

## CERTIFICATION OF COMPLIANCE

FCC ID.

**UFXMNC-W100**

APPLICANT

**MicroWeb Co., Ltd.**

<b>FCC Classification</b>	<b>:</b>	<b>FCC Part 15 Digital Transmission System (DTS)</b>
<b>Manufacturing Description</b>	<b>:</b>	<b>NETWORK CAMERA</b>
<b>Manufacturer</b>	<b>:</b>	<b>MicroWeb Co., Ltd.</b>
<b>Model number</b>	<b>:</b>	<b>MNC-W100, MNC-L100</b>
<b>Test Device Serial No.:</b>	<b>:</b>	<b>Identical prototype</b>
<b>Rule Part(s)</b>	<b>:</b>	<b>FCC Part 15.247 Subpart C; ANSI C-63.4-2003</b>
<b>Frequency Range</b>	<b>:</b>	<b>2412MHz ~ 2462MHz</b>
<b>Max. Output Power</b>	<b>:</b>	<b>19.06dBm Peak Conducted (802.11b)</b> <b>19.79dBm Peak Conducted (802.11g)</b>
<b>Data of issue</b>	<b>:</b>	<b>November 20, 2007</b>

This test report is issued under the authority of:

The test was supervised by:



Dong -Min JUNG, Technical Manager



Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.



NVLAP LAB Code.: 200723-0

## **TABLE OF CONTENTS**

1. GENERAL INFORMATION'S .....	3
2. INFORMATION'S ABOUT TEST ITEM .....	4
3. TEST REPORT .....	5
3.1 SUMMARY OF TESTS .....	5
3.2 TECHNICAL CHARACTERISTICS TEST .....	6
3.2.1 6dB BANDWIDTH .....	6
3.2.2 PEAK OUTPUT POWER .....	9
3.2.3 POWER SPECTRAL DENSITY .....	12
3.2.4 BAND – EDGE & SPURIOUS .....	15
3.2.5 FIELD STRENGTH OF HARMONICS .....	32
3.2.6 AC CONDUCTED EMISSIONS .....	37
 <b>APPENDIX</b>	
APPENDIX 1 MAXIMUM PERMISSIBLE EXPOSURE CALCULATIONS .....	42
APPENDIX 2 TEST EQUIPMENT USED FOR TESTS .....	45

## 1. General information's

### 1-1 Test Performed

Company name : LTA Co., Ltd.  
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
 Telephone : +82-31-323-6008  
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### 1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2008-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2009-06-20	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

## 2. Information's about test item

### 2-1 Applicant & Manufacturer

Company name : MicroWeb Co., Ltd.  
 Address : 909 Kranz Techno Bldg., 5442-1 Sangdaewon-dong, Jungwon-gu,  
 Seongnam-si, Gyeonggi-do, 462-729 Korea.  
 Tel / Fax : +82-31-735-7200 / +82-31-735-7600

### 2-2 Equipment Under Test (EUT)

Trade name : NETWORK CAMERA  
 Model name : MNC-W100, MNC-L100  
 : → Refer to the Model Description  
 Serial number : Identical prototype  
 Date of receipt : October 30, 2007  
 EUT condition : Pre-production  
 Antenna Gain : Max. 2.33dBi gain for 802.11B/G  
 Frequency Range : 2412MHz ~ 2462MHz (DSSS)  
 RF output power Range : 19.06dBm Peak Conducted (802.11b)  
 19.79dBm Peak Conducted (802.11g)  
 Number of channels : 11  
 Type of Modulation : CCK, DQPSK, DBPSK for DSSS  
 64QAM, 16QAM, QPSK, BPSK for OFDM  
 Transfer Rate : 11/5.5/2/1Mbps for 802.11b  
 54/48/36/24/18/12/9/6Mbps for 802.11g  
 Power Source for Adaptor. : Input: 100-240VAC, 0.5A Output: 12VDC, 1.5A

### 2-3 Tested frequency

	LOW	MID	HIGH
Frequency (MHz) for 802.11b	2412	2437	2462

### 2-4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
PC	HP	CNG6500KZW	HP
Monitor	VS11353	E060T240T	ViewSonic
Keyboard	SK-8115	61K-1C2N	DELL
Mouse	MO56UO	520107013	DELL
Printer	Deskjet 600K	SG7631B1XX	HP

### 2-5 Model Description

Model No.	802.11 b/g Module	Ethernet function
MNC-W100	O	O
MNC-L100	X	O

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.247(a)	6 dB Bandwidth	> 500kHz	Conducted	C
15.247(b)	Transmitter Peak Output Power	< 1Watt		C
15.247(d)	Transmitter Power Spectral Density	< 8dBm @ 3kHz		C
15.247(d)	Band Edge & Spurious	> 20 dBc		C
15.209	Field Strength of Harmonics	Emission	Radiated	C
15.207	AC Conducted Emissions	Emissions	Conducted	C
15.203	Antenna requirement	-	-	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

#### → Antenna Requirement

The MicroWeb Co., Ltd. 'MNC-W100' unit complies with the requirement of §15.203.

The antenna connector is the reverse polarity SMA connector.

The sample was tested according to the following specification:  
FCC Parts 15.247; ANSI C-63.4-2003

## 3.2 Technical Characteristics Test (802.11b/g)

### 3.2.1 6 dB Bandwidth

#### Procedure:

The bandwidth at 6dB below the highest in-band spectral density was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is ( as close as possible to ) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

Span = 30 MHz

VBW = 300 kHz (VBW  $\geq$  RBW)

Sweep = auto

Trace = max hold

Detector function = peak

#### Measurement Data:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Bandwidth (MHz)	Result
802.11b	2412	1	12.08	Complies
	2437	6	12.00	Complies
	2462	11	11.78	Complies
802.11g	2412	1	16.58	Complies
	2437	6	16.58	Complies
	2462	11	16.58	Complies

- See next pages for actual measured spectrum plots.

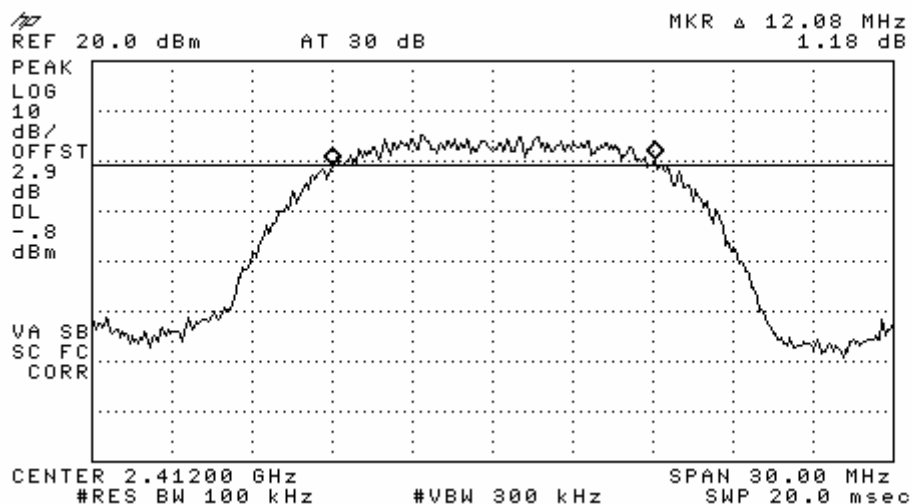
#### Minimum Standard:

6 dB Bandwidth > 500kHz

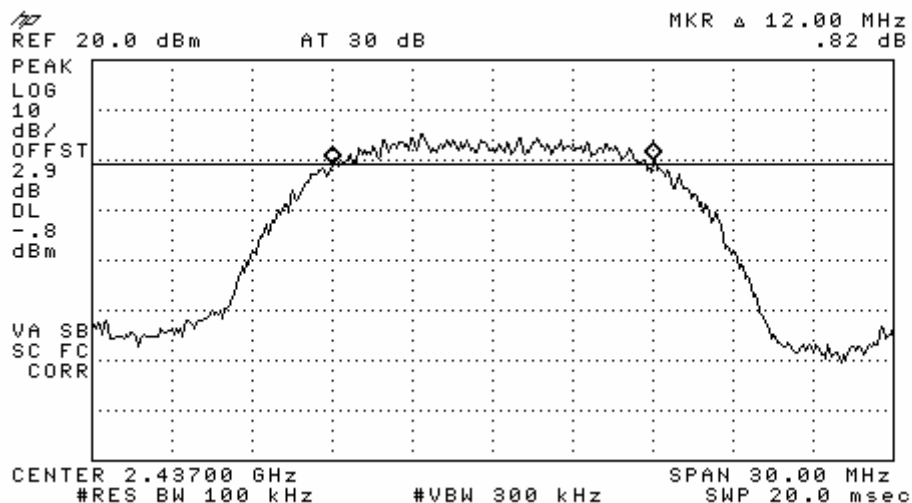
#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

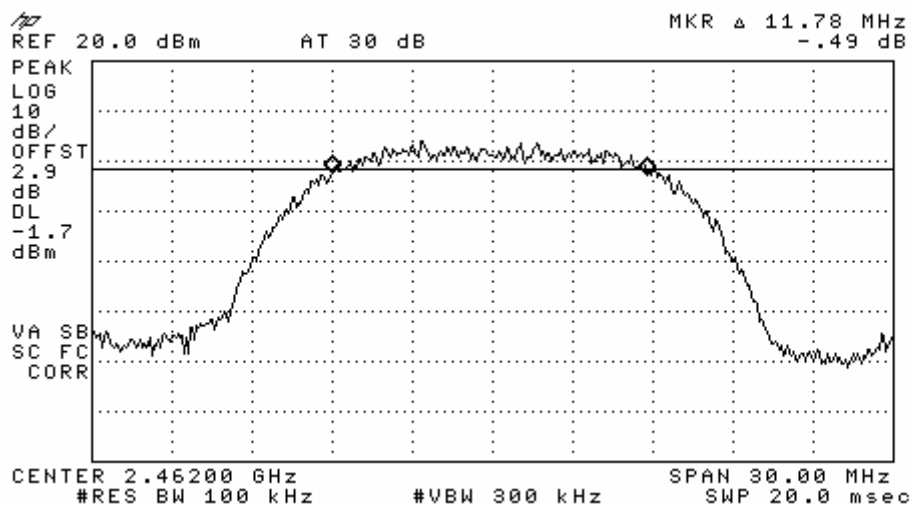
## 802.11b



RL

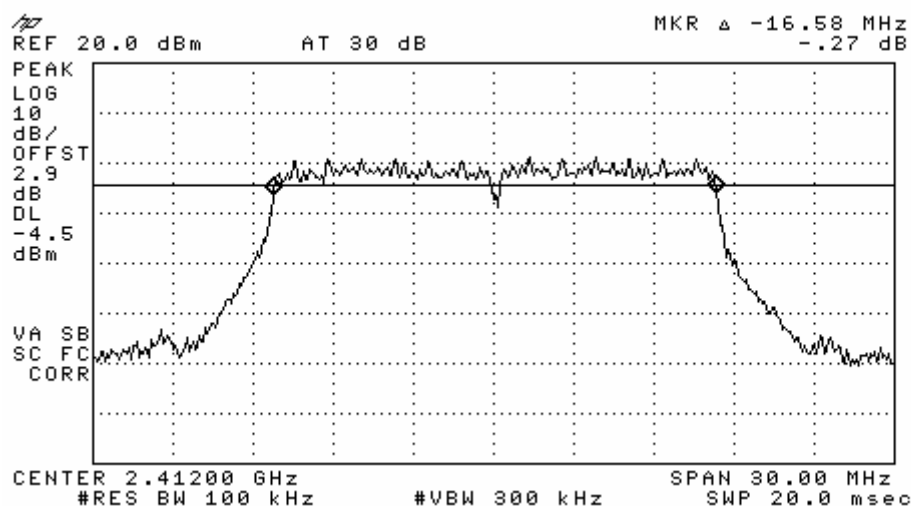


RL

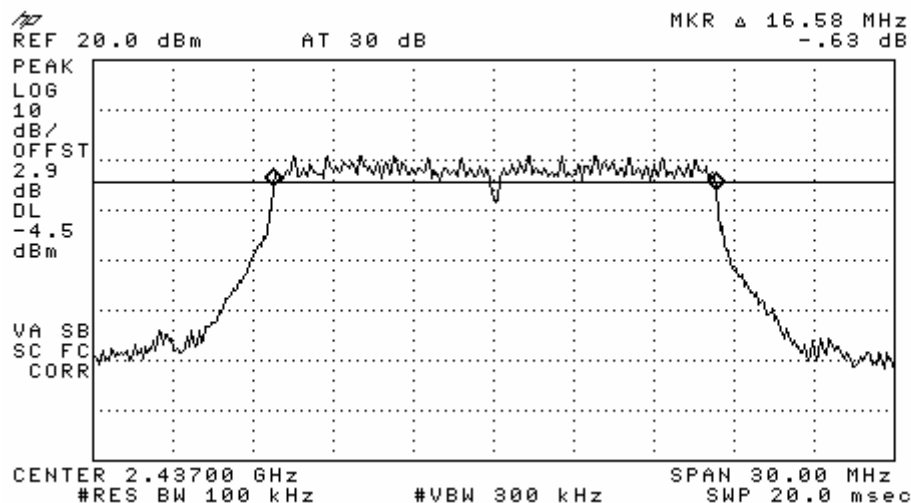


RL

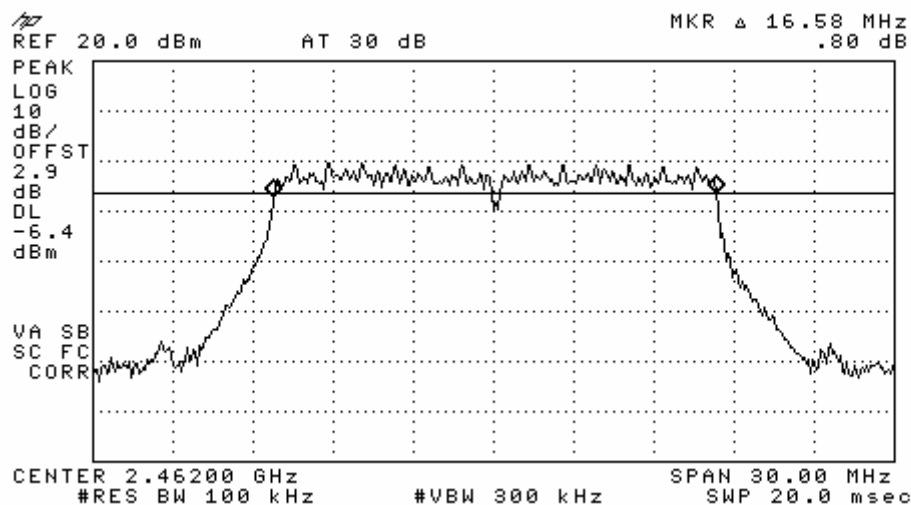
## 802.11g



RL



RL



RL



### 3.2.2 Peak Output Power Measurement

#### Procedure:

The maximum peak output power was measured with the spectrum analyzer connected to the antenna output of the EUT. The spectrum analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth. The EUT was operating in transmit mode at the appropriate center frequency.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 1MHz

