# FCC Part 15 EMI TEST REPORT

# of

E.U.T. : Redfire

Model : RedFire200e

FCC ID : TOP-WICI-RF2E

# for

**APPLICANT**: Wireless Interactive Comm., Inc.

ADDRESS : 23112 Alcalde Drive, Suite C, Laguna Hills,

CA 92653

Test Performed by

# **ELECTRONICS TESTING CENTER, TAIWAN**

NO.34, LIN 5, DINGFU TSUEN, LINKOU SHIANG TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

Tel: (02)26023052 Fax: (02)26010910 http://www.etc.org.tw; e-mail: r00@etc.org.tw

Report Number: 06-10-RBF-137

# TEST REPORT CERTIFICATION

Applicant : Wireless Interactive Comm., Inc.

23112 Alcalde Drive, Suite C, Laguna Hills, CA 92653

Description of EUT

a) Type of EUT : Redfire

b) Trade Name : Wireless Interactive Comm., Inc.

c) Model No. : Redfire 200e

d) Power Supply : I/P: 100-240V 1.0A 50-60Hz; O/P: 24V 1.25A 30W MAX

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C (2006)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Date Test Item Received : Oct. 31, 2006

Date Test Campaign Completed : MAY 04, 2007

Date of Issue : MAY 04, 2007

Test Engineer : John Mi

Approve & Authorized Signer :

Will Yauo, Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

<b>Table of Contents</b>	Page
1 GENERAL INFORMATION	1
1.1 Product Description	1
1.2 Characteristics of Device	1
1.3 Test Methodology	1
1.4 Test Facility	1
2 PROVISIONS APPLICABLE	2
2.1 Definition	2
2.2 Requirement for Compliance	3
2.3 Restricted Bands of Operation	5
2.4 Labeling Requirement	5
2.5 User Information	6
3. SYSTEM TEST CONFIGURATION	7
3.1 Justification	7
3.2 Devices for Tested System	7
4 RADIATED EMISSION MEASUREMENT	8
4.1 Applicable Standard	8
4.2 Measurement Procedure	8
4.3 Measuring Instrument	10
4.4 Radiated Emission Data	
4.5 Field Strength Calculation	
4.6 Photos of Radiation Measuring Setup	44
5 CONDUCTED EMISSION MEASUREMENT	48
5.1 Standard Applicable	48
5.2 Measurement Procedure	48
5.3 Conducted Emission Data	49
5.4 Result Data Calculation	65
5.5 Conducted Measurement Equipment	65
5.6 Photos of Conduction Measuring Setup	66
6 ANTENNA REQUIREMENT	70
6.1 Standard Applicable	
6.2 Antenna Construction and Directional Gain	70
7 EMISSION BANDWIDTH MEASUREMENT	71
7.1 Standard Applicable	71
7.2 Measurement Procedure	71

7.3 Measurement Equipment	/ 1
7.4 Measurement Data	72
8 OUTPUT POWER MEASUREMENT	79
8.1 Standard Applicable	79
8.2 Measurement Procedure	79
8.3 Measurement Equipment	79
8.4 Measurement Data	80
9 100 KHZ BANDWIDTH OF BAND EDGES MEASUREMENT	87
9.1 Standard Applicable	87
9.2 Measurement Procedure	87
9.3 Measurement Equipment	87
9.4 Measurement Data	88
10 POWER DENSITY MEASUREMENT	93
10.1 Standard Applicable	93
10.2 Measurement Procedure	93
10.3 Measurement Equipment	93
10.4 Measurement Data	94
11. OUT-OF-BAND CONDUCTED EMISSION MEASUREMENT	101
11.1 Standard Applicable	101
11.2 Measurement Procedure	101
11.3 Measurement Equipment	101
11.4 Measurement Data	102

Sheet 1 of 115Sheets FCC ID.: TOP-WICI-RF2E

#### 1 GENERAL INFORMATION

# 1.1 Product Description

a) Type of EUT : Redfire

b) Trade Name : Wireless Interactive Comm., Inc.

c) Model No. : RedFire200e

d) Power Supply : I/P: 100-240V 1.0A 50-60Hz; O/P: 24V 1.25A 30W MAX

#### 1.2 Characteristics of Device

Using advanced OFDM and power amp technology, the RedFire 200e has high outut power and amazing throughput even at long distance transmission. Operating in 2.4GHz band, using IEEE 802.11g standard, the RedFire 200e can rovide up to 54Mbps data rates communications.

# 1.3 Test Methodology

Both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003). There are four antenna reported and have been tested.

# 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO.34, LIN 5, DINGFU TSUEN, LINKOU SHIANG TAIPEI COUNTY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Oct. 20, 2005.

Sheet 2 of 115Sheets FCC ID.: TOP-WICI-RF2E

# 2 PROVISIONS APPLICABLE

# 2.1 Definition

#### **Unintentional radiator:**

A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

#### Class A Digital Device:

A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

#### Class B Digital Device:

A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note: A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

#### **Intentional radiator:**

A device that intentionally generates and emits radio frequency energy by radiation or induction.

# 2.2 Requirement for Compliance

# (1) Conducted Emission Requirement

Except for Class A digital devices, for equpment 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 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a  $50\mu\text{H}/50$  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 band edges.

Frequency MHz	Quasi Peak dB μ V	Average dB μ V
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency

# (2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB $\mu$ V/m	Radiated μV/m		
30 - 88	3	40.0	100		
88 - 216	3	43.5	150		
216 - 960	3	46.0	200		
Above 960	3	54.0	500		

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

#### (3) Antenna Requirement

For intentional device, according to §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.

Sheet 4 of 115Sheets FCC ID.: TOP-WICI-RF2E

#### (4) Bandwidth Requirement

For direct sequence system, according to 15.247(a)(2), the minimum 6dB bandwidth shall be at least 500 kHz.

# (5) Output Power Requirement

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

# (6) 100 kHz Bandwidth of Frequency Band Edges Requirement

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

# (7) Power Density Requirement

According to 15.247(d), for direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

# 2.3 Restricted Bands of Operation

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
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	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

<sup>\*\*:</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

# 2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

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

#### 2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- -- Reorient or relocate the receiving antenna.
- -- Increase the separation between the equipment and receiver.
- -- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- -- Consult the dealer or an experienced radio / TV technician for help.

# 3. SYSTEM TEST CONFIGURATION

#### 3.1 Justification

For both radiated and conducted emissions below 1 GHz, the system was configured for testing in a typical fashion as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation. Measurement was performed under the condition that a computer program was exercised to simulate data communication of EUT, and the transmission rate was set to maximum allowed by EUT. Three highest emissions were verified with varying placement of the transmitting antenna connected to EUT to maximize the emission from EUT.

For conducted emissions, only measured on TX and RX operation, for the digital circuits portion also function normally whenever TX or RX is operated. For radiated emissions, whichever RF channel is operated, the digital circuits function identically. As the reason, measurement of radiated emissions from digital circuits is only performed with channel 7 by transmitting mode.

During the preliminary test, the worse case is the antenna with a cable, and data presented in this test report just shows the worse case.

# 3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID.	Cable Description
Redfire	Wireless Interactive Comm., Inc.	RedFire200e/ TOP-WICI-RF2E	

Remark "\*" means equipment under test.

Sheet 8 of 115Sheets FCC ID.: TOP-WICI-RF2E

# 4 RADIATED EMISSION MEASUREMENT

# 4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a). For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and direct sequence spread spectrum, and the out band emission shall be comply with §15.247 (c)

# 4.2 Measurement Procedure

- 1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively.
- 2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
- 3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
- 4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
- 5. Repeat step 4 until all frequencies need to be measured were complete.
- 6. Repeat step 5 with search antenna in vertical polarized orientations.
- 7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

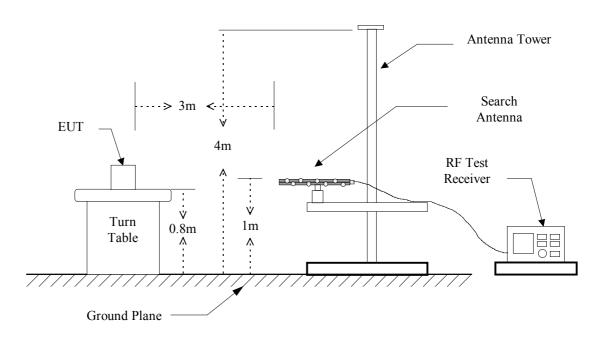
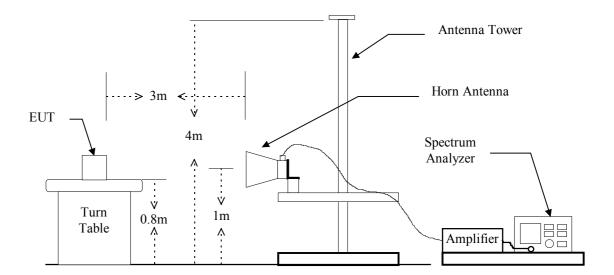


Figure 1: Frequencies measured below 1 GHz configuration

Figure 2: Frequencies measured above 1 GHz configuration



# **4.3 Measuring Instrument**

The following instrument are used for radiated emissions measurement:

Equipment	Manufacturer	Model No.	Next Cal. Date
Bi-Log Antenna	Schaffner	CBL 6111C	2007/12/21
Log-periodic Antenna	EMCO	3146	2007/08/13
Biconical Antenna	EMCO	3110	2007/06/21
EMI Test Receiver	Rohde & Schwarz	ESCI	2007/11/27
Double Ridged Antenna	EMCO	3115	2007/08/06
Double Ridged Antenna	EMCO	3115	2008/04/25
Amplifier	HP	8449B	2007/10/08
Amplifier	HP	83051A	2007/05/05
Spectrum	R&S	FSP40	2007/08/07
Signal generator	HP	HP 83732B	2007/06/22

Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band	Instrument	Function	Resolution	Video
(MHz)	THOU WITHOUT	1 directori	bandwidth	Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

ETC Report No.: 06-10-RBF-137 Sheet 11 of 115Sheets FCC ID.: TOP-WICI-RF2E

# 4.4 Radiated Emission Data

4.4.1 RF Portion

Mode: OB-003

A 802.11b

a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date : Apr. 19, 2007 Temperature : 23 °C Humidity : 51 %

Frequency (MHz)	l Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4824.067	45.2	***	44.6	***	2.6	47.8	***	74.0	54.0	-26.2	114	1.4
7236.101					5.8			74.0	54.0			
9648.135					7.3			74.0	54.0			
12060.169					9.2			74.0	54.0			
14472.203					11.6			74.0	54.0			
16884.237					12.1			74.0	54.0			
19296.271					8.8			74.0	54.0			
21708.305					9.8			74.0	54.0			
24120.339					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 12 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : Apr. 19, 2007 Temperature : 23 °C Humidity : 51 %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4873.964	44.8	***	43.9	***	2.7	47.5	***	74.0	54.0	-26.5	96	1.3
7310.946					5.9			74.0	54.0			
9747.928					7.3			74.0	54.0			
12184.910					9.3			74.0	54.0			
14621.892					11.6			74.0	54.0			
17058.874					13.1			74.0	54.0			
19495.856					8.5			74.0	54.0			
21932.838					9.9			74.0	54.0			
24369.820					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 13 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		t @3m V/m) Ave		@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4924.039	45.6	***	44.7	***	2.8	48.4	***	74.0	54.0	-25.6	102	1.4
7386.059					6.0			74.0	54.0			
9747.928					7.3			74.0	54.0			
12109.797					9.2			74.0	54.0			
14471.666					11.6			74.0	54.0			
16833.535					11.9			74.0	54.0			
19195.404					8.9			74.0	54.0			
21557.273					9.7			74.0	54.0			
23919.142					10.3			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 14 of 115Sheets FCC ID.: TOP-WICI-RF2E

# B 802.11g

# a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		t @3m V/m) Ave	Limit (dBu Peak		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4823.887	43.6	***	43.1	***	2.6	46.2	***	74.0	54.0	-27.8	86	1.5
7235.831					5.8			74.0	54.0			
9647.775					7.3			74.0	54.0			
12059.719					9.2			74.0	54.0			
14471.663					11.6			74.0	54.0			
16883.607					12.1			74.0	54.0			
19295.551					8.8			74.0	54.0			
21707.495					9.8			74.0	54.0			
24119.439					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 15 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave		@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4873.887	44.2	***	43.8	***	2.7	46.9	***	74.0	54.0	-27.1	67	1.5
7310.831					5.9			74.0	54.0			
9747.774					7.3			74.0	54.0			
12184.718					9.3			74.0	54.0			
14621.661					11.6			74.0	54.0			
17058.605					13.1			74.0	54.0			
19495.548					8.5			74.0	54.0			
21932.492					9.9			74.0	54.0			
24369.435					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 16 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency	ı	Reading	(dBuV)	)	Factor	Result	t @3m	Limit	@3m	Margin	Table	Ant.
(MHz)	F Peak	l Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4923.917	43.7	***	42.8	***	2.8	46.5	***	74.0	54.0	-27.5	72	1.4
7385.876					6.0			74.0	54.0			
9847.835					7.3			74.0	54.0			
12309.794					9.3			74.0	54.0			
14771.753					11.5			74.0	54.0			
17233.712					14.3			74.0	54.0			
19695.671					8.5			74.0	54.0			
22157.630					10.0			74.0	54.0			
24619.589				-	10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 17 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: GRD-001

