



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E04DR-017

Applicant : IBluebird Soft Inc.

Address : 558-5, Sinsa-dong, Gangnam-gu, Seoul, Korea

Manufacturer : Bluebird Soft Inc.

Address : 558-5, Sinsa-dong, Gangnam-gu, Seoul Korea

Type of Equipment : Industrial PDA

FCC ID. : SS4BIP30X0

Model Name : BIP-3010

Serial number : None

Total page of Report : 39 pages (including this page)

Date of Incoming : December 6, 2004

Date of issue : December 13, 2004

SUMMARY

The equipment complies with the regulation; **FCC Part 15 Subpart C Section 15.247.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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**1. VERIFICATION OF COMPLIANCE**

APPLICANT : IBluebird Soft Inc.
ADDRESS : 558-5, Sinsa-dong, Gangnam-gu, Seoul, Korea
CONTACT PERSON : Myung-Hoon, Kim / Assistant Quality Manager
TELEPHONE NO : +82-1588-1363
FCC ID : SS4BIP30X0
MODEL NO/NAME : BIP-3010
SERIAL NUMBER : N/A
DATE : December 13, 2004

DEVICE TYPE	Industrial PDA - <i>DIGITAL TRANSMISSION SYSTEM</i>
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4: 2001
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	NONE
FINAL TEST WAS CONDUCTED ON	3/1 METER(S) OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.207 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 and is not affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Output Power	Met the Limit / PASS
15.247 (b) (5)	Radio Frequency Exposure Level	Met the Limit / PASS
15.247 (c)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (c)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (d)	Peak Power Spectral Density	Met the Limit / PASS
15.109	Radiated Emission Limits	Met the Limit / PASS
15.107	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4/2001. Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The Electromagnetic compatibility measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myeon, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Federal Communications Commission on January 18, 2002 (Registration Number: 92819 and 340658), accredited by KOLAS (Korea Laboratory Accreditation Scheme, No: 85) and approved by TUV, DNV, SEMKO and MIC (Ministry of Information and Communications in Korea) according to the requirement of ISO17025.



3. GENERAL INFORMATION

3.1 Product Description

The IBluebird Soft Inc., Model BIP-3010 (referred to as the EUT in this report) is an Industrial PDA, which has bar code reader, 802.11b WLAN module, and a cradle for battery charging, and data uploading/downloading using USB or serial cable. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Industrial PDA
SPREAD SPECTRUM TYPE	DSSS
STANDARD	IEEE 802.11b
OPERATING FREQUENCY	2412-2462 MHz
OUTPUT POWER	15dBm
DATA TRANSFER RATE	802.11b: 1, 2, 5.5, and 11 Mbps
CHANNEL	11 Channels
MODULATION TYPE	DBPSK, DQPSK, CCK
DUTY CYCCLE	100%
ANTENNA	Hirose W-FL –R-SMT (10) connector SMA Type, but inserted into the EUT.
ANTENNA GAIN	1.0dBi
USED 802.11b WLAN SiP MODULE	MFR: USI Co., Ltd
	Model No: WM-B-H-02
LIST OF EACH OSC. ORCRY. FREQ.(FREQ.>=1MHz)	24.576, 3.6865 MHz
NUMBER OF LAYER	Main Board: 6 Layers
POWER REQUIREMENT	AC 100~240Vac, 2.4A from AC/DC Adapter
EXTERNAL CONNECTOR	USB and Serial Port

3.2 Alternative type(s)/model(s); also covered by this test report.

No other model differences have been mentioned.

4. EUT MODIFICATIONS

None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
802.11b WLAN Module	USI Co., Ltd	WM-B-H-02	N/A
Main Board	Bluebird Soft Inc	BIP-3010 Main PCB	N/A
Key Board	Bluebird Soft Inc	BIP-3010 Key PCB	N/A
LCD Module	NEC	NL2432DR22-11B	N/A

5.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
BIP-3010	Bluebird Soft Inc.	SS4BIP30X0	Industrial PDA (EUT)	HOST
BIA-3007	Samdo Human Tech	N/A	Cradle for the EUT	EUT
Latitude D505	Dell	DoC	Notebook P.C. (HOST)	EUT
ISA11-050240TI	TPI Tech Power	N/A	AC/DC ADAPTER	HOST
2225C	HP	DS16XU2225	Printer	HOST

5.4 Mode of operation during the test

The EUT has an internal antenna and WLAN module was inserted in CF-II Type slot on the EUT, but the WLAN Module in the EUT cannot operate with DSSS modulation with the EUT according to the requirement of the standard, so the WLAN module was inserted into a laptop computer instead of the EUT and then modulated signal was transmitted with maximum output power at low, middle and high channel.

For test for digital part of the EUT, the USB port or RS 232C port was connected to a personal computer and then the EUT continuously transferred data to the personal computer during the test.



5.5 Configuration of Test System

Line Conducted Test: The power cord of the EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power lines Conducted Emission tests were performed by using the procedure in ANSI C63.4/2001 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4/2001 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3meter open area test site.
The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.6 Antenna Requirement

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

Antenna Construction:

The transmitter antenna of the EUT is installed inside of the EUT, so no consideration of replacement by the user.



6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Stand-by mode	
Charging mode	
TX mode	X

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Stand-by mode	
Charging mode	
TX mode	X

7. MINIMUM 6dB BANDWIDTH

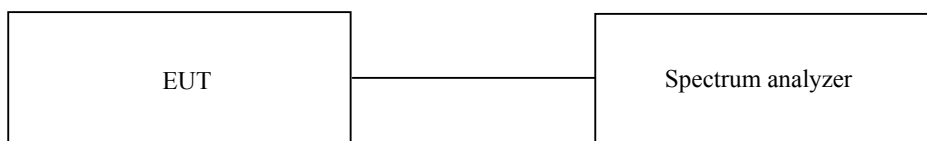
7.1 Operating environment

Temperature : 23°C

Relative humidity : 36 %

7.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 10, 2004

All test equipment used is calibrated on a regular basis.



7.4 Test data

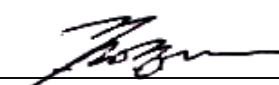
7.4.1 Test data for 821.11b

- Test Date : December 9, 2004

- Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2412	10400	500	9900
Middle	2437	10430	500	9930
High	2462	10470	500	9970

Remark: See next page for an overview sweep performed with peak detector.

