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

Test report file number	**: E05NR-010**
Applicant	**: MTI Co., Ltd.**
Address	**: 166-10 Garak-dong, Songpa-gu, Seoul Korea**
Manufacturer	**: MTI Co., Ltd.**
Address	**: 166-10 Garak-dong, Songpa-gu, Seoul Korea**
Type of Equipment	**: WLAN Cable Access Point**
FCC ID.	**: SQD-6220CSU-ABG**
Model Name	**: WLAN Cable Access Point 6220-CSU**
Serial number	**: None**
Total page of Report	**: 40 pages (including this page)**
Date of Incoming	**: August 27, 2004**
Date of issue	**: November 7, 2005**

SUMMARY

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

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.

Prepared by:
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EMC Div.
ONETECH Corp.

Reviewed by:
Y. K. Kwon / Director
EMC Div.
ONETECH Corp.

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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: MTI Co., Ltd.
ADDRESS	: 166-10 Garak-dong, Songpa-gu, Seoul Korea
CONTACT PERSON	: H. S. Byun / Director
TELEPHONE NO	: +82-2-421-4042
FCC ID	: SQD-6220CSU-ABG
MODEL NO/NAME	: WLAN Cable Access Point 6220-CSU
SERIAL NUMBER	: N/A
DATE	: November 7, 2005

EQUIPMENT CLASS	***DTS – DIGITAL TRNSMISSION SYSTEM*** ***NII – Unlicensed National Information Infrastructure Tx***
KIND OF EQUIPMENT	WLAN Cable Access Point
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	PART 15 SUBPART C Section 15.247 and Subpart E
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	NONE
FINAL TEST WAS CONDUCTED ON	3 METER(S) OPEN AREA TEST SITE

-. 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.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6dB Bandwidth	Met the Limit / See Note 1
15.247 (b) (3)	Maximum Peak Output Power	Met the Limit / See Note 1
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 / See Note 1
15.209	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.207	Conducted Limits	Not Applicable/ See Note 2
15.203	Antenna Requirement	Met requirement / PASS
15.407 (a) (1), (2)	Maximum Conducted Output Power	Met the Limit / See Note 1
15.407 (a) (1), (2)	Peak Power Spectral Density	Met the Limit / See Note 1
15.407 (a) (6)	Peak Exclusion	Met the Limit / See Note 1
15.407 (b) (4)	Undesirable Emission Limits	Met the Limit / PASS
15.407 (b) (6)	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.407 (b) (6)	Conducted Limits	Not Applicable / See Note 2
15.407 (e)	Indoor Use within the 5.15 – 5.25 GHz	Not Applicable / See Note 3
15.407 (f)	Radiation Exposure Requirement	Met requirement / PASS
15.407 (g)	Frequency Stability	Met the Limit / See Note 1

Note 1. The Equipment under Test (EUT) shall be use the WLAN Module approved by modular approval has FCC ID: MXF-M930907. The module shall be inserted in to the socket on the main board in the EUT without any change, so the test was not performed, so please refer to test report for the module issued by the ADT.

Note 2. The EUT does not connected to the public mains network, so the test was not performed.

Note3. The used WLAN Module can be operated at 2412-2462MHz, 5150-5350MHz, and 5725-5850MHz and turbo function, but the Equipment under Test (EUT) shall be operated at 2412-2462 and 5725-5825MHz, because the EUT disable 5150-5350 operating frequency band and turbo function via firmware.

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

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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, Gwangju-Si, Gyeunggi-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.