#### A 802.11b

a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date: <u>Apr. 19, 2007</u> Temperature: <u>23</u> °C Humidity: <u>51</u> %

Frequency	 	_	g (dBuV) \		Factor (dB)		t @3m V/m)	Limit (dBu	_	Margin (dB)	Table Deg.	Ant. High
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave	, ,	(Deg.)	(m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4824.058	48.8	***	50.5	***	-0.9	49.6	***	74.0	54.0	-24.4	62	1.3
7236.087					5.8			74.0	54.0			
9648.116					7.3			74.0	54.0			
12060.145					9.2			74.0	54.0			
14472.174					11.6			74.0	54.0			
16884.203					12.1			74.0	54.0			
19296.232					8.8			74.0	54.0			
21708.261					9.8			74.0	54.0			
24120.290					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 18 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : Apr. 19, 2007 Temperature : 23 °C Humidity : 51 %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4873.875	50.0	***	52.0	***	-0.8	51.2	***	74.0	54.0	-22.8	77	1.8
7310.813					5.9			74.0	54.0			
9747.751					7.3			74.0	54.0			
12184.689					9.3			74.0	54.0			
14621.627					11.6			74.0	54.0			
17058.565					13.1			74.0	54.0			
19495.503					8.5			74.0	54.0			
21932.441					9.9			74.0	54.0			
24369.379					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 19 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4924.058	47.3	***	48.8	***	-0.6	48.2	***	74.0	54.0	-25.8	82	1.6
7386.087					6.0			74.0	54.0			
9848.116					7.3			74.0	54.0			
12310.145					9.3			74.0	54.0			
14772.174					11.5			74.0	54.0			
17234.203					14.3			74.0	54.0			
19696.232					8.5			74.0	54.0			
22158.261					10.0			74.0	54.0			
24620.290					10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 20 of 115Sheets FCC ID.: TOP-WICI-RF2E

# B 802.11g

# a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave		@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4824.208	46.6	***	47.0	***	-0.6	46.4	***	74.0	54.0	-27.6	102	1.4
7236.312					5.8			74.0	54.0			
9648.416					7.3			74.0	54.0			
12060.520					9.2			74.0	54.0			
14472.624					11.6			74.0	54.0			
16884.728					12.1			74.0	54.0			
19296.832					8.8			74.0	54.0			
21708.936					9.8			74.0	54.0			
24121.040					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 21 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4874.125	44.8	***	47.5	***	2.7	50.2	***	74.0	54.0	-23.8	96	1.3
7311.188					5.9			74.0	54.0			
9648.416					7.3			74.0	54.0			
12060.520					9.2			74.0	54.0			
14472.624					11.6			74.0	54.0			
16884.728					12.1			74.0	54.0			
19296.832					8.8			74.0	54.0			
21708.936					9.8			74.0	54.0			
24121.040					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 22 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : <u>Apr. 19, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency	ı	Reading	(dBuV)	)	Factor	Result	t @3m	Limit	@3m	Margin	Table	Ant.
(MHz)	F Peak	_	Peak		(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4924.750	44.5	***	45.8	***	2.8	48.6	***	74.0	54.0	-25.4	88	1.5
7387.125					6.0			74.0	54.0			
9849.500					7.3			74.0	54.0			
12311.875					9.3			74.0	54.0			
14774.250					11.5			74.0	54.0			
17236.625					14.4			74.0	54.0			
19699.000					8.5			74.0	54.0			
22161.375					10.0			74.0	54.0			
24623.750				-	10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 23 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: SA-101

# A 802.11b

a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date: <u>Apr. 20, 2007</u> Temperature: <u>23</u> °C Humidity: <u>51</u> %

Frequency		Reading	g (dBuV) \		Factor (dB)		t @3m V/m)		@3m V/m)	Margin (dB)	Table Deg.	Ant. High
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Áve	Peak	Ave		(Deg.)	(m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4823.968	45.6	***	52.0	***	-0.9	51.1	***	74.0	54.0	-22.9	83	1.6
7235.952					5.8			74.0	54.0			
9647.936					7.3			74.0	54.0			
12059.920					9.2			74.0	54.0			
14471.904					11.6			74.0	54.0			
16883.888					12.1			74.0	54.0			
19295.872					8.8			74.0	54.0			
21707.856					9.8			74.0	54.0			
24119.840					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 24 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency (MHz)	F	1	g (dBuV)	/	Factor (dB) Corr.	(dBu	t @3m V/m)	`	V/m)	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
0.40= 0.00	Peak	Ave	Peak	Ave	0.0	Peak	Ave	Peak	Ave		(B0g.)	` ′
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3	-		74.0	54.0		-	
* 12185.000					9.3			74.0	54.0			
4874.076	46.2	***	50.1	***	-0.9	49.2	***	74.0	54.0	-24.8	79	1.4
7311.114					5.9			74.0	54.0			
9748.152					7.3			74.0	54.0			
12185.190					9.3			74.0	54.0			
14622.228					11.6			74.0	54.0			
17059.266					13.1			74.0	54.0			
19496.304					8.5			74.0	54.0			
21933.342					9.9			74.0	54.0			
24370.380					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 25 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : Apr. 20, 2007 Temperature : 27 °C Humidity : 51 %

Frequency (MHz)	l Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4923.964	46.3	***	51.4	***	-0.9	50.5	***	74.0	54.0	-23.5	88	1.6
7385.946					6.0			74.0	54.0			
9847.928					7.3			74.0	54.0			
12309.910					9.3			74.0	54.0			
14771.892					11.5			74.0	54.0			
17233.874					14.3			74.0	54.0			
19695.856					8.5			74.0	54.0			
22157.838					10.0			74.0	54.0			
24619.820					10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 26 of 115Sheets FCC ID.: TOP-WICI-RF2E

# B 802.11g

#### a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date : <u>Apr. 20, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

			_		_					=		
Frequency	ı	Reading	g (dBuV)		Factor (dB)		:@3m	Limit		Margin	Table	Ant. High
(MHz)	Peak	ł Ave	\ Peak	/ Ave	Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	(m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4824.102	46.6	***	48.2	***	-0.9	47.3	***	74.0	54.0	-26.7	79	1.5
7236.153					5.8			74.0	54.0			
9648.204					7.3			74.0	54.0			
12060.255					9.2			74.0	54.0			
14472.306					11.6			74.0	54.0			
16884.357					12.1			74.0	54.0			
19296.408					8.8			74.0	54.0			
21708.459					9.8			74.0	54.0			
24120.510					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 27 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : <u>Apr. 20, 2007</u> Temperature : <u>27</u> °C Humidity : <u>51</u> %

Frequency (MHz)	F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4873.892	45.8	***	46.9	***	2.7	49.6	***	74.0	54.0	-24.4	78	1.4
7310.838					5.9			74.0	54.0			
9747.784					7.3			74.0	54.0			
12184.730					9.3			74.0	54.0			
14621.676					11.6			74.0	54.0			
17058.622					13.1			74.0	54.0			
19495.568					8.5			74.0	54.0			
21932.514					9.9			74.0	54.0			
24369.460					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 28 of 115Sheets FCC ID.: TOP-WICI-RF2E

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : Apr. 20, 2007 Temperature : 27 °C Humidity : 51 %

Frequency		Reading	g (dBuV)	)	Factor	Result	t @3m	Limit	@3m	Margin	Table	Ant.
(MHz)	F Peak	_	Peak		(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4923.896	46.1	***	46.8	***	2.8	49.6	***	74.0	54.0	-24.4	88	1.5
7385.844					6.0			74.0	54.0			
9847.792					7.3			74.0	54.0			
12309.740					9.3			74.0	54.0			
14771.688					11.5			74.0	54.0			
17233.636					14.3			74.0	54.0			
19695.584					8.5			74.0	54.0			
22157.532					10.0			74.0	54.0			
24619.480					10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 29 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: PA-L01

#### A 802.11b

a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date: <u>Apr. 20, 2007</u> Temperature: <u>23</u> °C Humidity: <u>51</u> %

Frequency	 	_	g (dBuV) \		Factor (dB)		Result @3m (dBuV/m)		@3m V/m)	Margin (dB)	Table Deg.	Ant. High
(MHz)	Peak	Ave	Peak	Ave	Corr.	Peak	Ave	Peak	Ave	, ,	(Deg.)	(m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4824.133	45.6	***	44.8	***	-0.9	44.7	***	74.0	54.0	-29.3	93	1.5
7236.200					5.8			74.0	54.0			
9648.267					7.3			74.0	54.0			
12060.334					9.2			74.0	54.0			
14472.401					11.6			74.0	54.0			
16884.468					12.1			74.0	54.0			
19296.535					8.8			74.0	54.0			
21708.602					9.8			74.0	54.0			
24120.669					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 30 of 115Sheets FCC ID.: TOP-WICI-RF2E

# b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : <u>Apr. 20, 2007</u> Temperature : <u>23</u> °C Humidity : <u>51</u> %

Frequency (MHz)	I F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4874.082	45.2	***	44.7	***	-0.9	44.3	***	74.0	54.0	-29.7	88	1.6
7311.123					5.9			74.0	54.0			
9748.164					7.3			74.0	54.0			
12185.205					9.3			74.0	54.0			
14622.246					11.6			74.0	54.0			
17059.287					13.1			74.0	54.0			
19496.328					8.5			74.0	54.0			
21933.369					9.9			74.0	54.0			
24370.410					10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

# c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : <u>Apr. 20, 2007</u> Temperature : <u>23</u> °C Humidity : <u>51</u> %

Frequency (MHz)	F Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4924.079	45.8	***	45.2	***	-0.9	44.9	***	74.0	54.0	-29.1	72	1.4
7386.119					6.0			74.0	54.0			
9848.159					7.3			74.0	54.0			
12310.199					9.3			74.0	54.0			
14772.239					11.5			74.0	54.0			
17234.279					14.3			74.0	54.0			
19696.319					8.5			74.0	54.0			
22158.359					10.0			74.0	54.0			
24620.399					10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 32 of 115Sheets FCC ID.: TOP-WICI-RF2E

# B 802.11g

# a) CH Low

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2412.000</u> MHz (Local Frequency: <u>2412.000</u> MHz)

Test Date : <u>Apr. 20, 2007</u> Temperature : <u>23</u> °C Humidity : <u>51</u> %

			•		-					•		
Frequency	l	Reading	g (dBuV)	)	Factor	Result	: @3m	Limit	@3m	Margin Table		Ant.
(MHz)	Peak	ł Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
* 2412.000					-3.0			74.0	54.0			
* 4824.000					2.6			74.0	54.0			
* 7236.000					5.8			74.0	54.0			
* 9648.000					7.3			74.0	54.0			
* 12060.000					9.2			74.0	54.0			
4823.950	44.1	***	44.2	***	-0.9	43.3	***	74.0	54.0	-30.7	66	1.5
7235.925					5.8			74.0	54.0			
9647.900					7.3			74.0	54.0			
12059.875					9.2			74.0	54.0			
14471.850					11.6			74.0	54.0			
16883.825					12.1			74.0	54.0			
19295.800					8.8			74.0	54.0			
21707.775					9.8			74.0	54.0			
24119.750					10.4			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 33 of 115Sheets FCC ID.: TOP-WICI-RF2E

## b) CH Middle

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2437.000</u> MHz (Local Frequency: <u>2437.000</u> MHz)

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	ı	Reading	(dBuV)		Factor	Result	t @3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	l Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
* 2437.000					-2.9			74.0	54.0			
* 4874.000					2.7			74.0	54.0			
* 7311.000					5.9			74.0	54.0			
* 9748.000					7.3			74.0	54.0			
* 12185.000					9.3			74.0	54.0			
4873.920	45.2	***	44.9	***	2.7	47.9	***	74.0	54.0	-26.1	89	1.4
7310.880					5.9			74.0	54.0			
9747.840					7.3			74.0	54.0			
12184.800					9.3			74.0	54.0			
14621.760					11.6			74.0	54.0			
17058.720					13.1			74.0	54.0			
19495.680					8.5			74.0	54.0			
21932.640					9.9			74.0	54.0			
24369.600				-	10.7			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 34 of 115Sheets FCC ID.: TOP-WICI-RF2E

## c) CH High

Operation Mode : <u>Receiving / Transmitting</u>

Fundamental Frequency: <u>2462.000</u> MHz (Local Frequency: <u>2462.000</u> MHz)

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency (MHz)	l Peak	_	g (dBuV) \ Peak		Factor (dB) Corr.		: @3m V/m) Ave	Limit (dBu Peak	@3m V/m) Ave	Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
* 2462.000					-2.8			74.0	54.0			
* 4924.000					2.8			74.0	54.0			
* 7386.000					6.0			74.0	54.0			
* 9848.000					7.3			74.0	54.0			
* 12310.000					9.3			74.0	54.0			
4924.098	44.0	***	43.6	***	2.8	46.8	***	74.0	54.0	-27.2	67	1.4
7385.147					6.0			74.0	54.0			
9846.196					7.3			74.0	54.0			
12307.245					9.3			74.0	54.0			
14768.294					11.5			74.0	54.0			
17229.343					14.3			74.0	54.0			
19690.392					8.5			74.0	54.0			
22151.441					10.0			74.0	54.0			
24612.490					10.9			74.0	54.0			

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.
- 6. Remark "\*" means the receiving local frequency and the harmonics.