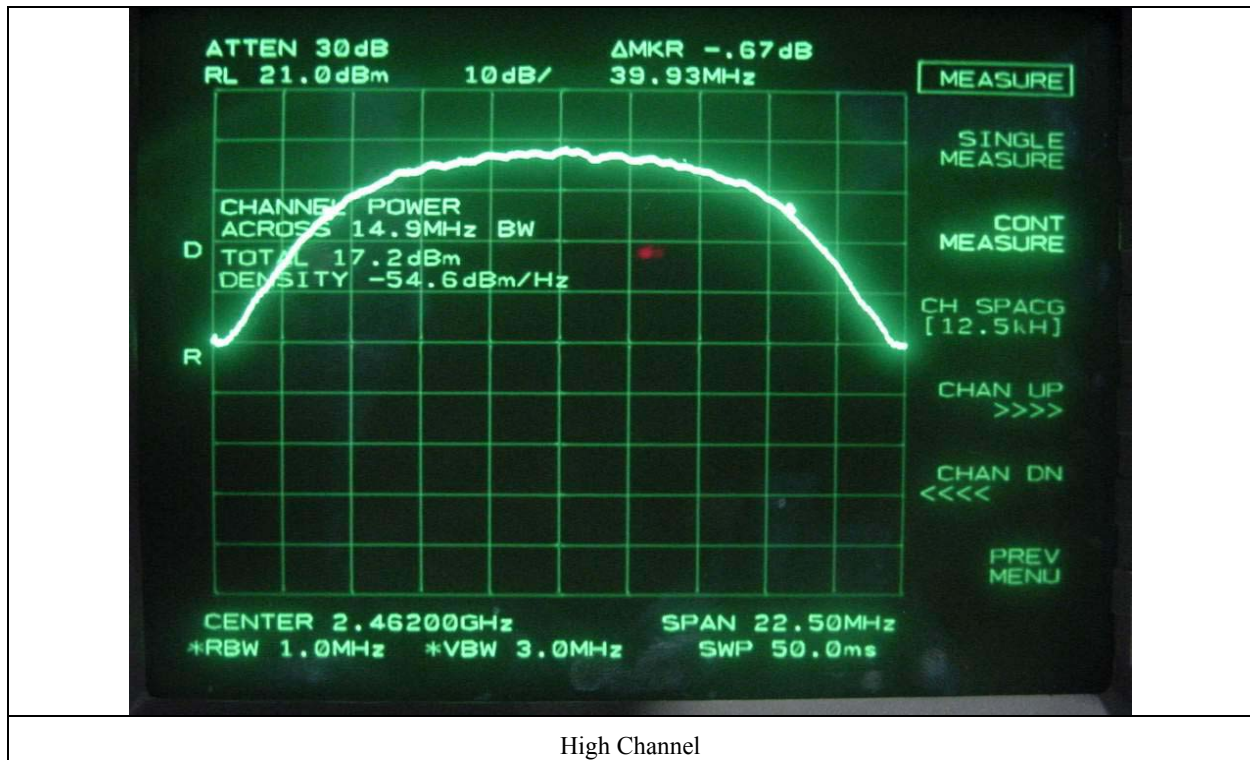

Tested by: Y. M. Choi / Senior Engineer6.



Low Channel



Middle Channel



8. MAXIMUM PEAK OUTPUT POWER

8.1 Operating environment

Temperature : 23°C

Relative humidity : 36 %

8.2 Test set-up

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.



8.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Due Cal
■ - 8564E	HP	Spectrum Analyzer	3650A00756	July 10, 2005

All test equipment used is calibrated on a regular basis.

**8.4 Test data**

- Test Date : December 9, 2004

- Test Result : Pass

CHANNEL	FREQUENCY (MHz)	99% Occupied Bandwidth (MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2412	14.93	18.5	30.0	-11.5
Middle	2437	14.93	18.0	30.0	-12.0
High	2462	14.89	17.2	30.0	-12.8

Remark: See next page for an overview sweep performed with peak detector.

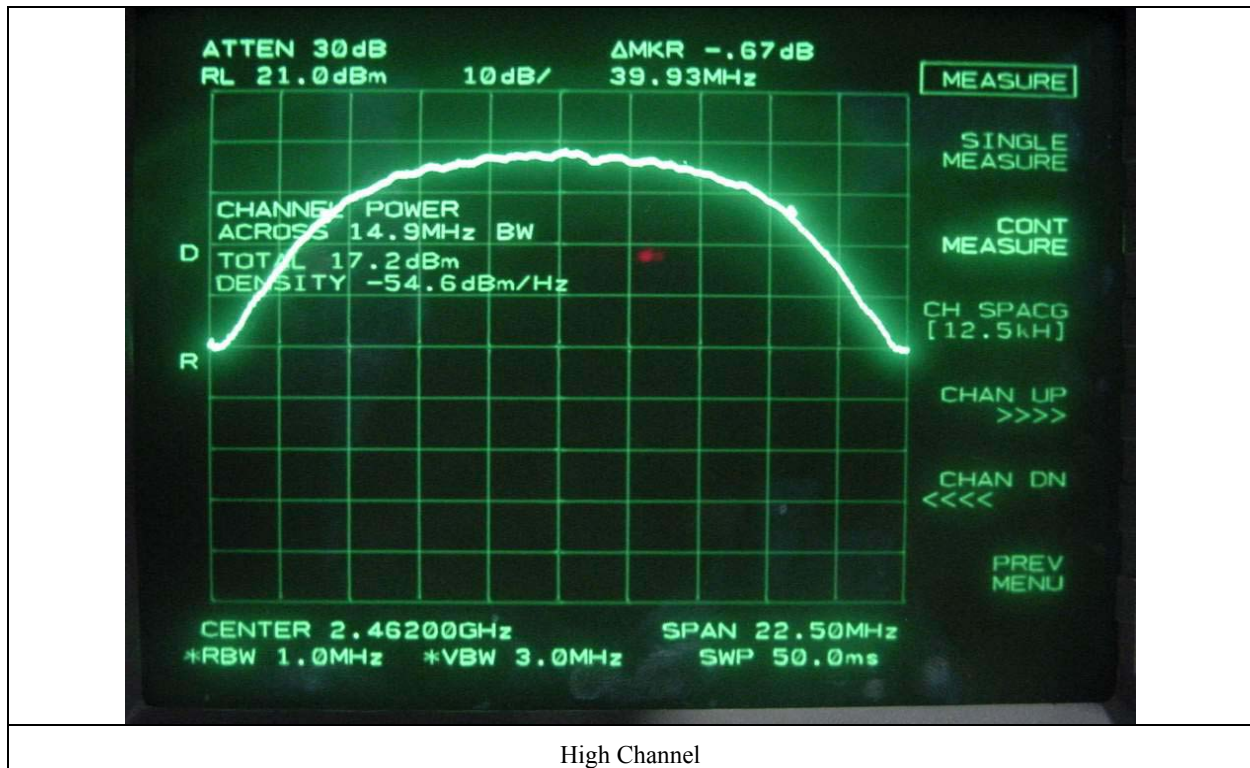

Tested by: Y. M. Choi / Senior Engineer6.



Low Channel



Middle Channel





9. MAXIMUM PERMISSIBLE EXPOSURE

9.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment is $1\text{mW}/\text{cm}^2$.

The electric field generated for a $1\text{mW}/\text{cm}^2$ exposure is calculated as follows:

$$E = \sqrt{(30 * P * G) / d}, \text{ and } S = E^2 / Z = E^2 / 3770, \text{ because } 1\text{mW} / \text{cm}^2 = 10\text{W} / \text{m}^2$$

Where

S = Power density in mW/cm^2 , Z = Impedance of free space, 377Ω

E = Electric field strength in Volts/m, G = Numeric antenna gain, and d = distance in meter

Combining equations and rearranging the terms to express the distance as a function of the remaining variable

$$d = \sqrt{(30 * P * G) / (3770 * S)}$$

Changing to units of mW and cm, using $P (\text{mW}) = P (\text{W}) / 1000$, $d (\text{cm}) = 100 * d (\text{m})$

$$d = 0.282 * \sqrt{(P * G) / S}$$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm^2

7.2 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Mode	Peak Output Power		Antenna Gain	Calculated RF Exposure Separation Distance (cm)
	(dBm)	(mW)	dBi	
802.11b	18.5	70.79	1	2.37

Following Caution on the manual will be described.

“CAUTION: Exposure to Radio Frequency Radiation.

Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit.”

10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

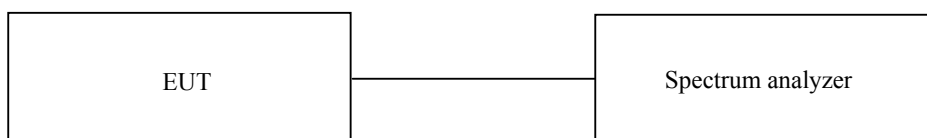
10.1 Operating environment

Temperature : 23°C

Relative humidity : 36 %

10.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



10.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3meters, open-field test site. The EUT was placed on a non-conductive turntable approximately 0.8 meters above the ground plane.