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3. GENERAL INFORMATION

3.1 Product Description

The MTI Co., Ltd., Model WLAN Cable Access Point 6220-CSU (referred to as the EUT in this report) is a wireless LAN Cable Access Point, which is an outdoor hardened, standard mountable access point solution designed to extend the reach of the cable operators' hybrid fiber coax network utilizing wireless technologies from existing rights of ways. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Base Station Equipment
OPERATING FREQUENCY	2412-2462 MHz and 5725 ~5825 MHz
OUTPUT POWER	802.11b: 19dBm±1.5dB, 802.11g: 15dBm±1.5dB 802.11a: 12dBm±1.5dB
DATA TRANSFER RATE	802.11b: Max. 11Mbps 802.11g: Max. 54Mbps 802.11a: Max. 54Mbps
CHANNEL	802.11b/g: 11 Channels, 802.11a: 7 Channels
MODULATION TYPE	802.11b: DSSS, 802.11a/g: OFDM
ANTENNA	802.11a/b/g: Directional Antenna, built in EUT Enclosure
ANTENNA GAIN	802.11a/b/g: 12dBi
USED WLAN MODULE	MFR: Gemtek Technology Co., Ltd.
	Model No: WMIA-123AG FCC ID: MXF-M930907
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1MHz)	14.3MHz and 25 MHz
NUMBER OF LAYER	Main Board: 6 Layers
POWER REQUIREMENT	DC48V, 315mA from Ethernet Port
EXTERNAL CONNECTOR	Ethernet Connector

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

-. None

4. EUT MODIFICATIONS

-. None

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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
MAIN BOARD	MTI Co., Ltd.	AG5031DUPBA	N/A
MPCI WLAN Card	Gemtek Technology Co., Ltd	WMIA-123AG	MXF-M930907

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
WLAN Cable Access Point 6220-CSU	MTI Co., Ltd.	SQD-6220CSU-ABG	WLAN Cable Access Point (EUT)	HOST
AP-1203	Nortel Networks	DoC	CSU POE Injector	EUT
PLL011	Dell Computer Corp.	DoC	Notebook PC (HOST)	EUT
ADP-70EB	Delta Electronics	N/A	AC/DC Adapter for Host	HOST
020-0470	Cardinal	GDE0196	Modem	HOST
2225C	HP	DS16XU2225	Printer	HOST

5.4 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting and receiving mode is programmed. For final testing, WLAN was set at Low Channel, Middle Channel, and High Channel with applicable all transfer data rate.

The set frequency and data transfer rate for the testing is as follows.

Operating Mode	Low Channel	Middle Channel	High Channel	Data Transfer Rate
802.11b	2412 MHz	2437MHz	2462MHz	1, 2, 5.5, and 11 Mbps
802.11g	2412 MHz	2437MHz	2462MHz	6, 9, 12, 18, 24, 36, 48, and 54Mbps
802.11a	5745MHz	5785MHz	5805MHz	6, 9, 12, 18, 24, 36, 48, and 54Mbps

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5.5 Configuration of Test System

Line Conducted Test: It is not need to test this requirement, because the EUT shall be operated by DC Voltage and does not connected to public mains network directly.

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

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

Antenna Construction:

The transmitter antenna of the EUT is built in on the EUT, so no consideration of replacement by the user.

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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)
It is not need this test item, because the EUT shall not be directly connected to the public utility (AC) power line.	

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	
TX mode	X

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7. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

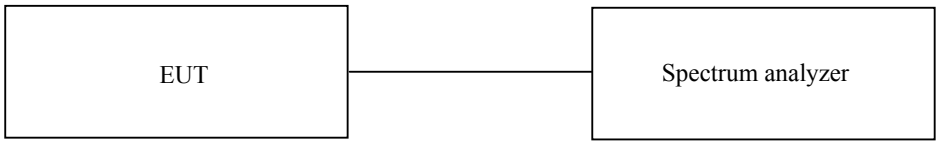
7.1 Operating environment

Temperature : 19°C

Relative humidity : 35 %

7.2 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.



7.3 Test data

Please refer to test report issued by the ADT.

7.4 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.

7.5 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 19, 2006
■ -	8449B	Hewlett-Packard	Preamplifier	3008A00833	June 19, 2006
□ -	83051A	Agilent	Preamplifier	3950M00201	June 10, 2005
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	June 19, 2006
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	June 6, 2006
■ -	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.

