and ANSI C63.4, LP 0002 EN / IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 / -11 EN 61000-3-2, EN 61000-3-3 EN 61000-6-3, EN 61000-6-1, AS/NZS 4251.1, EN 61000-6-4, EN 61000-6-2, AS/NZS 4251.2, EN 61204-3, EN 50130-4, EN 62040-2, EN 50371, EN 50385, AS/NZS 4268, ETSI EN 300 386 ETSI EN 300 328, ETSI EN 301 489-1/-3/-9/-17 ETSI EN 301 893, ETSI EN 300 220-2/-1 ETSI EN 300 440-2/-1 ETSI EN 301 357-2/-1 RSS-310, RSS-210 Issue 7, RSS-Gen Issue 2	Testing Laboratory 1109
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS13439	SL2-IN-E-0039 SL2-R1/R2-0039 SL2-A1-E-0039
Canada	Industry Canada	RSS210, Issue 7	IC 2324H-I

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

6. CALIBRATION AND UNCERTAINTY

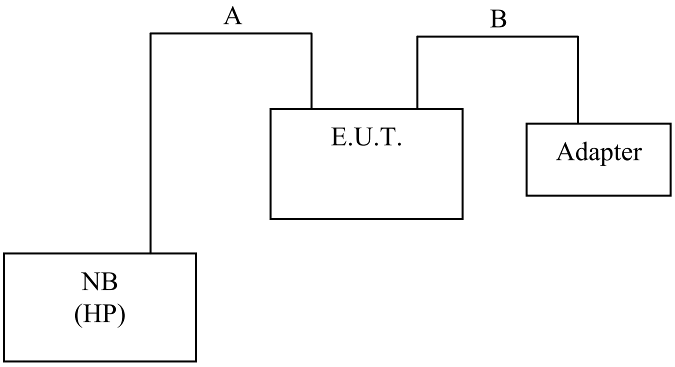
6.1 MEASURING INSTRUMENT CALIBRATION

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.

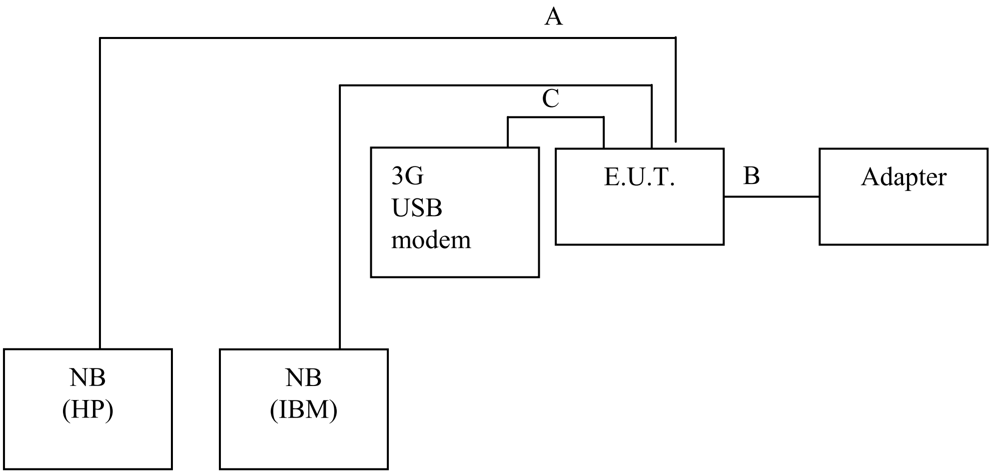
7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

RADIATED RF MEASUREMENT SETUP



POWERLINE CONDUCTED EMISSIONS & RADIATED EMISSION MEASUREMENT SETUP



7.2 SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1	Note Book	HP	CNC 6000	CNTPP2090	Power cable, unshd, 1.6m
2	Note Book	IBM	T43	DOC	Power cable, unshd, 1.6m
3	3G USB Modem	ZTE	MF620	DOC	USB cable, unshd, 0.12m

No.	Signal cable description	
A	LAN Cable	Unshielded, 6.0m, 2 pcs.
B	Power Cable	Unshielded, 1.8m, 1 pcs., with a core
C	USB cable	Unshielded, 0.12m, 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 “EVT-MGB111 Test Program” software was used for testing
   The EUT driver software installed in the host support equipment during testing was
   EVT-MGB111 Test Program
3. Start to test

(1) **TX Mode:**

⇨ **Tx Mode:CCK 、OFDM** (Bandwidth: 20、40)

⇨ **Tx Data Rate: 11Mbps long** (IEEE 802.11b mode TX)
6Mbps (IEEE 802.11g mode TX)

TXPower Offset

Target Power: IEEE 802.11b Channel Low (2412MHz) = **9**
IEEE 802.11b Channel Middle (2437MHz) = **9**
IEEE 802.11b Channel High (2462MHz) = **9**

Target Power: IEEE 802.11g Channel Low (2412MHz) = **9**
IEEE 802.11g Channel Middle (2437MHz) = **9**
IEEE 802.11g Channel High (2462MHz) = **9**

(2) **RX Mode：**

Set RX mode

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

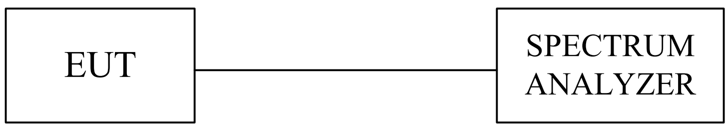
LIMIT

§ 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	FSEK 30	835253/002	OCT. 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	12424	500	PASS
Middle	2437	12324	500	PASS
High	2462	12352	500	PASS

NOTE :
1. At finial test to get the worst-case emission at11Mbps.
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.

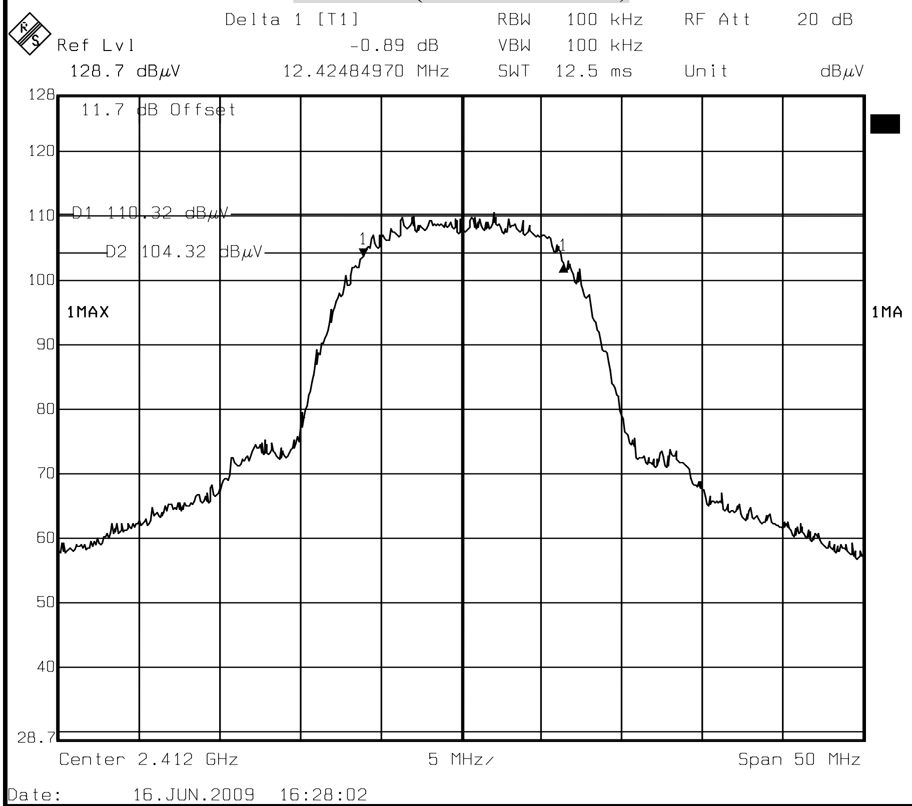
IEEE 802.11g mode (One TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16665	500	PASS
Middle	2437	16628	500	PASS
High	2462	16633	500	PASS

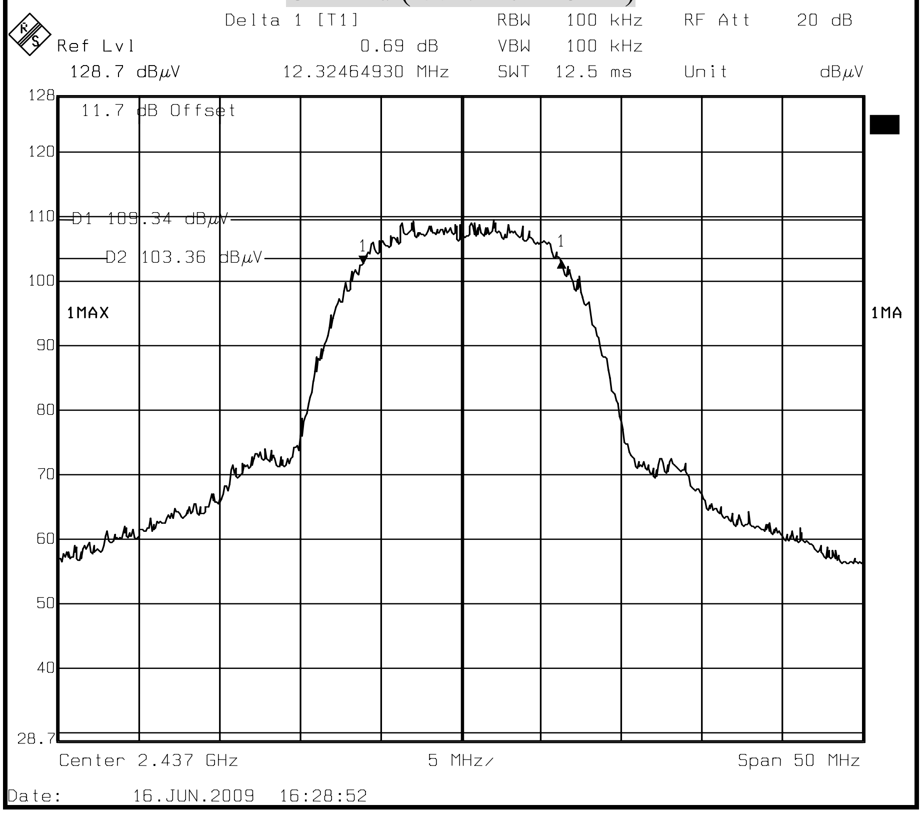
NOTE :
1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

6dB BANDWIDTH (802.11b MODE)

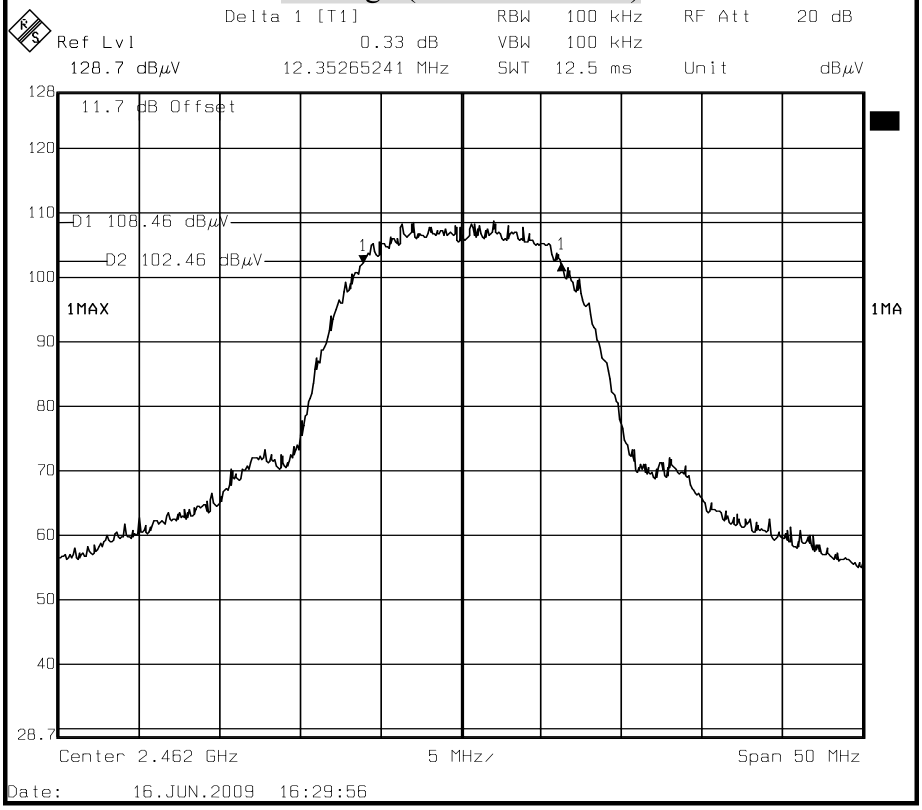
CH Low (802.11b MODE)



CH Mid (802.11b MODE)

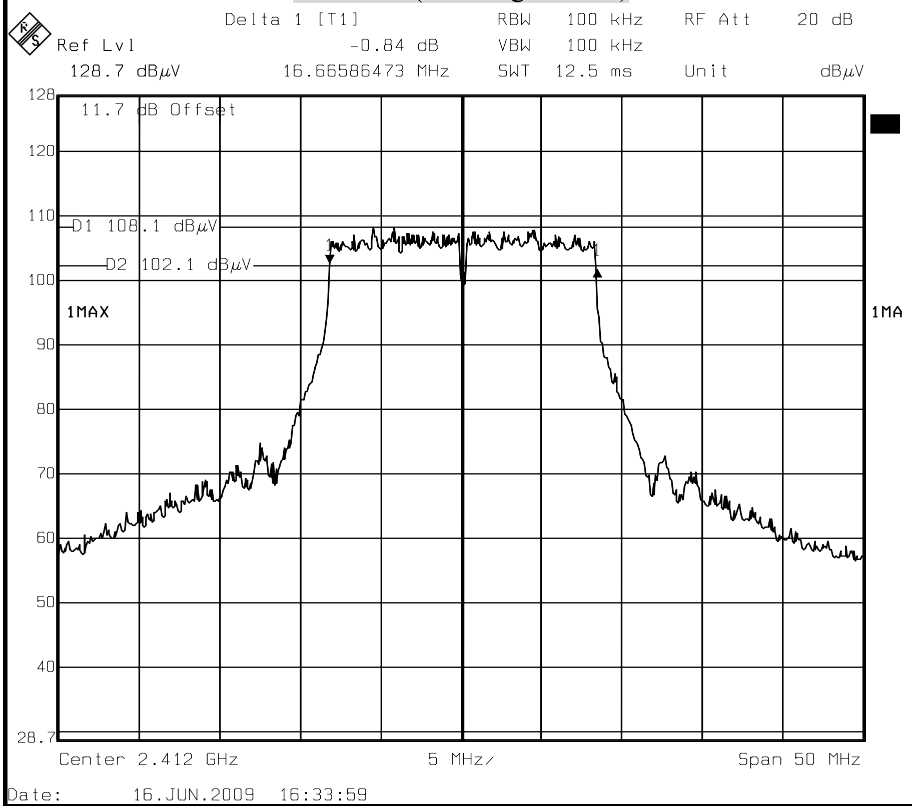


CH High (802.11b MODE)