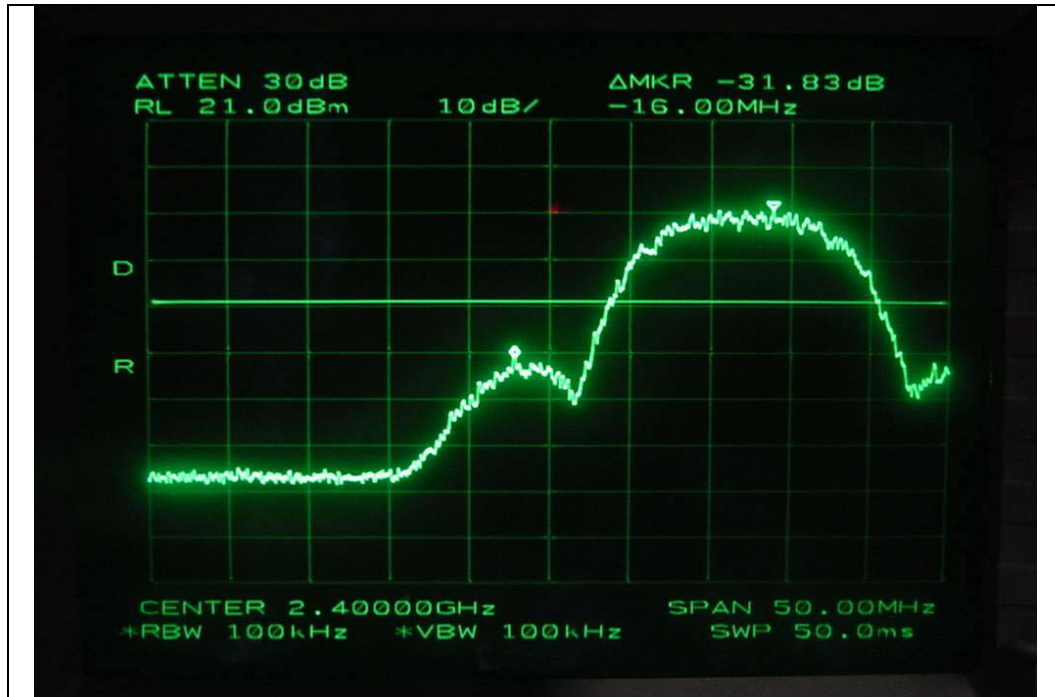
The frequency spectrum from 30MHz to 25GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

10.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 10, 2005
■ -	8449B	Hewlett-Packard	Preamplifier	3008A00833	June 10, 2005
□ -	83051A	Agilent	Preamplifier	3950M00201	June 10, 2005
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	June 6, 2005
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.