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7.6. Test data for radiated emission

7.6.1 Operating condition: 802.11b Mode

7.6.1.1 Radiated Emission which fall in the Restricted Band

-. Operating Condition: Low Channel

-. Test Date : November 3, 2005
-. Resolution bandwidth : 1 MHz for Peak and Average Mode
-. Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
-. Measurement distance : 3m
-. Result : PASSED BY –2.86dB at 1 Mbps data transfer rate

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)
Data Transfer Rate: 1 Mbps										
2388.58	31.33	Peak	H	27.64	1.33	-		60.30	74.0	-13.70
	34.00	Peak	V					62.97	74.0	-11.03
	20.33	Average	H					49.30	54.0	-4.70
	22.17	Average	V					51.14	54.0	-2.86
Data Transfer Rate: 5.5 Mbps										
2388.58	29.50	Peak	H	27.64	1.33	-		58.47	74.0	-15.53
	30.00	Peak	V					58.97	74.0	-15.03
	20.20	Average	H					49.17	54.0	-4.83
	22.00	Average	V					50.97	54.0	-3.03
Data Transfer Rate: 11 Mbps										
2388.58	29.83	Peak	H	27.64	1.33	-		58.80	74.0	-15.20
	31.20	Peak	V					60.17	74.0	-13.83
	20.17	Average	H					49.14	54.0	-4.86
	22.10	Average	V					51.07	54.0	-2.93

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

Tested by: Ki-Hong, Nam / Test Engineer

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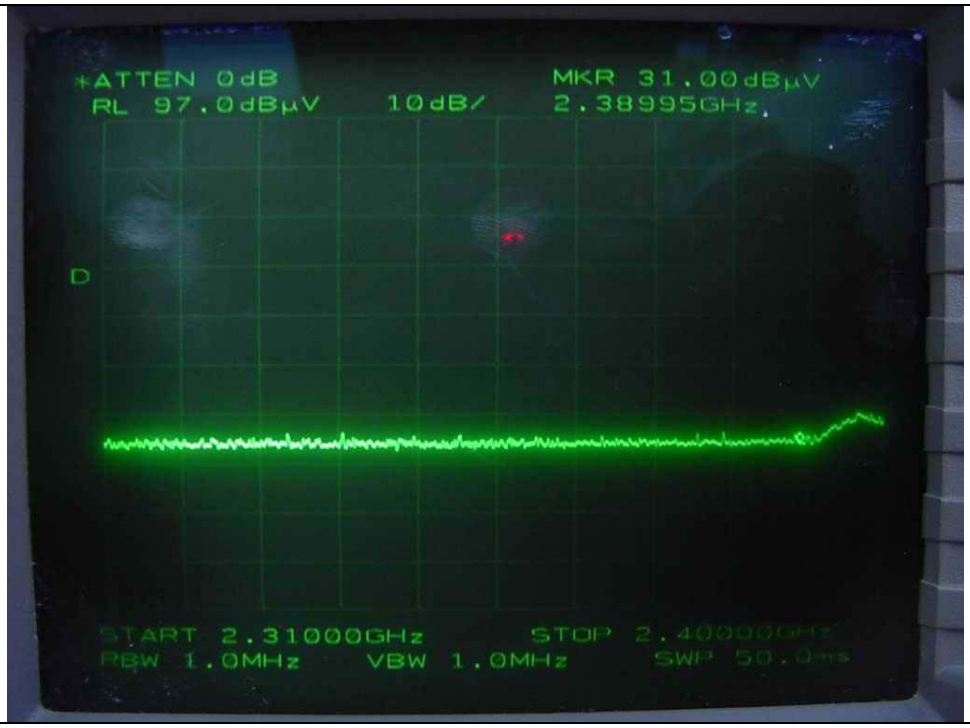
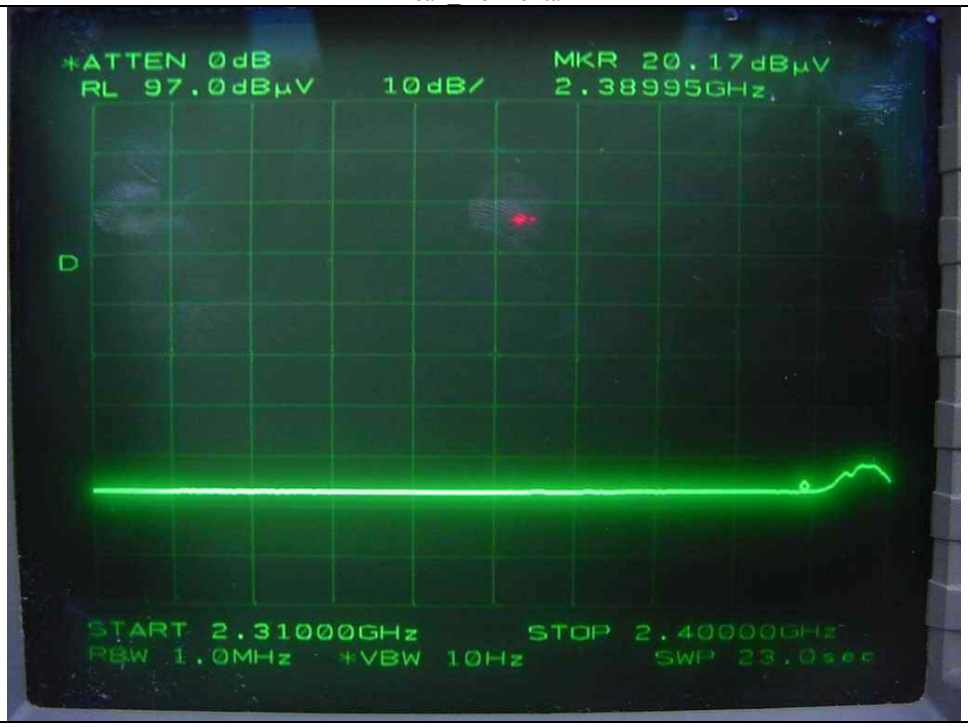