Sheet 35 of 115Sheets FCC ID.: TOP-WICI-RF2E

#### 4.4.2 Radiated Eimssion of Restricted bands

Mode: OB-003

A. 802.11b

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mode : CH Low Restricted Frequency band: 2310MHz – 2390MHz

Frequency		Reading	g (dBuV)		Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2367.540	46.7	***	45.4	***	-3.2	43.5	***	74.0	54.0	-30.5	67	1.3
2389.120	45.8	***	46.1	***	-3.1	43.0	***	74.0	54.0	-31.0	76	1.4

Operation Mode : CH High Restricted Frequency band: 2483.5MHz – 2500MHz

_	0 00 000 000 000								<i>J</i> 10 11 11 11				
Ī	Frequency		Reading	g (dBuV)	)	Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
	(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
Ī	2486.560	47.3	***	45.4	***	-2.8	44.5	***	74.0	54.0	-29.5	83	1.4
I	2494.330	48.1	***	46.2	***	-2.7	45.4	***	74.0	54.0	-28.6	56	1.3

B. 802.11g

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mode : CH Low Restricted Frequency band: 2310MHz – 2390MHz

Frequency		Reading	g (dBuV)	)	Factor	Result	:@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H V		/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2354.640	48.6		45.6		-3.3	45.3		74.0	54.0	-28.7	74	1.4
2388.720	47.3		46.2		-3.1	44.2		74.0	54.0	-29.8	88	1.4

Operation Mode : CH High Restricted Frequency band: 2483.5MHz – 2500MHz

Frequency		Reading	g (dBuV)	)	Factor	Result	:@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2486.140	47.6	***	47.4	***	-2.8	44.8	***	74.0	54.0	-29.2	69	1.3
2492.720	46.8	***	47.3	***	-2.7	44.6	***	74.0	54.0	-29.4	54	1.3

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Sheet 36 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: GRD-001

A. 802.11b

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mode : CH Low Restricted Frequency band: 2310MHz – 2390MHz

Frequency		Reading	g (dBuV)	)	Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2357.640	48.6	***	47.9	***	-3.2	45.4	***	74.0	54.0	-28.6	78	1.3
2388.560	47.8	***	47.1	***	-3.1	44.7	***	74.0	54.0	-29.3	92	1.3

Operation Mode : CH High Restricted Frequency band: 2483.5MHz – 2500MHz

Frequency		Reading	g (dBuV)		Factor	Result	:@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2486.920	48.3	***	47.2	***	-2.7	45.6	***	74.0	54.0	28.4	62	1.4
2497.640	47.4	***	46.9	***	-2.7	44.7	***	74.0	54.0	-29.3	74	1.4

#### B. 802.11g

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

 Operation Mode
 : CH Low
 Restricted Frequency band: 2310MHz – 2390MHz

 Frequency
 Reading (dBuV)
 Factor Result @3m Limit @3m Margin Table [dB]

Frequency		Reading	g (dBuV)	)	Factor (dB)		t @3m		@3m	Margin (dB)	Table	Ant. High
(MHz)	Peak	H Ave	\ Peak	/ Ave	Corr.	(dBu Peak	ıV/m) Ave	(dBu Peak	V/m) Ave	(ив)	Deg. (Deg.)	(m)
2374.620	46.8	***	47.0	***	-3.2	43.8	***	74.0	54.0	-30.2	58	1.3
2387.160	47.2	***	46.9	***	-3.1	44.1	***	74.0	54.0	-29.9	92	1.4

**Operation Mode** : CH High Restricted Frequency band: 2483.5MHz – 2500MHz Result @3m Frequency Factor Limit @3m Reading (dBuV) Margin Table (dB) High (dB) Deg. (dBuV/m) (dBuV/m) Н (MHz) Corr. (m) (Deg.) Peak Peak Ave Peak Ave Peak Ave Ave 2487.210 47.1 46.2 -2.744.4 74.0 54.0 -29.6 77 1.4 2493.440 74.0 47.4 46.5 -2.744.7 54.0 -29.3 69 1.4

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Sheet 37 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: SA-101

A. 802.11b

1Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

<b>Operation Mode</b>	: CH Low	Restricted Frequency band: 2310MHz – 2390MHz
O p 01 11 11 11 11 11 11 11 11 11 11 11 11		11050110000 1100 00000 00000 20101111111 20 001111111

Frequency		Reading	g (dBuV)	)	Factor	Result	:@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2349.520	47.8	***	46.2	***	-3.3	44.5	***	74.0	54.0	-29.5	78	1.4
2384.320	47.4	***	45.9	***	-3.1	44.3	***	74.0	54.0	-29.7	92	1.3

Operation Mode : CH High Restricted Frequency band: 2483.5MHz – 2500MHz

Ī	Frequency		Reading	(dBuV)		Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
	(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
Ī	2486.100	46.8	***	47.3	***	-2.8	44.5	***	74.0	54.0	-29.5	69	1.3
Ī	2493.270	46.2	***	45.9	***	-2.7	43.5	***	74.0	54.0	-30.5	84	1.4

### B. 802.11g

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mo	ae	: CH I	JOW		Restr	ictea Fr	equenc	y bana:	231UN	1HZ — Z	SYUMIH	Z
Frequency		Reading	g (dBuV)	)	Factor	Result	: @3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Da ali	١ ٨	Da.al.	/	(dB) Corr.	`	V/m)	`	V/m)	(dB)	Deg. (Deg.)	High (m)
. ,	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave		(Dcg.)	` ,
2363.450	46.3	***	45.8	***	-3.2	43.1	***	74.0	54.0	-30.9	88	1.3
2388.570	47.1	***	45.9	***	-3.1	44.0	***	74.0	54.0	-30.0	54	1.3

O	peration Mo	de	: CH F	Iigh		Restr	icted Fr	equenc	y band:	2483.	5MHz –	2500M	Hz
	Frequency		Reading	(dBuV)	,	Factor (dB)		t @3m		@3m	Margin (dB)	Table Deg.	Ant. High
	(MHz)	Peak	Ave	Peak	/ Ave	Corr.	Peak	V/m) Ave	(dBu Peak	V/m) Ave	(GD)	(Deg.)	(m)
	2485.920	46.2	***	47.1	***	-2.8	44.3	***	74.0	54.0	-29.7	67	1.4
	2489.440	47.3	***	46.2	***	-2.7	44.6	***	74.0	54.0	-29.4	96	1.4

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Sheet 38 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: PA-L01

A. 802.11b

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mode : CH Low Restricted Frequency band: 2310MHz – 2390MHz

Frequency		Reading	g (dBuV)		Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2367.820	47.8	***	47.2	***	-3.2	44.6	***	74.0	54.0	-29.4	78	1.4
2387.770	47.4	***	47.0	***	-3.1	44.3	***	74.0	54.0	-29.7	54	1.4

Operation Mode : CH High Restricted Frequency band: 2483.5MHz – 2500MHz

Frequency		Reading	g (dBuV)		Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
(MHz)	Peak	H Ave	\ Peak	/ Ave	(dB) Corr.	(dBu Peak	V/m) Ave	(dBu Peak	V/m) Ave	(dB)	Deg. (Deg.)	High (m)
2483.940	48.1	***	47.2	***	-2.8	45.3	***	74.0	54.0	-28.7	66	1.3
2486.570	47.4	***	48.3	***	-2.8	45.5	***	74.0	54.0	-28.5	72	1.4

B. 802.11g

Test Date : Jun. 06, 2007 Temperature : 23 °C Humidity : 51 %

Operation Mo	de	: CH I	J <b>OW</b>		Restr	icted Fr	<u>equenc</u>	y band:	: 2310N	<u> 1Hz – 2</u>	390MH	Z
Frequency Reading		g (dBuV)	)	Factor	Result	: @3m	Limit	@3m	Margin	Table	Ant.	
(MHz)	H	H V		/	(dB) Corr.	(dBuV/m)		(dBuV/m)		(dB)	Deg.	High (m)
()	Peak	Ave	Peak	Ave	••••	Peak	Ave	Peak	Ave		(Deg.)	()
2374.320	46.9	***	45.8	***	-3.2	43.7	***	74.0	54.0	-30.3	77	1.3
2388.540	46.2	***	46.1	***	-3.1	43.1	***	74.0	54.0	-30.9	62	1.3

C	<b>Deration Mo</b>	de	: CH F	Iigh		Restr	icted Fr	equenc	y band:	2483.	5MHz –	2500M	Hz
	Frequency		Reading	(dBuV)		Factor (dB)	Result	: @3m	Limit	@3m	Margin	Table	Ant.
	(MHz)	H	1	\	/	Corr.	(dBu	V/m)	(dBu	V/m)	(dB)	Deg.	High (m)
	(1711 12)	Peak	Ave	Peak	Ave	COII.	Peak	Ave	Peak	Ave		(Deg.)	(111)
	2484.310	47.1	***	46.2	***	-2.8	44.3	***	74.0	54.0	-29.7	89	1.4
	2489.520	47.4	***	47.0	***	-2.7	44.7	***	74.0	54.0	-29.3	92	1.4

- 1. Item of margin shown in above table refer to average limit.
- 2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "\*\*\*" means that Peak result is meet average limit.
- 3. Remark "---" means that the emissions level is too low to be measured.
- 4. Item "Margin" referred to Average limit while there is only peak result.
- 5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

#### 4.4.3 Other Emission

a) Emission frequencies below 1 GHz

Mode: OB-003/802.11b

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
36.480	V	36.7	-11.1	25.6	40.0	-14.4	216	1.0
79.140	٧	41.3	-15.1	26.2	40.0	-13.8	77	1.2
139.620	٧	36.9	-10.8	26.1	43.5	-17.4	228	1.2
394.520	Н	38.2	-6.3	31.9	46.0	-14.1	83	1.6
659.840	Н	39.4	-2.2	37.2	46.0	-8.8	296	1.7
923.740	Н	36.1	2.5	38.6	46.0	-7.4	214	1.8

Mode: OB-003/802.11g

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 53 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
78.230	V	41.1	-15.3	25.8	40.0	-14.2	93	1.0
139.540	V	36.9	-10.8	26.1	43.5	-17.4	102	1.2
494.420	V	37.5	-4.4	33.1	46.0	-12.9	156	1.5
659.830	٧	38.0	-2.2	35.8	46.0	-10.2	59	1.4
886.620	V	33.9	2.3	36.2	46.0	-9.8	101	1.9
923.740	Н	35.3	2.5	37.8	46.0	-8.2	78	1.2

- 1. Remark "---" means that the emissions level is too low to be measured.
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Mode: GRD-001/802.11b

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
36.480	V	37.3	-11.1	26.2	40.0	-13.8	67	1.2
139.620	٧	37.9	-10.8	27.1	43.5	-16.4	254	1.0
199.300	V	33.5	-7.2	26.3	43.5	-17.2	112	1.8
394.520	٧	37.2	-6.3	30.9	46.0	-15.1	86	1.2
494.420	V	38.6	-4.4	34.2	46.0	-11.8	98	1.5
853.720	Н	34.0	2.2	36.2	46.0	-9.8	57	1.6

Mode: GRD-001/802.11g

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
79.140	V	41.4	-15.1	26.3	40.0	-13.7	72	1.0
139.580	V	38.2	-10.8	27.4	43.5	-16.1	174	1.0
199.290	V	33.0	-7.2	25.8	43.5	-17.7	162	1.4
394.520	V	37.5	-6.3	31.2	46.0	-14.8	102	1.6
528.240	V	41.2	-5.0	36.2	46.0	-9.8	258	1.9
659.830	V	39.3	-2.2	37.1	46.0	-8.9	159	1.4

- 1. Remark "---" means that the emissions level is too low to be measured.
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Mode: SA-101/802.11b

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
79.140	٧	40.5	-15.1	25.4	40.0	-14.6	213	1.0
139.620	V	35.9	-10.8	25.1	43.5	-18.4	184	1.0
199.290	V	32.6	-7.2	25.4	43.5	-18.1	72	1.2
394.520	V	37.5	-6.3	31.2	46.0	-14.8	166	1.6
659.840	٧	38.9	-2.2	36.7	46.0	-9.3	59	1.2
853.720	Н	34.3	2.2	36.5	46.0	-9.5	114	2.1

Mode: SA-101/802.11g

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
100.740	V	34.3	-13.7	20.6	43.5	-22.9	182	1.0
129.930	Н	37.8	-11.5	26.3	43.5	-17.2	149	1.9
394.520	Н	38.1	-6.3	31.8	46.0	-14.2	172	2.1
528.240	V	40.4	-5.0	35.4	46.0	-10.6	163	1.8
659.840	V	39.0	-2.2	36.8	46.0	-9.2	54	1.4
853.720	I	33.7	2.2	35.9	46.0	-10.1	102	1.6

- 1. Remark "---" means that the emissions level is too low to be measured.
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Mode: PA-L01/802.11b