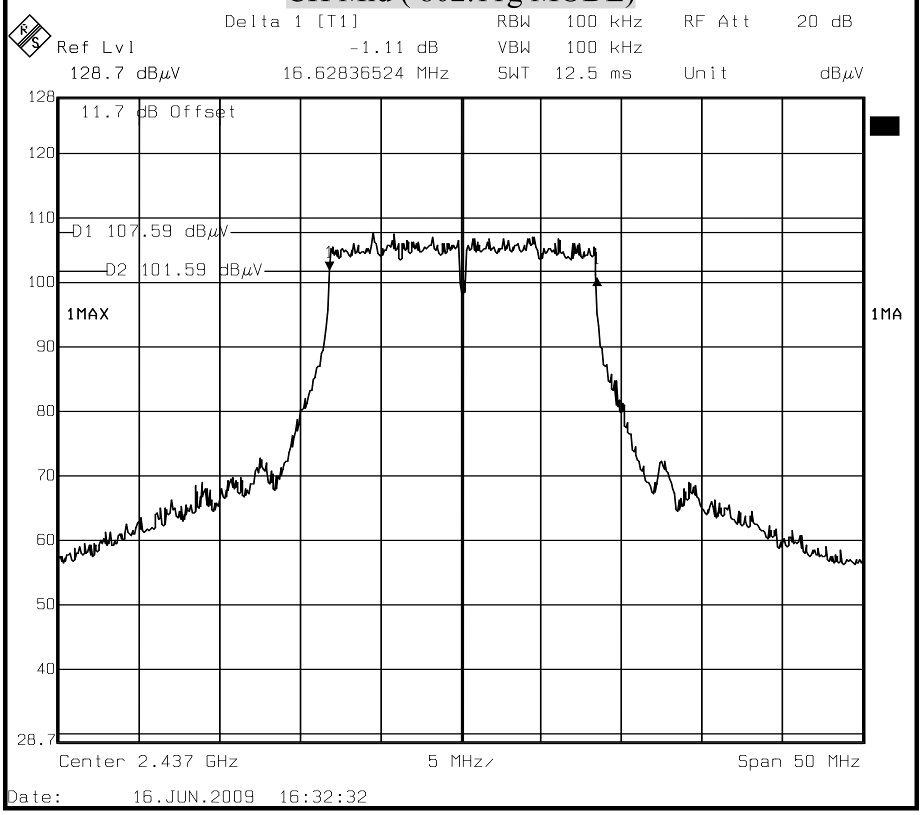


6dB BANDWIDTH (802.11g MODE)

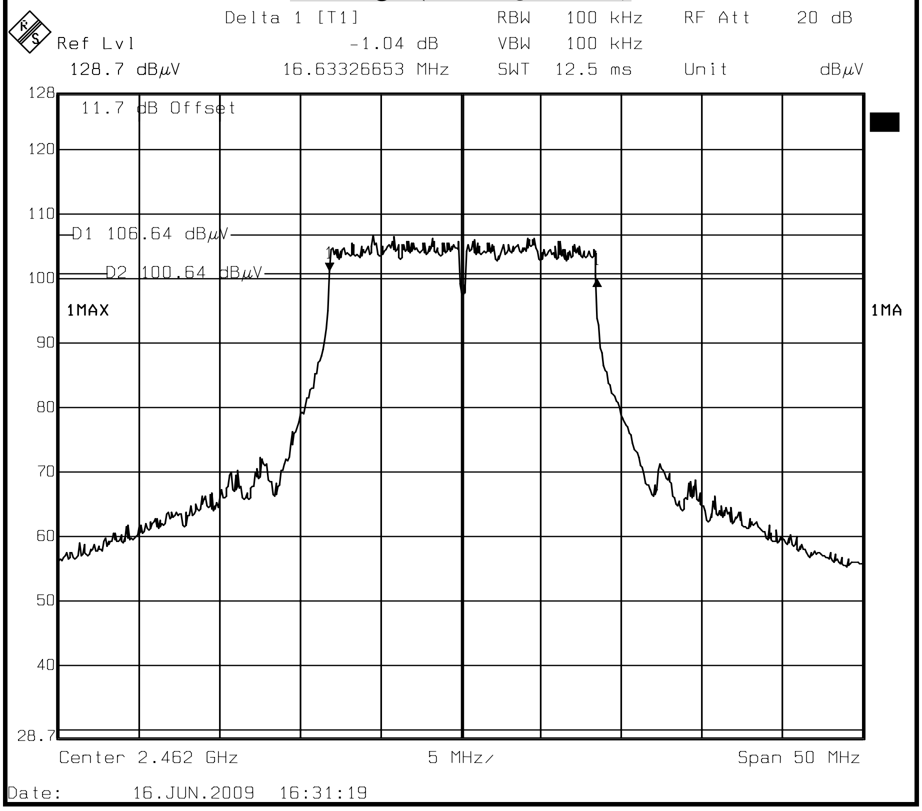
CH Low (802.11g MODE)



CH Mid (802.11g MODE)



CH High (802.11g MODE)



8.2 MAXIMUM PEAK OUTPUT POWER

LIMIT

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

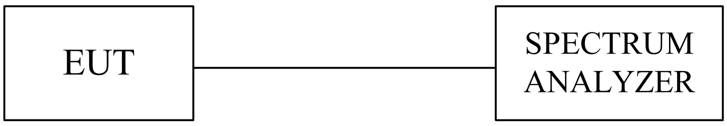
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 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	R&S	FSEK 30	835253/002	OCT. 14, 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.

Measurement of Digital Transmission Systems Operating under Section 15.247

TEST RESULTS

No non-compliance noted

IEEE 802.11b mode (One TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	20.47	30	PASS
Middle	2437	19.71	30	PASS
High	2462	18.91	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.

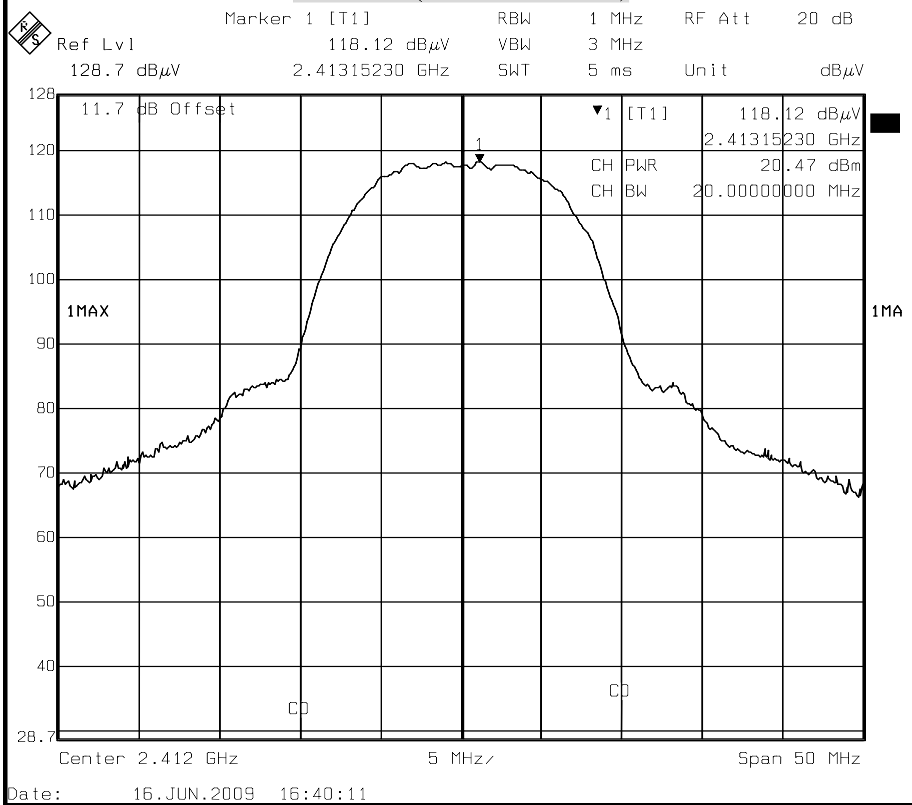
IEEE 802.11g mode (One TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	22.33	30	PASS
Middle	2437	21.62	30	PASS
High	2462	20.50	30	PASS

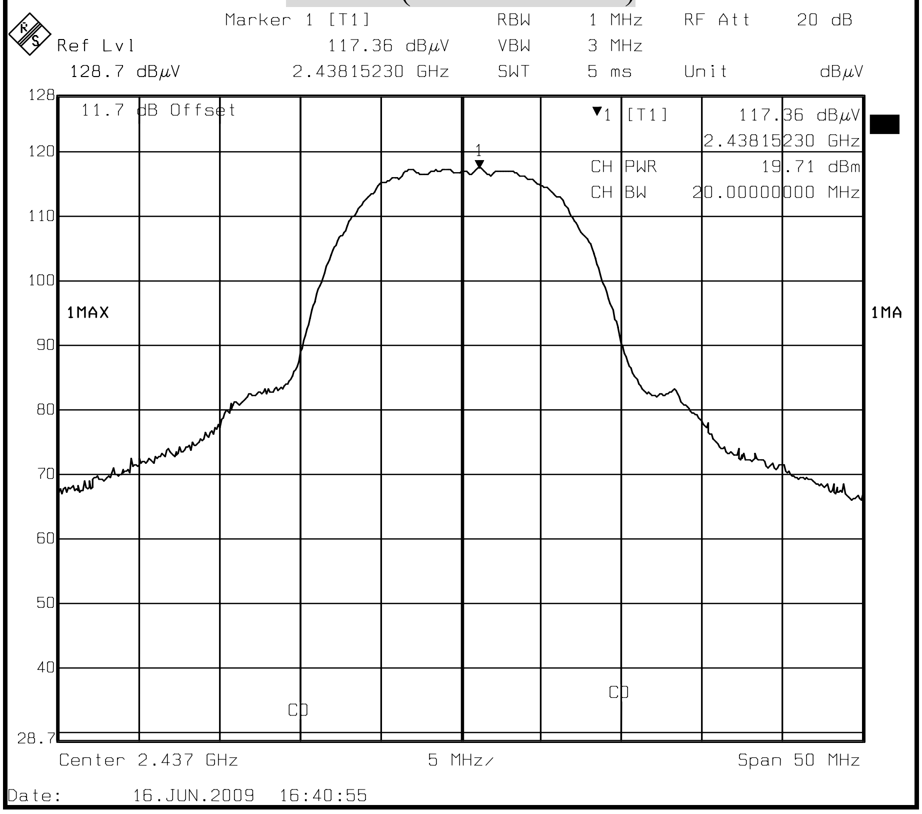
NOTE : 1.At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

MAXIMUM PEAK OUTPUT POWER (802.11b MODE)

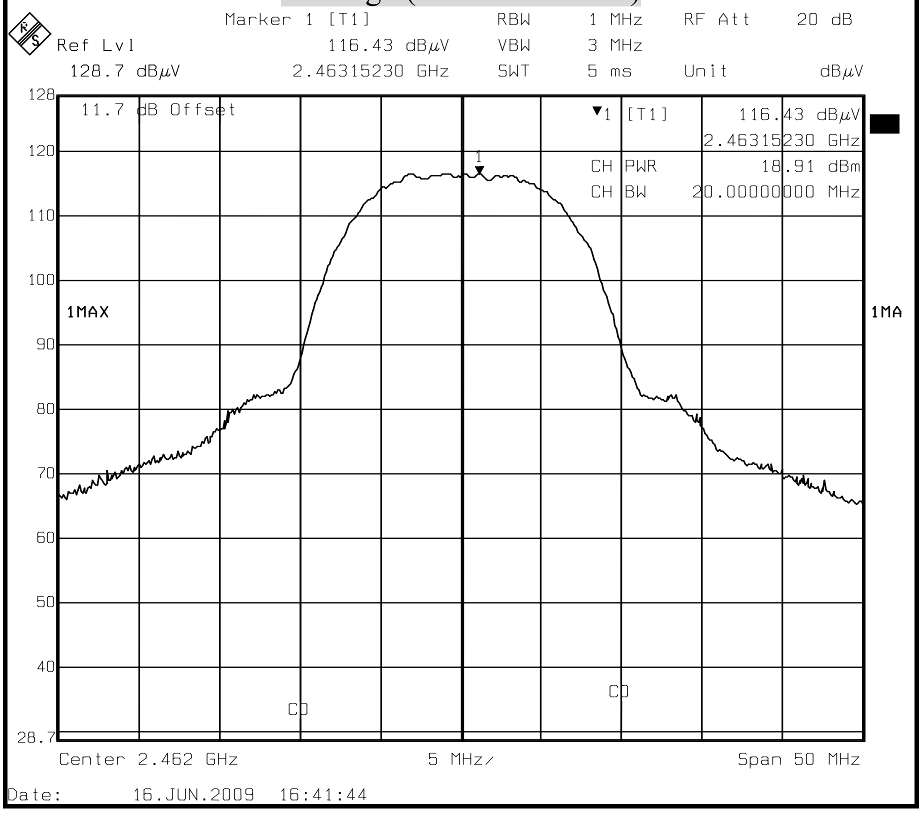
CH Low (802.11b MODE)



CH Mid (802.11b MODE)

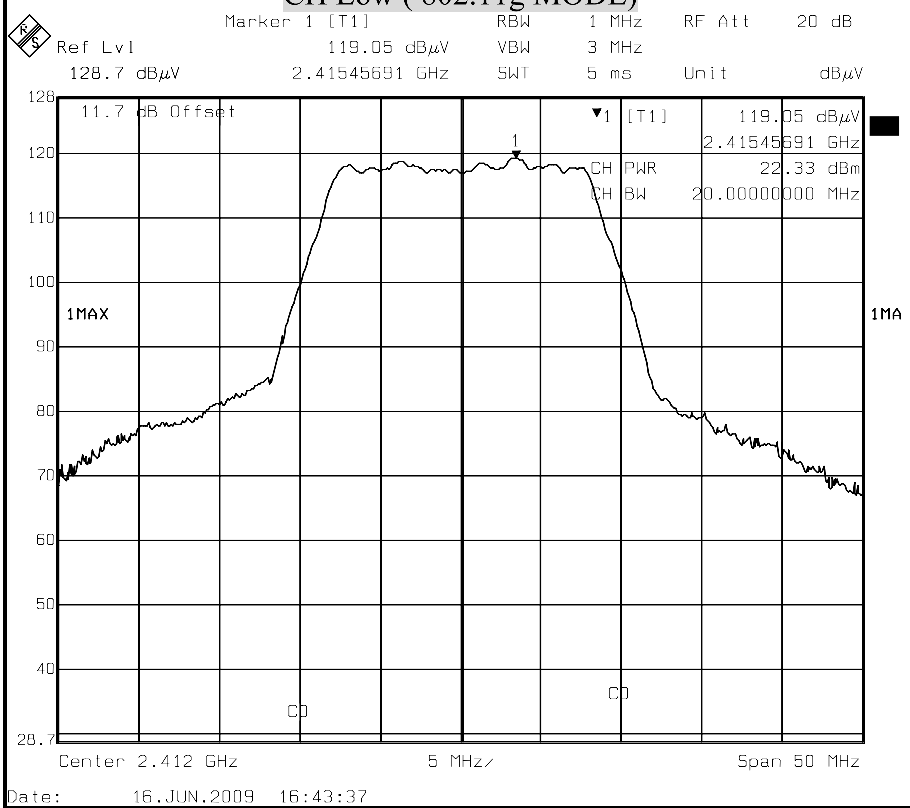


CH High (802.11b MODE)

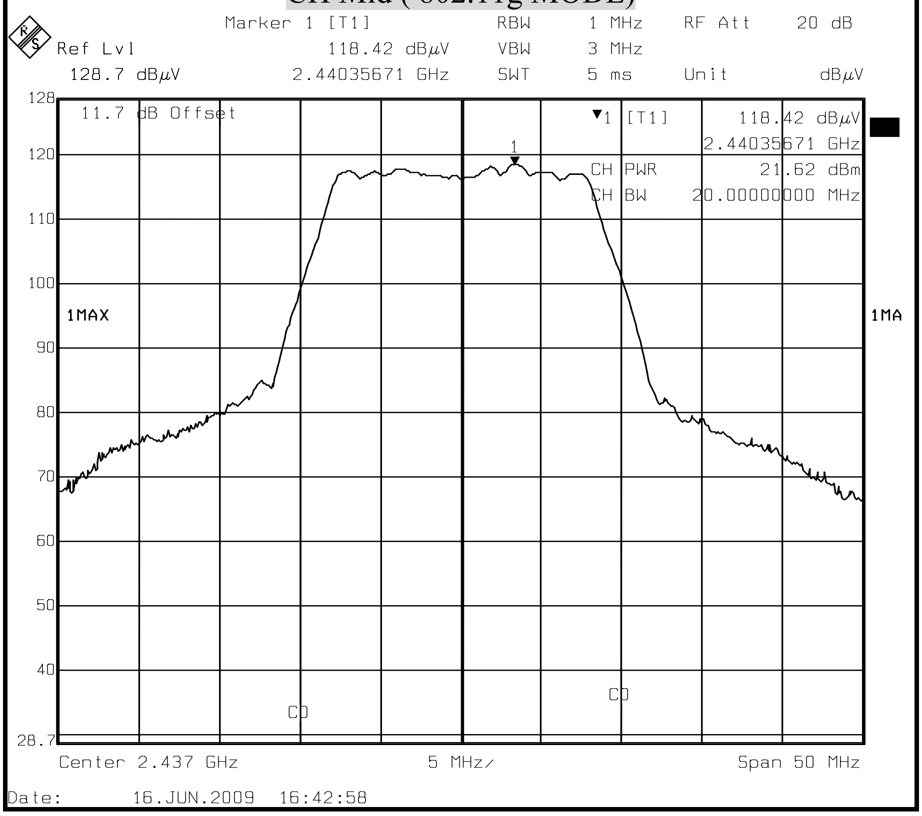


MAXIMUM PEAK OUTPUT POWER (802.11g MODE)