Span = auto

VBW = 3MHz (VBW  $\geq$  RBW)

Sweep = auto

Detector function = peak

#### Measurement Data:

Mode	Frequency (MHz)	Channel No.	Test Results	
			Measured Data (dBm)	Result
802.11b	2412	1	19.06	Complies
	2437	6	18.76	Complies
	2462	11	17.76	Complies
802.11g	2412	1	19.79	Complies
	2437	6	19.75	Complies
	2462	11	18.53	Complies

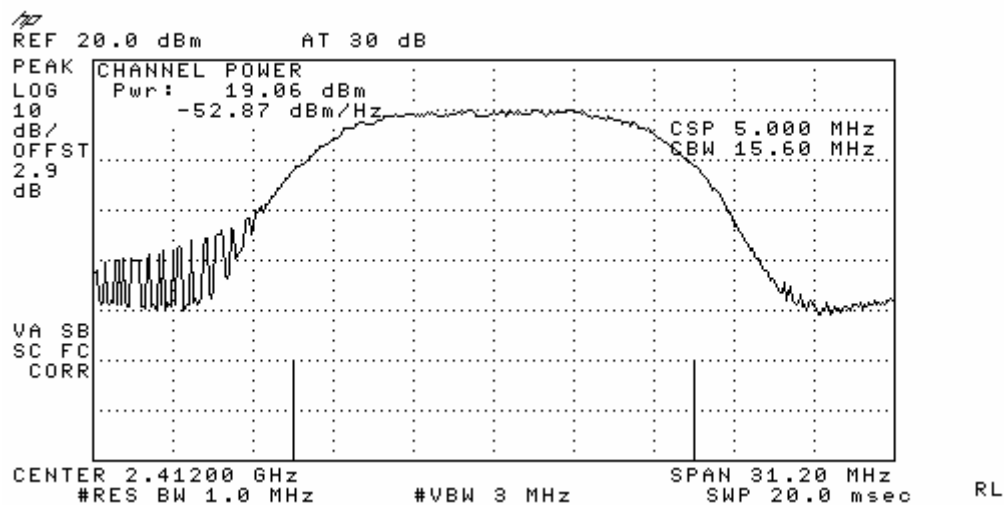
- See next pages for actual measured spectrum plots.

#### Minimum Standard:

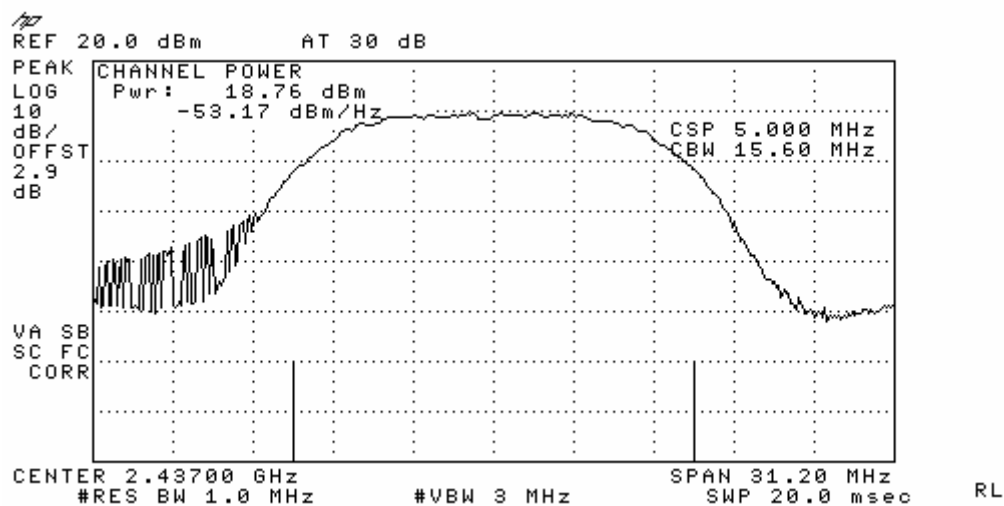
Peak output power	< 1W
-------------------	------

## Measurement Data:

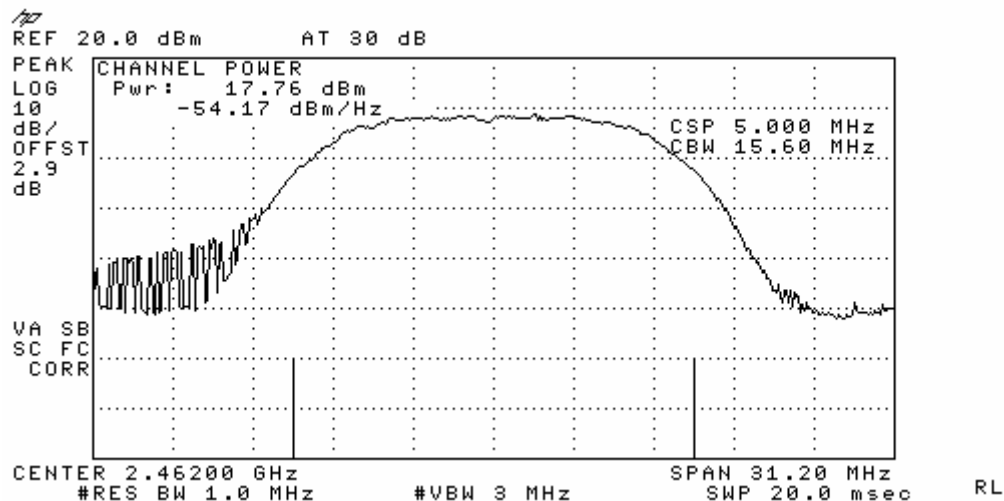
## CH 1



## CH 6

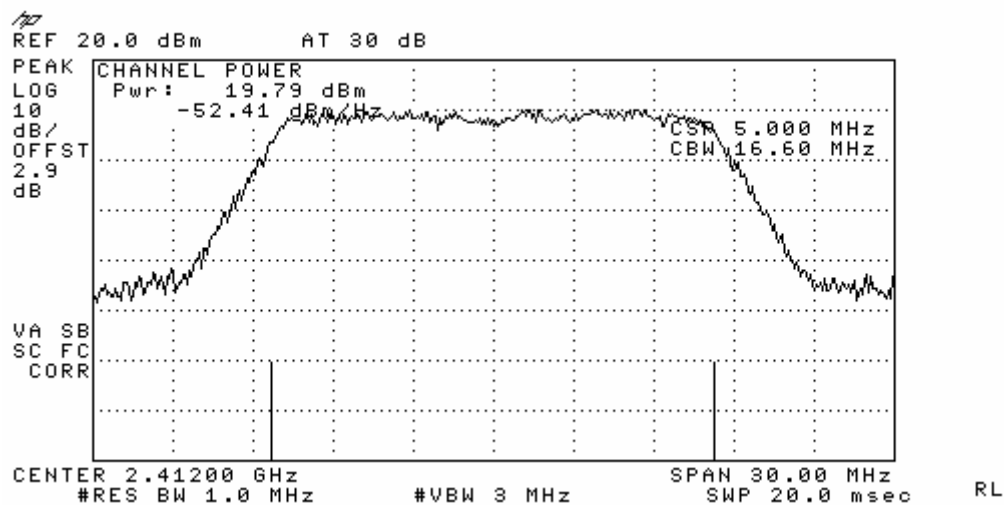


## CH 11

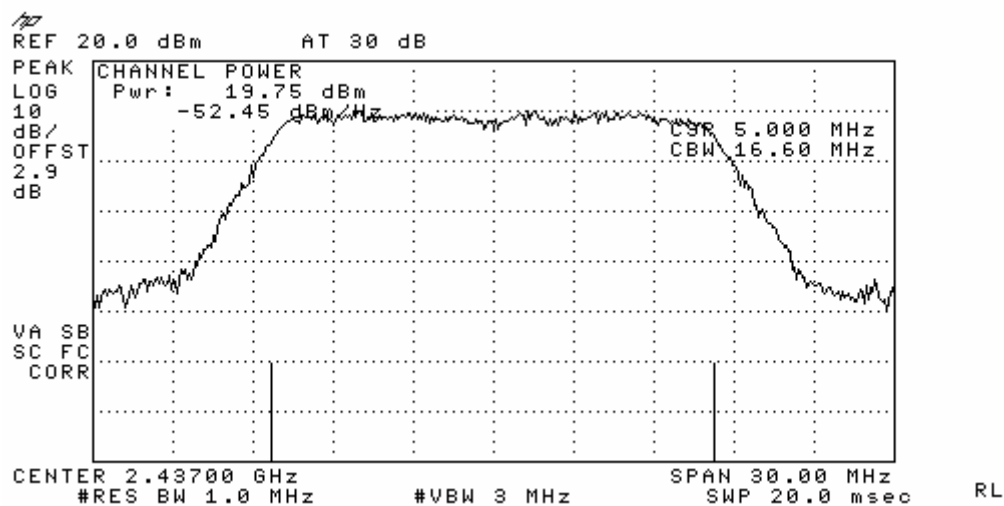


## Measurement Data:

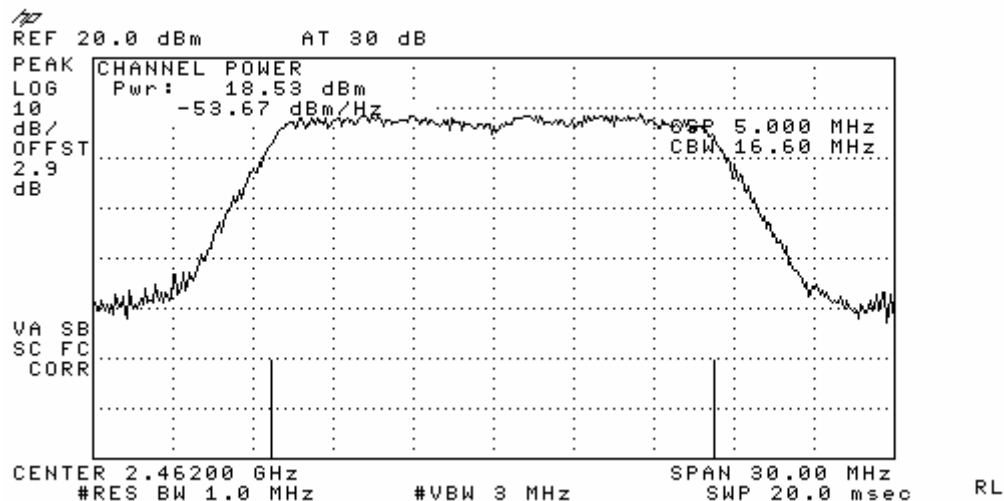
## CH 1



## CH 6



## CH 11



### 3.2.3 Power Spectral Density

#### Procedure:

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 3 kHz

Span = 300 kHz

VBW = 10 kHz

Sweep = 1000 sec

Detector function = peak

Trace = max hold

#### Measurement Data:

Mode	Frequency (MHz)	Ch.	Test Results	
			dBm	Result
802.11b	2412	1	-12.12	Complies
	2437	6	-12.01	Complies
	2462	11	-13.39	Complies
802.11b	2412	1	-13.36	Complies
	2437	6	-13.54	Complies
	2462	11	-13.83	Complies

- See next pages for actual measured spectrum plots.