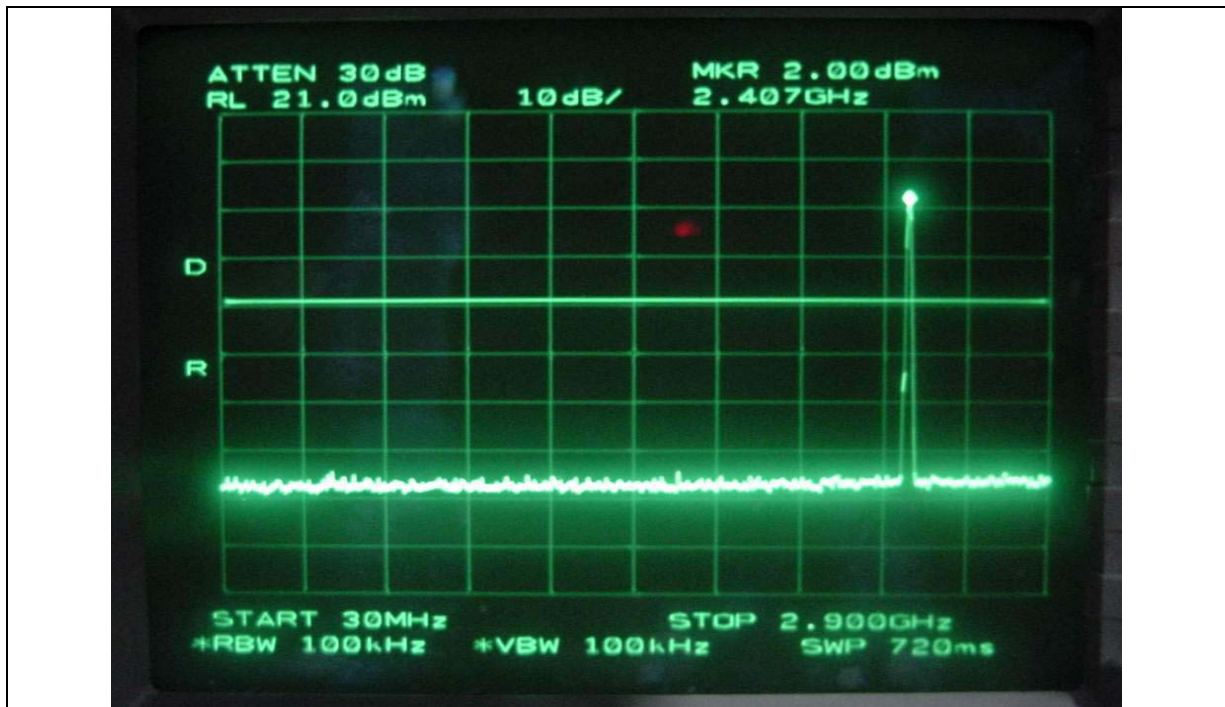
10.5. Test data for conducted emission



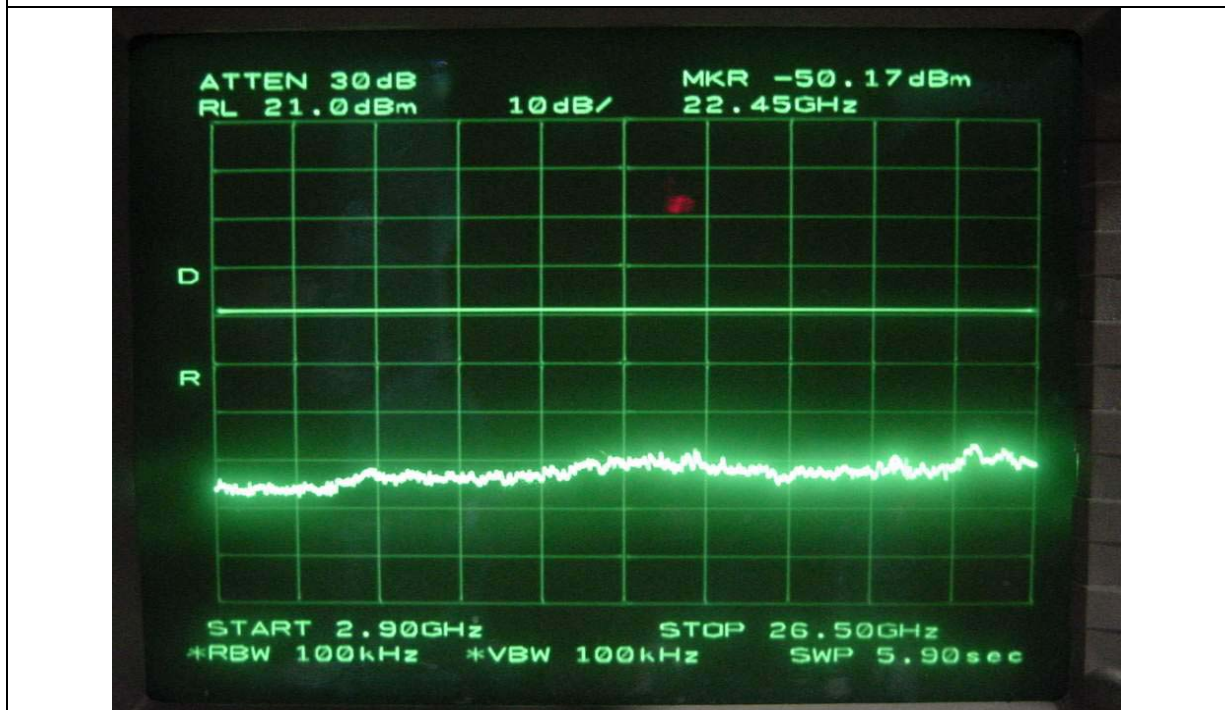
Low Channel



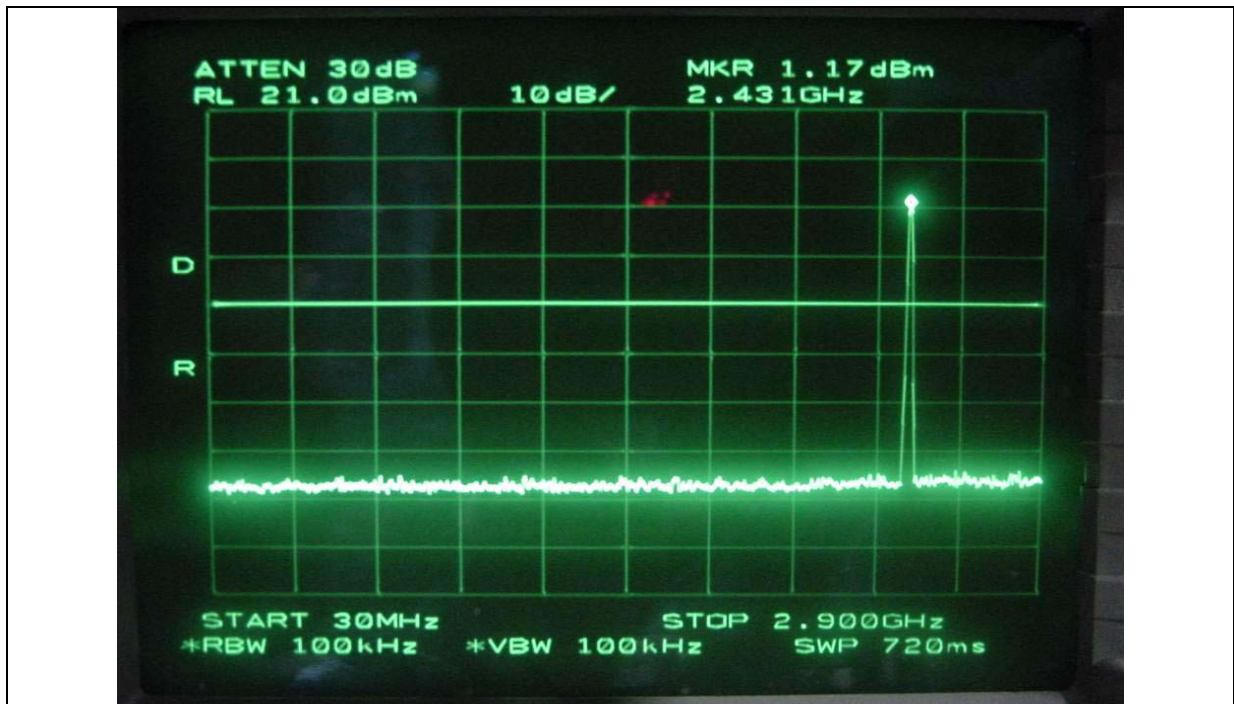
High Channel



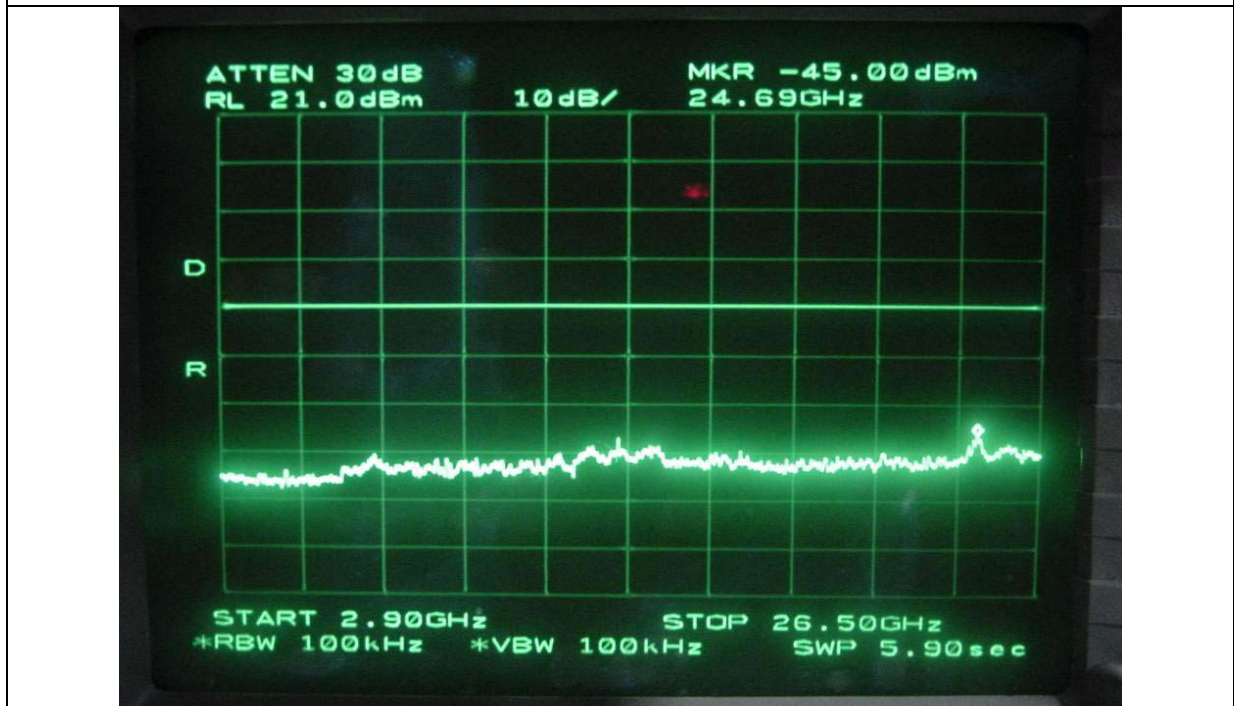
Low Channel



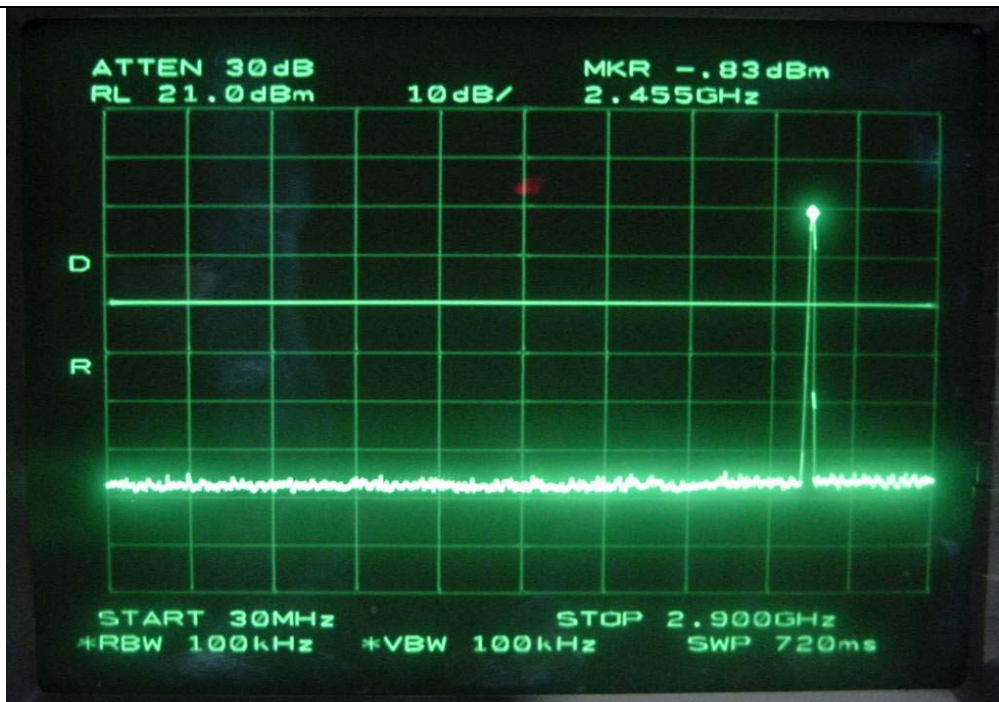
Low Channel



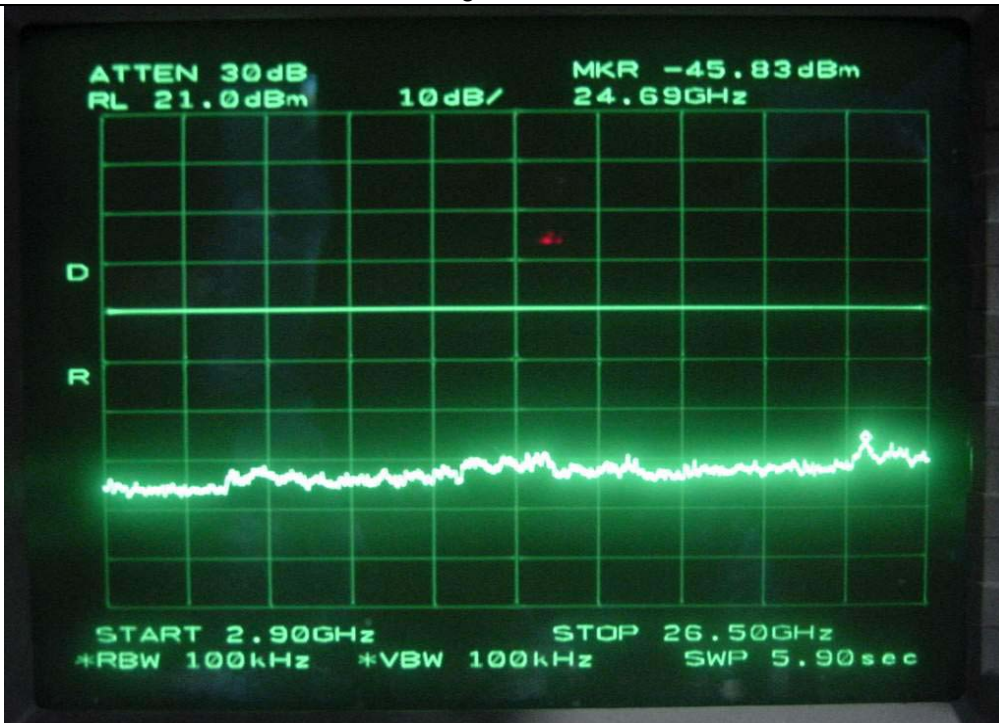
Middle Channel



Middle Channel



High Channel



High Channel



10.6. Test data for radiated emission

10.6.1 Operating condition: 802.11b Mode

10.6.1.1 Radiated Emission which fall in the Restricted Band

- Test Date : December 13, 2004
- Resolution bandwidth : 1 MHz for Peak and Average Mode
- Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
- Frequency range : 1 GHz ~ 25GHz
- Measurement distance : 3m
- Operating Condition : Low / High Channel
- Result : PASSED BY -4.22 dB at Low Channel

Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Dist. Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Test Data for Low Channel										
2387.50	31.00	Peak	H	27.18	1.33	-		60.21	74.0	-13.79
	33.50	Peak	V					62.01	74.0	-11.99
	20.10	Average	H					48.61	54.0	-5.39
	20.19	Average	V					48.70	54.0	-5.30
Test Data for High Channel										
2486.50	32.85	Peak	H	27.60	1.33	-		61.78	74.0	-12.22
	32.00	Peak	V					60.93	74.0	-13.07
	20.45	Average	H					49.38	54.0	-4.62
	20.00	Average	V					48.93	54.0	-5.07

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Tested by: Y. M. Choi / Senior Engineer6.

**10.6.1.2 Spurious & Harmonic Radiated Emission**

- Test Date : December 13, 2004
- Resolution bandwidth : 1 MHz for Peak and Average Mode for the emissions fall in restricted band,
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
- Frequency range : 1 GHz ~ 25 GHz
- Measurement distance : 3m
- Result : PASSED BY -5.23 dB at High Channel

Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Dist. Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Test Data for Low Channel										