Operation Mode: Receiving / Transmitting

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
394.520	Н	37.9	-6.3	31.6	46.0	-14.4	214	2.1
424.610	V	34.6	-5.5	29.1	46.0	-16.9	28	1.8
494.600	V	37.5	-4.4	33.1	46.0	-12.9	62	2.1
528.240	V	40.4	-5.0	35.4	46.0	-10.6	136	1.6
659.840	V	38.9	-2.2	36.7	46.0	-9.3	138	1.8
811.700	V	33.8	1.1	34.9	46.0	-11.1	96	1.7

Mode: PA-L01/802.11g

Operation Mode: <u>Receiving / Transmitting</u>

Test Date : Apr. 20, 2007 Temperature : 23 °C Humidity : 51 %

Frequency	Ant-Pol	Meter	Corrected	Result @3m	Limit @3m	Margin	Table	Ant.
		Reading	Factor	(dBuV/m)	(dBuV/m)	(dB)	Degree	High
(MHz)	H/V	(dBuV)	(dB)				(Deg.)	(m)
394.520	V	38.1	-6.3	31.8	46.0	-14.2	162	1.6
498.100	V	37.8	-4.4	33.4	46.0	-12.6	133	2.4
528.240	V	40.2	-5.0	35.2	46.0	-10.8	169	1.9
659.840	Н	39.1	-2.2	36.9	46.0	-9.1	183	2.2
853.720	Н	34.5	2.2	36.7	46.0	-9.3	257	1.8
923.700	Н	36.5	2.5	39.0	46.0	-7.0	233	2.1

- 1. Remark "---" means that the emissions level is too low to be measured.
- 2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Sheet 43 of 115Sheets FCC ID.: TOP-WICI-RF2E

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

## 4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

where

Corrected Factor = Antenna FACTOR + Cable Loss + High Pass Filter Loss - Amplifier Gain

# 4.6 Photos of Radiation Measuring Setup

Mode: OB-003









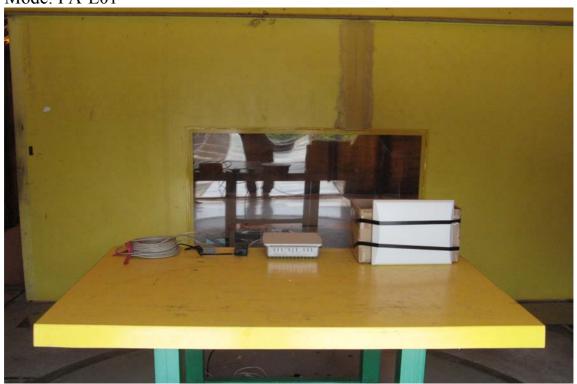














#### 5 CONDUCTED EMISSION MEASUREMENT

## 5.1 Standard Applicable

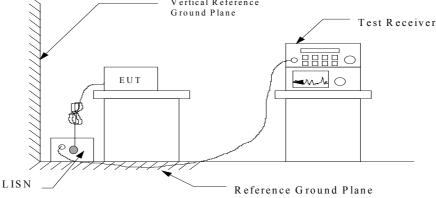
For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and § 15.207(a) respectively. Both Limits are identical specification.

#### **5.2 Measurement Procedure**

- 1. Setup the configuration per figure 3.
- 2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
- 3. Record the 6 or 8 highest emissions relative to the limit.
- 4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
- 5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
- 6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration

Vertical Reference



## 5.3 Conducted Emission Data

Mode: OB-003/802.11b

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

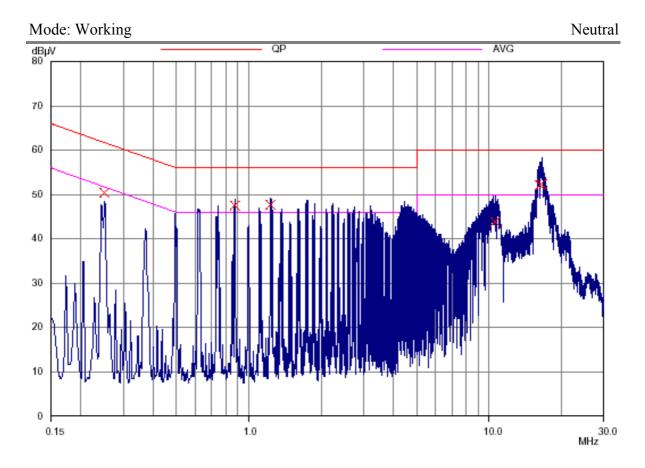
Mode: Working Neutral

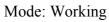
Frequency	Meter R	Reading	Factor	Res	Result		Limit		gin
ricquency	(dB	μV)	ractor	(dB	$(dB\mu V)$		(dBµV)		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.251	50.3		0.2	50.5		61.7	51.7	-11.2	
0.876	47.4	41.2	0.3	47.7	41.5	56.0	46.0	-8.3	-4.5
1.230	47.6	41.4	0.3	47.9	41.7	56.0	46.0	-8.1	-4.3
10.636	43.8		0.8	44.6		60.0	50.0	-15.4	
16.304	52.1	39.6	1.2	53.3	40.8	60.0	50.0	-6.7	-9.2
16.531	52.2	39.8	1.2	53.4	41.0	60.0	50.0	-6.6	-9.0

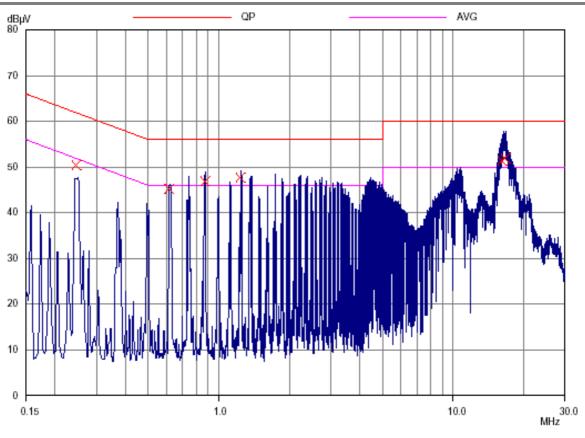
Mode: Working Line

Frequency	Meter R	Reading	Factor	Res	Result		nit	Mar	gin
rrequency	(dB	(dBµV)		(dB	$(dB\mu V)$		(dBµV)		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.247	50.3		0.2	50.5		61.9	51.9	-11.3	
0.614	45.2	40.3	0.3	45.5	40.6	56.0	46.0	-10.5	-5.4
0.876	46.8	41.6	0.3	47.1	41.9	56.0	46.0	-8.9	-4.1
1.238	47.7	39.6	0.3	48.0	39.9	56.0	46.0	-8.0	-6.1
16.187	51.3	39.2	1.2	52.5	40.4	60.0	50.0	-7.5	-9.6
16.734	51.8	38.9	1.2	53.0	40.1	60.0	50.0	-7.0	-9.9

- 1) Place of measurement: EMC LAB. of the ETC
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.







Mode: OB-003/802.11g

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

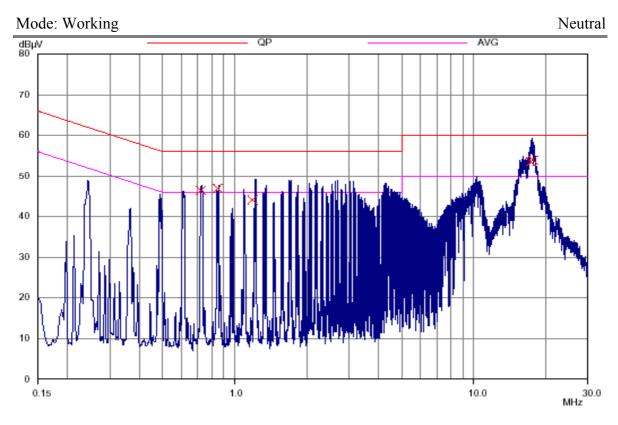
Mode: Working Neutral

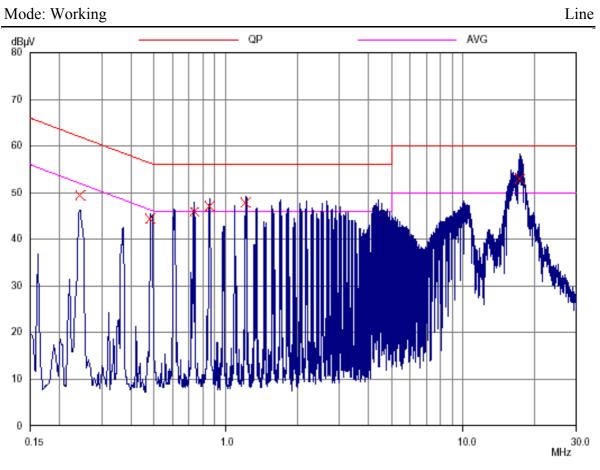
Meter Read Frequency	Reading	E 4	Res	ult	Limit		Margin		
Frequency	(dB	μV)	Factor	(dB	$(dB\mu V)$		μV)	(dBµV)	
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.271	48.6		0.2	48.8		61.1	51.1	-12.3	
0.724	46.3	40.7	0.3	46.6	41.0	56.0	46.0	-9.4	-5.0
0.853	47.0	41.2	0.3	47.3	41.5	56.0	46.0	-8.7	-4.5
1.195	44.1	38.4	0.3	44.4	38.7	56.0	46.0	-11.6	-7.3
17.351	53.5	39.2	1.2	54.7	40.4	60.0	50.0	-5.3	-9.6
17.687	53.9	40.3	1.3	55.2	41.6	60.0	50.0	-4.8	-8.4

Mode: Working Line

T.	Frequency Meter Reading	Reading	Б. 4	Res	ult	Limit		Margin	
Frequency	(dB	μV)	Factor	$(dB\mu V)$		(dBµV)		(dBµV)	
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.243	49.4		0.2	49.6		62.0	52.0	-12.4	
0.482	44.4		0.3	44.7		56.3	46.3	-11.6	
0.739	45.8	39.2	0.3	46.1	39.5	56.0	46.0	-9.9	-6.5
0.857	47.1	41.1	0.3	47.4	41.4	56.0	46.0	-8.6	-4.6
1.210	47.8	40.2	0.3	48.1	40.5	56.0	46.0	-7.9	-5.5
17.421	52.9	41.3	1.2	54.1	42.5	60.0	50.0	-5.9	-7.5

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Mode: GRD-001/802.11b

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

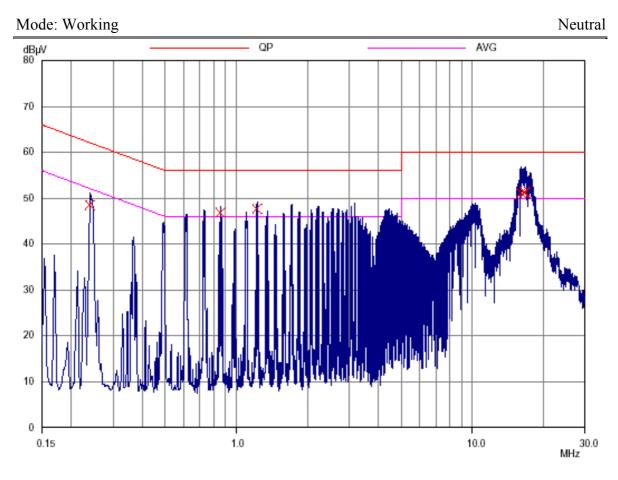
Mode: Working Neutral

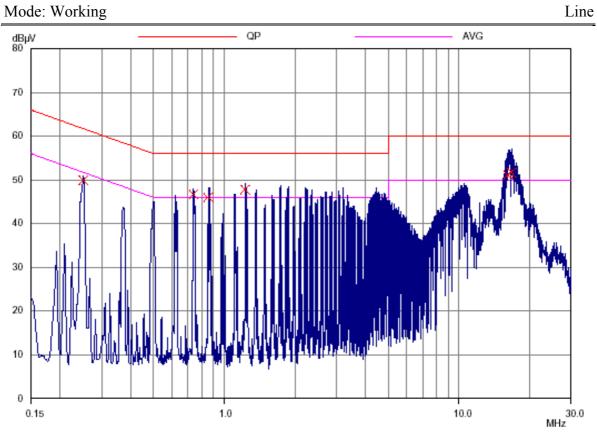
E	Meter R	Reading	E4	Res	ult	Limit		Margin	
Frequency	(dB	μV)	Factor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.239	48.5		0.2	48.7		62.1	52.1	-13.4	
0.857	46.8	40.6	0.3	47.1	40.9	56.0	46.0	-8.9	-5.1
1.226	47.6	41.3	0.3	47.9	41.6	56.0	46.0	-8.1	-4.4
16.085	51.1	39.2	1.2	52.3	40.4	60.0	50.0	-7.7	-9.6
16.683	51.3	40.1	1.2	52.5	41.3	60.0	50.0	-7.5	-8.7
16.765	51.0	39.8	1.2	52.2	41.0	60.0	50.0	-7.8	-9.0