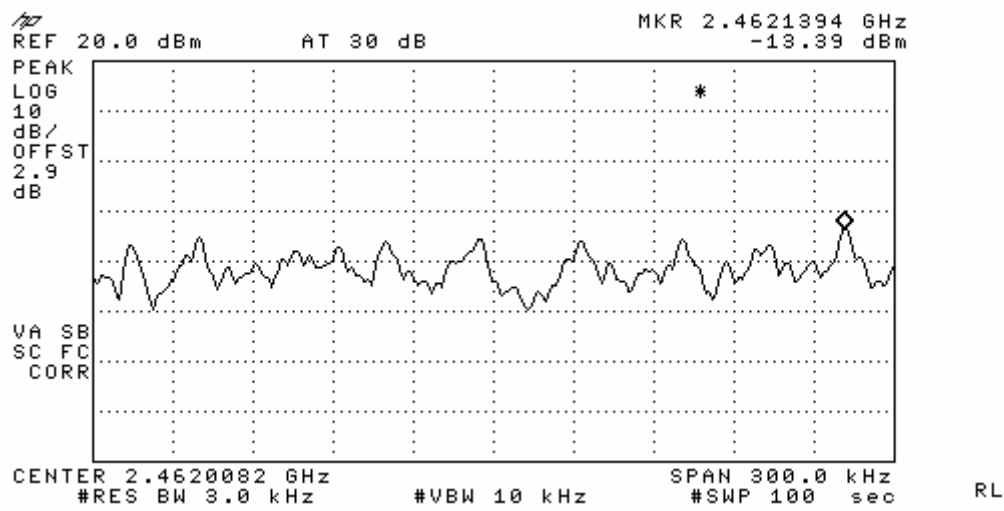
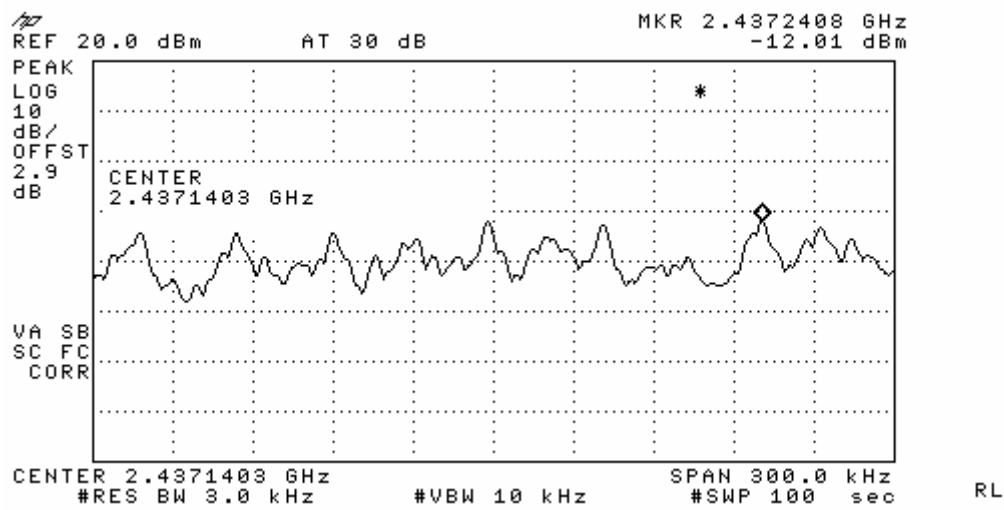
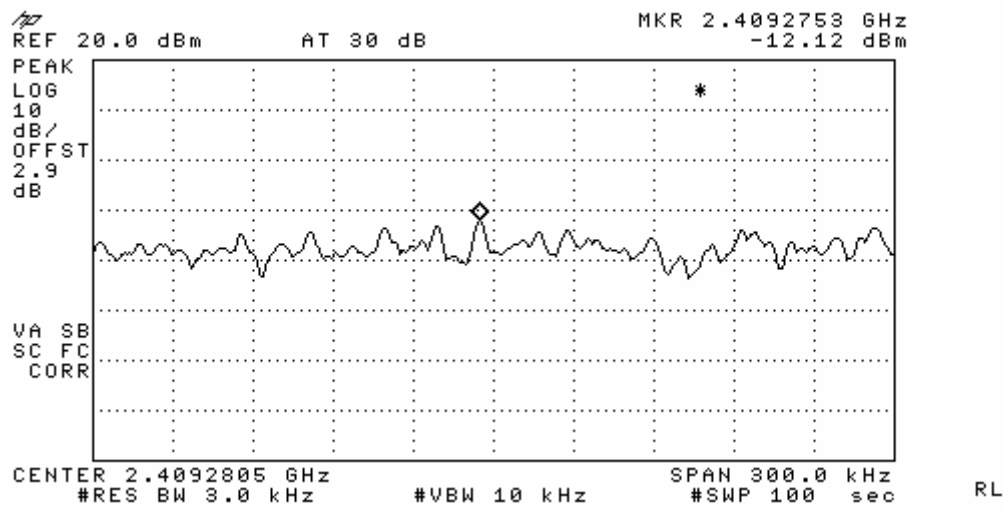
#### Minimum Standard:

Power Spectral Density	< 8dBm @ 3kHz BW
------------------------	------------------

#### Measurement Setup

Same as the Chapter 3.2.1 (Figure 1)

802.11b Power Density Measurement





### 3.2.4 Band - edge & Spurious

#### Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate frequencies.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz

VBW = 100 kHz

Span = 40 MHz

Detector function = peak

Trace = max hold

Sweep = auto

Radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a)

The spectrum analyzer is set to:

Center frequency = the highest, the lowest channels

PEAK: RBW = VBW = 1MHz, Sweep=Auto

Average: RBW = 1MHz, VBW=10Hz, Sweep=Auto

Measurement Distance: 3m

Polarization: Horizontal / Vertical

#### Measurement Data: Complies

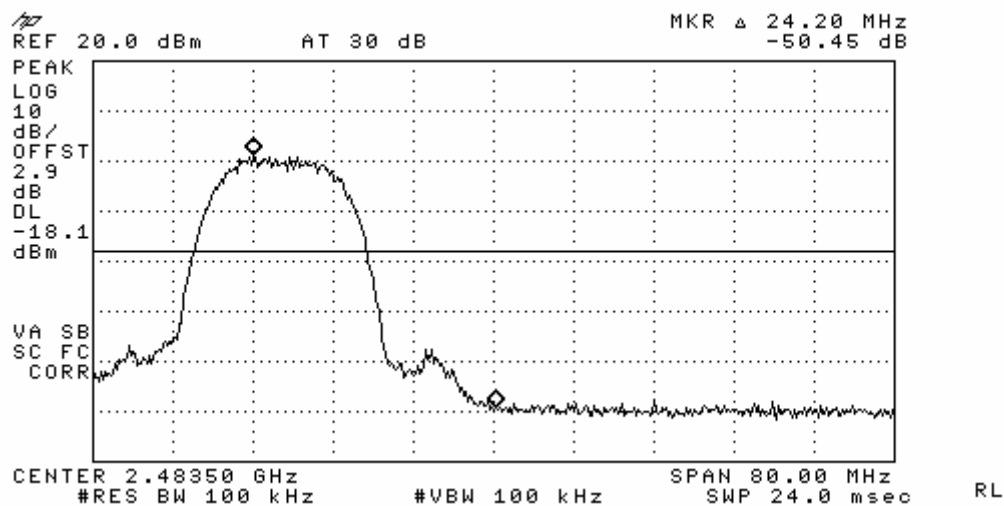
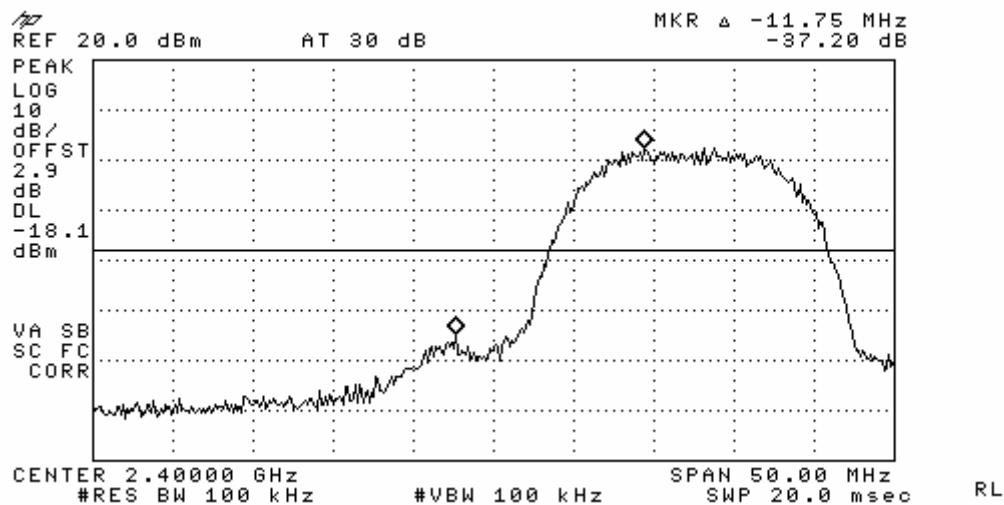
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

<b>Minimum Standard:</b>	> 20 dBc
--------------------------	----------

#### Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

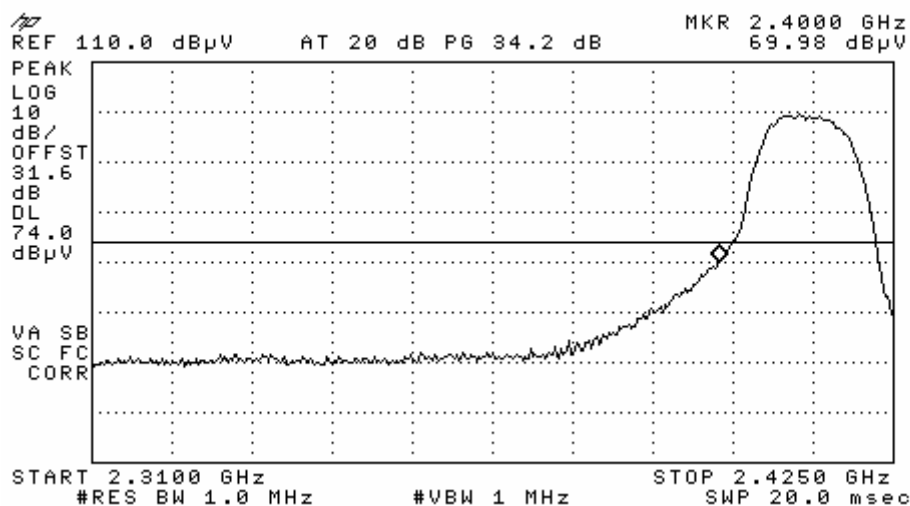
## 802.11b Band-edge : Conducted Measurements





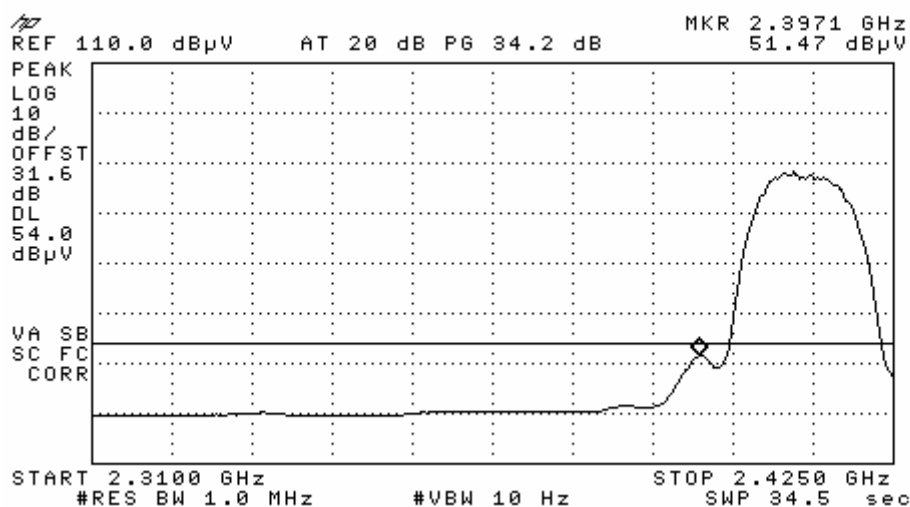
## 802.11b Band-edge : Radiated Measurements (Restricted bands)

### CH 1 / Horizontal / Peak data



L

### CH 1 / Horizontal / Average data



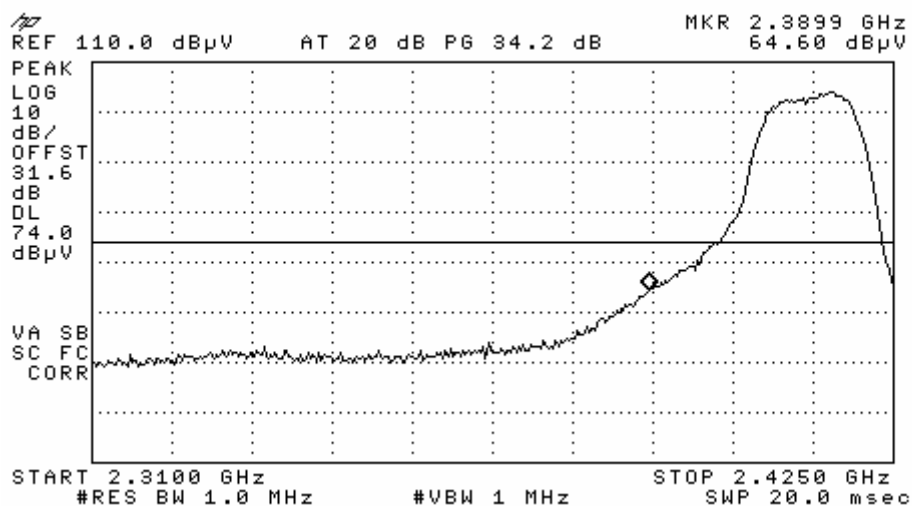
L

Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2397.1	69.98	51.47
Measurement uncertainty	± 6 dB	

No other emissions were detected at a level greater than 20dB below limit.