2.4120	57.50	Peak	H	27.18	1.33			86.01	-	
	58.80	Peak	V					87.31	-	
4.824*	54.95	Peak	H	32.35	2.67	25.50		63.77	74.00	-10.53
	39.55	Average	H					48.07	54.00	-5.93
7.236*	49.00	Peak	H	35.88	5.83	25.40		65.31	74.00	-8.69
	32.00	Average	H					48.31	54.00	-5.69
Test Data for Middle Channel										
2.437	58.00	Peak	H	27.60	1.33			86.93	-	
	58.63	Peak	V					87.56	-	
4.874*	55.00	Peak	H	31.35	2.67	25.50		63.52	74.00	-10.48
	39.50	Average	H					48.02	54.00	-5.98
7.311*	48.85	Peak	H	35.88	5.83	25.40		65.16	74.00	-8.84
	32.00	Average	H					48.31	54.00	-5.69

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical, "*" Frequency fall in restricted band



-Continued

Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Dist. Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Test Data for High Channel										
2.462	57.47	Peak	H	27.60	1.33			86.40	-	
	58.00	Peak	V					86.93	-	
4.924*	55.63	Peak	H	31.60	2.67	25.50		64.40	74.00	-9.60
	40.00	Average	H					48.77	54.00	-5.23
7.386*	49.20	Peak	H	36.07	5.83	25.40		65.70	74.00	-8.30
	32.00	Average	H					48.50	54.00	-5.50

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical, "*" Frequency fall in restricted band

Tested by: Y. M. Choi / Senior Engineer6.

11. PEAK POWER SPECTRUL DENSITY

11.1 Operating environment

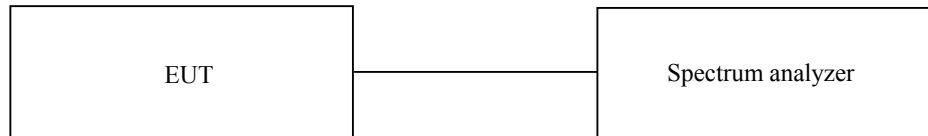
Temperature : 23°C

Relative humidity : 36 %

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 3 kHz, the video bandwidth is set to 3 times the resolution bandwidth, and sweep time was set to span / 3 kHz. The sweep time was allowed to be longer than span / 3 kHz for a full response of the mixer in the spectrum analyzer.

The maximum level from the EUT in a 3 kHz bandwidth was measured with above condition.



11.3 Test equipment used

Model Number	Manufacturer	Description	Serial Number	Due Cal
■ - 8564E	HP	Spectrum Analyzer	3650A00756	July 10, 2004

All test equipment used is calibrated on a regular basis.