Mode: Working Line

Meter Reading Frequency		Reading	Footon	Res	ult	Limit		Margin	
Frequency	(dB	μV)	Factor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.251	49.8		0.2	50.0		61.7	51.7	-11.7	
0.739	46.6	40.2	0.3	46.9	40.5	56.0	46.0	<b>-</b> 9.1	-5.5
0.857	45.9	40.0	0.3	46.2	40.3	56.0	46.0	-9.8	-5.7
1.234	47.7	41.2	0.3	48.0	41.5	56.0	46.0	-8.0	-4.5
16.218	51.1	40.3	1.2	52.3	41.5	60.0	50.0	-7.7	-8.5
16.722	51.6	40.8	1.2	52.8	42.0	60.0	50.0	-7.2	-8.0

- 1) Place of measurement: EMC LAB. of the ETC
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Mode: GRD-001/802.11g

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

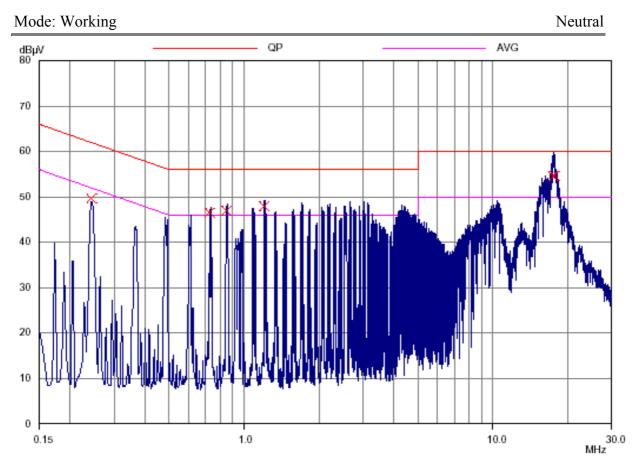
Mode: Working Neutral

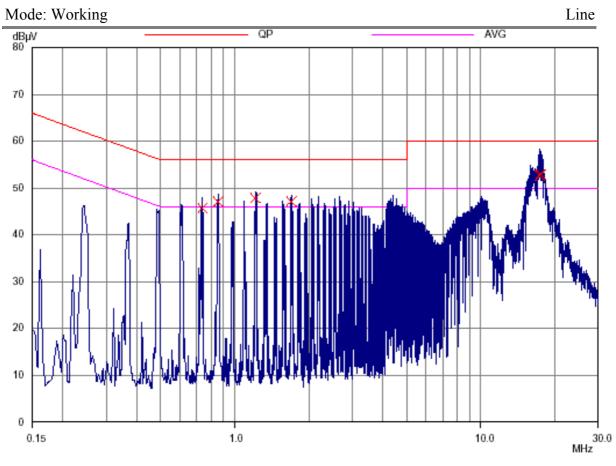
Frequency	Meter R	Reading	T 4	Res	Result		nit	Mar	gin
Frequency	(dB	μV)	Factor	(dB	$(dB\mu V)$		(dBµV)		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.243	49.6		0.2	49.8		62.0	52.0	-12.2	
0.728	46.4	40.3	0.3	46.7	40.6	56.0	46.0	-9.3	-5.4
0.853	46.9	40.6	0.3	47.2	40.9	56.0	46.0	-8.8	-5.1
1.201	47.8	41.2	0.3	48.1	41.5	56.0	46.0	-7.9	-4.5
17.503	54.5	40.4	1.3	55.8	41.7	60.0	50.0	-4.2	-8.3
17.695	54.6	41.3	1.3	55.9	42.6	60.0	50.0	-4.1	-7.4

Mode: Working Line

Frequency	Meter R	Reading	ъ .	Res	ult	Limit		Mar	gin
Frequency	(dB	μV)	Factor	(dB	$(dB\mu V)$		(dBµV)		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.739	45.6		0.3	45.9		56.0	46.0	-10.1	
0.857	47.0	41.2	0.3	47.3	41.5	56.0	46.0	-8.7	-4.5
1.210	47.8	41.4	0.3	48.1	41.7	56.0	46.0	-7.9	-4.3
1.703	47.1	41.2	0.4	47.5	41.6	56.0	46.0	-8.5	-4.4
17.421	52.6	40.3	1.2	53.8	41.5	60.0	50.0	-6.2	-8.5
17.566	52.9	41.6	1.3	54.2	42.9	60.0	50.0	-5.8	-7.1

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Mode: SA-101/802.11b

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

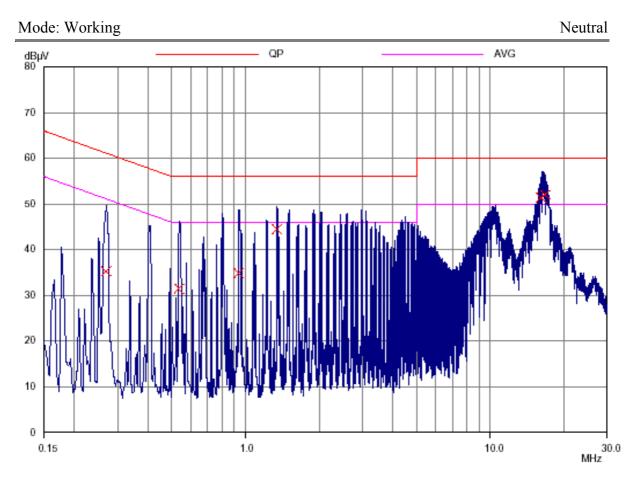
Mode: Working Neutral

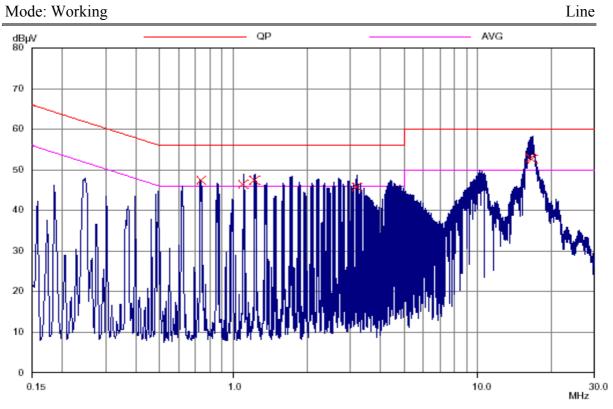
Engguenav	Meter R	Reading	Eastan	Result Factor		Limit		Margin	
Frequency	(dBµV)		Factor	(dB	(dBµV)		(dBµV)		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.271	35.2		0.2	35.4		61.1	51.1	-25.7	
0.536	31.3		0.3	31.6		56.0	46.0	-24.4	
0.939	34.7		0.3	35.0		56.0	46.0	-21.0	
1.347	44.3		0.4	44.7		56.0	46.0	-11.3	
16.164	51.4	40.2	1.2	52.6	41.4	60.0	50.0	-7.4	-8.6
16.777	51.9	41.3	1.2	53.1	42.5	60.0	50.0	-6.9	-7.5

Mode: Working Line

Enggnenav	1 v	Factor	Res	ult	Limit		Margin		
Frequency	(dB	μV)	Factor	$(dB\mu V)$		(dBµV)		(dBµV)	
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.739	47.5	42.7	0.3	47.8	43.0	56.0	46.0	-8.2	-3.0
1.101	46.4	38.8	0.3	46.7	39.1	56.0	46.0	-9.3	-6.9
1.222	47.4	39.6	0.3	47.7	39.9	56.0	46.0	-8.3	-6.1
3.199	45.7	31.0	0.6	46.3	31.6	56.0	46.0	-9.7	-14.4
16.445	52.8	38.9	1.2	54.0	40.1	60.0	50.0	-6.0	-9.9
16.722	52.6	39.3	1.2	53.8	40.5	60.0	50.0	-6.2	-9.5

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Mode: SA-101/802.11g

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

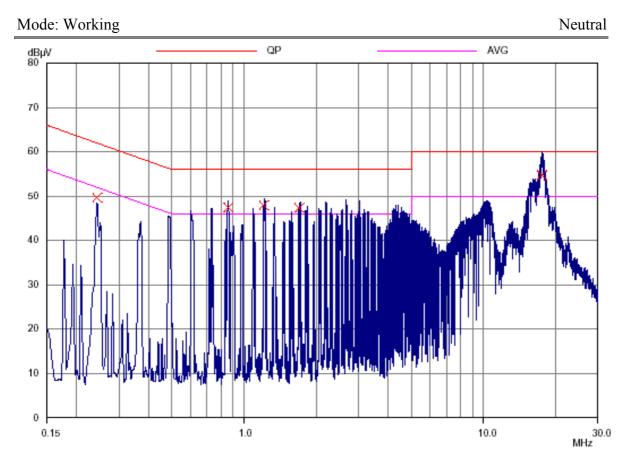
Mode: Working Neutral

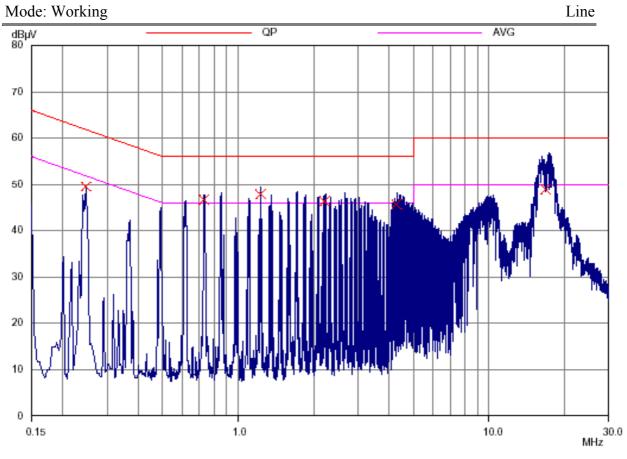
T	requency   Meter Reading   Fa		E4	Res	ult	Lin	nit	Mar	gin
Frequency			Factor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.243	49.6		0.2	49.8		62.0	52.0	-12.2	
0.860	47.4	40.8	0.3	47.7	41.1	56.0	46.0	-8.3	-4.9
1.210	47.8	41.1	0.3	48.1	41.4	56.0	46.0	-7.9	-4.6
1.703	47.3	41.0	0.4	47.7	41.4	56.0	46.0	-8.3	-4.6
17.503	54.6	40.3	1.3	55.9	41.6	60.0	50.0	-4.1	-8.4
17.550	54.7	41.6	1.3	56.0	42.9	60.0	50.0	-4.0	-7.1

Mode: Working Line

Fraguency	Frequency Meter Reading (dBµV)		Factor	Res	ult	Limit		Margin	
rrequency			ractor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.247	49.5		0.2	49.7		61.9	51.9	-12.1	
0.732	46.7	39.2	0.3	47.0	39.5	56.0	46.0	-9.0	-6.5
1.230	47.9	40.1	0.3	48.2	40.4	56.0	46.0	-7.8	-5.6
2.207	46.3	39.8	0.5	46.8	40.3	56.0	46.0	-9.2	-5.7
4.289	45.6	38.2	0.6	46.2	38.8	56.0	46.0	-9.8	-7.2
16.824	48.8	40.1	1.2	50.0	41.3	60.0	50.0	-10.0	-8.7

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Mode: PA-L01/802.11b

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

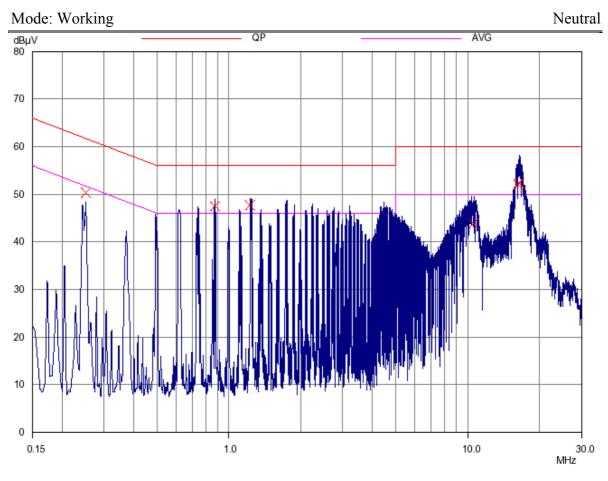
Mode: Working Neutral

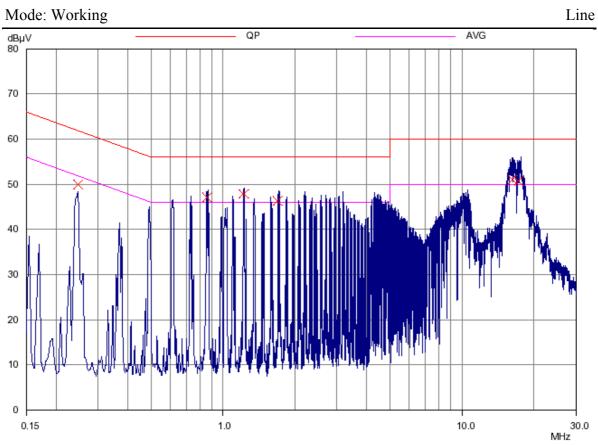
E	Trequency   Meter Reading		E4	Res	ult	Limit		Margin	
requency			Factor	(dB	μV)	(dB	μV)	$(dB\mu V)$	
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.251	50.3		0.2	50.5		61.7	51.7	-11.2	
0.876	47.4	36.8	0.3	47.7	37.1	56.0	46.0	-8.3	-8.9
1.230	47.6	37.3	0.3	47.9	37.6	56.0	46.0	-8.1	-8.4
10.636	43.8		0.8	44.6		60.0	50.0	-15.4	
16.304	52.1	38.1	1.2	53.3	39.3	60.0	50.0	-6.7	-10.7
16.531	52.2	38.6	1.2	53.4	39.8	60.0	50.0	-6.6	-10.2