Peak_Horizontal



Average_Horizontal

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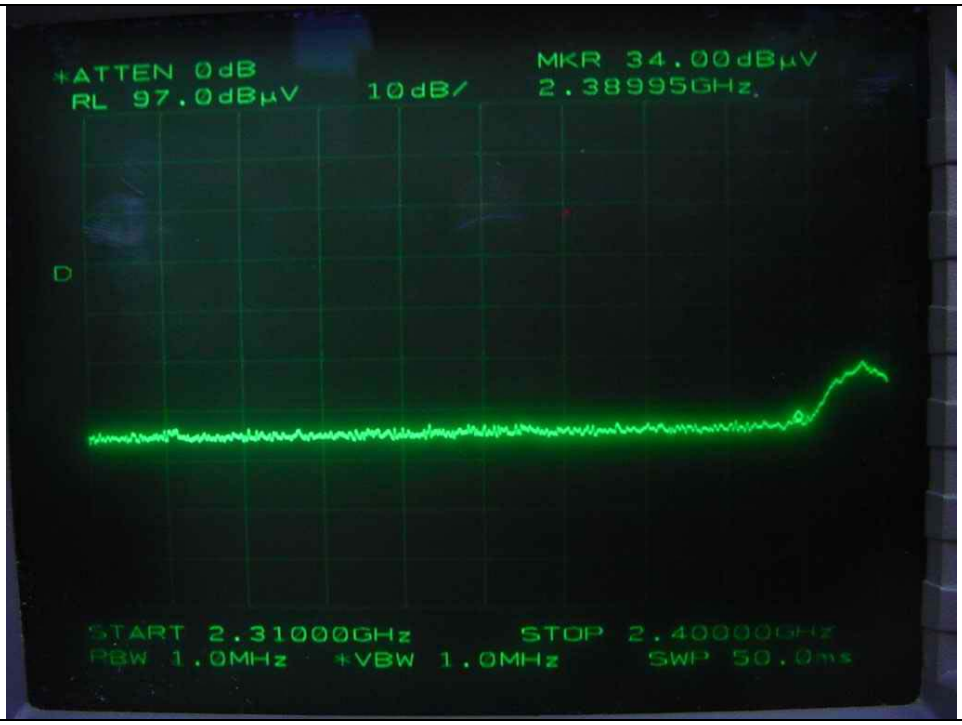
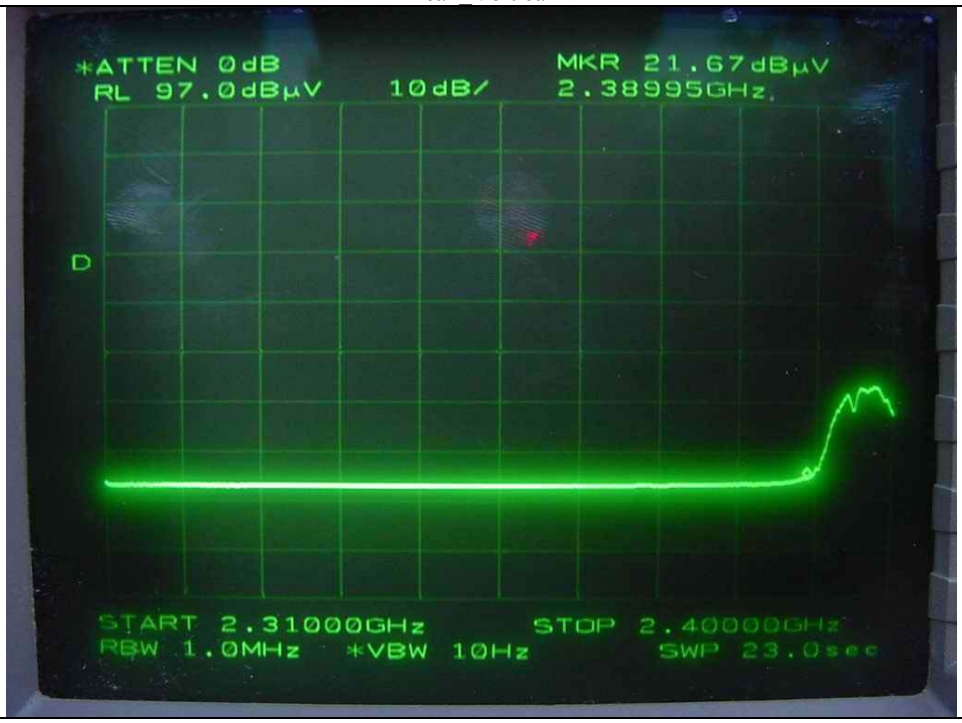


Peak_Vertical



Average_Vertical

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-.Operating Condition : High Channel

-.Test Data : November 3, 2005
-. Resolution bandwidth : 1 MHz for Peak and Average Mode
-. Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
-. Measurement distance : 3m
-. Result : PASSED BY –3.26dB at 1 Mbps data transfer rate

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)
Data Transfer Rate: 1 Mbps										
2487.58	30.00	Peak	H	27.59	1.33	-		58.92	74.0	-15.09
	31.33	Peak	V					60.25	74.0	13.76
	20.33	Average	H					49.25	54.0	-4.75
	21.83	Average	V					50.75	54.0	-3.26
Data Transfer Rate: 5.5 Mbps										
2487.58	28.50	Peak	H	27.59	1.33	-		57.42	74.0	-16.59
	31.00	Peak	V					59.92	74.0	-14.09
	20.17	Average	H					49.09	54.0	-4.92
	21.50	Average	V					50.42	54.0	-3.58
Data Transfer Rate: 11 Mbps										
2487.58	28.83	Peak	H	27.59	1.33	-		57.75	74.0	-16.26
	30.50	Peak	V					59.42	74.0	-14.59
	20.00	Average	H					48.92	54.0	-5.09
	21.67	Average	V					50.59	54.0	-3.42

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

Each data transfer rates were tested, but the worst data was collected at the above tabulated test data.