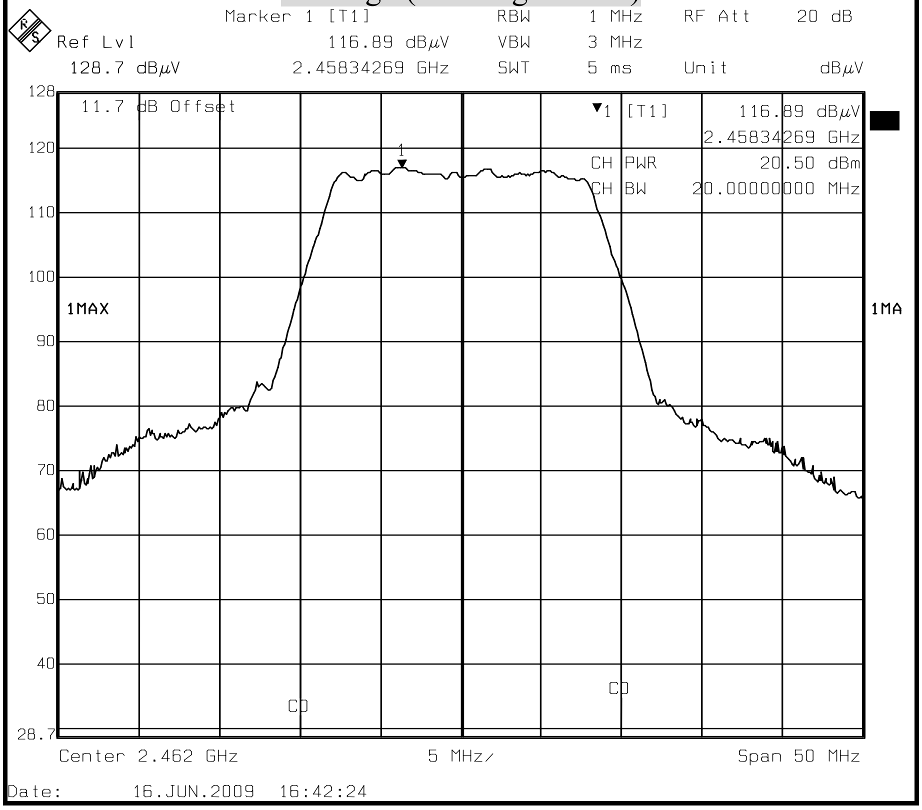
CH Low (802.11g MODE)



CH Mid (802.11g MODE)



CH High (802.11g MODE)



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

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.

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

G=2dB=1.5848932 mW

Power density = 0.0796 * P * G /400

IEEE 80211b =0.0796*111.4296*1.58489139/400=0.035144

IEEE 80211g =0.0796*171.0015*1.58489319/400=0.053933

Mode	Minimum separation distance (cm)	Output Power (dBm)	Output Power (mw)	Numeric antenna gain (dB)	Power Density Limit (mW/cm^2)	Power Density at 20cm (mW/cm^2)
IEEE 802.11b	20.0	20.47	111.43	2	1	0.035144
IEEE 802.11g	20.0	22.33	171.00	2	1	0.053933

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.

8.4 POWER SPECTRAL DENSITY

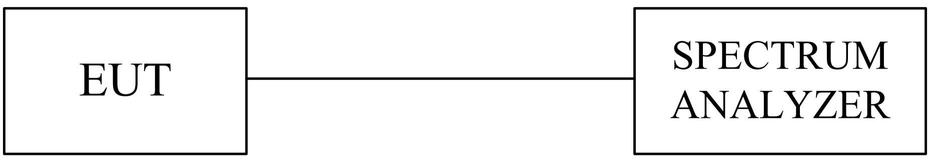
LIMIT

§ 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	FSEK 30	835253/002	OCT. 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

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
Low	2412	-9.87	8	PASS
Middle	2437	-10.68	8	PASS
High	2462	-11.43	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.

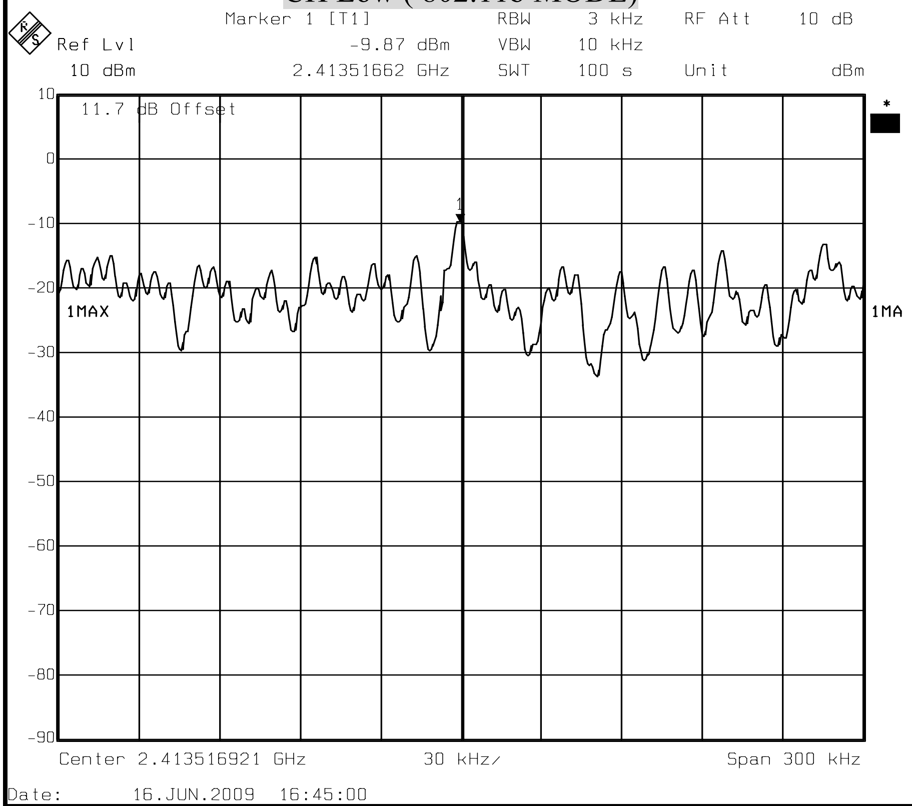
IEEE 802.11g mode

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-12.98	8	PASS
Middle	2437	-14.10	8	PASS
High	2462	-15.07	8	PASS

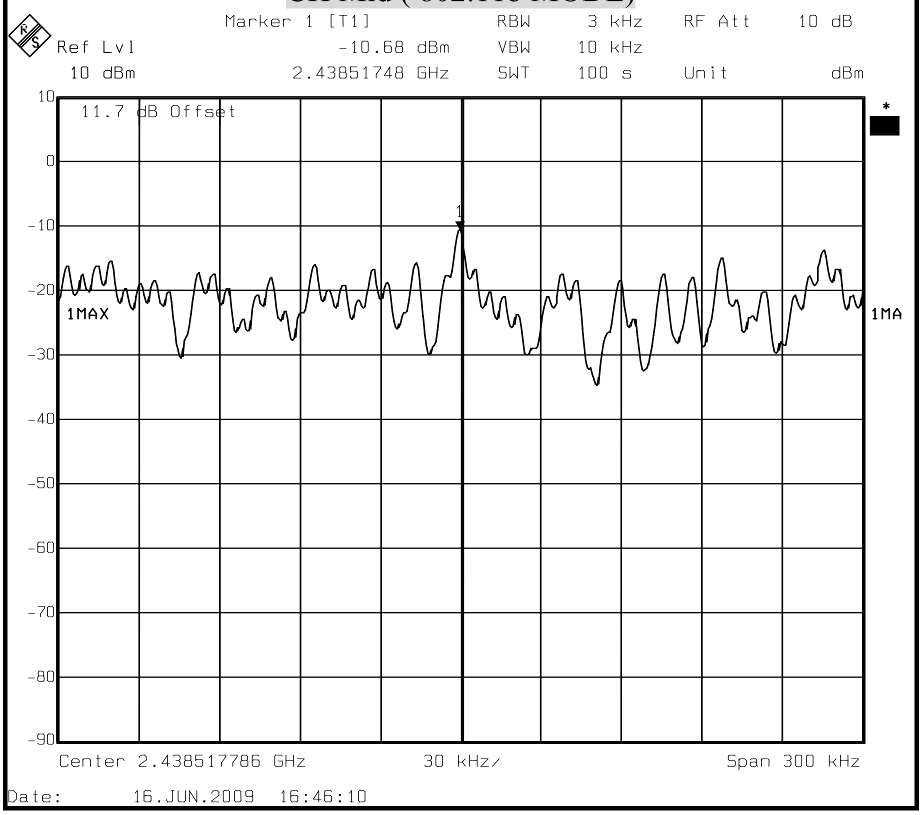
NOTE : 1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

POWER SPECTRAL DENSITY (IEEE 802.11b MODE)

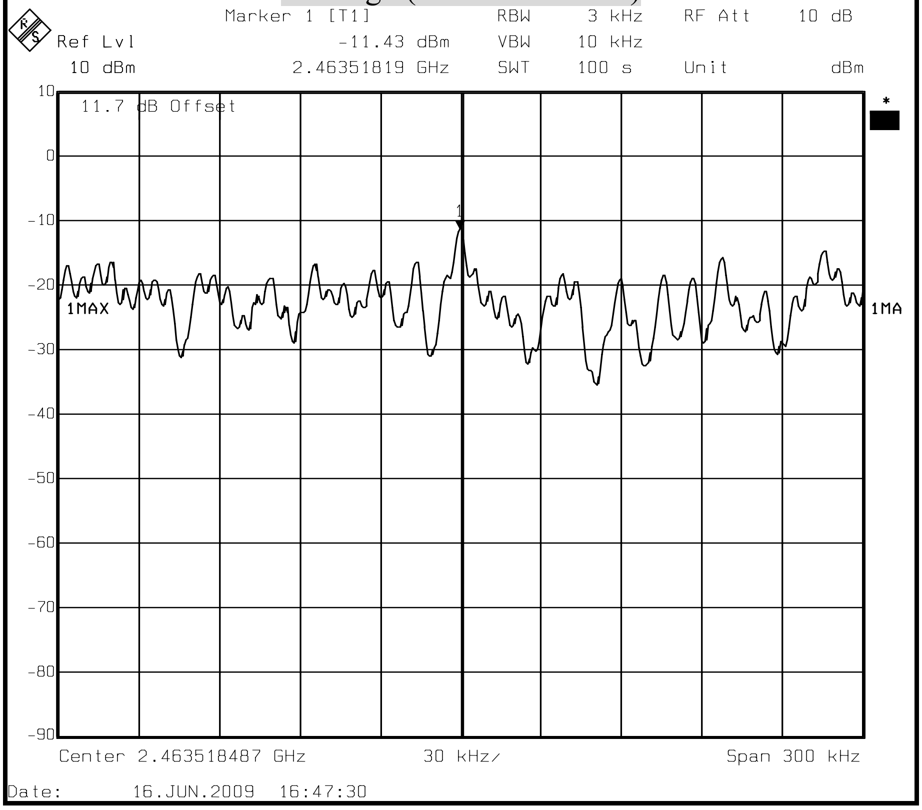
CH Low (802.11b MODE)



CH Mid (802.11b MODE)

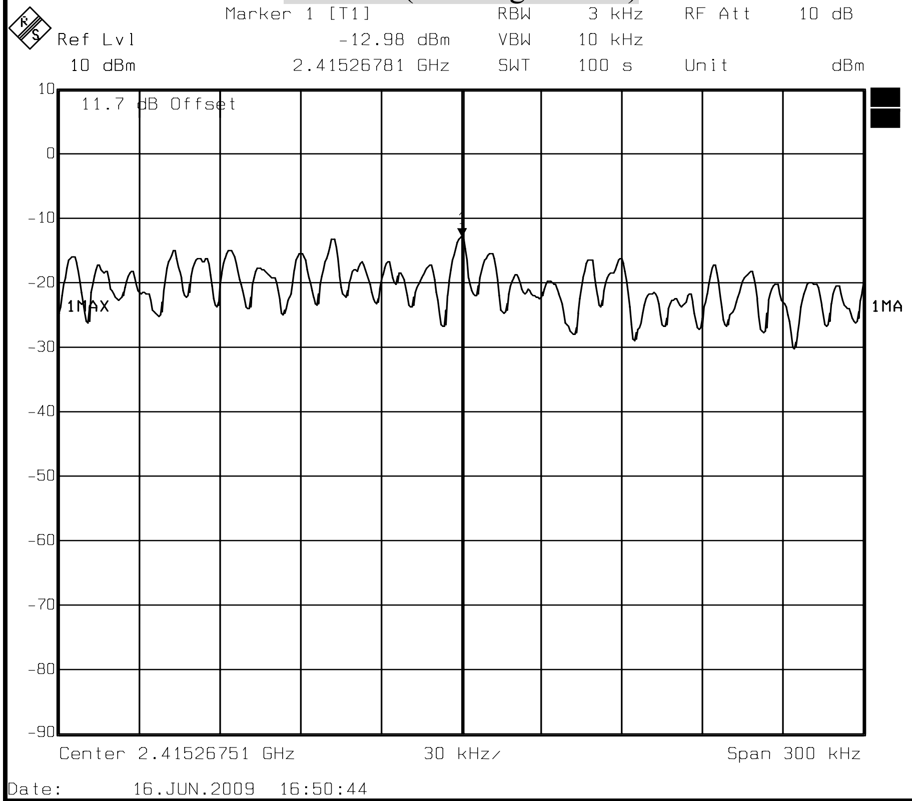


CH High (802.11b MODE)

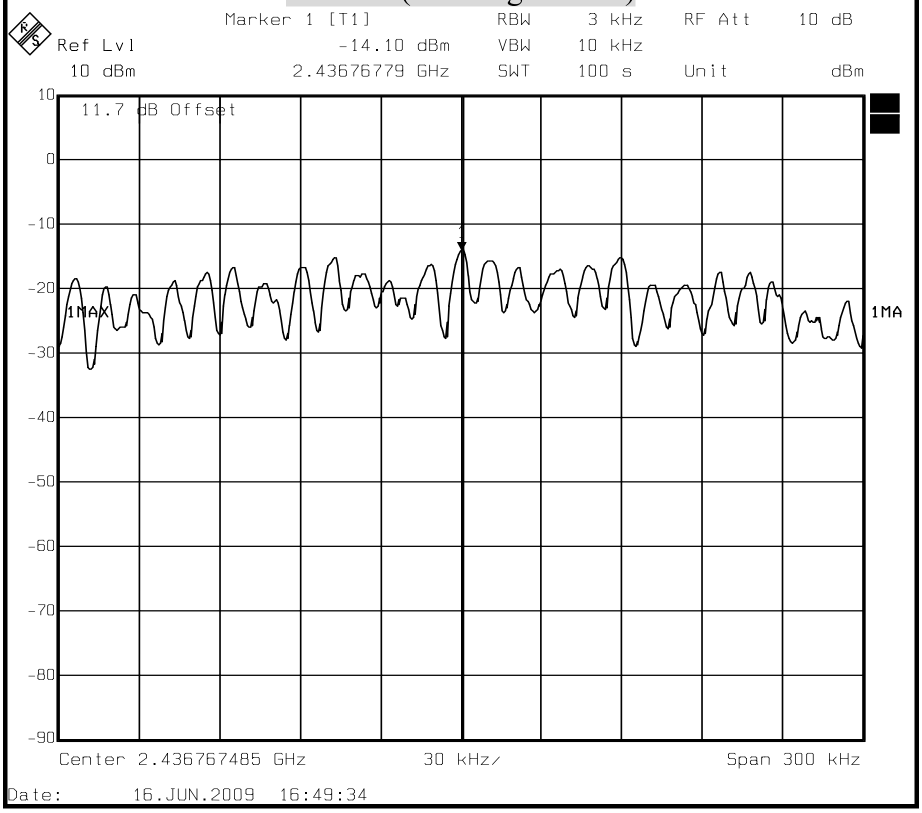


POWER SPECTRAL DENSITY (IEEE 802.11g MODE)