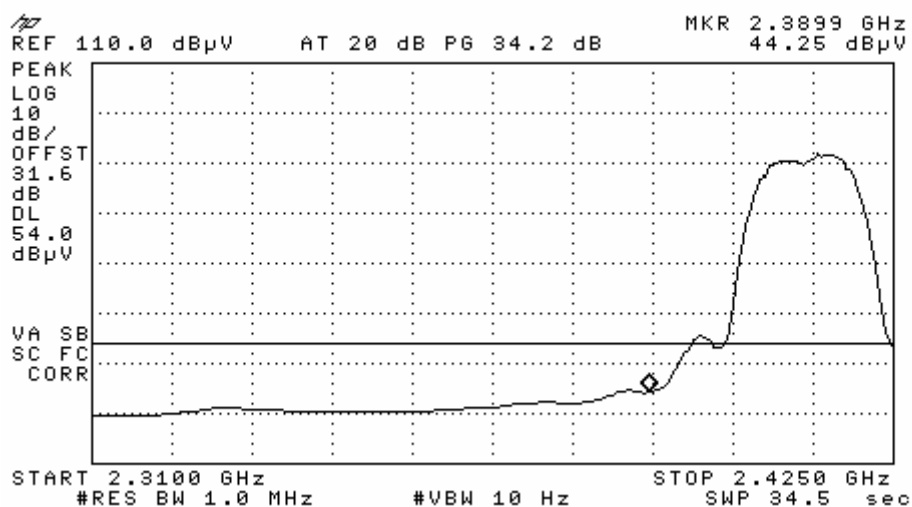
## 802.11b Band-edge : Radiated Measurements (Restricted bands)

### CH 1 / Vertical / Peak data



L

### CH 1 / Vertical / Average data



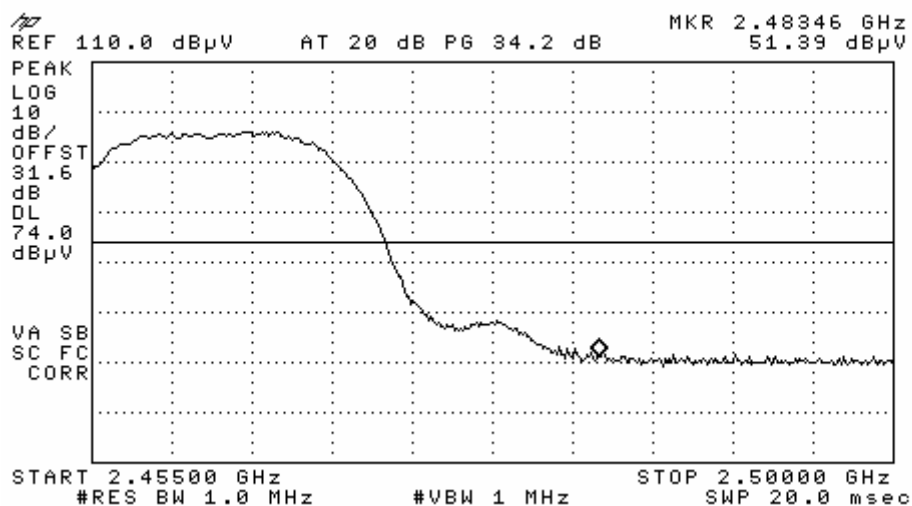
L

Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2389.9	64.6	44.25
Measurement uncertainty	± 6 dB	

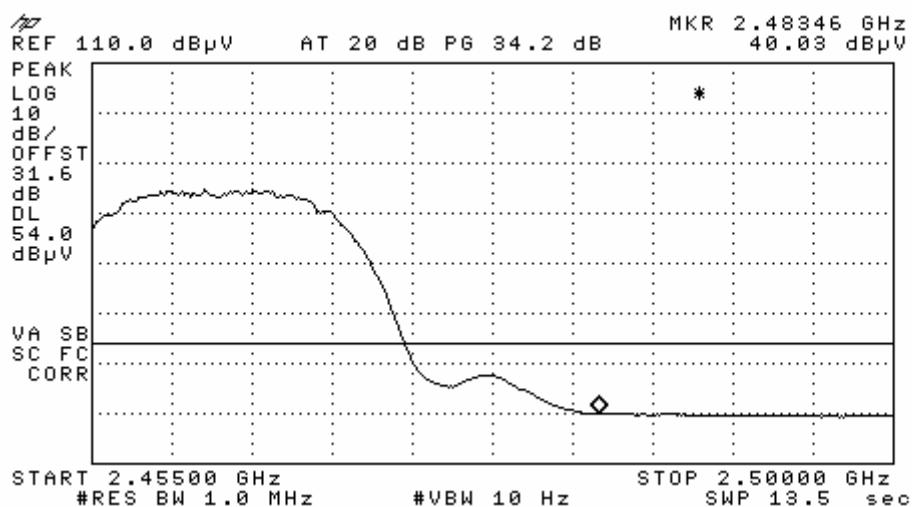
No other emissions were detected at a level greater than 20dB below limit.

## 802.11b Band-edge : Radiated Measurements (Restricted bands)

### CH 11 / Horizontal / Peak data



### CH 11 / Horizontal / Average data

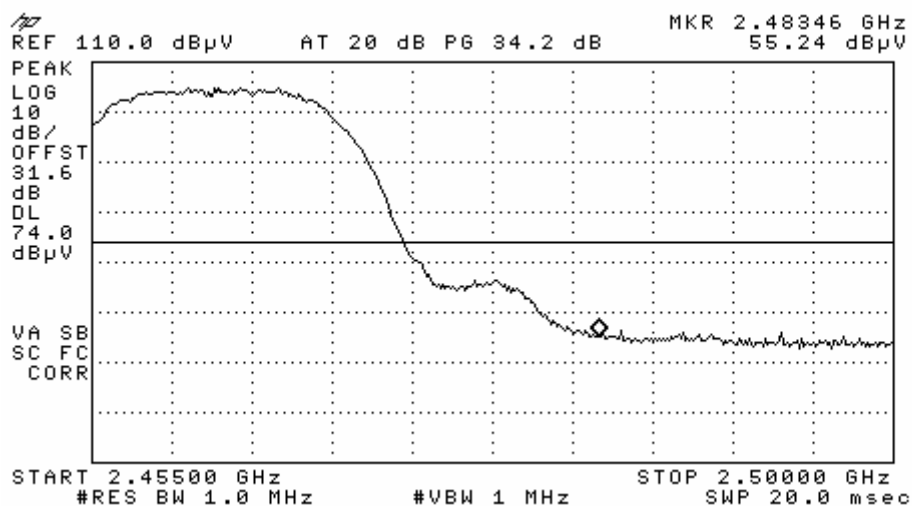


Restricted band test data		
Frequency (MHz)	PK Level (dB $\mu$ V/m)	AV Level (dB $\mu$ V/m)
2483.5	51.39	40.03
Measurement uncertainty	$\pm 6$ dB	

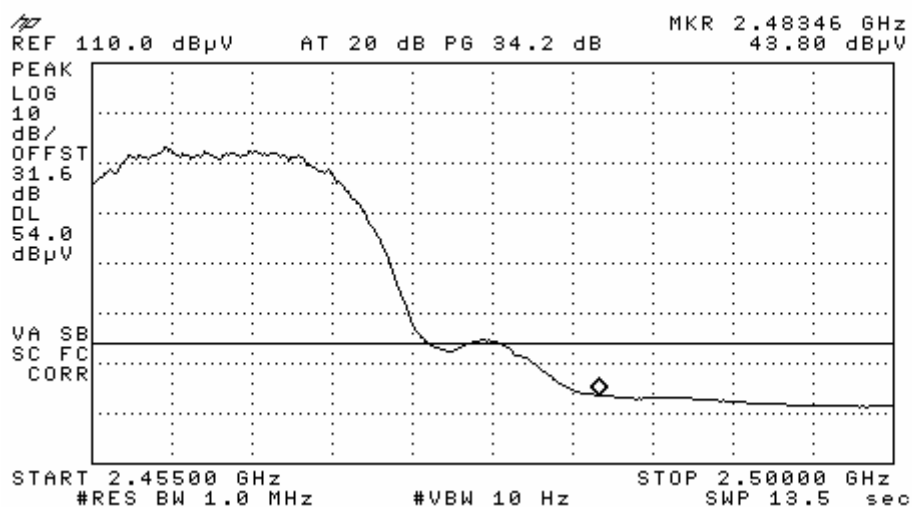
No other emissions were detected at a level greater than 20dB below limit.

## 802.11b Band-edge : Radiated Measurements (Restricted bands)

### CH 11 / Vertical / Peak data



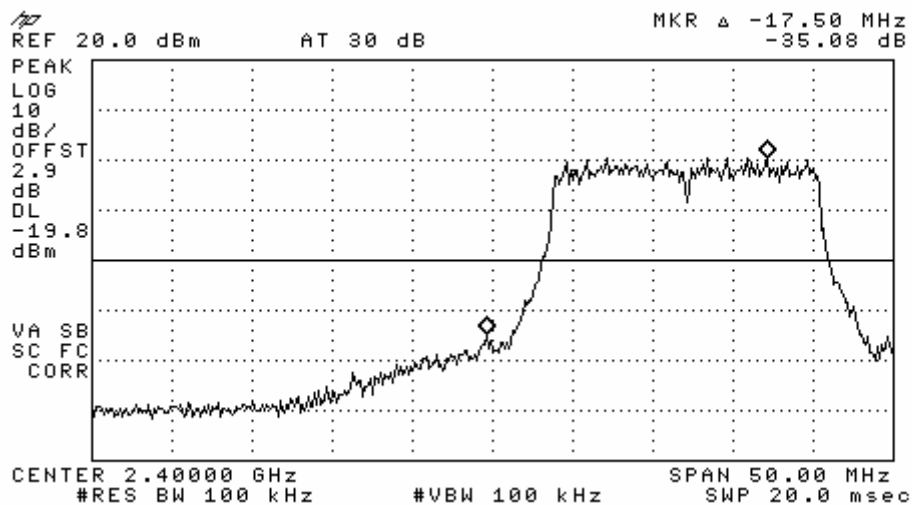
### CH 11 / Vertical / Average data



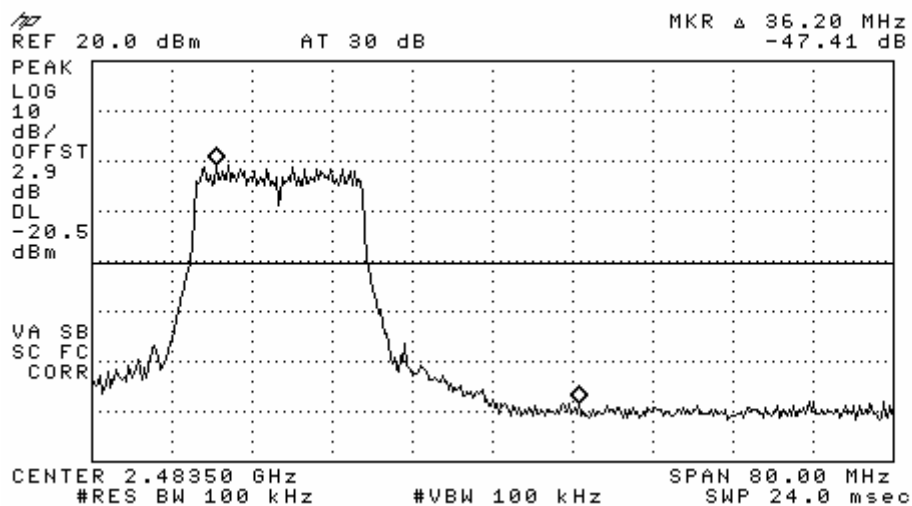
Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2483.5	55.24	43.8
Measurement uncertainty	± 6 dB	

No other emissions were detected at a level greater than 20dB below limit.

## 802.11g Band-edge : Conducted Measurements



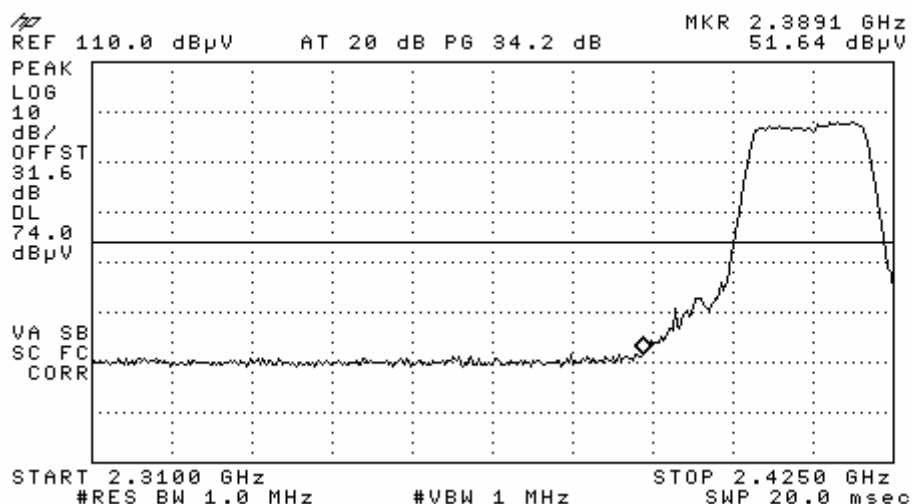
RL



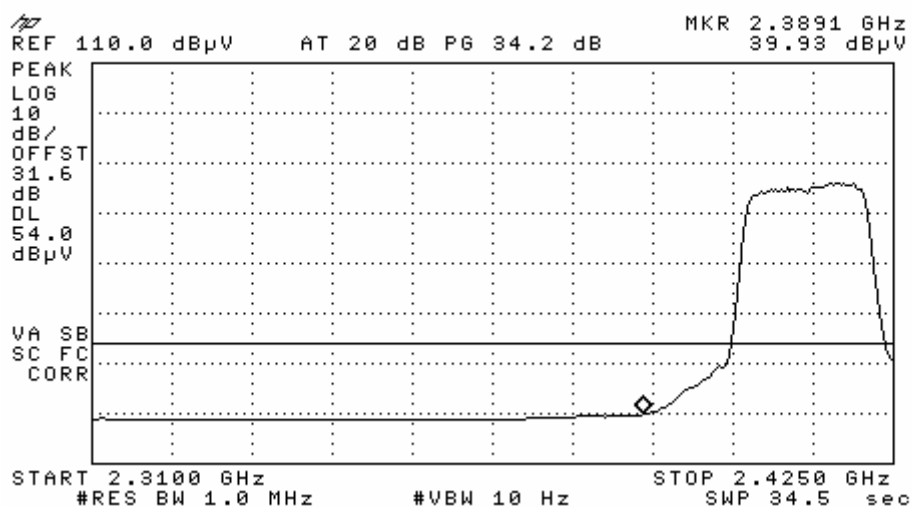
RL

## 802.11g Band-edge : Radiated Measurements (Restricted bands)

### CH 1 / Horizontal / Peak data



### CH 1 / Horizontal / Average data

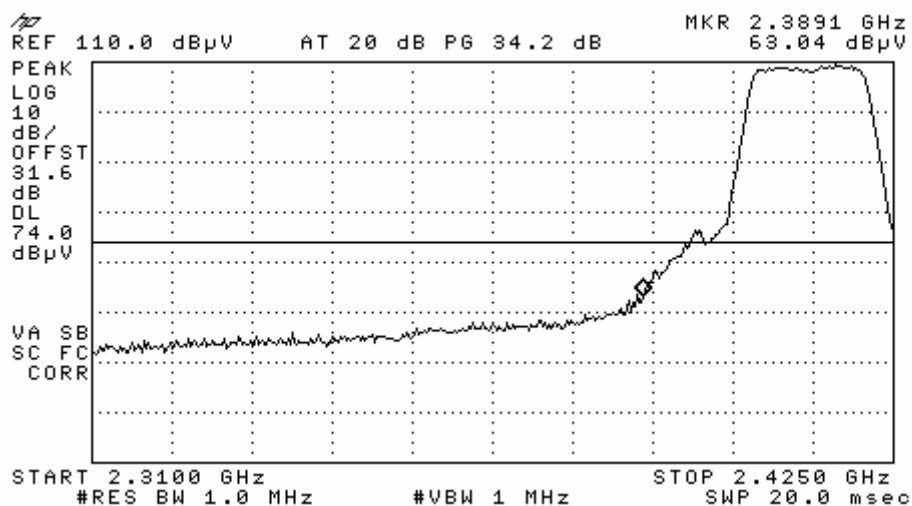


Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2389.1	51.64	39.93
Measurement uncertainty	$\pm 6$ dB	

No other emissions were detected at a level greater than 20dB below limit.