Mode: Working Line

Enggnen	Meter Reading		Fastan	Res	ult	Lin	nit	Margin	
Frequency	(dB	μV)	Factor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.247	49.9	40.3	0.2	50.1	40.5	61.9	51.9	-11.7	-11.3
0.857	47.1	40.2	0.3	47.4	40.5	56.0	46.0	-8.6	-5.5
1.222	47.8	36.8	0.3	48.1	37.1	56.0	46.0	-7.9	-8.9
1.695	46.3	37.3	0.4	46.7	37.7	56.0	46.0	-9.3	-8.3
16.300	51.0	38.1	1.2	52.2	39.3	60.0	50.0	-7.8	-10.7
17.328	50.7	38.8	1.2	51.9	40.0	60.0	50.0	-8.1	-10.0

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





Sheet 63 of 115Sheets FCC ID.: TOP-WICI-RF2E

Mode: PA-L01/802.11g

Operation Mode : <u>Receiving / Transmitting</u>

Test Date : Apr. 22, 2007 Temperature : 27 °C Humidity : 51 %

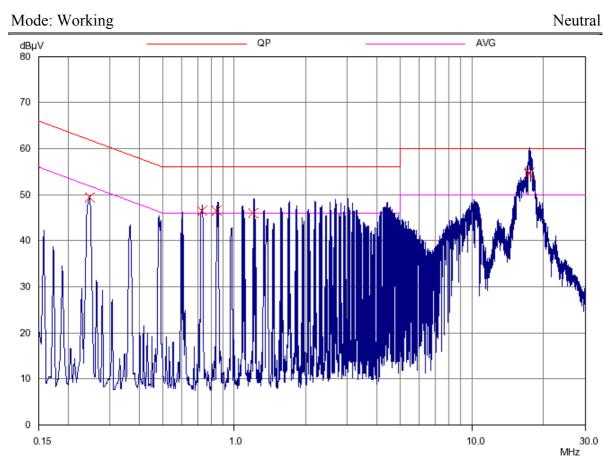
Mode: Working Neutral

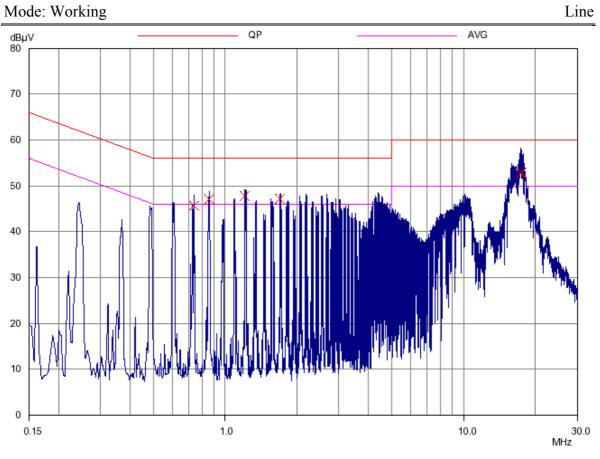
Enggnenav	uency Meter Reading (dBµV)		Easten	Res	ult	Limit		Margin	
Frequency			ractor	Factor (dBμV)		(dB	$(dB\mu V)$		μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.247	49.4	45.1	0.2	49.6	45.3	61.9	51.9	-12.2	-6.5
0.735	46.4	42.3	0.3	46.7	42.6	56.0	46.0	-9.3	-3.4
0.845	46.4	36.6	0.3	46.7	36.9	56.0	46.0	-9.3	-9.1
1.203	45.9	28.6	0.3	46.2	28.9	56.0	46.0	-9.8	-17.1
17.433	54.5	41.7	1.2	55.7	42.9	60.0	50.0	-4.3	-7.1
17.492	54.7	42.0	1.2	55.9	43.2	60.0	50.0	-4.1	-6.8

Mode: Working Line

Enggrand	Meter Reading		Factor	Res	ult	Limit		Margin	
Frequency	(dB	μV)	Factor	(dB	μV)	(dB	μV)	(dB	μV)
(MHz)	Q.P	AVG	(dB)	Q.P	AVG	Q.P	AVG	Q.P	AVG
0.738	45.6	41.2	0.3	45.9	41.5	56.0	46.0	-10.1	-4.5
0.856	47.1	40.3	0.3	47.4	40.6	56.0	46.0	-8.6	-5.4
1.210	47.8	32.9	0.3	48.1	33.2	56.0	46.0	-7.9	-12.8
1.703	47.1	38.2	0.4	47.5	38.6	56.0	46.0	-8.5	-7.4
17.422	52.6	37.4	1.2	53.8	38.6	60.0	50.0	-6.2	-11.4
17.567	52.9	36.8	1.3	54.2	38.1	60.0	50.0	-5.8	-11.9

- 1) Place of measurement: <u>EMC LAB. of the ETC</u>
- 2) The EUT was placed 0.8m above reference ground plane.
- 3) The symbol of "----" means the Q.P. value is under the limit for AVG. so, the AVG. value doesn't need to be measured.
- 4) The expanded uncertainty of the conducted emission tests is 2.45 dB.





## 5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

$$RESULT = READING + LISN FACTOR$$

Assume a receiver reading of 22.5 dB  $\mu$  V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB  $\mu$  V.

RESULT = 22.5 + 0.1 = 22.6 dB 
$$\mu$$
 V  
Level in  $\mu$  V = Common Antilogarithm[(22.6 dB  $\mu$  V)/20]  
= 13.48  $\mu$  V

## 5.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test.

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Rohde & Schwarz	ESCI	11/27/2007
Line Impedance Stabilization network	EMCO	3825/2	07/03/2007
Line Impedance Stabilization network	Rohde & Schwarz	ESH2-Z5	09/11/2007
Monitor	IBM	E54	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.
Shielded Room	Riken		N.C.R.
Computer	Acer	Veriton	N.C.R.

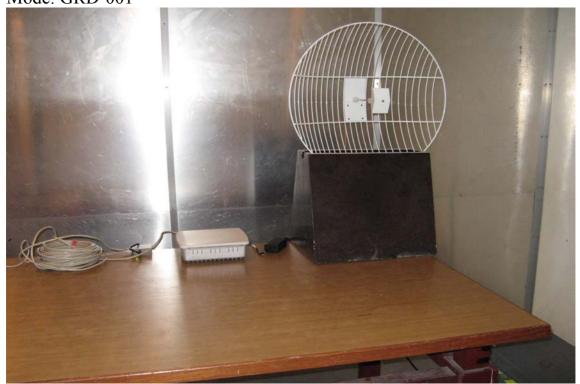
# **5.6 Photos of Conduction Measuring Setup**

Mode: OB-003























### **6 ANTENNA REQUIREMENT**

### 6.1 Standard Applicable

For intentional device, according to §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 §15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.247 (c)(1)(i), systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### 6.2 Antenna Construction and Directional Gain

There are four antenna reported. The antenna type and antenna gain were listed below. Please see construction Photos of Exhibit B and the antenna specifications of Exhibits M for details.

Model	Туре	Antenna Gain	Application	
PA-L01	Panel antenna	18 dBi	Fixed, point-to-point	
GRD-001	Grid antenna	24 dBi	Fixed, point-to-point	
OB-003	Omni antenna	12 dBi	Fixed, point-to-point or	
			Fixed, point-to-multipoint	
SA-101	Sector antenna	12 dBi	Fixed, point-to-point or	
			Fixed, point-to-multipoint	

For point-to-multipoint operations, the highest antenna gain of antennas is 12dBi. The power should be reduced by 6dB. (12 dBi- 6 dBi = 6 dB) Thus the power limit is 24dBm and the power density limit is 2dBm.

For point-to-point operations, the highest antenna gain of antennas is 24dBi. The power should be reduced by 6dB. ((24 dBi - 6 dBi) / 3 = 6 dB) Thus the power limit is 24dBm and the power density limit is 2dBm.

#### 7 EMISSION BANDWIDTH MEASUREMENT

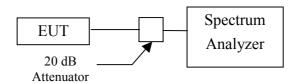
### 7.1 Standard Applicable

According to 15.247(a)(2), for direct sequence system, the minimum 6dB bandwidth shall be at least 500 kHz.

#### 7.2 Measurement Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.

Figure 4: Emission bandwidth measurement configuration.



## 7.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSP40	08/07/2007
Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

Sheet 72 of 115Sheets FCC ID.: TOP-WICI-RF2E

### 7.4 Measurement Data

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

#### A 802.11b

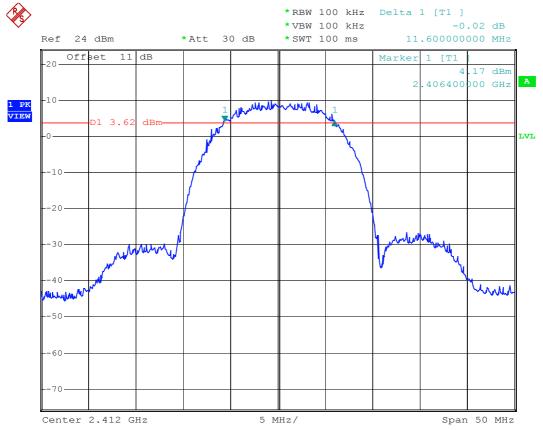
a) Channel Low : 6 dB Emission Bandwidth is
b) Channel Middle : 6 dB Emission Bandwidth is
c) Channel High : 6 dB Emission Bandwidth is
12.0 MHz

### B 802.11g

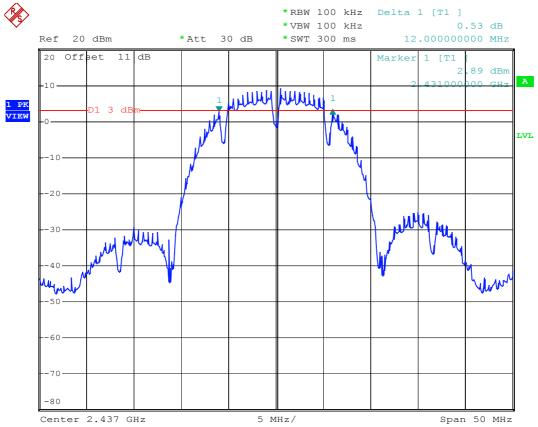
a) Channel Low : 6 dB Emission Bandwidth is
b) Channel Middle : 6 dB Emission Bandwidth is
c) Channel High : 6 dB Emission Bandwidth is
16.5 MHz

Note: The expanded uncertainty of the emission bandwidth tests is 1500Hz.

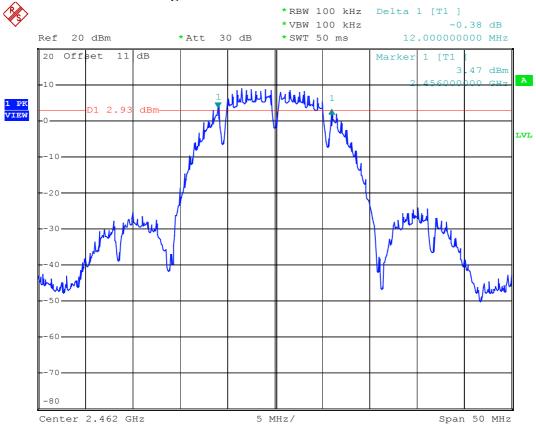
### Mode: 802.11b/Channel Low



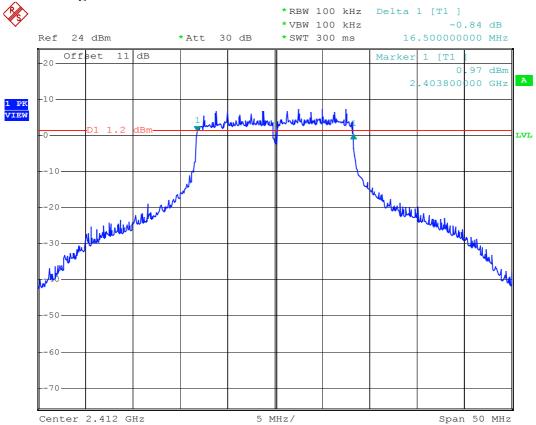
### Mode: 802.11b/Channel Middle



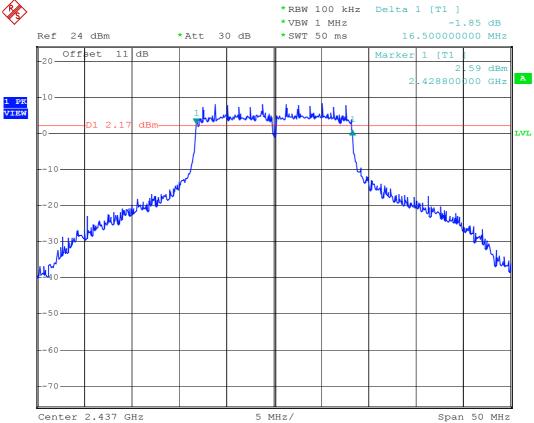
## Mode: 802.11b/Channel High



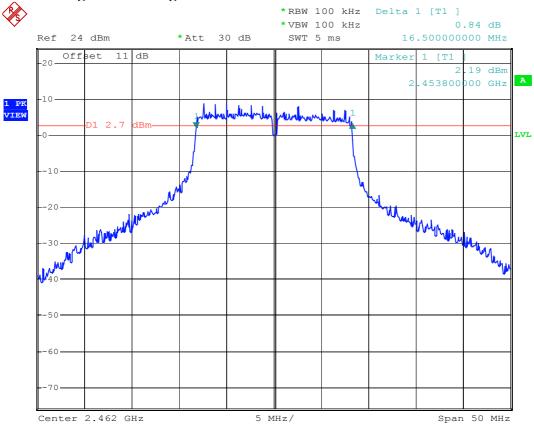
## Mode: 802.11g/Channel Low



## Mode: 802.11g/Channel Middle



## Mode: 802.11g/Channel High



#### **8 OUTPUT POWER MEASUREMENT**

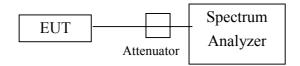
### 8.1 Standard Applicable

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 8.2 Measurement Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- 3. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
- 4. Use channel power function and record the level displayed.
- 5. Repeat above procedures until all frequencies measured were complete.