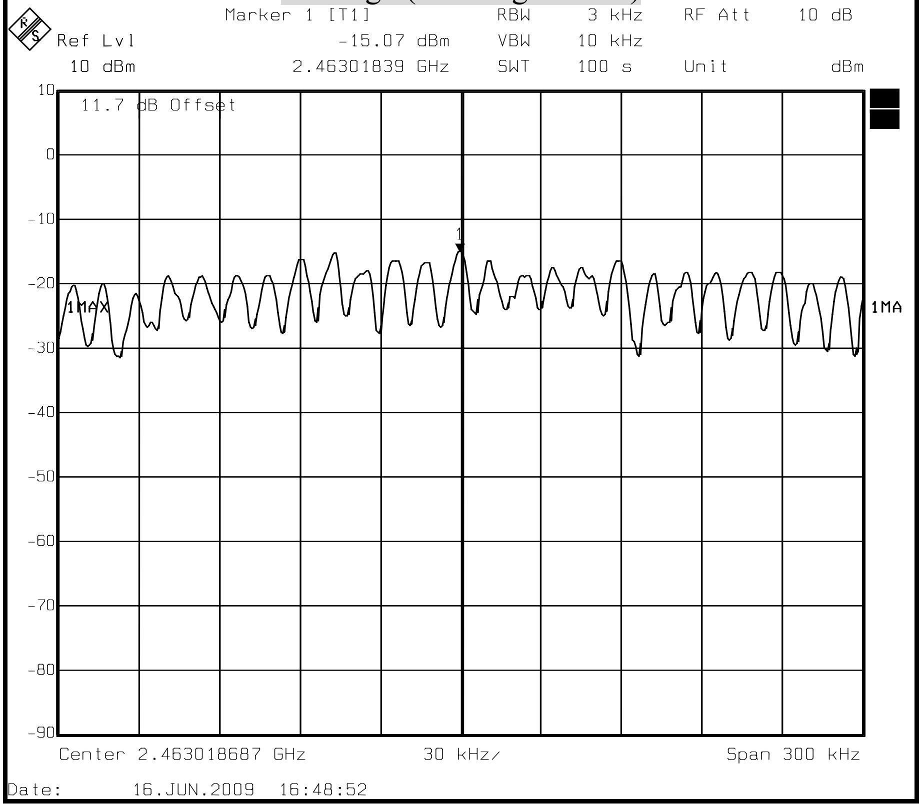
CH Low (802.11g MODE)



CH Mid (802.11g MODE)



CH High (802.11g MODE)



8.5 CONDUCTED SPURIOUS EMISSION

LIMITS

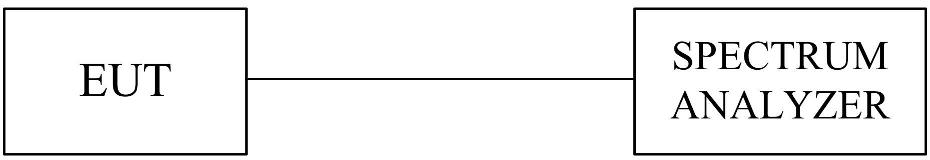
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the and that contains the highest level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

The spectrum from 30 MHz to 26.5 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.

TEST DATA

IEEE 802.11b mode

Low

Frequency (MHz)	Offset (dB)	Reading (dBµV)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pass/Fail
2412.3625	11.7	97.03	108.73	N/A	N/A	--
1727.4749	11.7	38.77	50.47	88.73	-38.26	PASS
4804.1483	11.7	50.33	62.03	88.73	-26.70	PASS
6501.6232	11.7	39.23	50.93	88.73	-37.80	PASS

Mid

Frequency (MHz)	Offset (dB)	Reading (dBµV)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pass/Fail
2437.5241	11.7	96.97	108.67	N/A	N/A	--
1992.7054	11.7	39.19	50.89	88.67	-37.78	PASS
4857.1943	11.7	50.52	62.22	88.67	-26.45	PASS
6955.9919	11.7	37.35	49.05	88.67	-39.62	PASS

High

Frequency (MHz)	Offset (dB)	Reading (dBµV)	Level (dBµV)	Limit (dBµV)	Margin (dB)	Pass/Fail
2462.1351	11.7	95.22	106.92	N/A	N/A	--
1727.4749	11.7	42.78	54.48	86.92	-32.44	PASS
5599.8396	11.7	50.92	62.62	86.92	-24.30	PASS
6902.9458	11.7	35.30	47.00	86.92	-39.92	PASS

IEEE 802.11g mode

Low

Frequency (MHz)	Offset (dB)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Pass/Fail
2412.3524	11.7	95.02	106.72	N/A	N/A	--
1727.4749	11.7	37.47	49.17	86.72	-37.55	PASS
4804.1483	11.7	50.35	62.05	86.72	-24.67	PASS
6690.7615	11.7	40.81	52.51	86.72	-34.21	PASS

Mid

Frequency (MHz)	Offset (dB)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Pass/Fail
2437.5241	11.7	94.59	106.29	N/A	N/A	--
1939.6593	11.7	36.83	48.53	86.29	-37.76	PASS
4857.1943	11.7	50.66	62.36	86.29	-23.93	PASS
6690.7615	11.7	40.02	51.72	86.29	-34.57	PASS

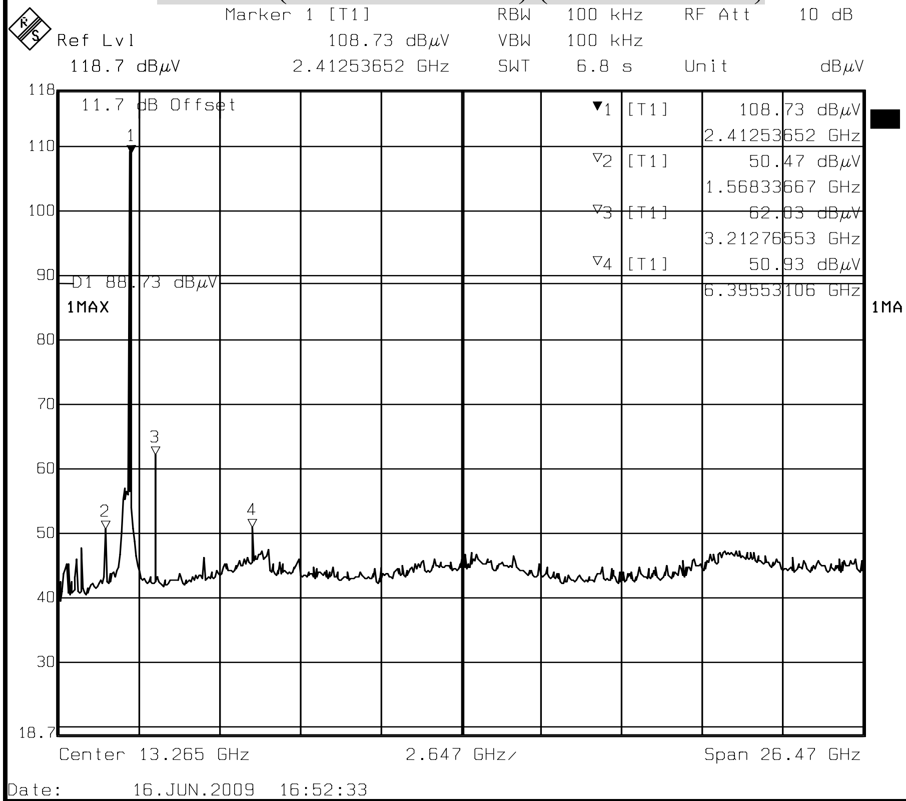
High

Frequency (MHz)	Offset (dB)	Reading (dBμV)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Pass/Fail
2462.5132	11.7	93.87	105.57	N/A	N/A	--
1886.6132	11.7	39.01	50.71	85.57	-34.86	PASS
4114.5491	11.7	51.01	62.71	85.57	-22.86	PASS
6902.9458	11.7	37.30	49.00	85.57	-36.57	PASS

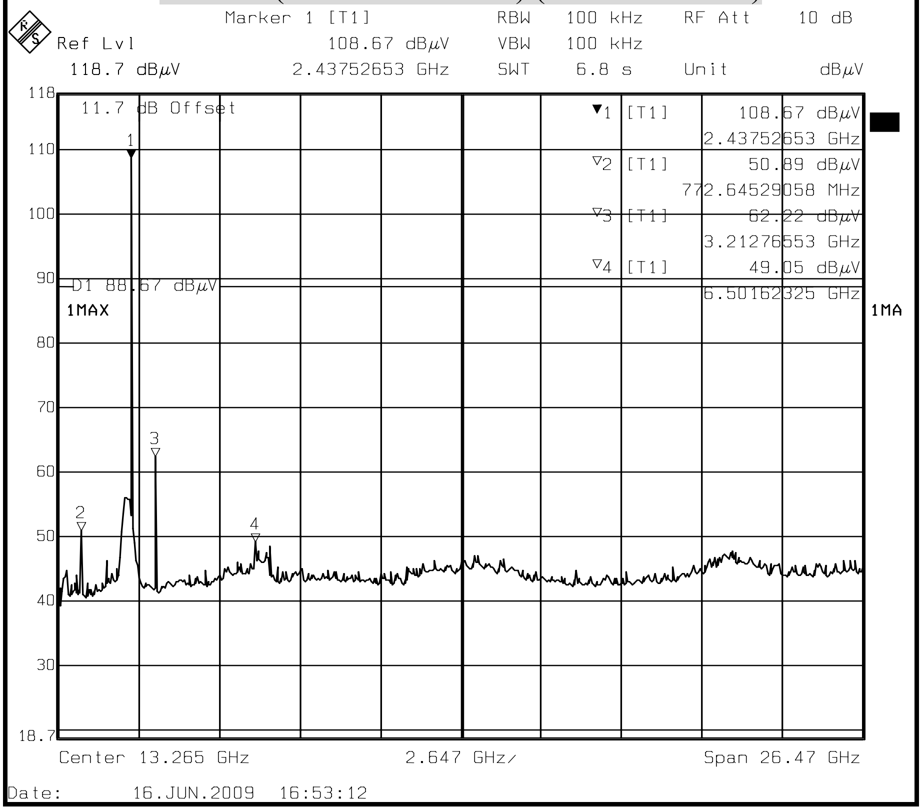
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(IEEE 802.11b MODE)

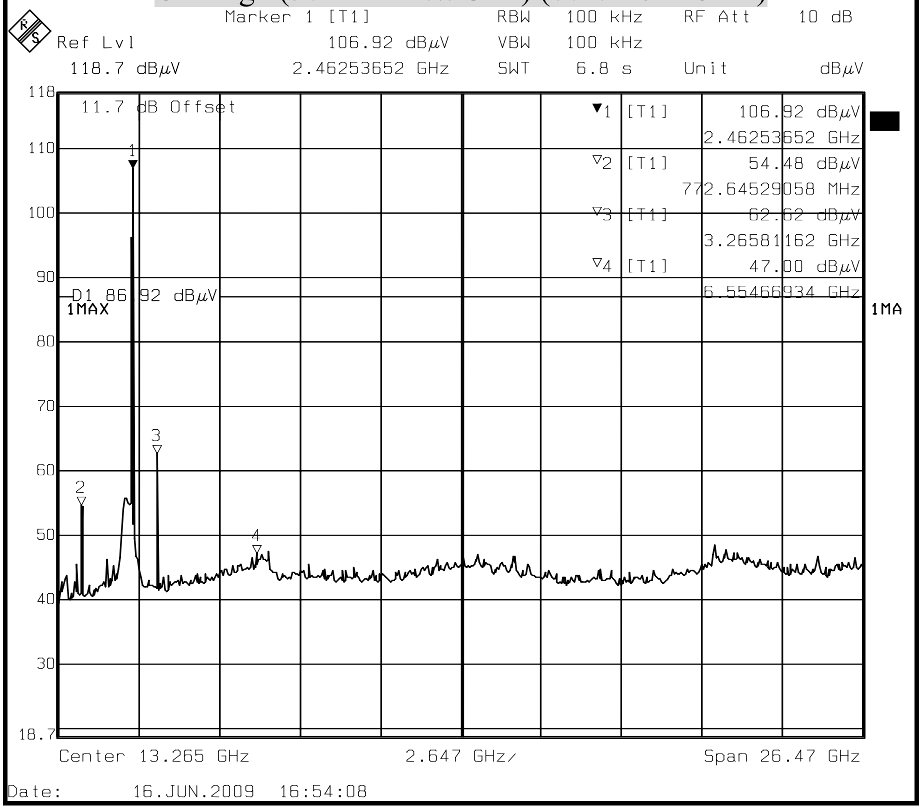
CH Low (30MHz~26.5GHz) (802.11b MODE)



CH Mid (30MHz~26.5GHz) (802.11b MODE)



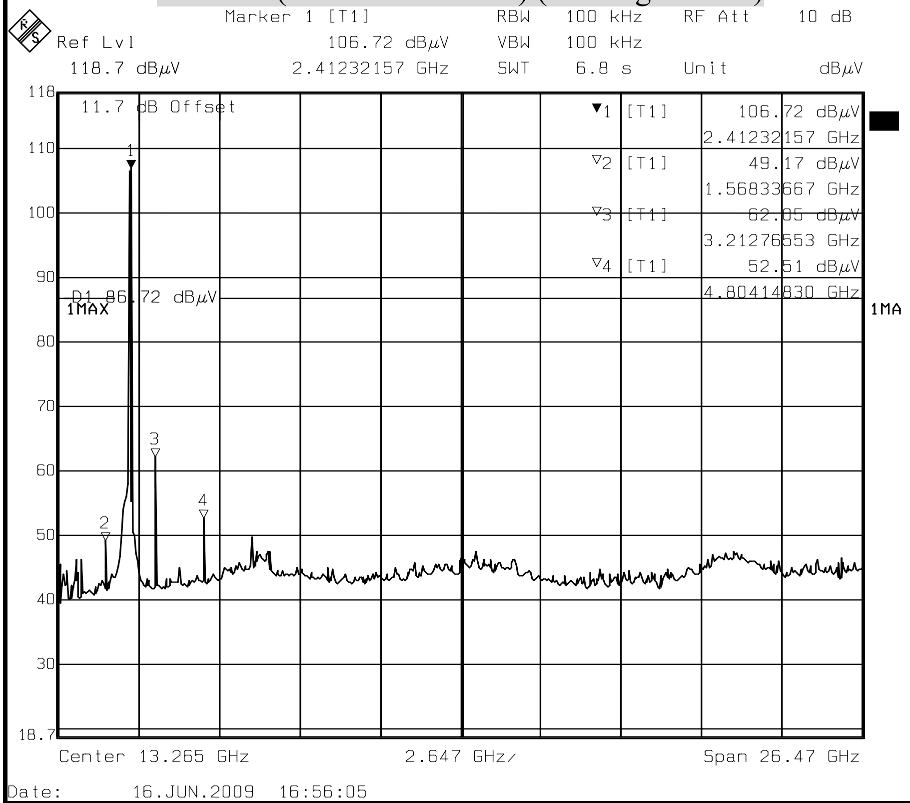
CH High (30MHz~26.5GHz) (802.11b MODE)