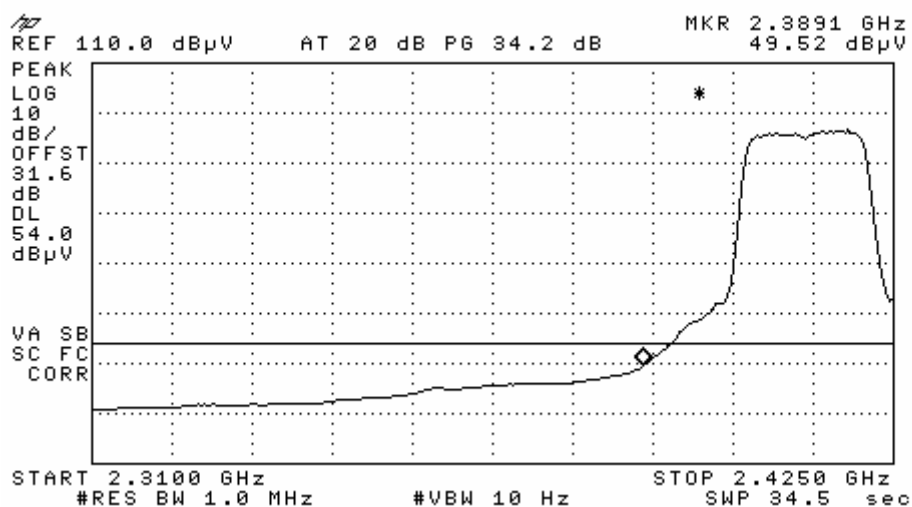
## 802.11g Band-edge : Radiated Measurements (Restricted bands)

### CH 1 / Vertical / Peak data



L

### CH 1 / Vertical / Average data



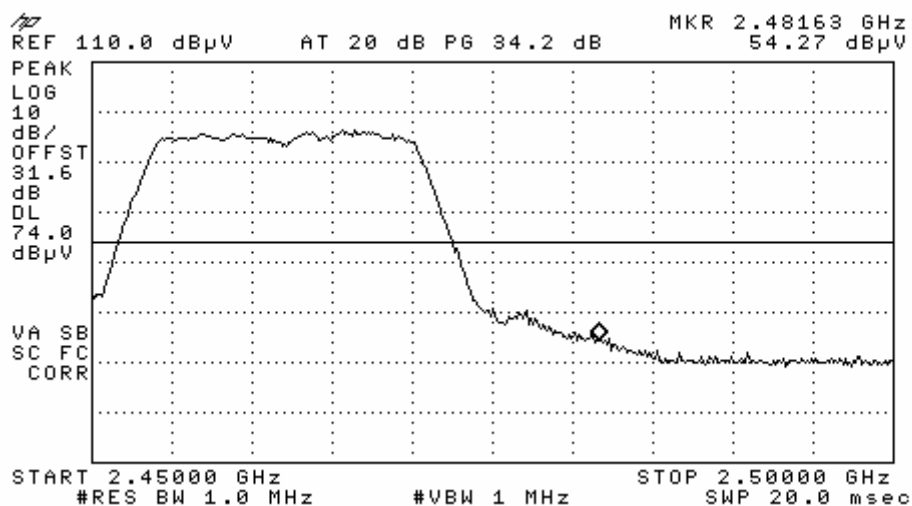
L

Restricted band test data		
Frequency (MHz)	PK Level (dB $\mu$ V/m)	AV Level (dB $\mu$ V/m)
2389.1	63.04	49.52
Measurement uncertainty	$\pm$ 6 dB	

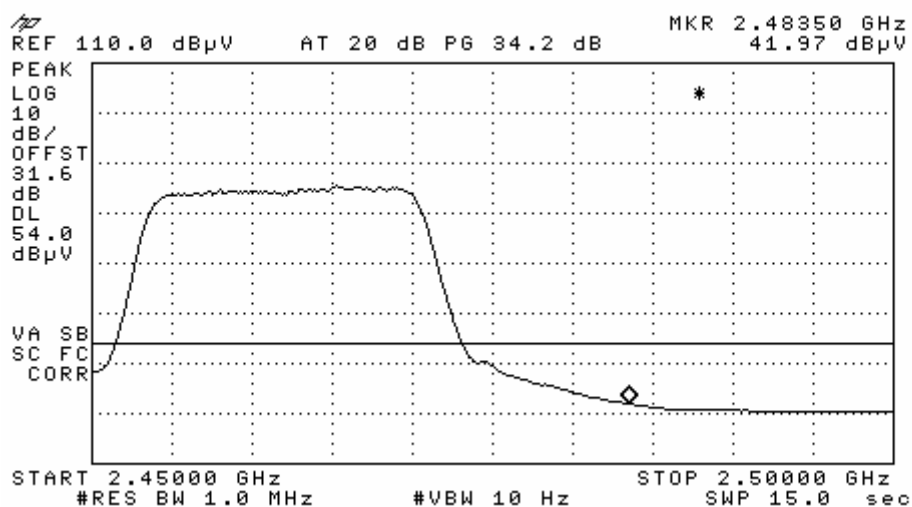
No other emissions were detected at a level greater than 20dB below limit.

## 802.11g Band-edge : Radiated Measurements (Restricted bands)

### CH 11 / Horizontal / Peak data



### CH 11 / Horizontal / Average data



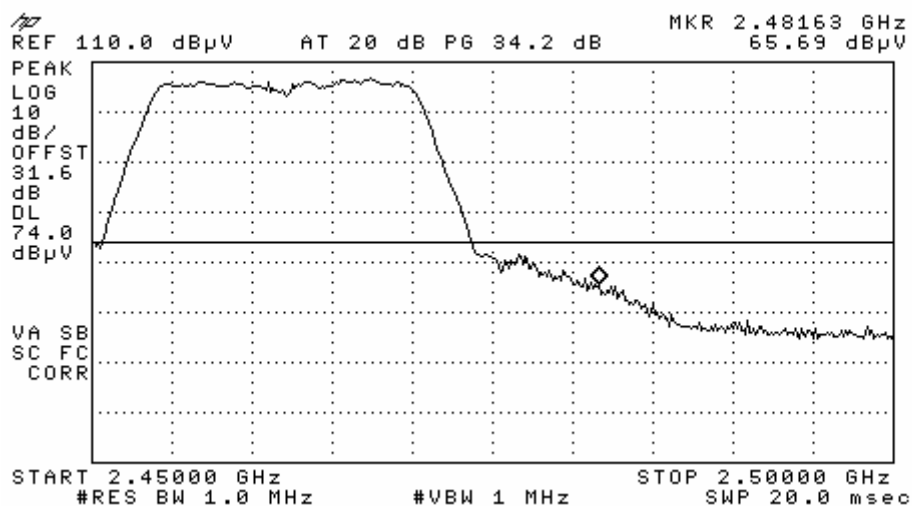
Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2483.5	54.27	41.97
Measurement uncertainty	± 6 dB	

No other emissions were detected at a level greater than 20dB below limit.



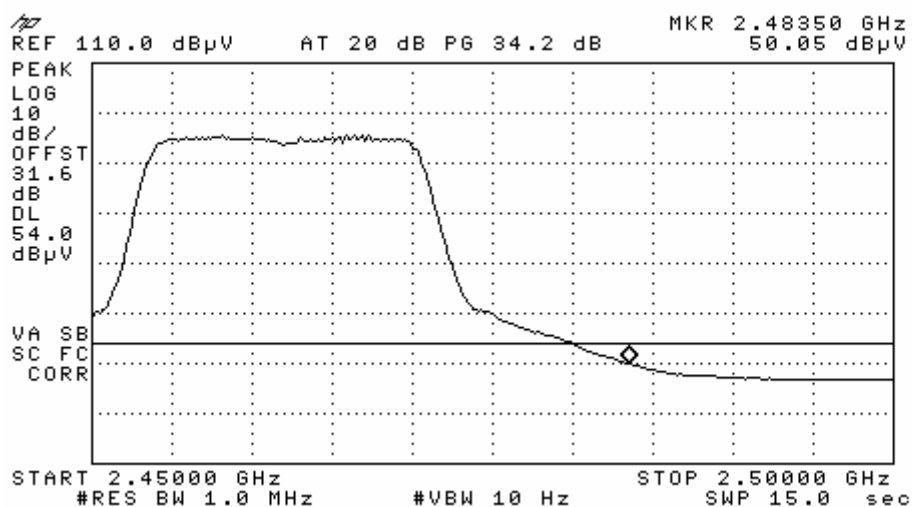
## 802.11g Band-edge : Radiated Measurements (Restricted bands)

### CH 11 / Vertical / Peak data



L

### CH 11 / Vertical / Average data

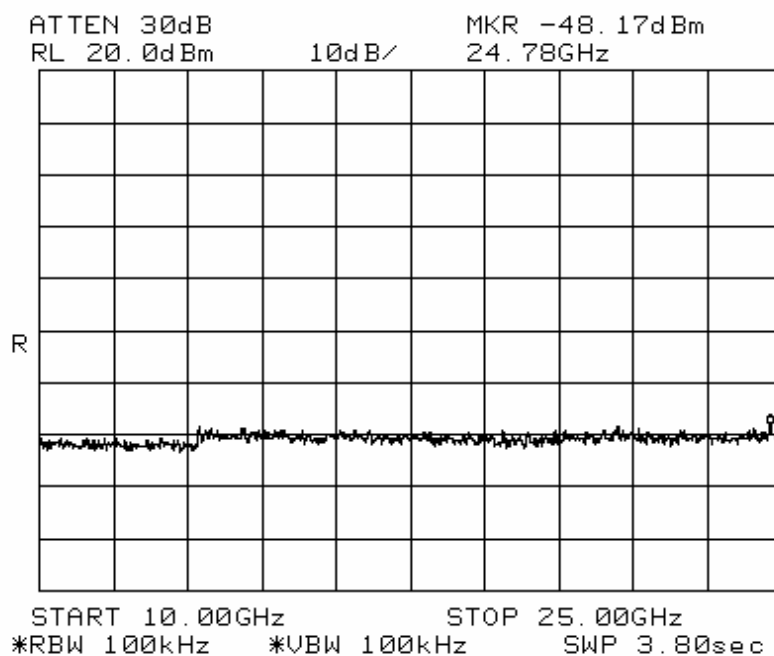
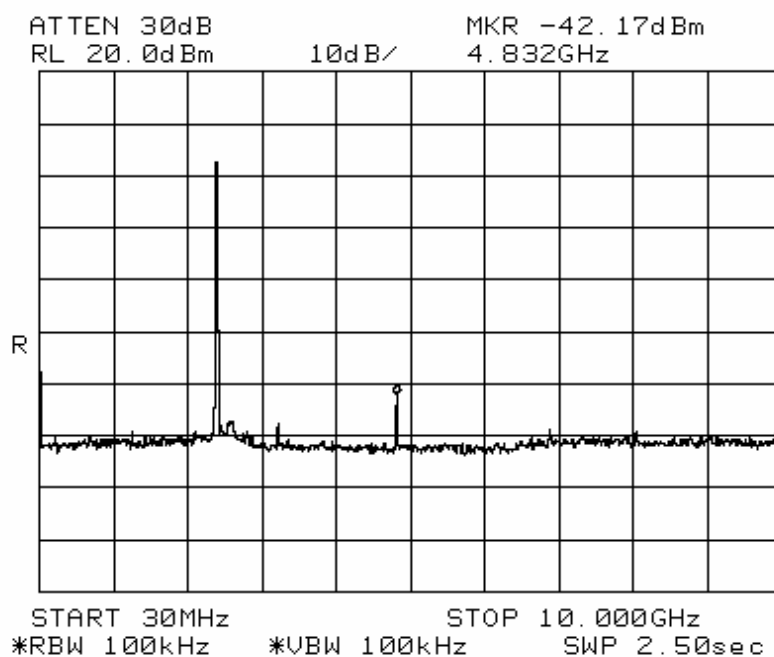