**11.4 Test data****7.4.1 Test data for 821.11b**

-. Test Date : December 9, 2004

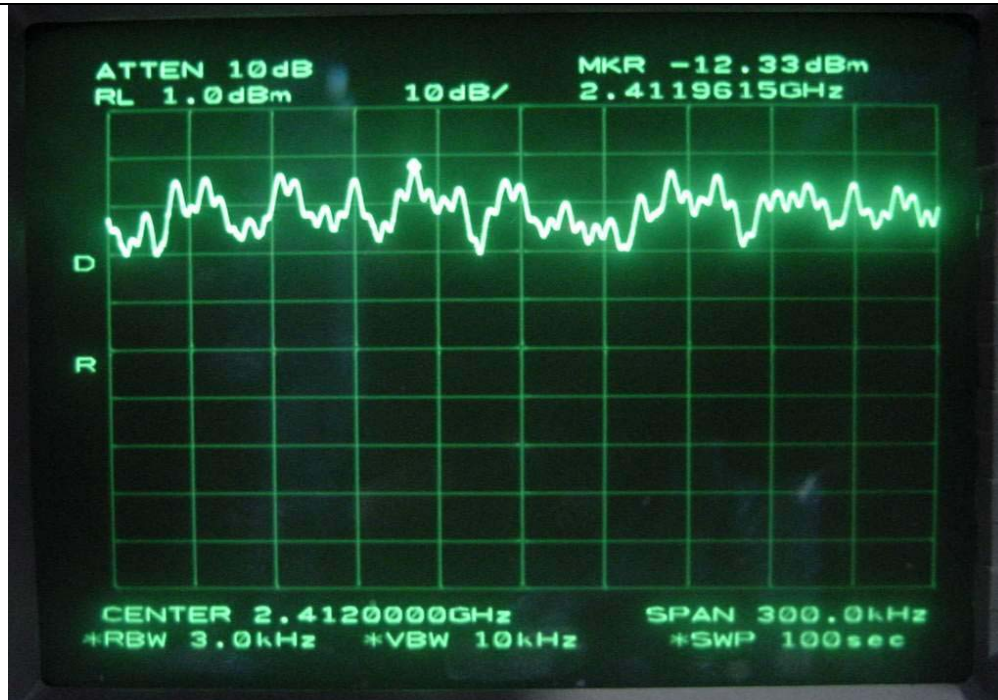
-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2412	-12.33	8	-20.33
Middle	2437	-13.00	8	-21.00
High	2462	-13.67	8	-21.67

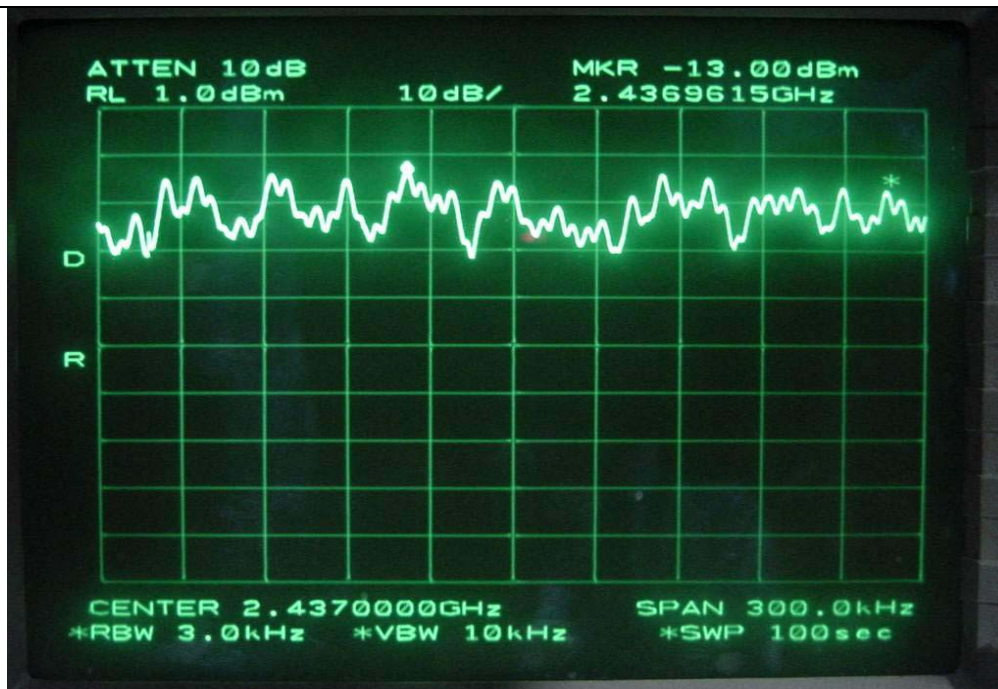
Remark: See next page for an overview sweep performed with peak detector.

Remark: See next page for measurement data.

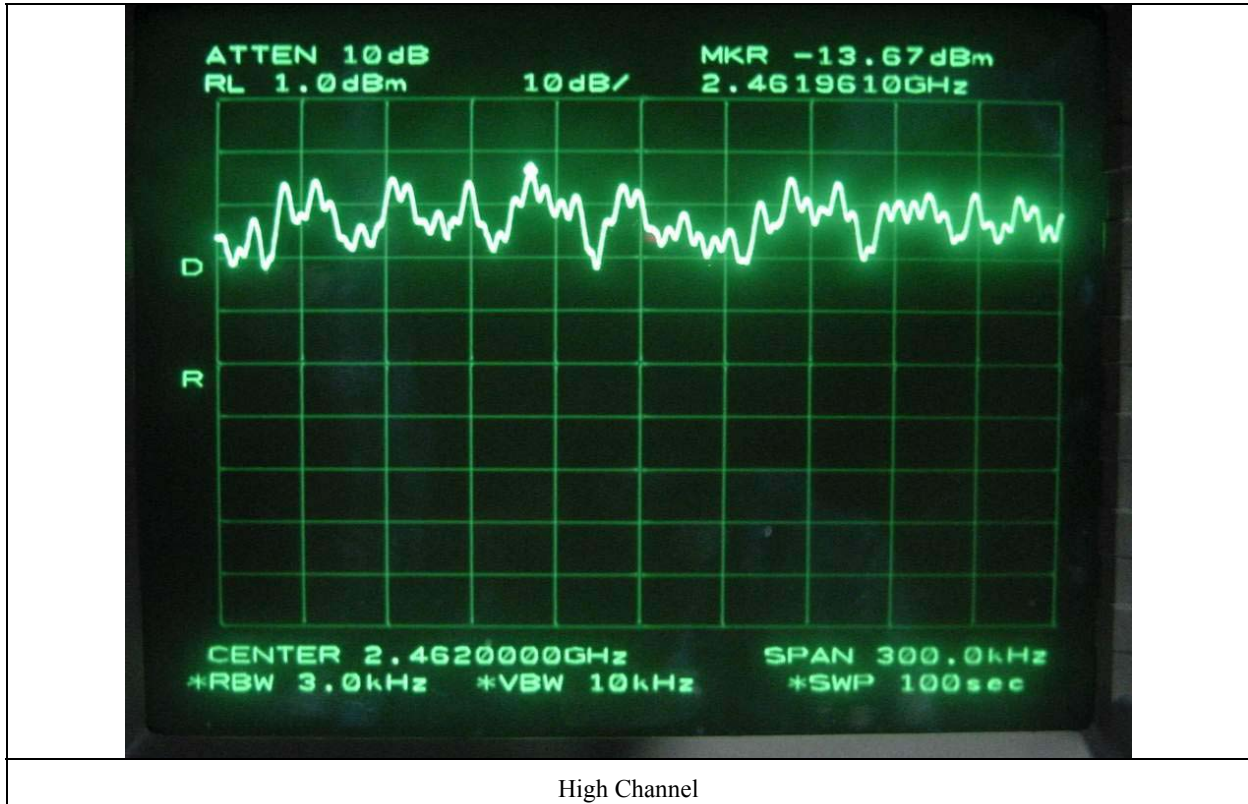

Tested by: Y. M. Choi / Senior Engineer6.