Figure 5: Output power and measurement configuration.



# 8.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSP40	08/07/2007
Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

### 8.4 Measurement Data

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

For both point-to-point or point-to-multipoint operations the power limit is 24dBm.

### A 802.11b

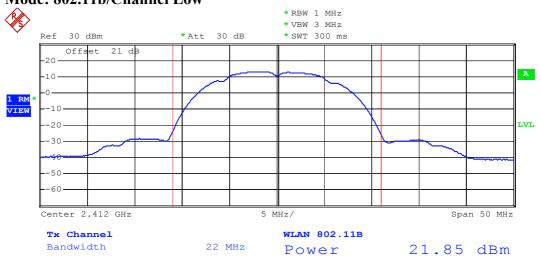
a) Channel Low : Output Peak Power is
b) Channel Middle : Output Peak Power is
c) Channel High : Output Peak Power is
21.85 dBm or 153.109 mW
22.22 dBm or 166.725 mW
22.45 dBm or 175.792 mW

### B 802.11g

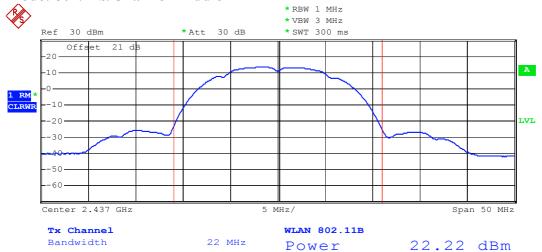
a) Channel Low : Output Peak Power is
b) Channel Middle : Output Peak Power is
c) Channel High : Output Peak Power is
20.41 dBm or 109.901 mW
20.12 dBm or 102.802 mW
20.60 dBm or 114.815 mW

Note: The expanded uncertainty of the output power tests is 2dB.

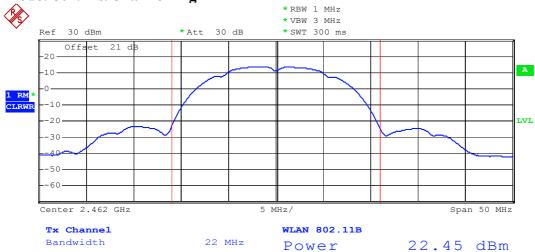
### Mode: 802.11b/Channel Low



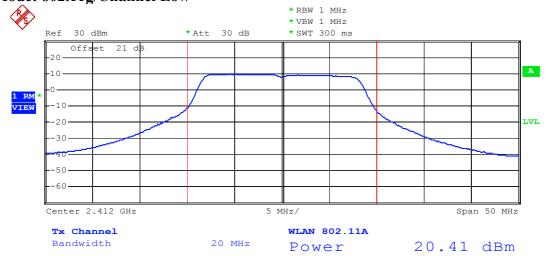
### Mode: 802.11b/Channel Middle



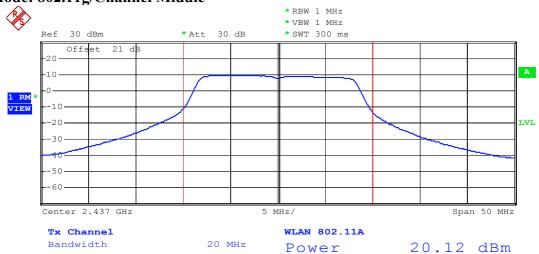




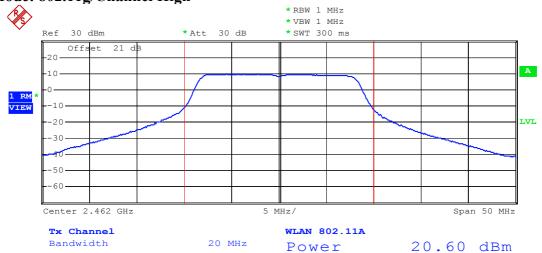
# Mode: 802.11g/Channel Low



# Mode: 802.11g/Channel Middle



# Mode: 802.11g/Channel High



#### 9 100 kHz BANDWIDTH OF BAND EDGES MEASUREMENT

### 9.1 Standard Applicable

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

### 9.2 Measurement Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- 3. Set both RBW of spectrum analyzer to 100kHz and VBW to 1 MHz with a convenient frequency span including 100kHz bandwidth from band edge.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.

# 9.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSP40	08/07/2007
Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

Sheet 88 of 115Sheets FCC ID.: TOP-WICI-RF2E

### 9.4 Measurement Data

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

### A 802.11b

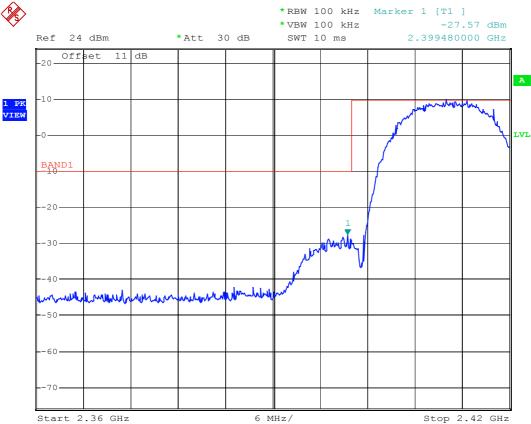
- a) Lower Band Edge: All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
- b) Upper Band Edge: All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

#### B 802.11g

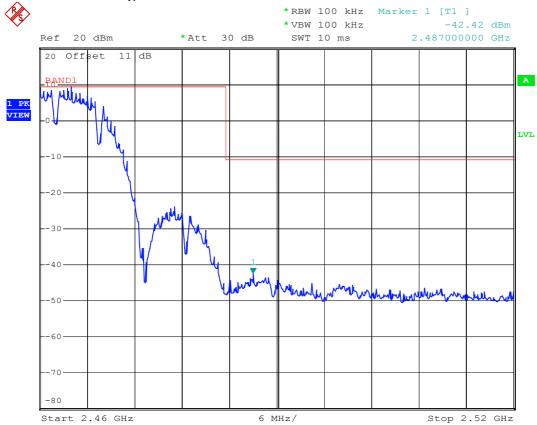
- a) Lower Band Edge: All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
- b) Upper Band Edge: All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

Note: The expanded uncertainty of the 100 khz bandwidth of band edges tests is 2dB.

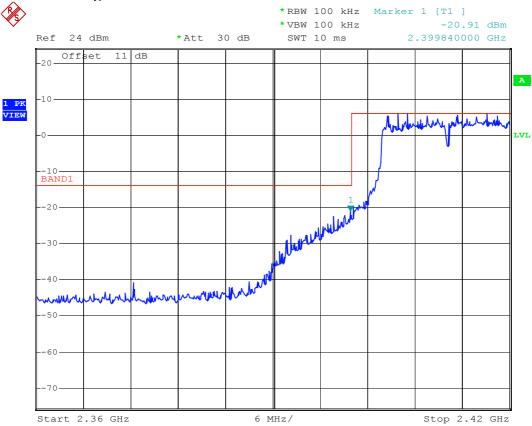
### Mode: 802.11b/Channel Lowest



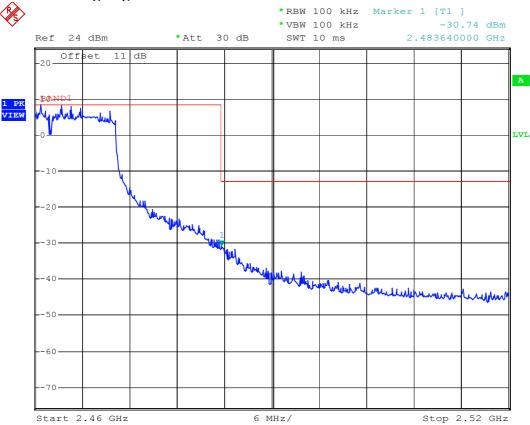
## Mode: 802.11b/Highest



## Mode: 802.11g/Channel Lowest



## Mode: 802.11g/Highest



#### 10 POWER DENSITY MEASUREMENT

### 10.1 Standard Applicable

According to 15.247(d), for direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

#### 10.2 Measurement Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- 3. Adjust the center frequency of spectrum analyzer on highest level appearing on spectral display within a 300 kHz frequency span.
- 4. Set the spectrum analyzer on a 3 kHz resolution bandwidth and 300 kHz video bandwidth as well as max hold function.
- 5. Repeat above procedures until all measured frequencies were complete.

## 10.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSP40	08/07/2007
Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

#### 10.4 Measurement Data

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

For both point-to point or point-to multipoint operations the power density limit is 2dBm.

#### A 802.11b

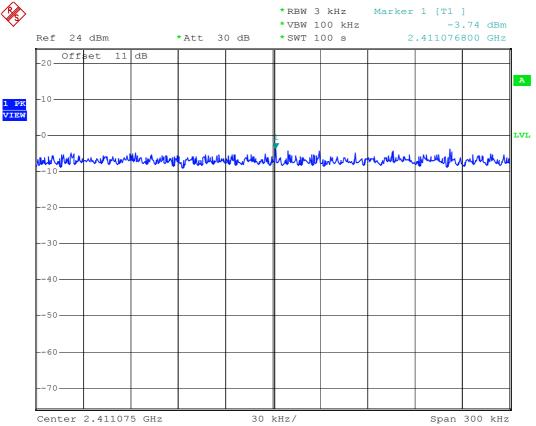
a) Channel Low : Maximun Power Density of 3 kHz Bandwidth is
 b) Channel Middle : Maximun Power Density of 3 kHz Bandwidth is
 c) Channel High : Maximun Power Density of 3 kHz Bandwidth is
 -3.74 dBm
 -3.98 dBm
 -4.37 dBm

### B 802.11g

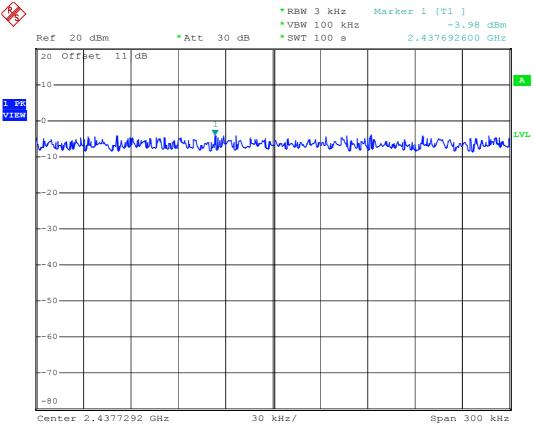
a) Channel Low : Maximun Power Density of 3 kHz Bandwidth is
 b) Channel Middle : Maximun Power Density of 3 kHz Bandwidth is
 c) Channel High : Maximun Power Density of 3 kHz Bandwidth is
 -2.91 dBm

Note: The expanded uncertainty of the power density tests is 2dB.