L

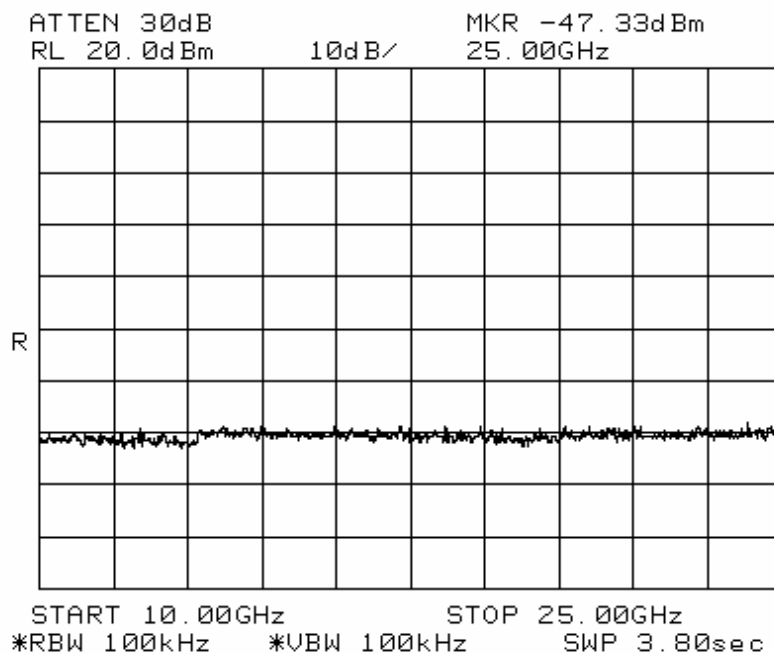
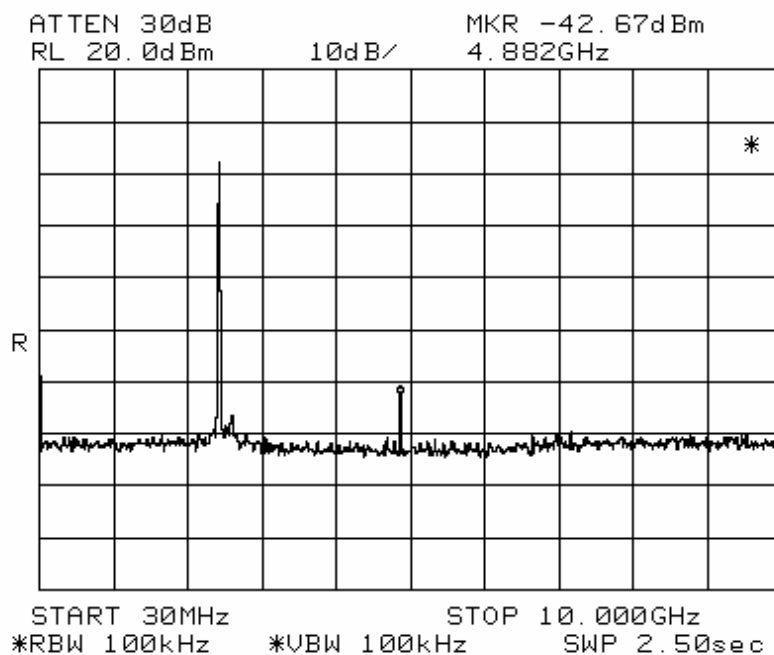
Restricted band test data		
Frequency (MHz)	PK Level (dBuV/m)	AV Level (dBuV/m)
2483.5	65.69	50.05
Measurement uncertainty	± 6 dB	

No other emissions were detected at a level greater than 20dB below limit.

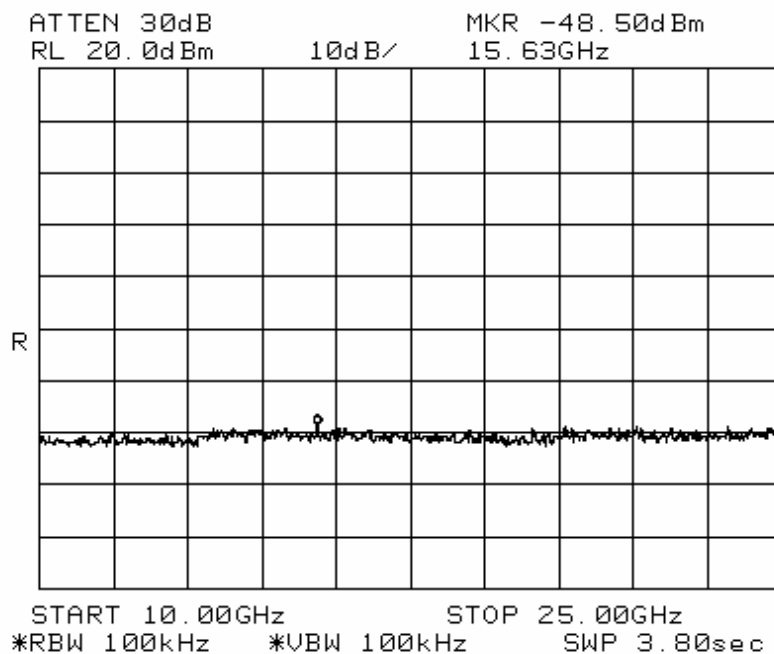
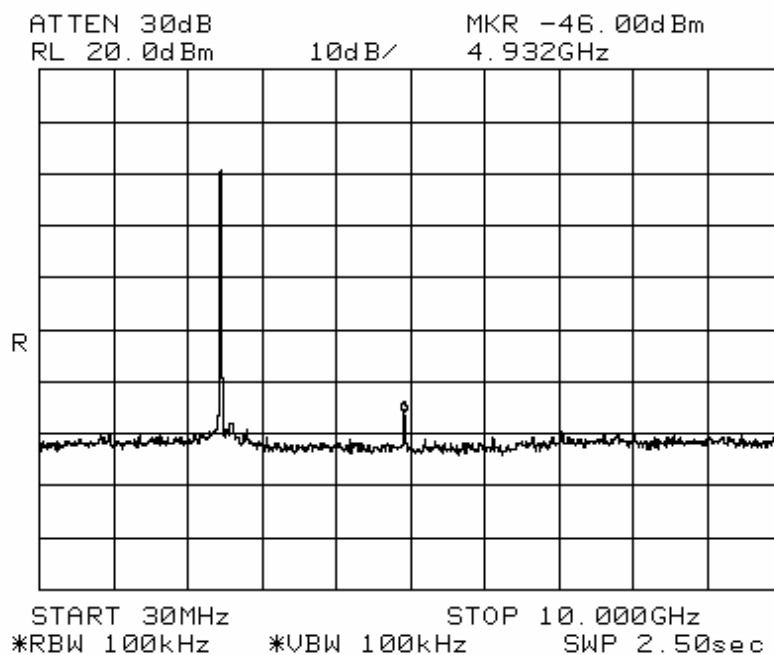
**802.11b - Low channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



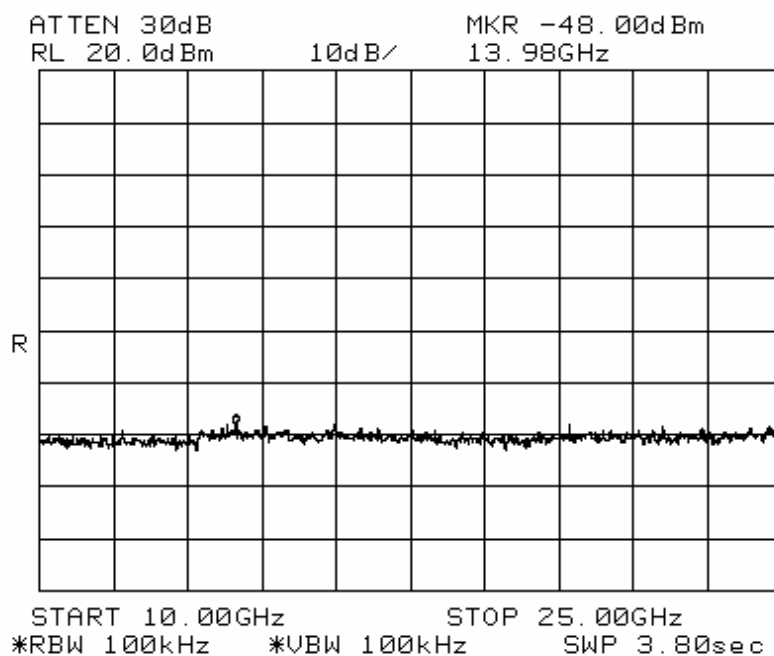
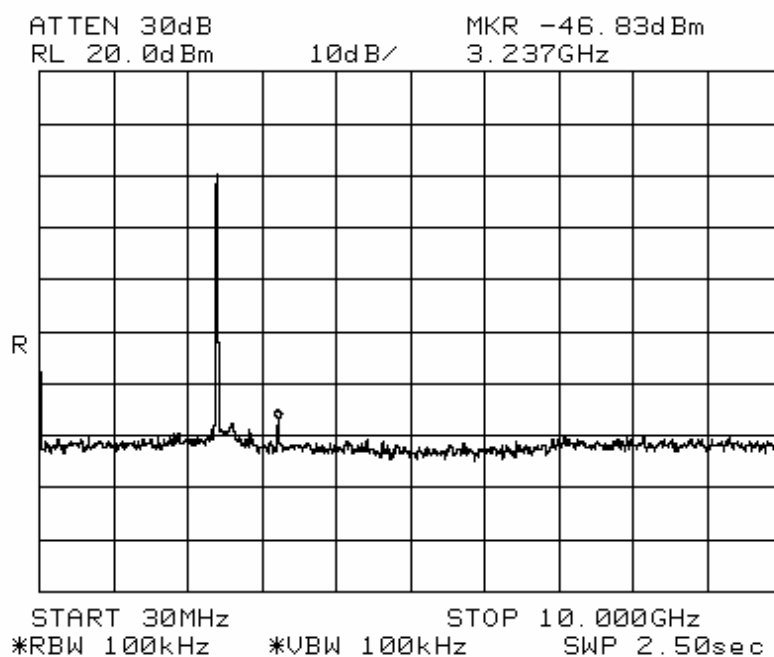
**802.11b - Mid channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



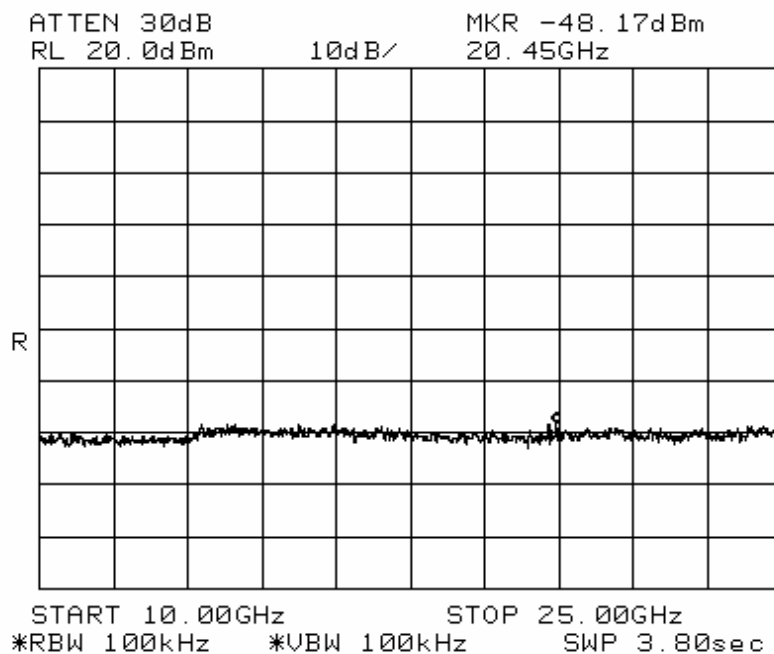
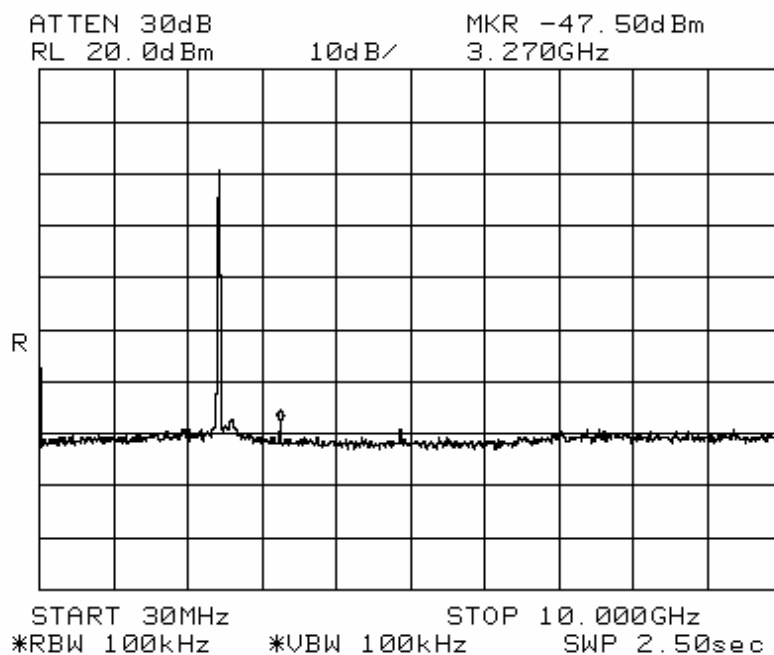
**802.11b – High channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