Low Channel



Middle Channel





12. RADIATED EMISSION TEST, GENERAL REQUIREMENT

12.1 Operating environment

Temperature : 14°C

Relative humidity : 41 %

12.2 Test set-up

The radiated emissions measurements were on the 3 meters, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30MHz to 1000MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 and 4.0 meters in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

Test set-up photos are included in appendix VI.

12.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 200 MHz : ±4.3 dB

Radiated emission electric field intensity, 200 MHz ~ 1000 MHz : ±4.1 dB

12.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Nov. 01, 2005
■ -	85650A	Hewlett Packard	Quasi-Peak Adapter	3107A01542	July 10, 2005
■ -	8568B	Hewlett-Packard	Spectrum Analyzer	3109A05456	July 10, 2005
■ -	85685A	Hewlett-Packard	RF Preselector	3107A01264	July 10, 2005
-	8449B	Hewlett-Packard	RF Amplifier	3008A00833	June 10, 2005
-	8447F	Hewlett-Packard	RF Amplifier	3113A04554	June 10, 2005
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	3104C	EMCO	Biconical Antenna	9109-4441	July 11, 2005
■ -	3146	EMCO	Log Periodic Antenna	9109-3214	July 11, 2005
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.

**12.5 Test data****12.5.1 Operating Mode: PC Mode**

- Type of Test : FCC Class A
- Test Date : December 15, 2004
- Resolution bandwidth : 120 kHz
- Frequency range : 30MHz ~ 1000MHz
- Measurement distance : 3m
- Operating Condition : Tx On at Middle Channel
- Test result : Passed by -8.67 dB at 31.94 MHz

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
31.94	21.50	V	18.15	0.76	40.41	49.08	-8.67
59.07	30.95	V	7.12	1.40	39.47	49.08	-9.61
80.39	29.70	V	14.72	1.61	37.33	49.08	-11.75
199.58	22.80	H	16.05	2.20	41.05	53.52	-12.47
229.62	23.43	H	17.01	2.52	42.96	56.44	-13.48

Tabulated test data for Radiated Electromagnetic Field

Remark: "H": Horizontal, "V": Vertical

PC Mode means the EUT was connected to a personal computer and then operating status was in uploading/downloading mode

Low, Middle and High channels were tested, but the worst emissions levels were recorded in this test report.


Tested by: Y. M. Choi / Senior Engineer6.

**12.5.2 Operating Mode: PDA Mode**

- Type of Test : FCC Class A
- Test Date : December 15, 2004
- Resolution bandwidth : 120 kHz
- Frequency range : 30MHz ~ 1000MHz
- Measurement distance : 3m
- Operating Condition : Tx On at Middle Channel
- Test result : Passed by -8.67 dB at 31.94 MHz

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
36.78	18.70	V	16.10	1.07	35.87	49.08	-13.21
99.77	28.10	V	10.44	1.89	40.43	53.52	-13.09
130.78	25.00	H	13.63	1.99	40.62	53.52	-12.90
199.58	21.30	H	16.05	2.20	39.55	53.52	-13.97
299.39	22.00	H	20.04	2.90	44.94	56.44	-11.50

Tabulated test data for Radiated Electromagnetic Field

Remark: "H": Horizontal, "V": Vertical

PDA means the EUT was communicated with Access Point and battery of the EUT was charged.

Low, Middle and High channels were tested, but the worst emissions levels were recorded in this test report.


Tested by: Y. M. Choi / Senior Engineer6.



13. CONDUCTED EMISSION TEST

13.1 Operating environment

Temperature : 20°C

Relative humidity : 34 %

13.2 Test set-up

The conducted emission measurements of power line were performed in a shielded room. The EUT was placed on a wooden table, 0.8 meters height above the floor. Power was fed to the EUT through a 50 ohm/ 50 microhenry Line Impedance Stabilization Network (LISN). The ground plane was electrically bonded to the shield room ground system and all power lines entering the shield room were filtered.

13.3 Measurement uncertainty

Conducted emission, quasi-peak detect : ± 3.0 dB

Conducted emission, average detect : ± 3.0 dB

13.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	Apr. 29, 2005
■ -	3825/2	EMCO	AMN	9109-1869	Oct. 20, 2005
■ -	N/A	HanKook Shield room	Shield Room	N/A	N/A
■ -	YSE 500B	YoungShin Eng.	Frequency Converter	950413001	N/A
■ -	ETCR-10	DaeHa	Automatic Voltage Com.	N/A	N/A

All test equipment used is calibrated on a regular basis.



13.5 Test data

13.5.1 Operating condition: PDA Mode

- Type of Test : FCC Class A
- Test Date : December 13, 2004
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15MHz ~ 30MHz
- Test Result : PASSED BY -20.29 dB at 0.16 MHz with Peak Detector

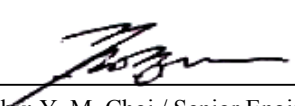
Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission level	Detect Mode	Limits		Emission level	Limits	
0.16	N	58.71	P	79.00	-20.29			
0.295	H	45.91	P	79.00	-33.09			
0.315	N	42.76	P	79.00	-36.24			
0.64	N	42.54	P	73.00	-30.48			
0.80	N	42.10	P	73.00	-30.90			

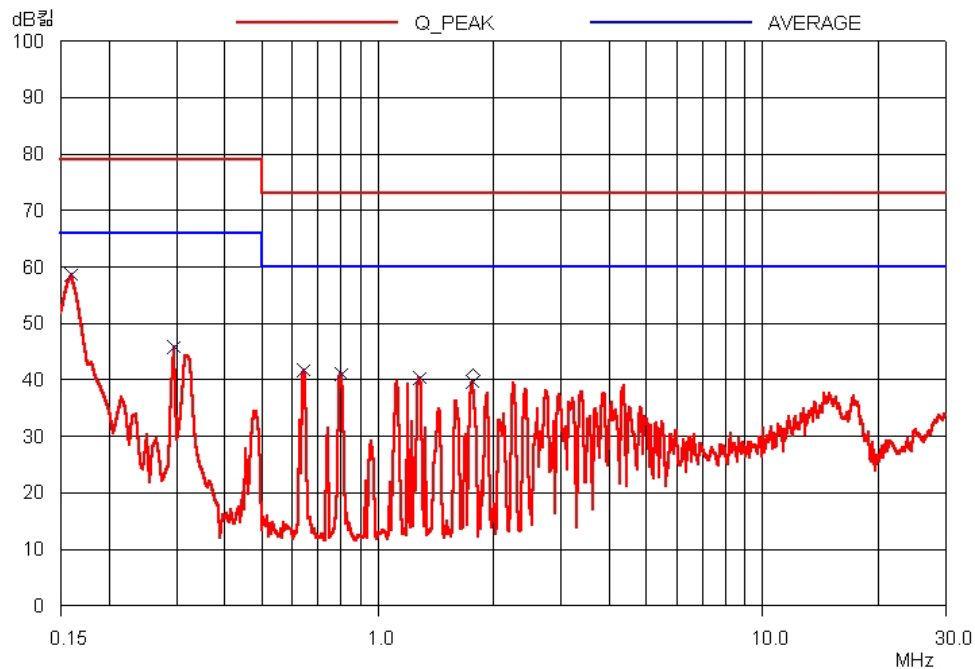
Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "P": Peak detect.