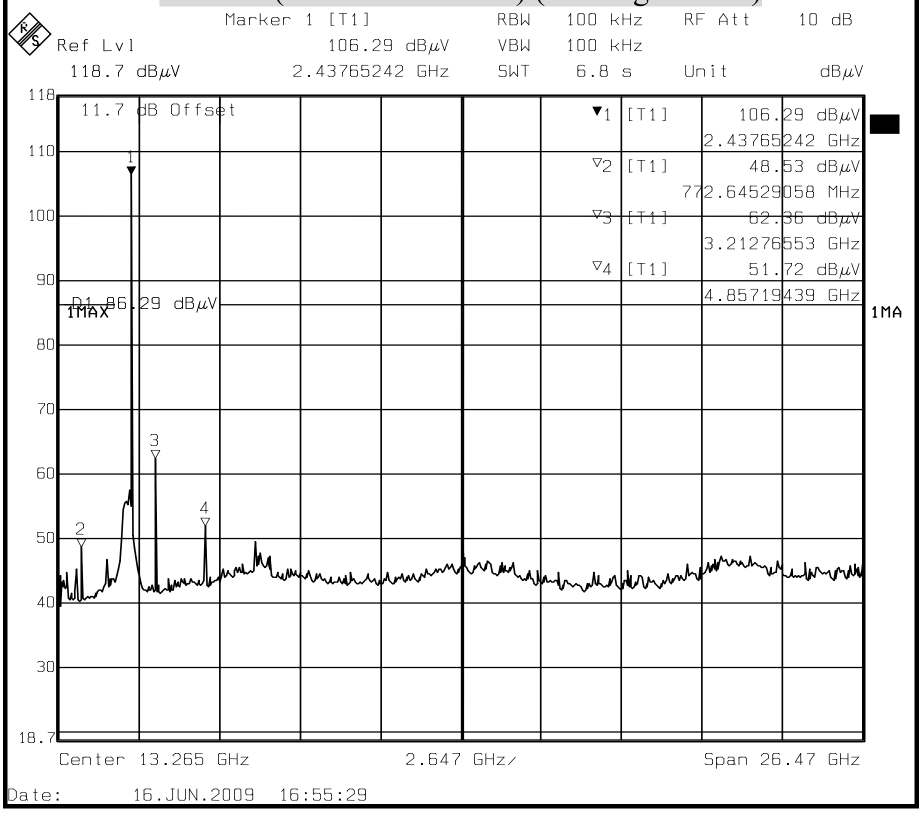
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

(802.11g MODE)

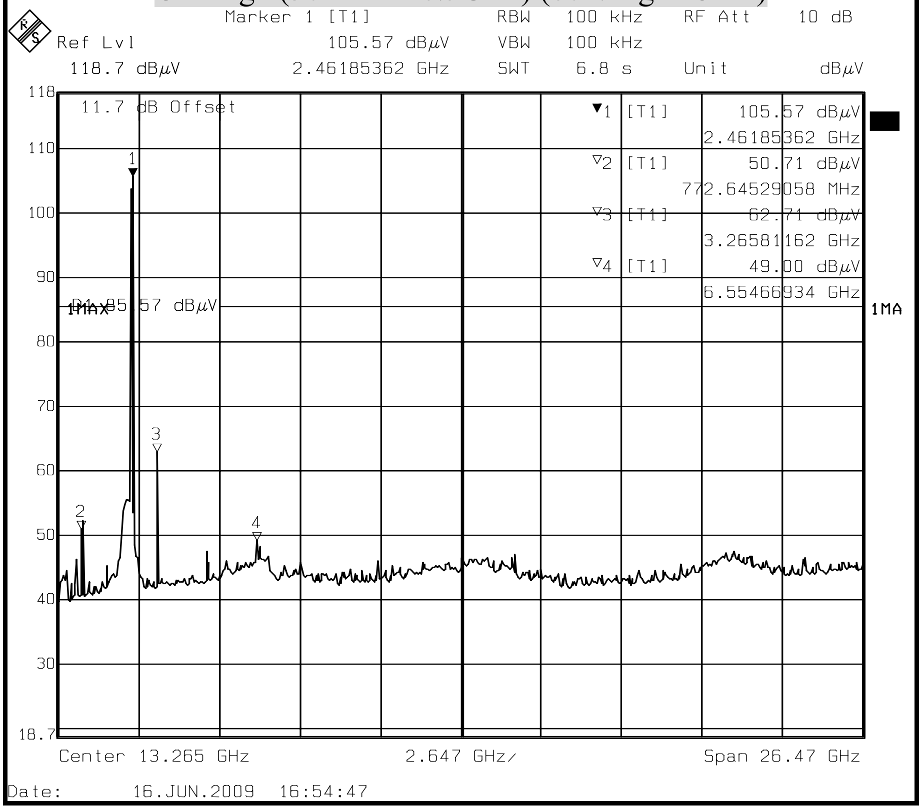
CH Low (30MHz~26.5GHz) (802.11g MODE)



CH Mid (30MHz~26.5GHz) (802.11g MODE)



CH High (30MHz~26.5GHz) (802.11g MODE)



8.6 RADIATED EMISSIONS

8.6.1 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.

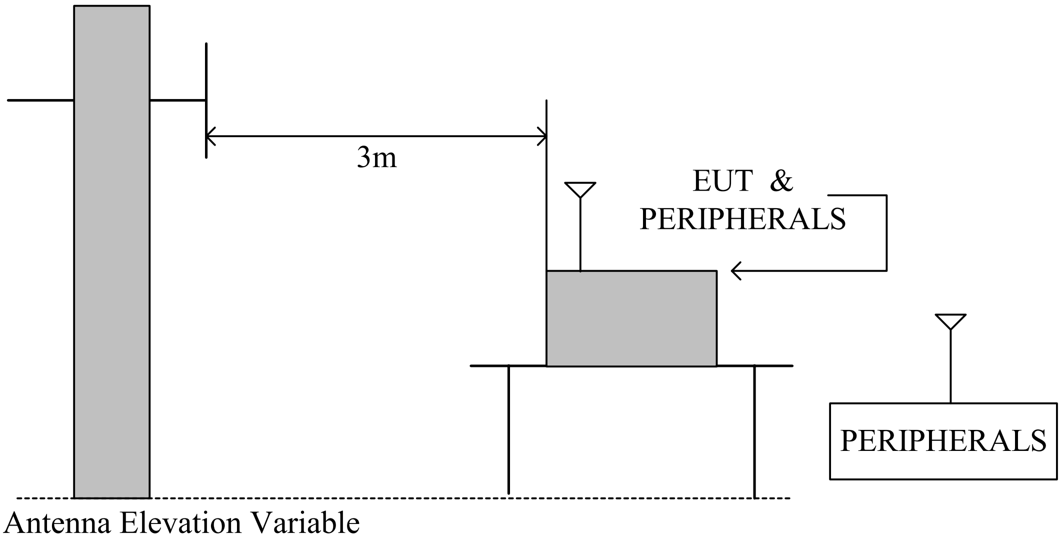
TEST EQUIPMENTS

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

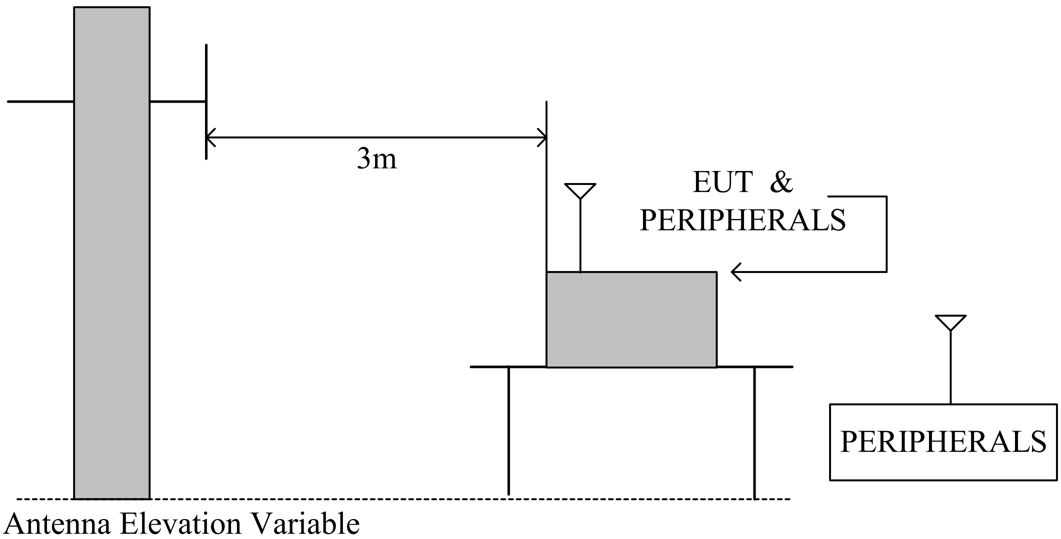
Open Area Test Site # 6				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
TYPE N COAXIAL CABLE	SUHNER	CHA9513	006	AUG. 26, 2009
EMI Receiver	R&S	ESVS10	833206/012	APR. 28, 2010
Spectrum Analyzer	R&S	FSEK 30	835253/002	OCT. 14, 2009
BI-LOG Antenna	Sunol	JB1	A070506-2	SEP. 8, 2009
Horn Antenna	Com-Power	AH-118	071032	DEC. 22, 2009
SMA RF CABLE	SUHNER	SUCOFLEX104PEA	20520/4PEA	NOV. 12, 2009
Pre-Amplifier	MITEQ	AFS44-00108650-42-10P-44	1205908	OCT. 23, 2009
Signal Generator	HP	8673C	2938A00663	JUL. 16, 2009
Pre-Amplifier	HP	8447F	2944A03817	NOV. 01, 2009
Turn Table	Yo Chen	001	----------	N.C.R.
Antenna Tower	AR	TP1000A	309874	N.C.R.
Controller	CT	SC101	----------	N.C.R.
Test S/W	e-3 (5.04303e)			

TEST SETUP

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



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



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 polarizations 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.

8.6.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz

Product Name	NetComm 3G Wireless Router	**Test Date**	2009/6/16
Model	N3G007W	**Test By**	Eric Yang
Test Mode	Normal operating (worst case)	**TEMP& Humidity**	27.5°C, 51%

Horizontal

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Level	Limits	Margin	Detector Mode
(MHz)	(dBμV)	(dB/M)	(dB)	(dBμV/M)	(dB μ V/M)	(dB)	PK/QP
85.51	19.80	7.93	1.19	28.92	40.00	-11.08	QP
133.36	20.60	13.85	1.45	35.90	43.50	-7.60	QP
166.68	18.50	12.20	1.64	32.34	43.50	-11.16	QP
250.00	24.60	12.20	2.02	38.82	46.00	-7.18	QP
375.00	19.10	15.65	3.40	38.15	46.00	-7.85	QP
400.00	21.50	16.20	3.71	41.41	46.00	-4.59	QP
500.00	17.30	18.00	3.05	38.35	46.00	-7.65	QP
625.00	14.40	19.63	3.61	37.64	46.00	-8.36	QP
750.00	11.20	21.20	3.96	36.36	46.00	-9.65	QP
N/A	-----	-----	-----	-----	-----	-----	-----

Vertical

Frequency	Meter Reading	Antenna Factor	Cable Loss	Emission Level	Limits	Margin	Detector Mode
(MHz)	(dBμV)	(dB/M)	(dB)	(dBμV/M)	(dB μ V/M)	(dB)	PK/QP
85.51	21.20	7.93	1.19	30.32	40.00	-9.68	QP
111.68	20.60	12.52	1.35	34.47	43.50	-9.03	QP
166.68	19.60	12.20	1.64	33.44	43.50	-10.06	QP
250.00	23.50	12.20	2.02	37.72	46.00	-8.28	QP
375.00	19.20	15.65	3.40	38.25	46.00	-7.75	QP
400.00	23.80	16.20	3.71	43.71	46.00	-2.29	QP
500.00	17.60	18.00	3.05	38.65	46.00	-7.35	QP
625.00	11.50	19.63	3.61	34.74	46.00	-11.26	QP
750.00	10.10	21.20	3.96	35.26	46.00	-10.75	QP
933.33	6.30	23.03	4.55	33.89	46.00	-12.11	QP
N/A	-----	-----	-----	-----	-----	-----	-----

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

8.6.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz

Product Name	NetComm 3G Wireless Router	**Test Date**	2009/6/15
Model	N3G007W	**Test By**	Eric Yang
Test Mode	IEEE 802.11b TX (CH Low)	**TEMP& Humidity**	24.5°C, 42%

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)**
	2413.15	111.21	30.20	2.34	41.85	0.00	101.90	Fundamental Frequency		P
	2413.15	104.67	30.20	2.34	41.85	0.00	95.36			A
	3216.02	59.84	30.53	2.77	42.51	1.26	51.89	81.90	-30.01	P
	3216.02	57.40	30.53	2.77	42.51	1.26	49.45	75.36	-25.91	A
*	4823.59	55.75	33.58	3.70	43.88	0.69	49.85	74.00	-24.15	P
*	4823.59	45.62	33.58	3.70	43.88	0.69	39.72	54.00	-14.28	A
	6432.27	65.66	36.11	4.56	43.81	0.77	63.29	81.90	-18.61	P
	6432.27	64.30	36.11	4.56	43.81	0.77	61.93	75.36	-13.43	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Low)	TEMP& Humidity	24.5°C, 42%

Vertical

	TX / IEEE 802.11b mode / CH Low				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)
	2410.06	116.79	30.21	2.34	41.85	0.00	107.49	Fundamental Frequency		P
	2410.06	110.18	30.21	2.34	41.85	0.00	100.88			A
	3216.23	65.50	30.53	2.77	42.51	1.26	57.55	87.49	-29.94	P
	3216.23	64.36	30.53	2.77	42.51	1.26	56.41	80.88	-24.47	A
*	4824.32	60.09	33.58	3.71	43.88	0.69	54.19	74.00	-19.81	P
*	4824.32	49.53	33.58	3.71	43.88	0.69	43.63	54.00	-10.37	A
	6432.27	68.39	36.11	4.56	43.81	0.77	66.02	87.49	-21.47	P
	6432.27	67.67	36.11	4.56	43.81	0.77	65.30	80.88	-15.58	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	24.5°C, 42%

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)
	2439.26	112.71	30.17	2.34	41.85	0.00	103.37	Fundamental Frequency		P
	2439.26	106.10	30.17	2.34	41.85	0.00	96.76			A
	3249.43	60.81	30.55	2.82	42.53	1.22	52.86	83.37	-30.51	P
	3249.43	59.12	30.55	2.82	42.53	1.22	51.17	76.76	-25.59	A
*	4873.55	54.25	33.70	3.73	43.91	0.71	48.48	74.00	-25.52	P
*	4873.55	43.15	33.70	3.73	43.91	0.71	37.38	54.00	-16.62	A
	6498.98	60.88	36.30	4.59	43.80	0.78	58.75	83.37	-24.62	P
	6498.98	58.87	36.30	4.59	43.80	0.78	56.74	76.76	-20.02	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH Middle)	TEMP& Humidity	24.5°C, 42%

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)
	2437.96	116.06	30.17	2.34	41.85	0.00	106.72	Fundamental Frequency		P
	2437.96	109.16	30.17	2.34	41.85	0.00	99.82			A
	3249.47	63.20	30.55	2.82	42.53	1.22	55.25	86.72	-31.47	P
	3249.47	61.59	30.55	2.82	42.53	1.22	53.64	79.82	-26.18	A
*	4874.02	58.54	33.70	3.73	43.91	0.71	52.77	74.00	-21.23	P
*	4874.02	47.15	33.70	3.73	43.91	0.71	41.38	54.00	-12.62	A
	6498.92	67.68	36.30	4.59	43.80	0.78	65.55	86.72	-21.17	P
	6498.92	66.71	36.30	4.59	43.80	0.78	64.58	79.82	-15.24	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	24.5°C, 42%

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)
	2461.57	109.98	30.15	2.34	41.86	0.00	100.61	Fundamental Frequency		P
	2461.57	103.49	30.15	2.34	41.86	0.00	94.12			A
	3282.81	62.29	30.57	2.87	42.56	1.17	54.34	80.61	-26.27	P
	3282.81	60.59	30.57	2.87	42.56	1.17	52.64	74.12	-21.48	A
*	4922.58	52.15	33.81	3.76	43.94	0.73	46.51	74.00	-27.49	P
*	4922.58	41.36	33.81	3.76	43.94	0.73	35.72	54.00	-18.28	A
	6565.60	60.65	36.73	4.62	43.76	0.80	59.04	80.61	-21.57	P
	6565.60	58.31	36.73	4.62	43.76	0.80	56.70	74.12	-17.42	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11b TX (CH High)	TEMP& Humidity	24.5°C, 42%

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)
	2458.82	115.53	30.15	2.34	41.86	0.00	106.16	Fundamental Frequency		P
	2458.82	109.09	30.15	2.34	41.86	0.00	99.72			A
	3282.83	67.01	30.57	2.87	42.56	1.17	59.06	86.16	-27.10	P
	3282.83	66.02	30.57	2.87	42.56	1.17	58.07	79.72	-21.65	A
*	4923.80	56.99	33.82	3.76	43.94	0.73	51.36	74.00	-22.64	P
*	4923.80	45.68	33.82	3.76	43.94	0.73	40.05	54.00	-13.95	A
	6565.63	66.26	36.73	4.62	43.76	0.80	64.66	86.16	-21.51	P
	6565.63	64.89	36.73	4.62	43.76	0.80	63.29	79.72	-16.44	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	24.5°C, 42%