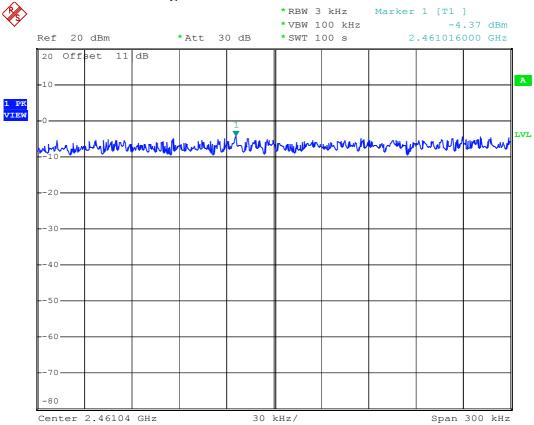
### Mode: 802.11b/Channel Low



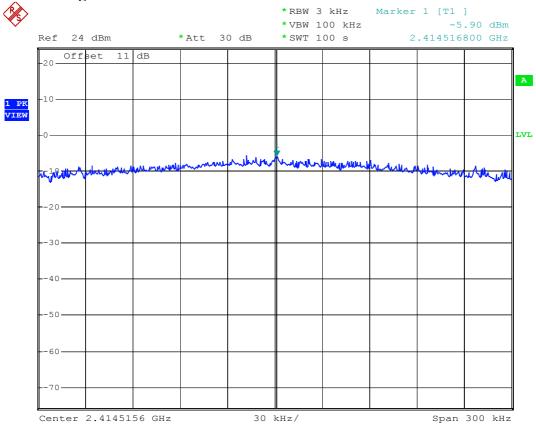
### Mode: 802.11b/Channel Middle



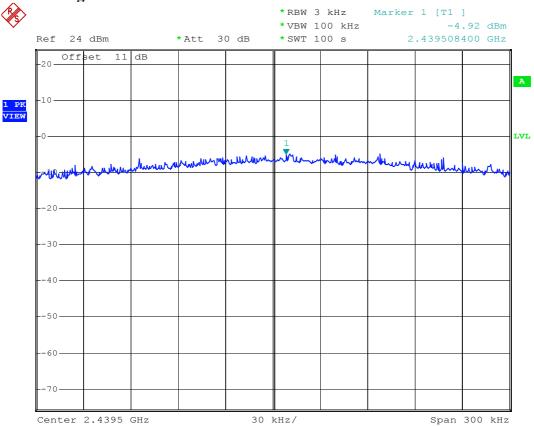
## Mode: 802.11b/Channel High



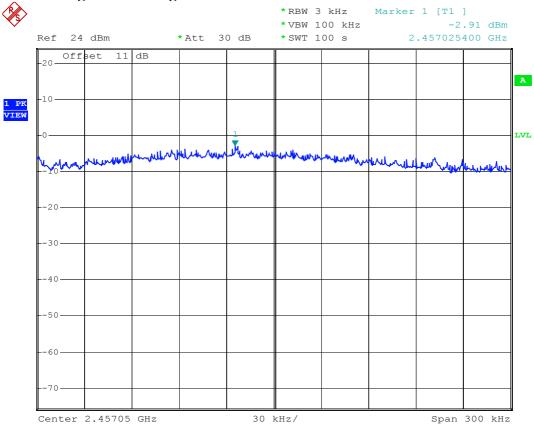
## Mode: 802.11g/Channel Low



## Mode: 802.11g/Channel Middle



# Mode: 802.11g/Channel High



#### 11. OUT-OF-BAND CONDUCTED EMISSION MEASUREMENT

### 11.1 Standard Applicable

According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 band 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 Section 15.209(a) is not required.

#### 11.2 Measurement Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- 3. Use the following spectrum analyzer settings:
  - Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

 $VBW \ge RBW$ 

Sweep = auto

Detector function = peak

Trace = max hold.

- 4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. Plot the result on the screen of spectrum analyzer.
- 5. Repeat above procedures until all measured frequencies were complete.

## 11.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Due
RF Test Receiver	Rohde & Schwarz	ESBI	07/22/2007
Attenuator	Weinschel Engineering	AS3667	N/A
Plotter	Hewlett-Packard	7440A	N/A

Sheet 102 of 115Sheets FCC ID.: TOP-WICI-RF2E

#### 11.4 Measurement Data

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

#### A 802.11b

#### **Mode: Channel Low**

- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.

#### **Mode: Channel Middle**

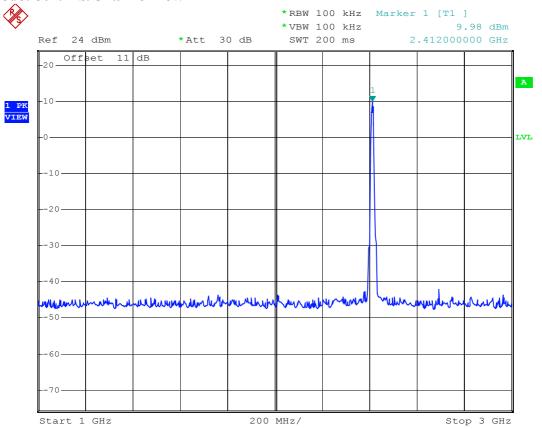
- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.

### **Mode: Channel High**

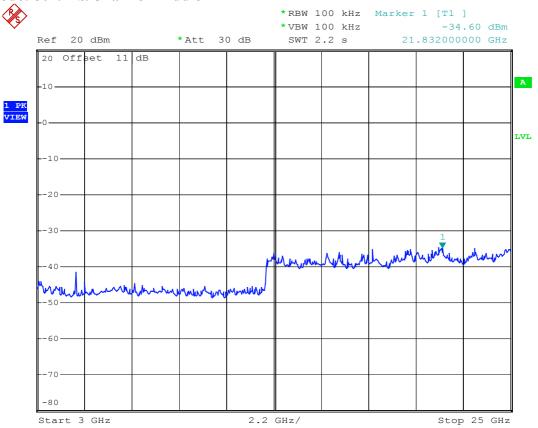
- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier

Note: The expanded uncertainty of the out-of-band conducted emission tests is 2dB.

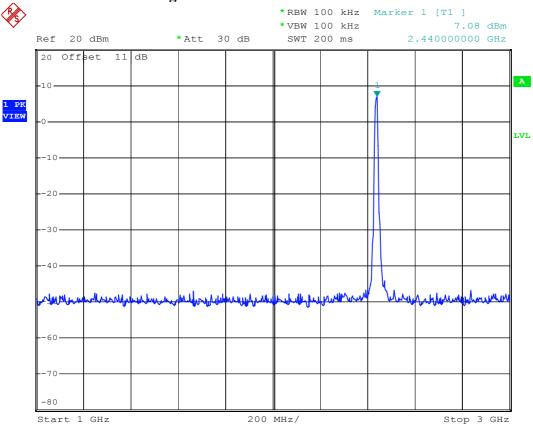
### Mode: 802.11b/Channel Low



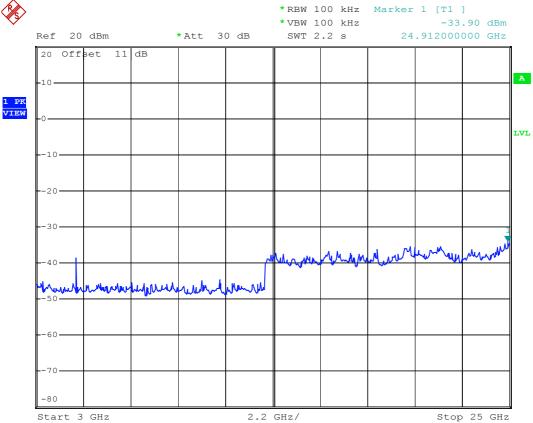
### Mode: 802.11b/Channel Middle



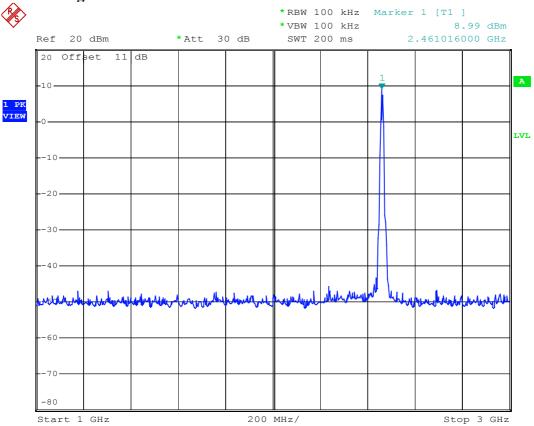
## Mode: 802.11b/Channel High



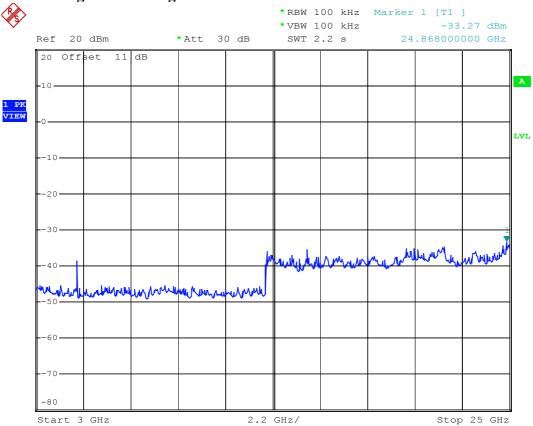
## Mode: 802.11g/Channel Low



## Mode: 802.11g/Channel Middle



## Mode: 802.11g/Channel High



Sheet 109 of 115Sheets FCC ID.: TOP-WICI-RF2E

Test Date: MAY 01, 2007 Temperature: 23 °C Humidity: 52 %

### B. 802.11g

#### **Mode: Channel Low**

- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.

#### **Mode: Channel Middle**

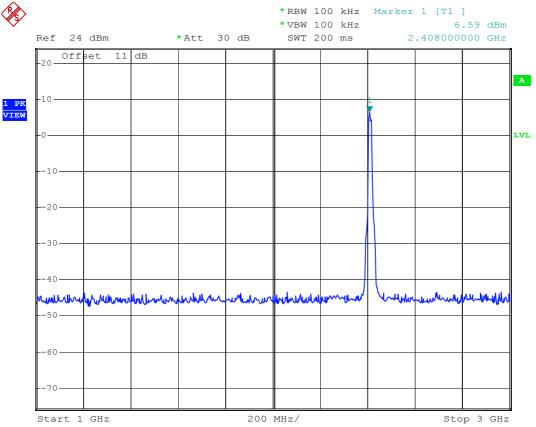
- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.

#### **Mode: Channel High**

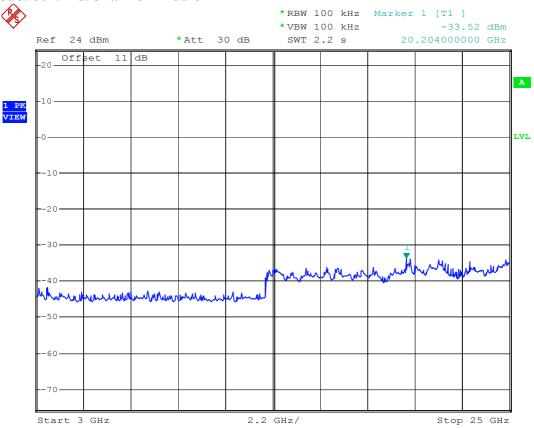
- a) 1 GHz to 3 GHz frequency band: All emissions are attenuated more than 20dB from the carrier.
- b) 3 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from the carrier

Note: The expanded uncertainty of the out-of-band conducted emission tests is 2dB.

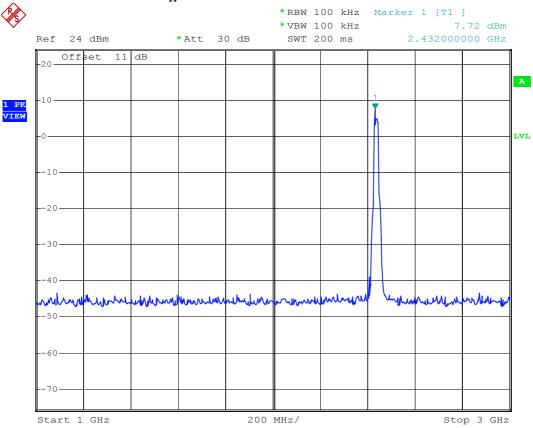
### Mode: 802.11b/Channel Low



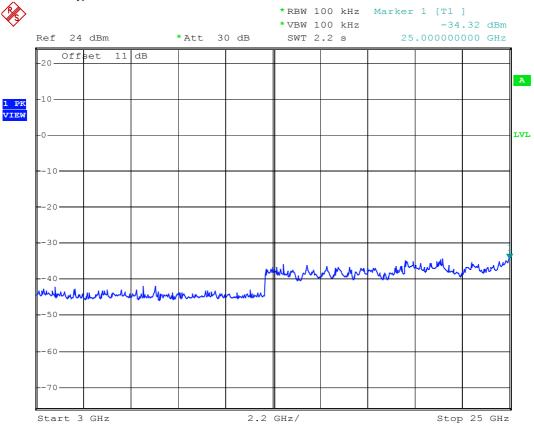
### Mode: 802.11b/Channel Middle



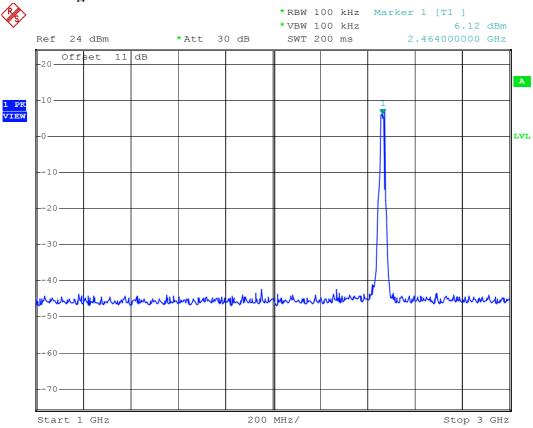
## Mode: 802.11b/Channel High



## Mode: 802.11g/Channel Low



## Mode: 802.11g/Channel Middle



# Mode: 802.11g/Channel High