Tested by: Ki-Hong, Nam / Test Engineer

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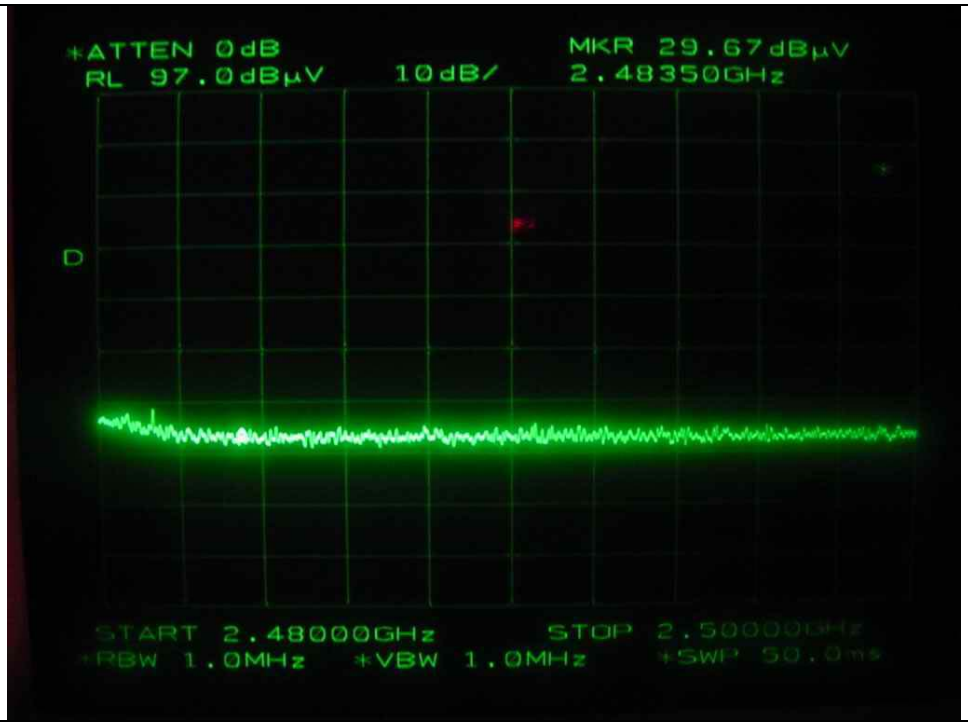
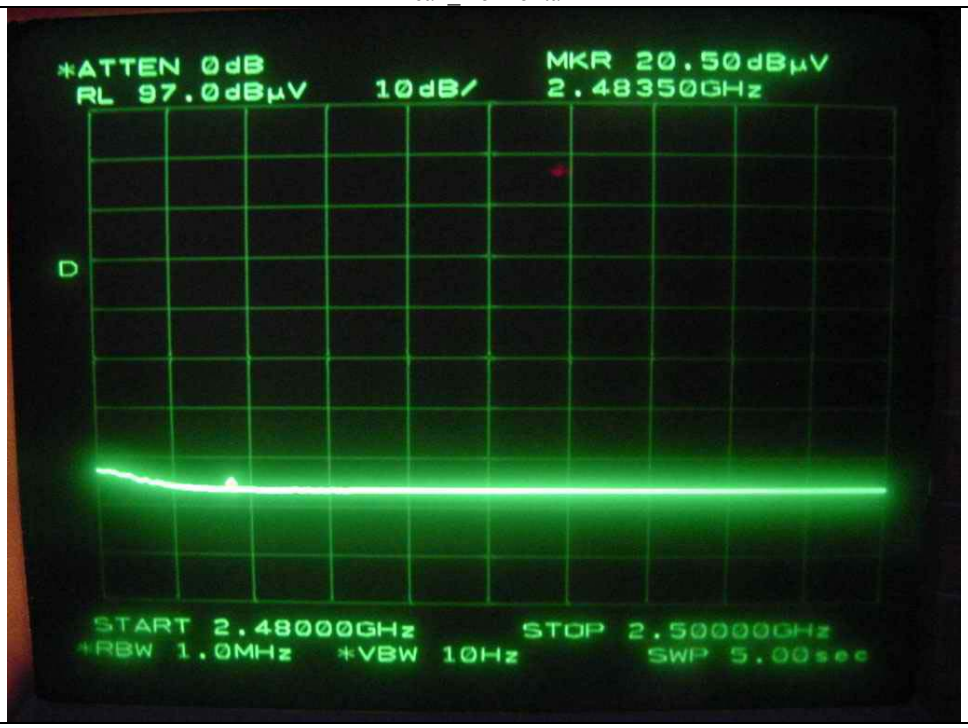