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)
	2410.65	111.11	30.21	2.34	41.85	0.00	101.81	Fundamental Frequency		P
	2410.65	102.40	30.21	2.34	41.85	0.00	93.10			A
	3216.11	60.26	30.53	2.77	42.51	1.26	52.31	81.81	-29.50	P
	3216.11	58.03	30.53	2.77	42.51	1.26	50.08	73.10	-23.02	A
*	4823.56	56.41	33.58	3.70	43.88	0.69	50.51	74.00	-23.49	P
*	4823.56	42.22	33.58	3.70	43.88	0.69	36.32	54.00	-17.68	A
	6432.29	65.40	36.11	4.56	43.81	0.77	63.03	81.81	-18.78	P
	6432.29	64.29	36.11	4.56	43.81	0.77	61.92	73.10	-11.18	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Low)	TEMP& Humidity	24.5°C, 42%

Vertical

	TX / IEEE 802.11g mode / CH Low				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)
	2413.65	114.68	30.20	2.34	41.85	0.00	105.37	Fundamental Frequency		P
	2413.65	105.91	30.20	2.34	41.85	0.00	96.60			A
	3216.23	64.08	30.53	2.77	42.51	1.26	56.13	85.37	-29.24	P
	3216.23	62.60	30.53	2.77	42.51	1.26	54.65	76.60	-21.95	A
*	4822.88	60.94	33.57	3.70	43.88	0.69	55.04	74.00	-18.96	P
*	4822.88	46.49	33.57	3.70	43.88	0.69	40.59	54.00	-13.41	A
	6432.24	68.18	36.11	4.56	43.81	0.77	65.81	85.37	-19.56	P
	6432.24	67.41	36.11	4.56	43.81	0.77	65.04	76.60	-11.56	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	24.5°C, 42%

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)
	2438.96	111.55	30.17	2.34	41.85	0.00	102.21	Fundamental Frequency		P
	2438.96	103.36	30.17	2.34	41.85	0.00	94.02			A
	3249.47	61.42	30.55	2.82	42.53	1.22	53.47	82.21	-28.74	P
	3249.47	59.44	30.55	2.82	42.53	1.22	51.49	74.02	-22.53	A
*	4874.56	53.22	33.70	3.73	43.91	0.71	47.45	74.00	-26.55	P
*	4874.56	41.89	33.70	3.73	43.91	0.71	36.12	54.00	-17.88	A
	6598.85	59.94	36.95	4.64	43.74	0.81	58.60	82.21	-23.61	P
	6598.85	57.25	36.95	4.64	43.74	0.81	55.91	74.02	-18.11	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH Middle)	TEMP& Humidity	24.5°C, 42%

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)
	2440.67	115.79	30.17	2.34	41.85	0.00	106.45	Fundamental Frequency		P
	2440.67	106.51	30.17	2.34	41.85	0.00	97.17			A
	3249.47	64.18	30.55	2.82	42.53	1.22	56.23	86.45	-30.22	P
	3249.47	62.93	30.55	2.82	42.53	1.22	54.98	77.17	-22.19	A
*	4874.88	56.26	33.70	3.73	43.91	0.71	50.49	74.00	-23.51	P
*	4874.88	41.08	33.70	3.73	43.91	0.71	35.31	54.00	-18.69	A
	6498.91	67.76	36.30	4.59	43.80	0.78	65.63	86.45	-20.82	P
	6498.91	66.80	36.30	4.59	43.80	0.78	64.67	77.17	-12.50	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	24.5°C, 42%

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)
	2460.15	109.86	30.15	2.34	41.86	0.00	100.49	Fundamental Frequency		P
	2460.15	100.84	30.15	2.34	41.86	0.00	91.47			A
	3282.82	62.51	30.57	2.87	42.56	1.17	54.56	80.49	-25.93	P
	3282.82	61.10	30.57	2.87	42.56	1.17	53.15	71.47	-18.32	A
*	4919.87	51.24	33.81	3.76	43.94	0.73	45.60	74.00	-28.40	P
*	4919.87	41.35	33.81	3.76	43.94	0.73	35.71	54.00	-18.29	A
	6565.61	60.61	36.73	4.62	43.76	0.80	59.00	80.49	-21.49	P
	6565.61	58.00	36.73	4.62	43.76	0.80	56.39	71.47	-15.08	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	NetComm 3G Wireless Router	Test Date	2009/6/15
Model	N3G007W	Test By	Eric Yang
Test Mode	IEEE 802.11g TX (CH High)	TEMP& Humidity	24.5°C, 42%

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)
	2461.58	114.60	30.15	2.34	41.86	0.00	105.23	Fundamental Frequency		P
	2461.58	105.73	30.15	2.34	41.86	0.00	96.36			A
	3282.81	66.35	30.57	2.87	42.56	1.17	58.40	85.23	-26.83	P
	3282.81	65.20	30.57	2.87	42.56	1.17	57.25	76.36	-19.11	A
*	4923.65	54.68	33.82	3.76	43.94	0.73	49.05	74.00	-24.95	P
*	4923.65	44.45	33.82	3.76	43.94	0.73	38.82	54.00	-15.18	A
	6565.60	66.03	36.73	4.62	43.76	0.80	64.42	85.23	-20.81	P
	6565.60	64.97	36.73	4.62	43.76	0.80	63.36	76.36	-13.00	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.

8.6.4 RESTRICTED BAND EDGE

IEEE 802.11b mode

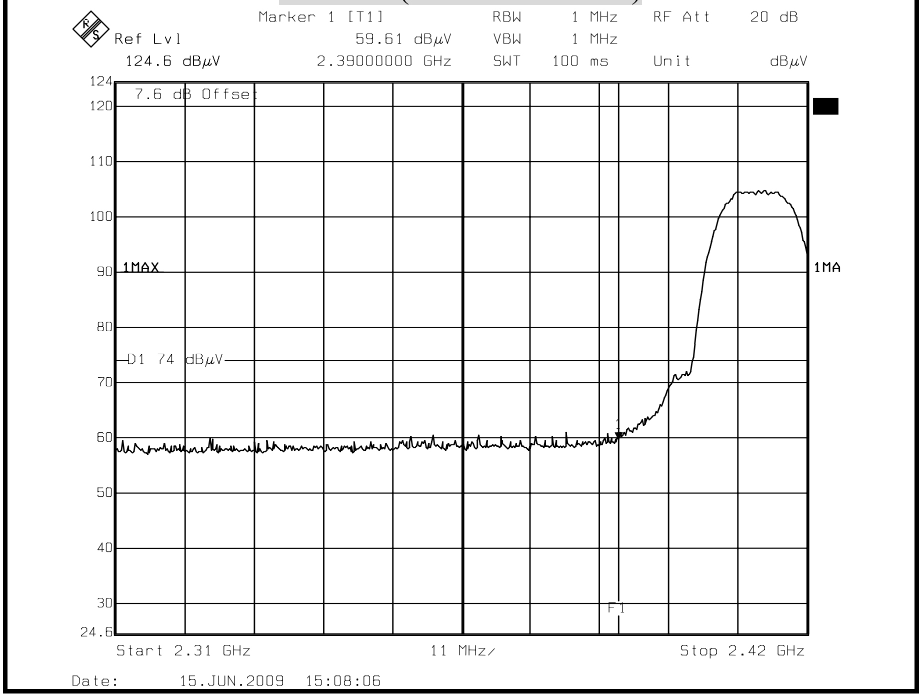
Channel	Polarity	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
LOW	H	2390.00	59.61	74	-14.39	Peak
	H	2390.00	48.35	54	-5.65	Average
	V	2390.00	64.63	74	-9.37	Peak
	V	2390.00	52.55	54	-1.45	Average
HIGH	H	2483.50	60.25	74	-13.75	Peak
	H	2483.50	47.91	54	-6.09	Average
	V	2483.50	62.44	74	-11.56	Peak
	V	2483.50	50.69	54	-3.31	Average

IEEE 802.11g mode

Channel	Polarity	Freq.(MHz)	Level(dBuV)	Limit(dBuV)	Margin(dB)	Detector
LOW	H	2390.00	60.37	74	-13.63	Peak
	H	2390.00	47.26	54	-6.74	Average
	V	2390.00	64.42	74	-9.58	Peak
	V	2390.00	51.73	54	-2.27	Average
HIGH	H	2483.50	60.91	74	-13.09	Peak
	H	2483.50	47.55	54	-6.45	Average
	V	2483.50	62.62	74	-11.38	Peak
	V	2483.50	49.09	54	-4.91	Average

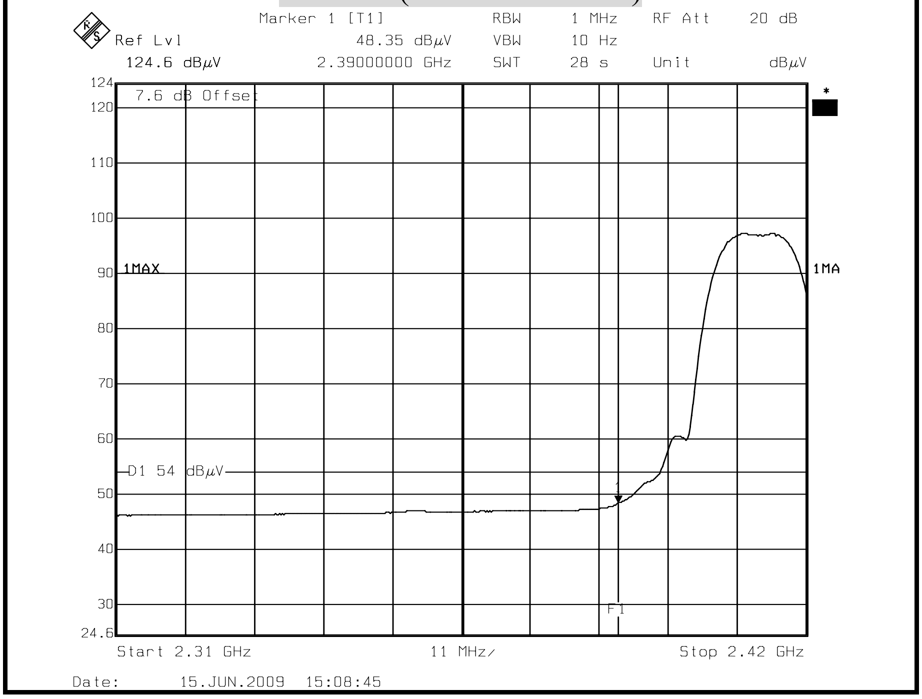
Detector mode : Peak **Polarity : Horizontal**

CH Low (802.11b MODE)



Detector mode : Average **Polarity : Horizontal**

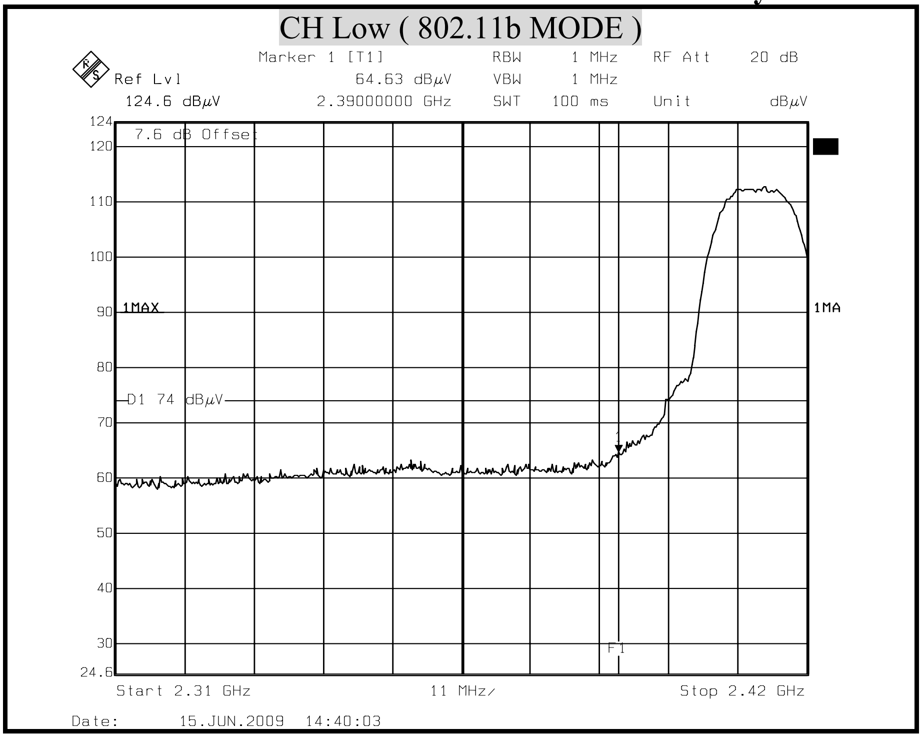
CH Low (802.11b MODE)



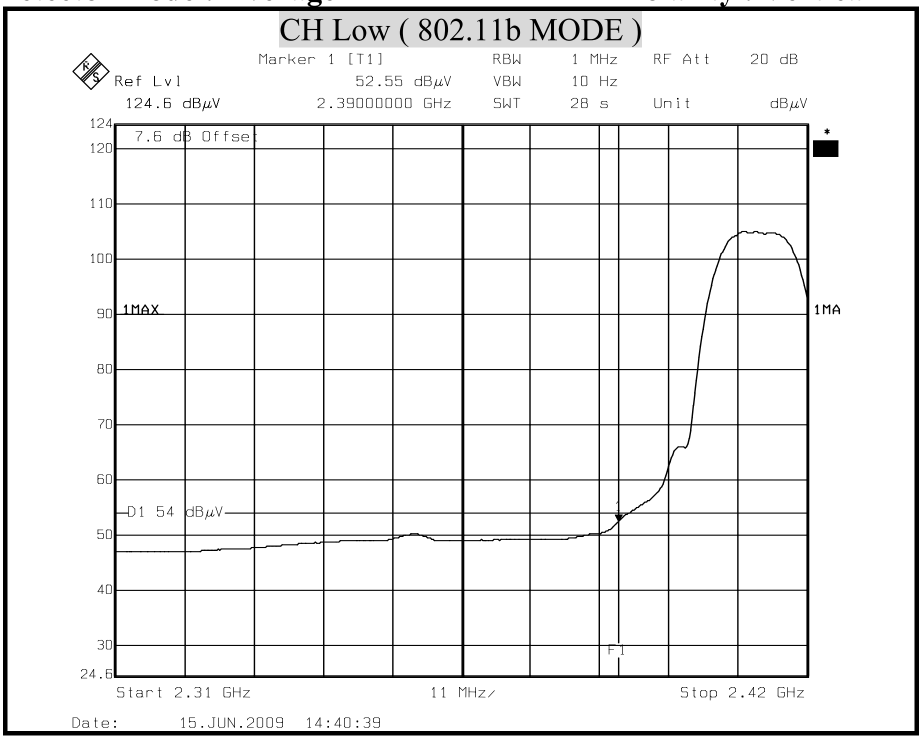
Remark:

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**



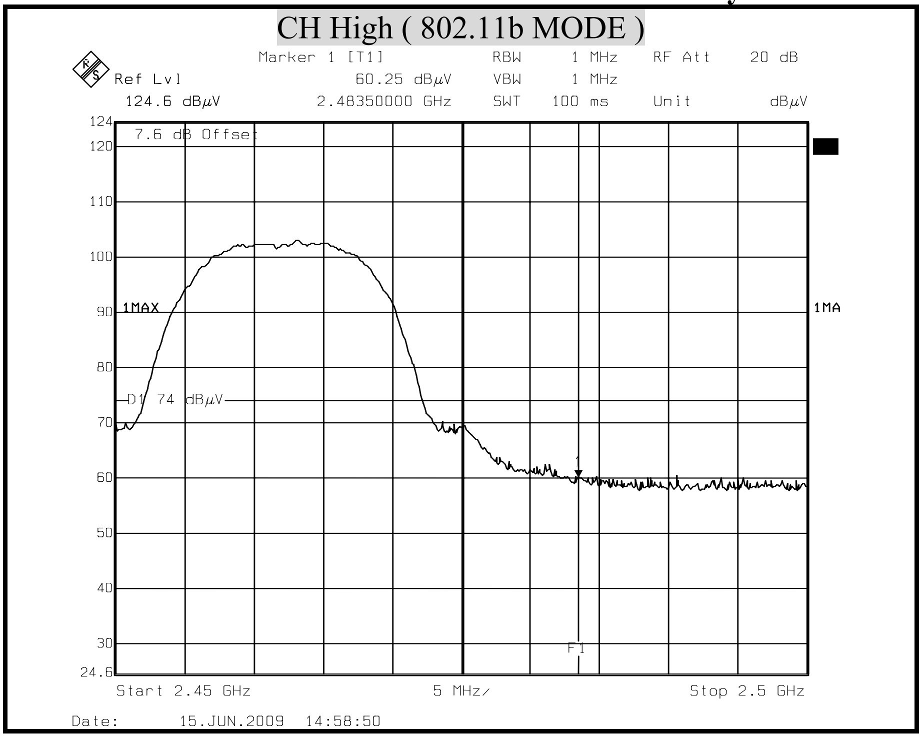
Detector mode : Average **Polarity : Vertical**