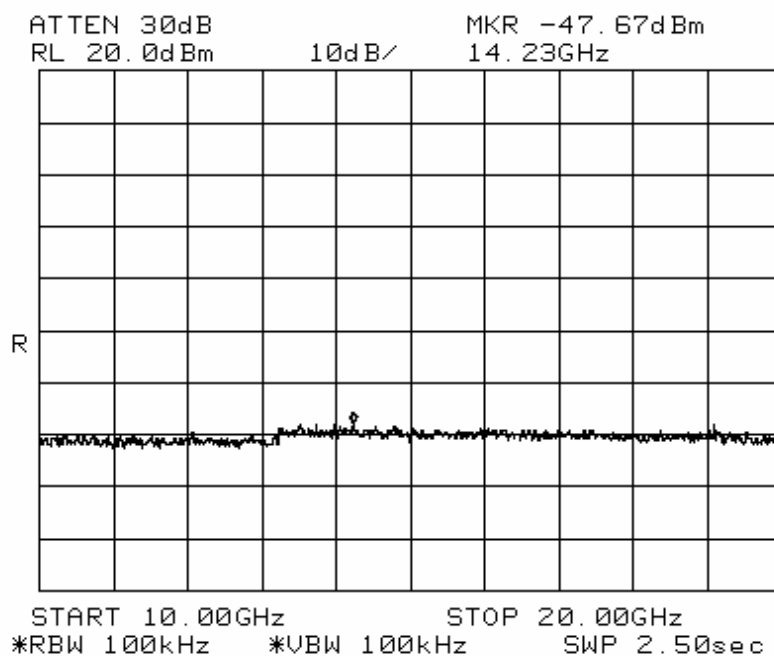
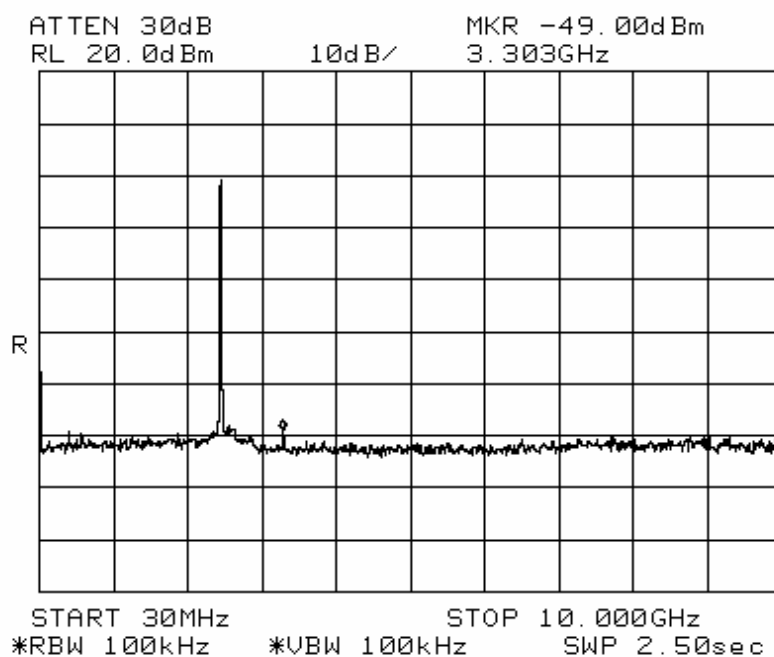
**802.11g - Low channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



**802.11g - Mid channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



**802.11g – High channel**  
**Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.**



### 3.2.5 Field Strength of Harmonics

#### Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 100 kHz ( 30MHz ~ 1 GHz)

VBW ≥ RBW

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Span = 100 MHz

Detector function = peak

Trace = max hold

Sweep = auto

#### Measurement Data: Complies

- See next pages for actual measured data.

#### Minimum Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



**802.11b Measurement Data:****Peak mode**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)
4823.6	65.2	4874	64.6	4923.9	64.7
7238.6	60.6	7307.5	59	7386	60.6
-	-	-	-	-	-
-	-	-	-	-	-
Measurement uncertainty		$\pm 6$ dB			

No other emissions were detected at a level greater than 20dB below limit.

**Average mode**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)
4823.6	52.9	4874	50.7	4923.9	50.9
7238.6	49.1	7307.5	47.1	7386	49.1
-	-	-	-	-	-
-	-	-	-	-	-
Measurement uncertainty		$\pm 6$ dB			

No other emissions were detected at a level greater than 20dB below limit.

**802.11g Measurement Data:****Peak mode**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)
4821.9	65.7	4871	64.9	4921	64.7
7236	66.5	7306	64	7381	63.3
-	-	-	-	-	-
-	-	-	-	-	-
Measurement uncertainty		$\pm 6$ dB			

No other emissions were detected at a level greater than 20dB below limit.

**Average mode**

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)	Frequency (MHz)	Level (dBuV/m)
4821.9	51.1	4871	50.2	4921	50.4
7236	49.6	7306	47.6	7381	47
-	-	-	-	-	-
-	-	-	-	-	-
Measurement uncertainty		$\pm 6$ dB			

No other emissions were detected at a level greater than 20dB below limit.

**Radiated Emissions –WLAN 802.11b**

243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-3236008,9  
Fax:+82-31-3236010

EUT/Model No.: MNC-W100

TEST MODE: PING +802.11b mode

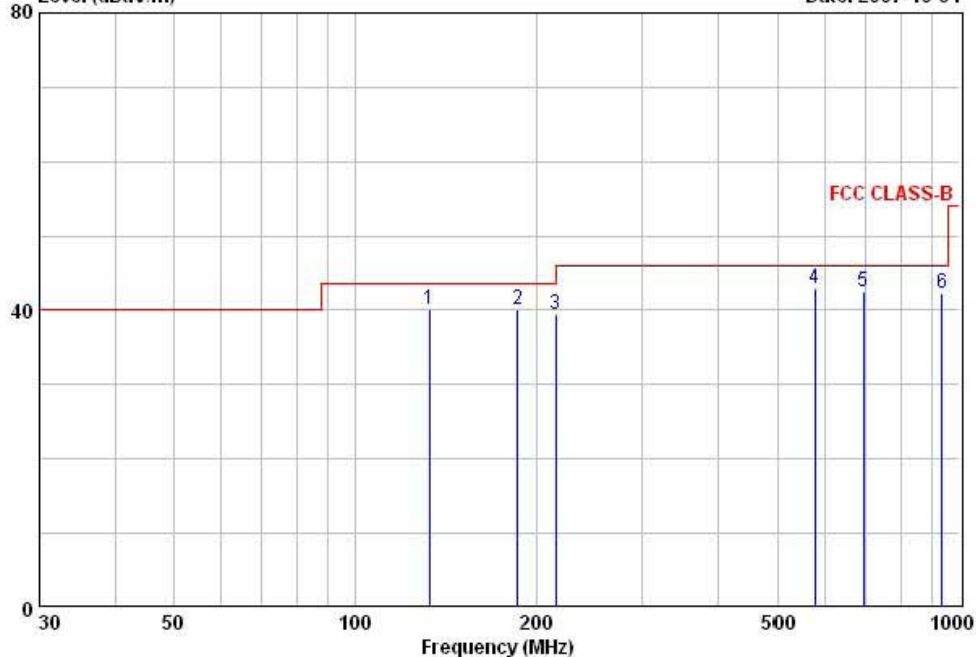
Temp Humi : 14 / 42

Tested by: B.S.KIM

Data: 194

Level (dBuV/m)

Date: 2007-10-31



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV	dB	QK dBuV/m	dBuV/m	dB	cm	deg	
1	132.78	51.70	-11.57	40.13	43.50	3.37	176	253	VERTICAL
2	186.04	52.30	-12.16	40.14	43.50	3.36	114	203	HORIZONTAL
3	215.53	52.10	-12.73	39.37	43.50	4.13	112	65	HORIZONTAL
4	575.43	46.50	-3.64	42.86	46.00	3.14	125	104	HORIZONTAL
5	693.44	44.10	-1.57	42.53	46.00	3.47	146	78	VERTICAL
6	934.62	39.10	3.19	42.29	46.00	3.71	145	132	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

**Radiated Emissions –WLAN 802.11g**

243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-3236008,9  
Fax:+82-31-3236010

EUT/Model No.: MNC-W100

TEST MODE: PING +802.11g mode

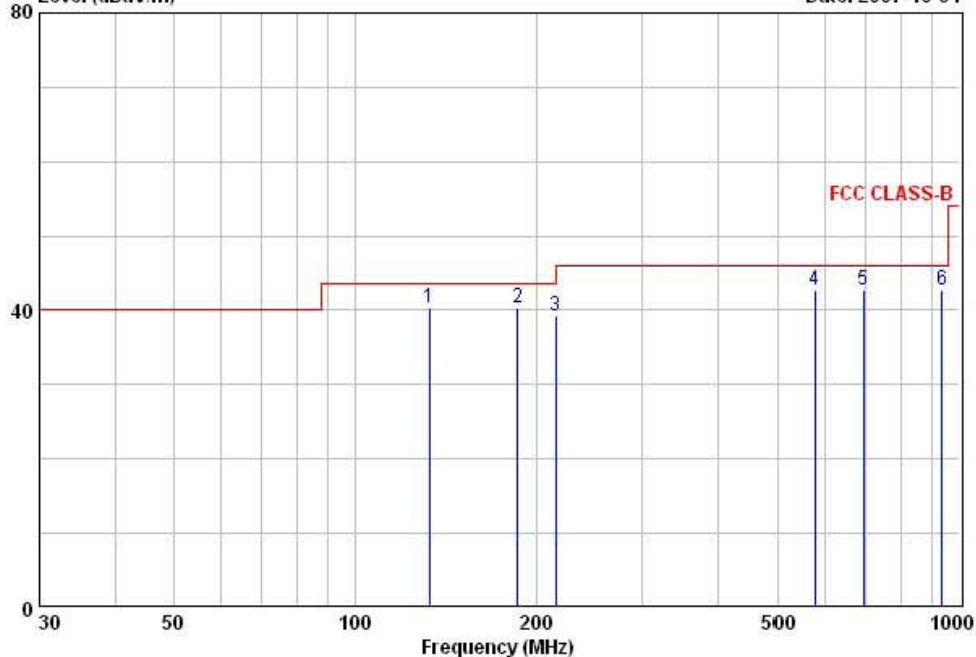
Temp Humi : 14 / 42

Tested by: B.S.KIM

Data: 231

Level (dBuV/m)

Date: 2007-10-31



	Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
	MHz	dBuV	dB	QK dBuV/m	dBuV/m	dB	cm	deg	
1	132.78	51.80	-11.57	40.23	43.50	3.27	176	253	VERTICAL
2	186.04	52.40	-12.16	40.24	43.50	3.26	114	203	HORIZONTAL
3	215.53	52.00	-12.73	39.27	43.50	4.23	112	65	HORIZONTAL
4	575.43	46.30	-3.64	42.66	46.00	3.34	125	104	HORIZONTAL
5	693.44	44.20	-1.57	42.63	46.00	3.37	146	78	VERTICAL
6	934.62	39.50	3.19	42.69	46.00	3.31	145	132	HORIZONTAL

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

### 3.2.6 AC Conducted Emissions

#### Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

#### Measurement Data: Complies

- See next pages for actual measured spectrum plots.
- No emissions were detected at a level greater than 10dB below limit.

#### Minimum Standard: FCC Part 15.207(a)/EN 55022

##### Class B

Frequency Range	quasi-peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

##### Class A

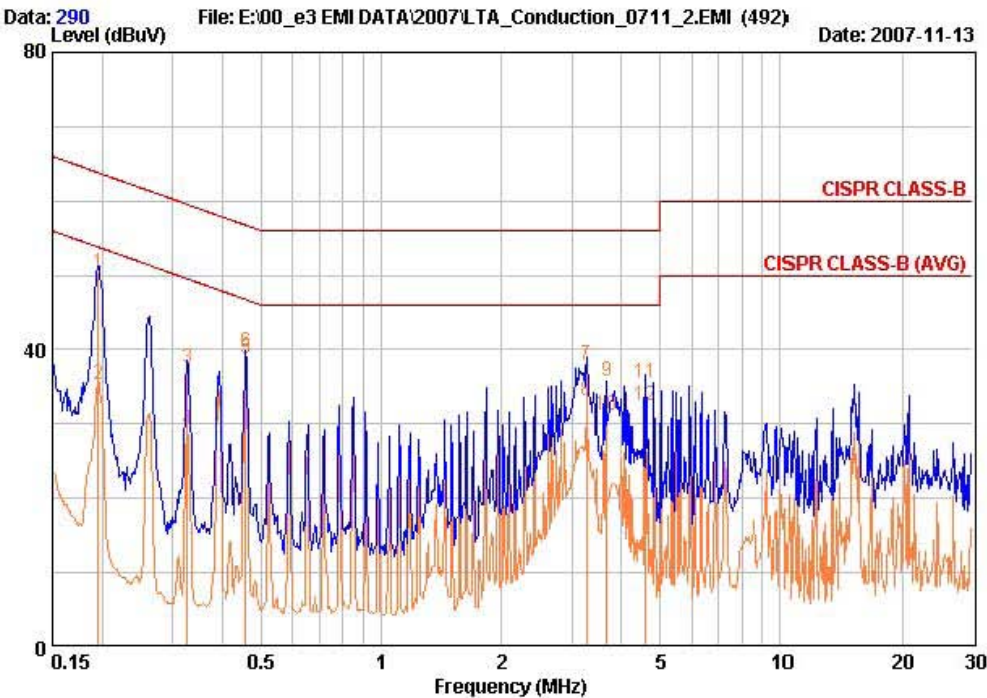
Frequency Range	quasi-peak	Average
0.15 ~ 0.5 MHz	79 dBuV	66 dBuV
0.5 ~ 30 MHz	73 dBuV	60 dBuV

AC Conducted Emissions –WLAN 802.11b -Line



243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
Fax:+82-31-323-6010

EUT / Model No. : MNC-W100	Phase : LINE
Test Mode : PING + 802.11b mode	Test Power : 120 / 60
Temp./Humi. : 24 / 32	Test Engineer : B.S.KIM



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.195	50.20	35.10	0.22	50.42	35.32	63.82	53.82	13.40	18.50
0.327	37.20	29.00	0.31	37.51	29.31	59.53	49.53	22.02	20.22
0.458	39.30	38.40	0.33	39.63	38.73	56.73	46.73	17.10	8.00
3.271	37.30	32.60	0.60	37.90	33.20	56.00	46.00	18.10	12.80
3.665	35.30	30.60	0.50	35.80	31.10	56.00	46.00	20.20	14.90
4.581	35.10	31.90	0.49	35.59	32.39	56.00	46.00	20.41	13.61