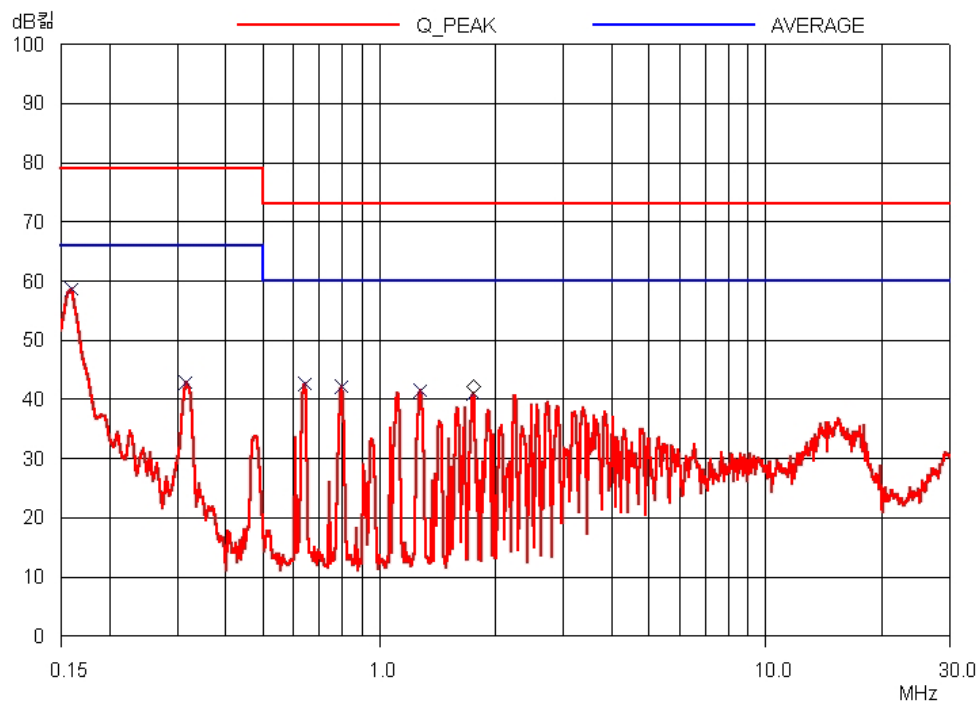
PDA means the EUT was communicated with Access Point and battery of the EUT was charged.

See next page for an overview sweep performed with peak and average detector.


Tested by: Y. M. Choi / Senior Engineer6.



HOT LINE



NEUTRAL LINE

**13.5.2 Operating condition: PC Mode**

- Type of Test : FCC Class A
- Test Date : December 13, 2004
- Resolution bandwidth : 9 kHz
- Frequency range : 0.15MHz ~ 30MHz
- Operating Condition : PDA Mode
- Test Result : PASSED BY -18.20 dB at 0.165 MHz with Peak Detector

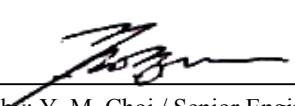
Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission level	Detect Mode	Limits		Emission level	Limits	
0.155	N	55.06	P	79.00	-23.94			
0.165	H	60.80	P	79.00	-18.20			
0.20	N	54.52	P	79.00	-24.48			
0.66	H	43.39	P	73.00	-29.61			
1.32	H	42.32	P	73.00	-30.68			
1.805	H	42.24	P	73.00	-30.76			

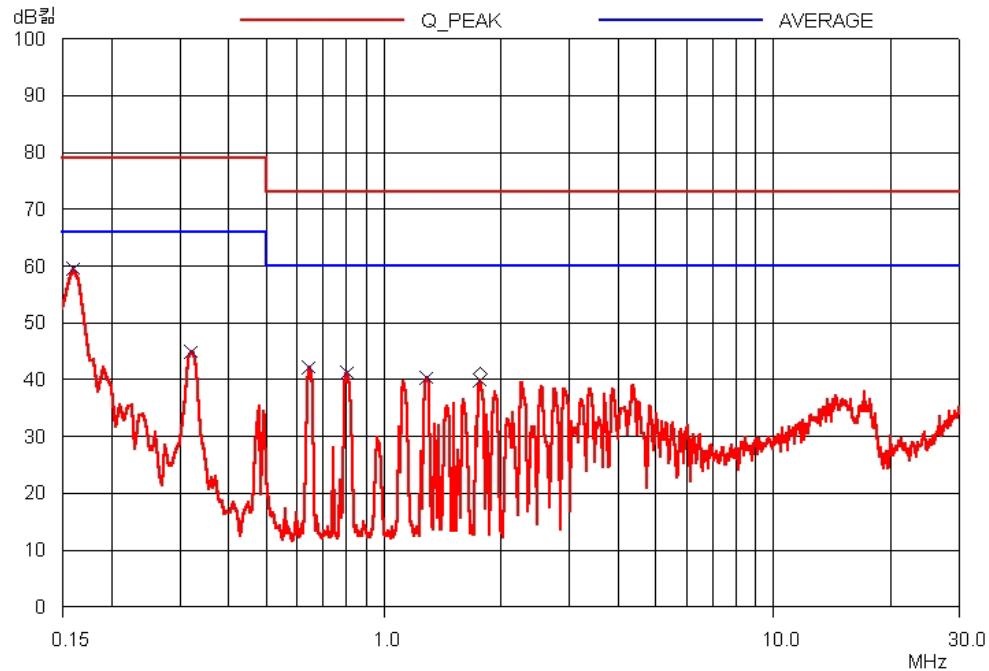
Line Conducted Emissions Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "P": Peak detect.

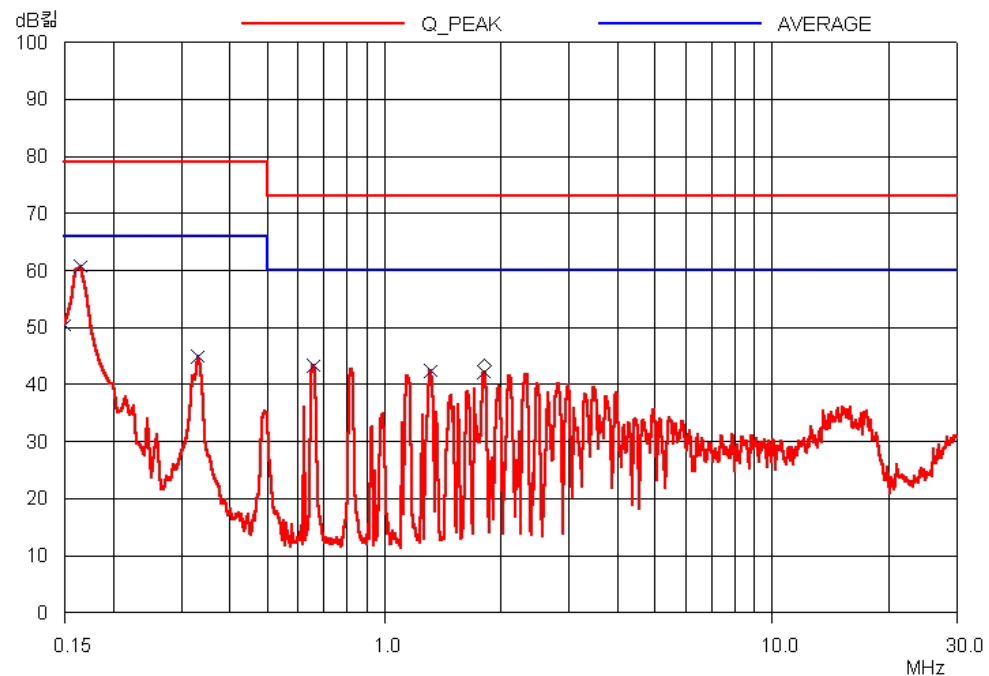
PC Mode means the EUT was connected to a personal computer and then operating status was in uploading/downloading mode

See next page for an overview sweep performed with peak and average detector.


Tested by: Y. M. Choi / Senior Engineer6.



HOT LINE



NEUTRAL LINE