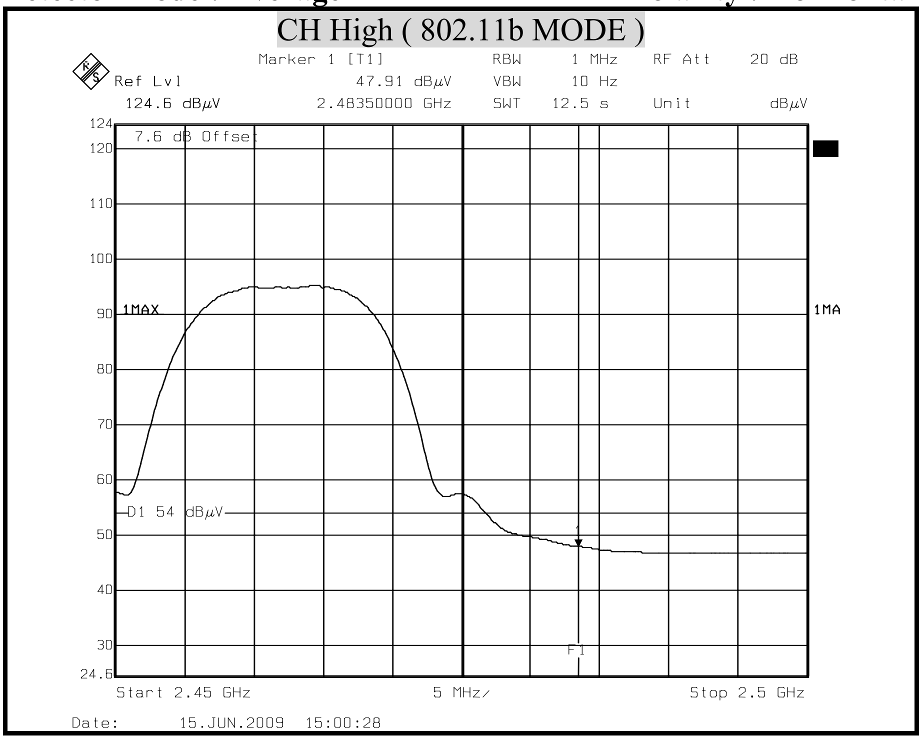
Remark:

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**

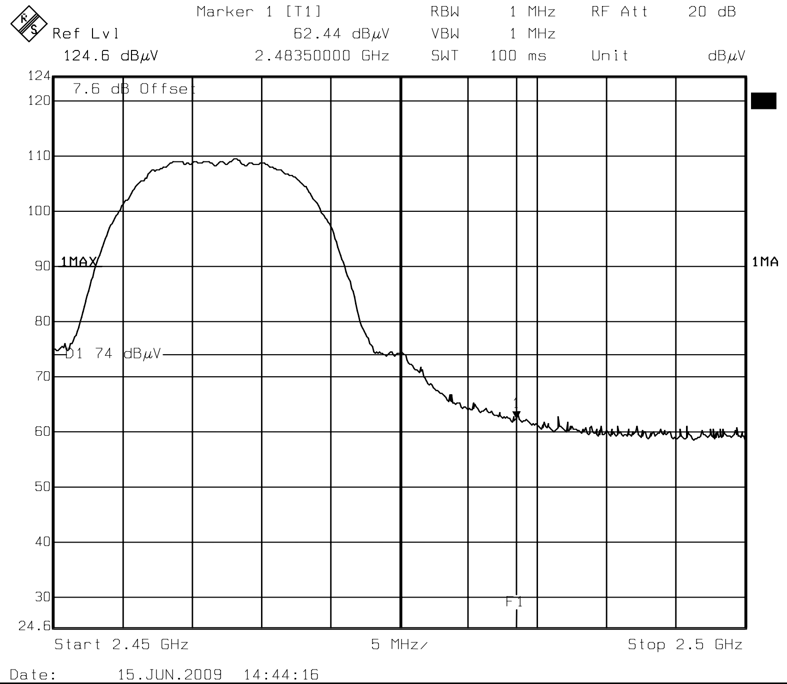


Remark:

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)

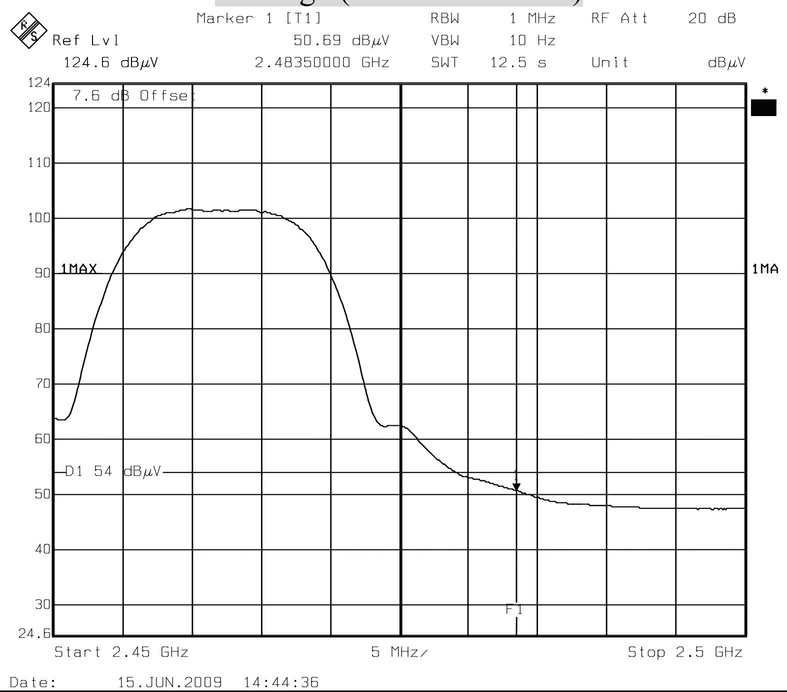
Detector mode : Peak **Polarity : Vertical**

CH High (802.11b MODE)



Detector mode : Average **Polarity : Vertical**

CH High (802.11b MODE)

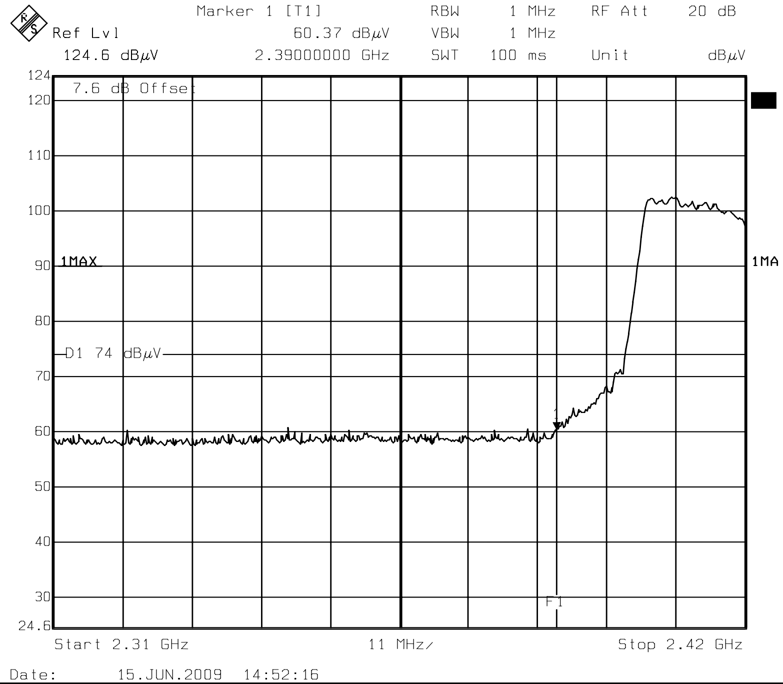


Remark:

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)

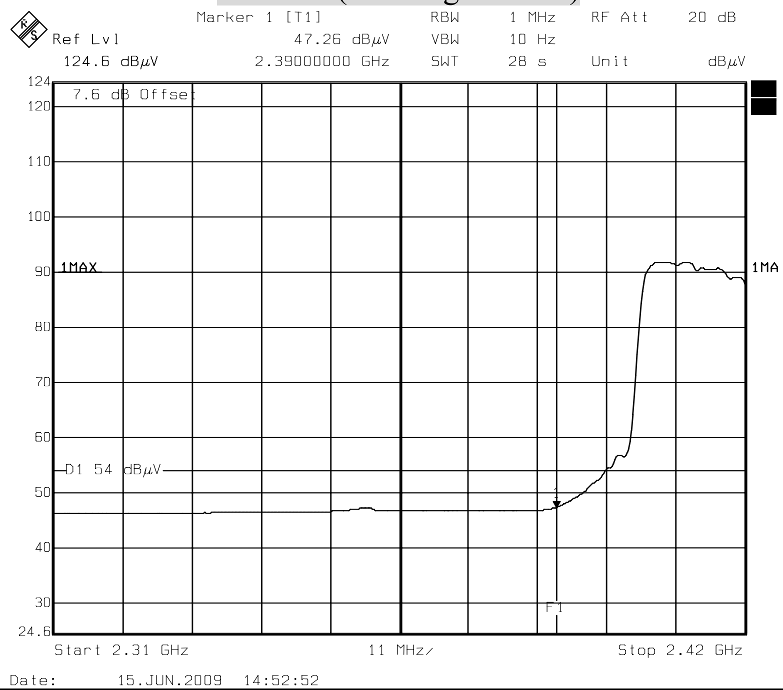
Detector mode : Peak **Polarity : Horizontal**

CH Low (802.11g MODE)



Detector mode : Average **Polarity : Horizontal**

CH Low (802.11g MODE)

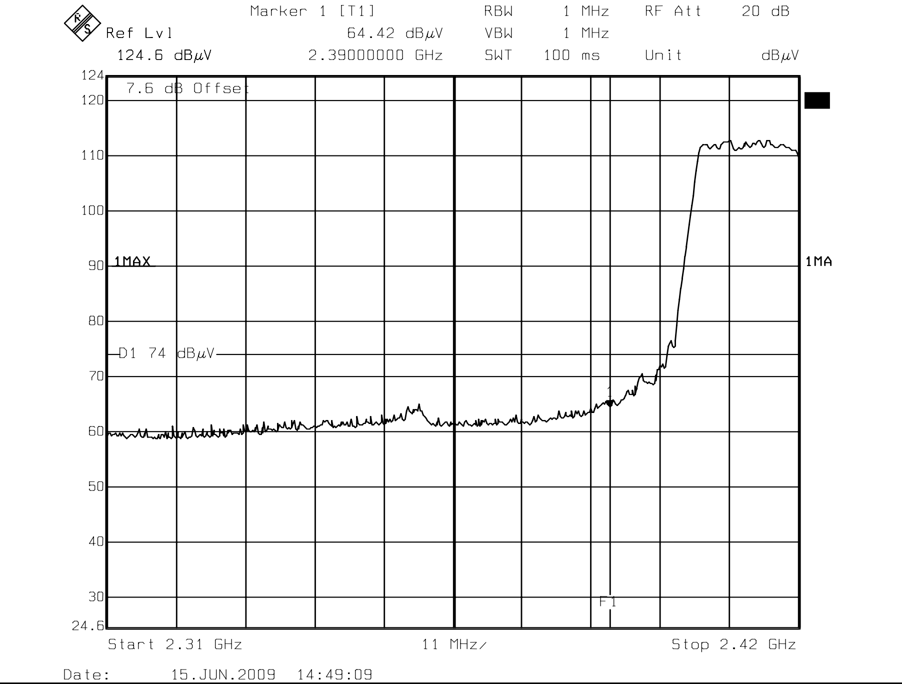


Remark:

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)

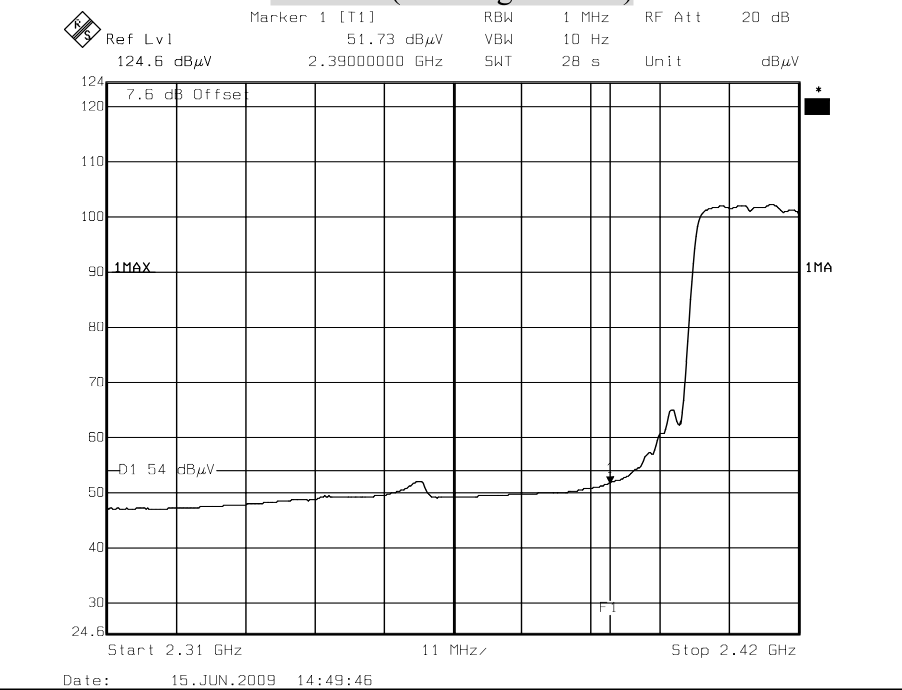
Detector mode : Peak **Polarity : Vertical**

CH Low (802.11g MODE)



Detector mode : Average **Polarity : Vertical**

CH Low (802.11g MODE)

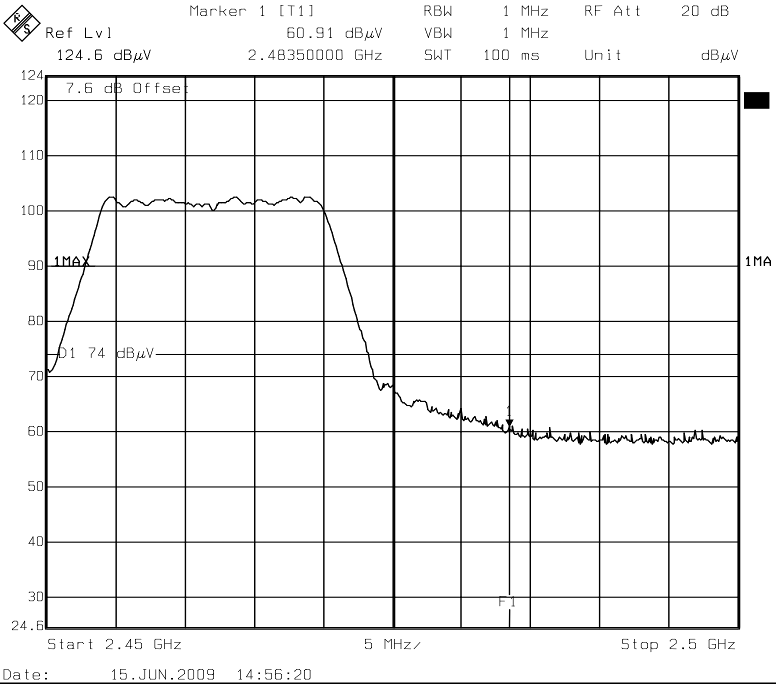


Remark:

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)

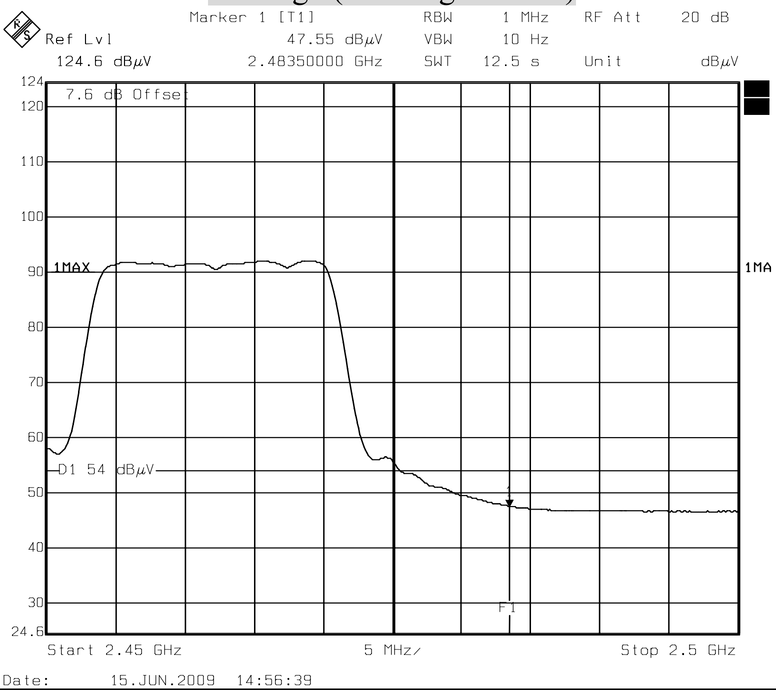
Detector mode : Peak **Polarity : Horizontal**

CH High (802.11g MODE)



Detector mode : Average **Polarity : Horizontal**

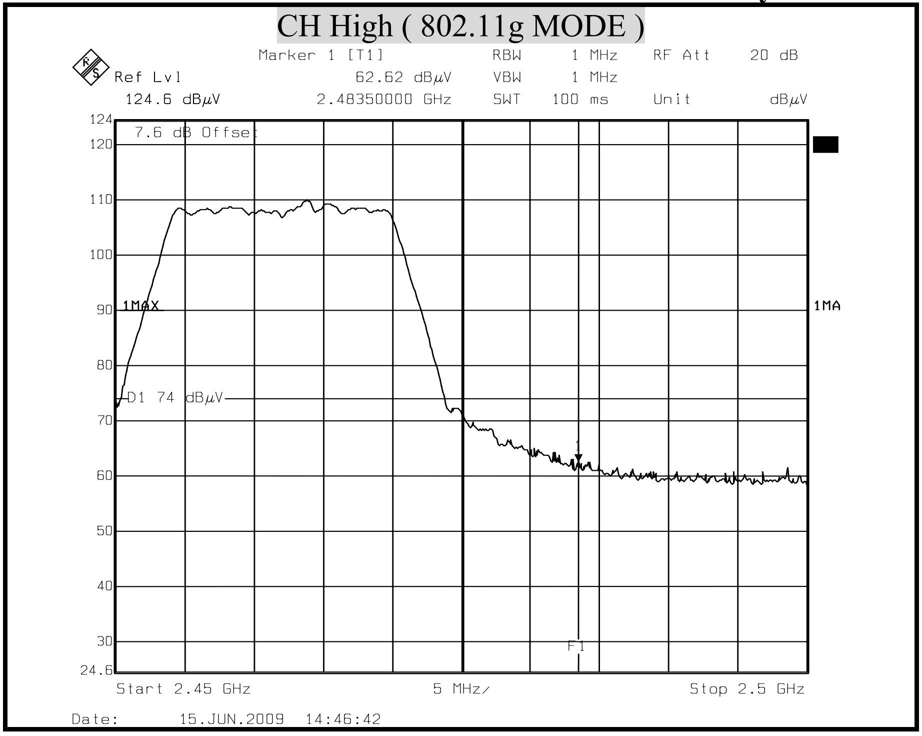
CH High (802.11g MODE)



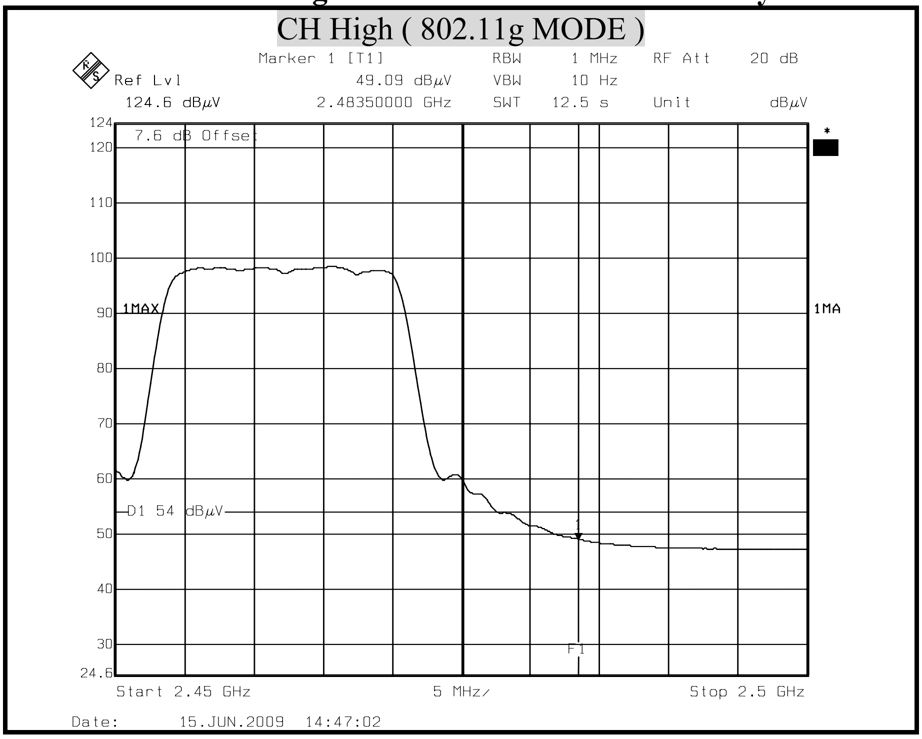
Remark:

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)

8.7 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.

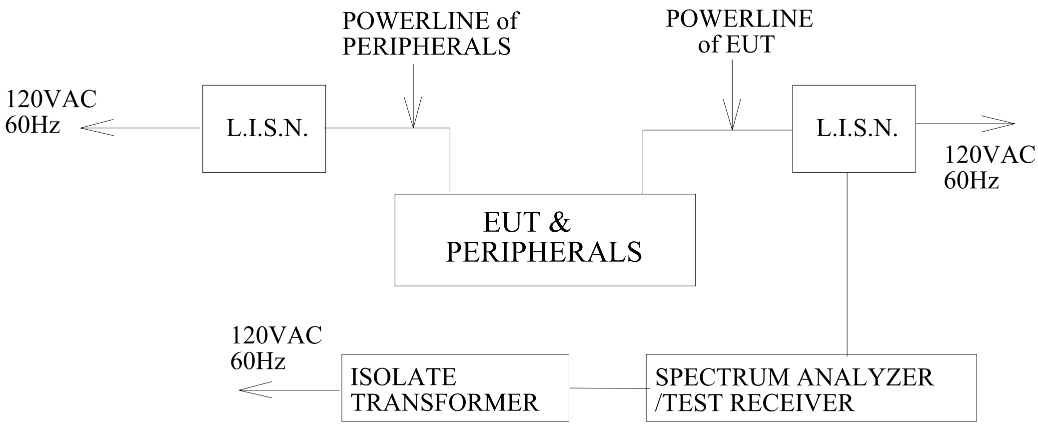
Frequency of Emission (MHz)	Conducted limit (dBµv)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

TEST EQUIPMENTS

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

Conducted Emission room #1				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
L.I.S.N.	SCHWARZBECK	NNLK 8121	8121-446	NOV. 19, 2009 For Insertion loss
	Rohde & Schwarz	ESH 3-Z5	840062/021	OCT. 05, 2009
TEST RECEIVER	Rohde & Schwarz	ESCS 30	100348	JUL. 02, 2009
BNC COAXIAL CABLE	CCS	BNC50	11	JAN. 14, 2010
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.

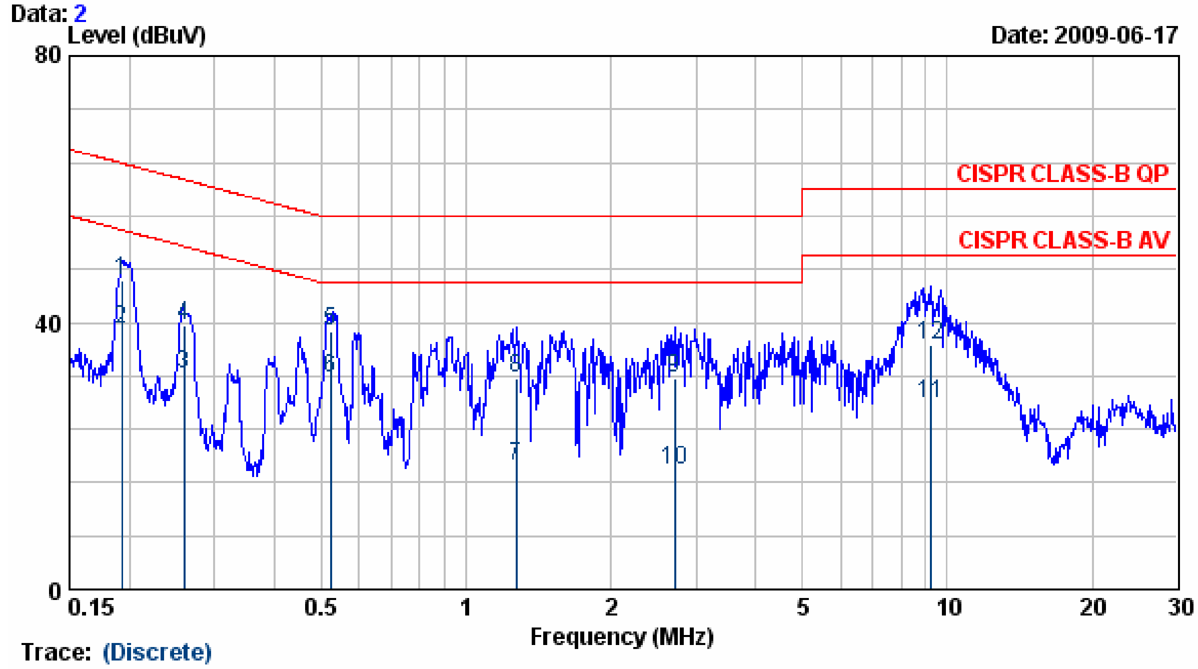
TEST RESULTS

No non-compliance noted.

CONDUCTED RF VOLTAGE MEASUREMENT

Model No.	N3G007W	**Resolution Bandwidth**	9 kHz
Environmental Conditions	26 ℃, 60 % RH	**Test Mode**	Normal operation
Tested by	Eric Yang		

LINE

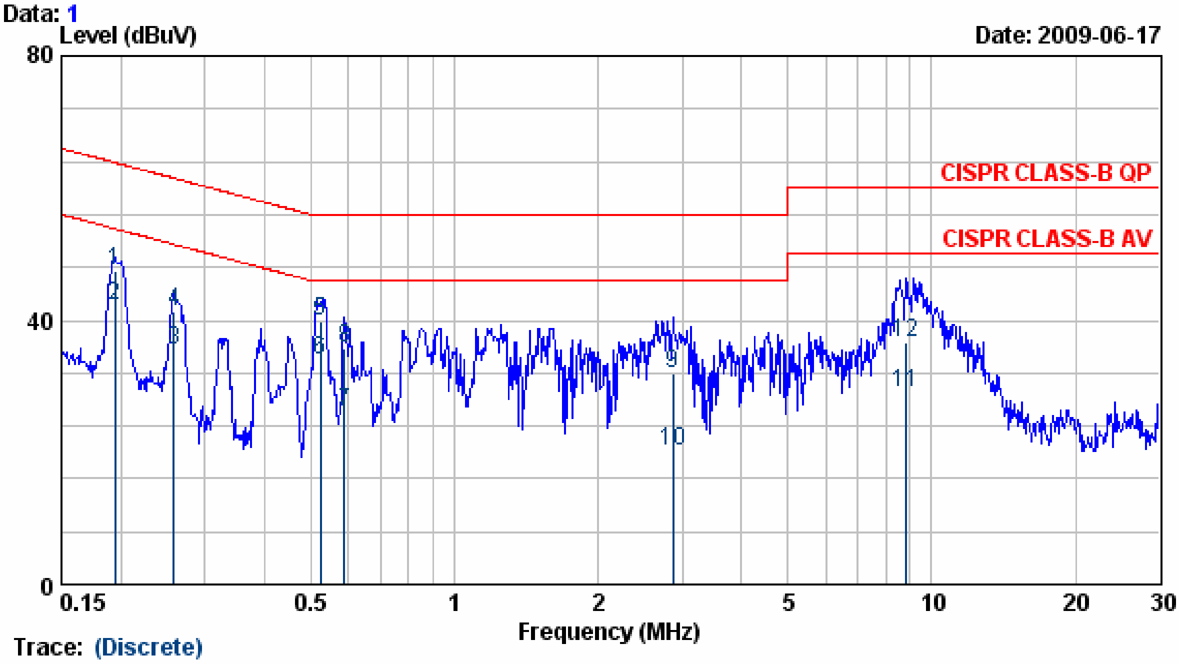


Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.192	9.80	0.05	36.32	46.17	63.93	-17.76	QP
0.192	9.80	0.05	29.13	38.98	53.93	-14.95	AVERAGE
0.259	9.84	0.05	22.48	32.37	51.45	-19.09	AVERAGE
0.259	9.84	0.05	29.60	39.49	61.45	-21.97	QP
0.523	9.90	0.05	28.85	38.80	56.00	-17.20	QP
0.523	9.90	0.05	21.62	31.57	46.00	-14.43	AVERAGE
1.269	9.93	0.04	8.60	18.58	46.00	-27.42	AVERAGE
1.269	9.93	0.04	21.56	31.54	56.00	-24.46	QP
2.707	9.91	0.08	21.72	31.71	56.00	-24.29	QP
2.707	9.91	0.08	7.80	17.79	46.00	-28.21	AVERAGE
9.204	9.89	0.58	17.25	27.72	50.00	-22.28	AVERAGE
9.204	9.89	0.58	26.07	36.54	60.00	-23.46	QP

REMARKS： 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

Model No.	N3G007W	**Resolution Bandwidth**	9 kHz
Environmental Conditions	26 ℃, 60 % RH	**Test Mode**	Normal operation
Tested by	Eric Yang		

NEUTRAL



Freq. MHz	LISN Factor dB	Cable Loss dB	Meter Reading dBuV	Measured Level dBuV	Limits dBuV	Over Limits dBuV	Detector
0.194	9.80	0.05	37.75	47.60	63.84	-16.24	QP
0.194	9.80	0.05	32.36	42.21	53.84	-11.63	AVERAGE
0.259	9.84	0.05	25.46	35.35	51.47	-16.12	AVERAGE
0.259	9.84	0.05	31.55	41.44	61.47	-20.03	QP
0.524	9.90	0.05	29.95	39.90	56.00	-16.10	QP
0.524	9.90	0.05	24.06	34.01	46.00	-11.99	AVERAGE
0.589	9.90	0.05	16.27	26.22	46.00	-19.78	AVERAGE
0.589	9.90	0.05	25.71	35.66	56.00	-20.34	QP
2.869	9.90	0.09	22.02	32.00	56.00	-24.00	QP
2.869	9.90	0.09	10.37	20.35	46.00	-25.65	AVERAGE
8.822	9.89	0.56	18.50	28.95	50.00	-21.05	AVERAGE
8.822	9.89	0.56	26.24	36.69	60.00	-23.31	QP

REMARKS： 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit value (dB) = Level (dBuV) – Limit Line (dBuV)

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 dipole antenna.

One antenna
RF Antenna Cable Assembly
Manufacture: WHA YU GROUP
Model: C381-510109-A
Connector: SMA Plug Reverse
Type: Dipole
Antenna Gain: 2 dBi