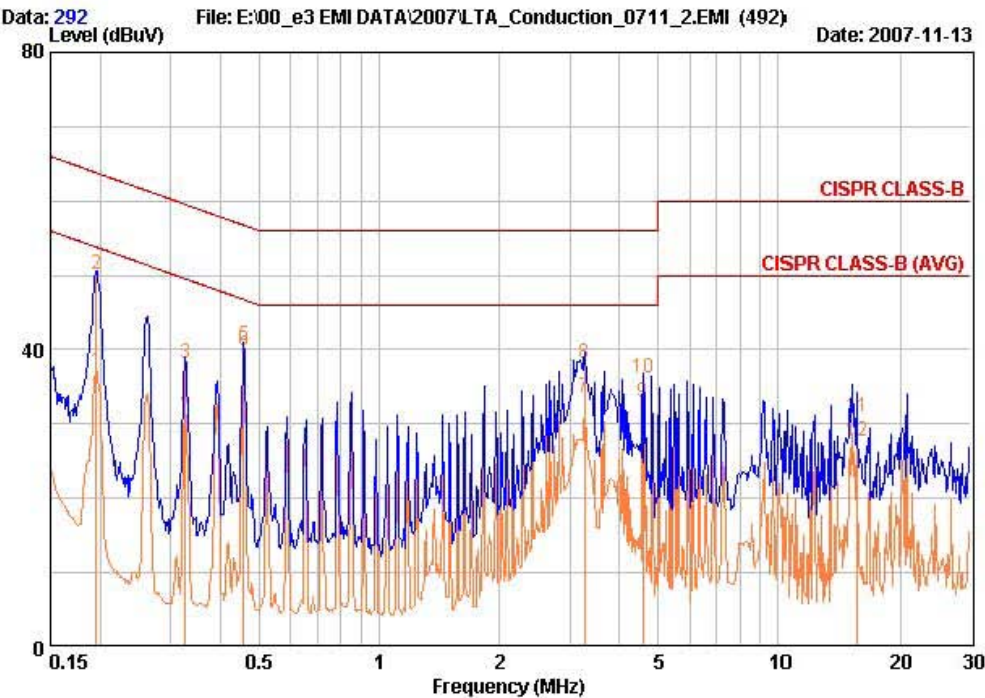
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

AC Conducted Emissions – WLAN 802.11b - Neutral



243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
Fax:+82-31-323-6010

EUT / Model No. :	MNC-W100	Phase	: NEUTRAL
Test Mode	: PING + 802.11b mode	Test Power	: 120 / 60
Temp./Humi.	: 24 / 32	Test Engineer	: B.S.KIM



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.195	49.90	36.90	0.22	50.12	37.12	63.82	53.82	13.70	16.70
0.327	37.80	31.70	0.31	38.11	32.01	59.53	49.53	21.42	17.52
0.458	40.30	39.50	0.32	40.62	39.82	56.73	46.73	16.11	6.91
3.272	37.50	32.90	0.57	38.07	33.47	56.00	46.00	17.93	12.53
4.580	35.70	32.40	0.45	36.15	32.85	56.00	46.00	19.85	13.15
15.553	29.80	26.60	1.11	30.91	27.71	60.00	50.00	29.09	22.29

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

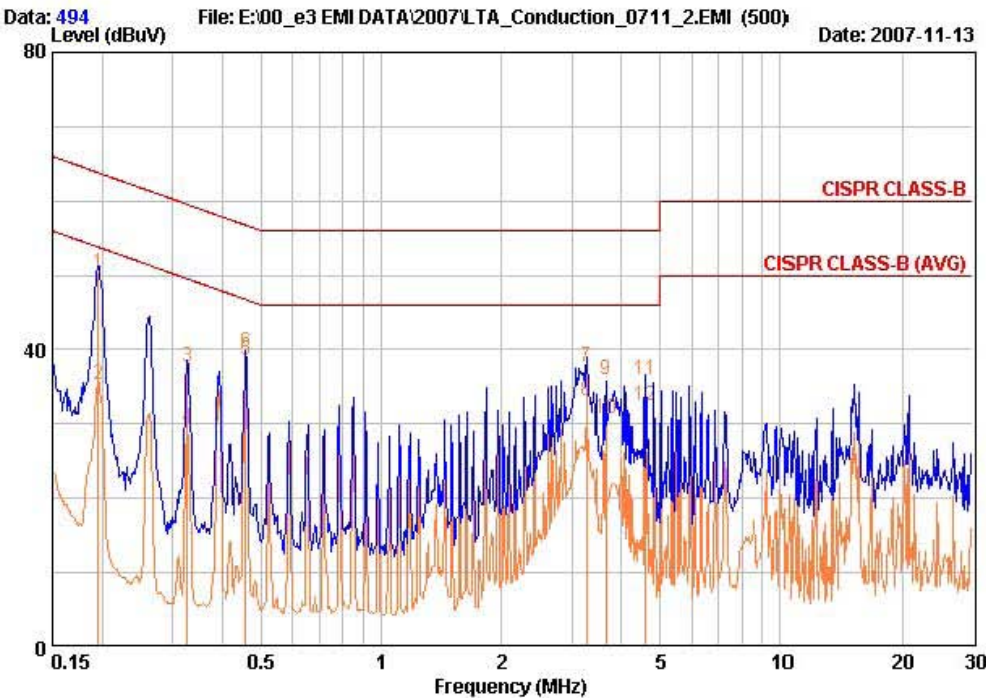


AC Conducted Emissions – WLAN 802.11g - Line



243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
Fax:+82-31-323-6010

EUT / Model No. : MNC-W100	Phase : LINE
Test Mode : PING + 802.11g mode	Test Power : 120 / 60
Temp./Humi. : 24 / 32	Test Engineer : B.S.KIM



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.195	50.10	35.20	0.22	50.32	35.42	63.82	53.82	13.50	18.40
0.326	37.30	29.10	0.31	37.61	29.41	59.55	49.55	21.94	20.14
0.458	39.40	38.30	0.33	39.73	38.63	56.73	46.73	17.00	8.10
3.272	37.20	32.50	0.60	37.80	33.10	56.00	46.00	18.20	12.90
3.664	35.40	30.20	0.50	35.90	30.70	56.00	46.00	20.10	15.30
4.582	35.40	32.00	0.49	35.89	32.49	56.00	46.00	20.11	13.51

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

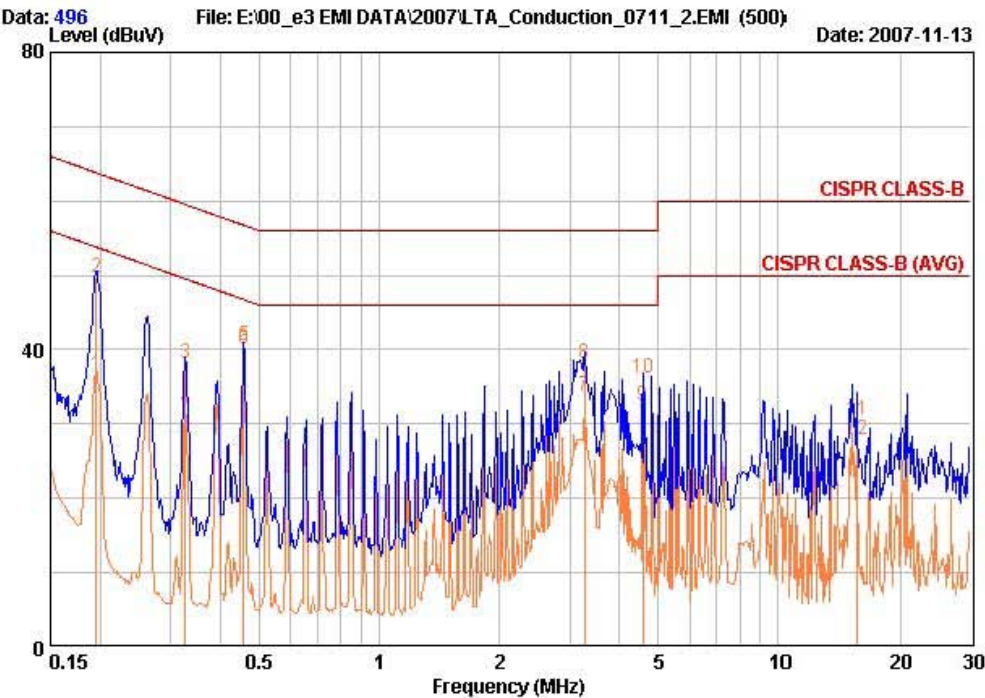


AC Conducted Emissions – WLAN 802.11g - Neutral



243 Jubug-ni, yangji-Myeon, Youngin-si,  
Gyeonggi-do 449-822 Korea  
Tel :+82-31-323-6008  
Fax:+82-31-323-6010

EUT / Model No. :	MNC-W100	Phase	: NEUTRAL
Test Mode	: PING + 802.11g mode	Test Power	: 120 / 60
Temp./Humi.	: 24 / 32	Test Engineer	: B.S.KIM



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV		QP	AV	QP	AV	QP	AV
	dBuV	dBuV	dB	dBuV	dBuV	dBuV	dBuV	dB	dB
0.195	49.50	36.50	0.22	49.72	36.72	63.82	53.82	14.10	17.10
0.327	37.90	31.80	0.31	38.21	32.11	59.53	49.53	21.32	17.42
0.458	40.20	39.70	0.32	40.52	40.02	56.73	46.73	16.21	6.71
3.271	37.50	33.20	0.57	38.07	33.77	56.00	46.00	17.93	12.23
4.581	35.80	32.00	0.45	36.25	32.45	56.00	46.00	19.75	13.55
15.552	29.50	26.70	1.11	30.61	27.81	60.00	50.00	29.39	22.19

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

## APPENDIX 1

### **Maximum Permissible Exposure Calculations**

## \*\* MPE Calculations \*\*

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user. The MPE calculation for this exposure is shown below.

The peak radiated output power (EIRP) is calculated as follows:

$EIRP = P + G$ $EIRP = 19.79 \text{ dBm} + 2.33 \text{ dBi}$ $EIRP = 19.63 \text{ dBm}$	Where, $P$ = Power input to the antenna (mW) $G$ = Power gain of the antenna (dBi)
-----------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------

### Power density at the specific separation:

$S = PG / (4R^2 \pi)$  $S = (95.28 * 1.71) / (4 * 20^2 * \pi)$  $S = 0.0324 \text{ mW/cm}^2$	Where, $S$ = Maximum power density ( $\text{mW/cm}^2$ ) $P$ = Power input to the antenna (mW) $G$ = Numeric power gain of the antenna $R$ = Distance to the center of the radiation of the antenna (20cm = limit for MPE)
----------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The Maximum permissible exposure (MPE) for the general population is  $1 \text{ mW/cm}^2$ .

The power density at 20cm does not exceed the  $1 \text{ mW/cm}^2$  limit. Therefore, the exposure condition is compliant with FCC rules.

### Estimated safe separation:

$R = \sqrt{PG / 4 \pi}$  $R = \sqrt{95.28 * 1.71 / 4 \pi}$  $R = 3.6 \text{ Cm}$	Where, $P$ = Power input to the antenna (mW) $G$ = Numeric power gain of the antenna $R$ = Distance to the center of the radiation of the antenna (20cm = limit for MPE)
----------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The numeric gain( $G$ ) of the antenna with a gain specified in dB is determined by:

$$G = \text{Log}^{-1} (\text{dB antenna gain} / 10)$$

$$G = \text{Log}^{-1} (2.33 / 10)$$

$$G = 1.71$$

## APPENDIX 2

### TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Apr-08
2	Signal Generator	8648C	3623A02597	HP	Apr-08
3	Attenuator (3dB)	8491A	37822	HP	Oct-08
4	Attenuator (10dB)	8491A	63196	HP	Oct-08
5	EMI Test Receiver	ESVD	843748/001	R&S	Aug-08
6	LISN	KNW-407	8-1430-1	Kyoritsu	Oct-08
7	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Oct-08
8	RF Amplifier	8447D	2949A02670	HP	Jan-08
9	RF Amplifier	8447D	2439A09058	HP	Oct-08
10	RF Amplifier	8449B	3008A02126	HP	Apr-09
11	Test Receiver	ESHS10	828404009	R&S	Aug-08
12	TRILOG Antenna	VULB 9160	9160-3212	SCHWARZBECK	Jul-08
13	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Apr-09
14	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Apr-09
15	Horn Antenna	3115	00055005	ETS LINDGREN	Mar-09
16	Dipole Antenna	VHA9103	2116	Schwarzbeck	Nov-07
17	Dipole Antenna	VHA9103	2117	Schwarzbeck	Nov-07
18	Dipole Antenna	UHA9105	2261	Schwarzbeck	Nov-07
19	Dipole Antenna	UHA9105	2262	Schwarzbeck	Nov-07
20	Spectrum Analyzer	8591E	3649A05888	HP	Oct-08
21	Spectrum Analyzer	8563E	3425A02505	HP	Apr-08
22	Hygro-Thermograph	THB-36	0041557-01	ISUZU	May-08
23	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	Jun-08
24	RF Switch	MP59B	6200414971	ANRITSU	Jun-08
25	RF Switch	MP59B	6200438565	ANRITSU	Jun-08
26	Power Divider	11636A	6243	HP	Oct-08
27	DC Power Supply	6622A	3448A03079	HP	Oct-08
28	Attenuator (30dB)	11636A	6243	HP	Oct-08
29	Frequency Counter	5342A	2826A12411	HP	Apr-08
30	Power Meter	EPM-441A	GB32481702	HP	Apr-08
31	Power Sensor	8481A	2702A64048	HP	Apr-08
32	Audio Analyzer	8903B	3729A18901	HP	Oct-08
33	Modulation Analyzer	8901B	3749A05878	HP	Oct-08
34	TEMP & HUMIDITY Chamber	YJ-500	L05022	JinYoung Tech	Oct-08
35	LOOP-ANTENNA	FMZB 1516	151602/94	SCHWARZBECK	Mar-09