Peak_Horizontal



Average_Horizontal

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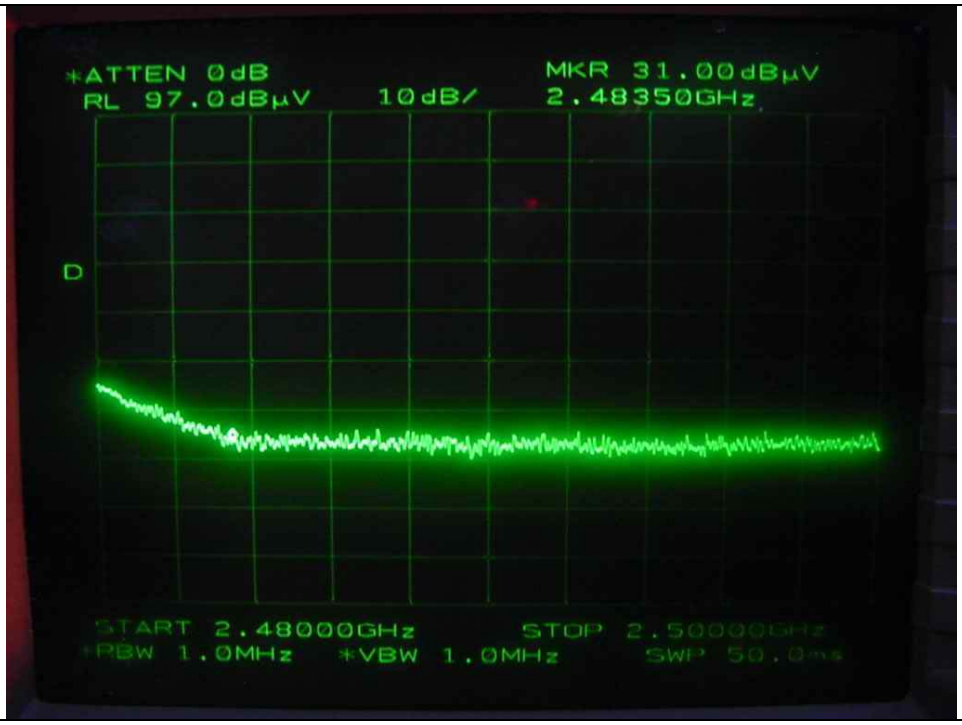

Peak_Vertical

Average_Vertical

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7.6.1.2 Spurious & Harmonic Radiated Emission

-. Test Date : November 3, 2005
-. 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 ~ 40 GHz
-. Measurement distance : 3m
-. Result : PASSED BY –18.12 dB at Middle 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										
4824.00*	37.17	Peak	V	31.30	2.62	25.4		45.68	74.00	-28.32
	26.33	Average	H					34.84	54.00	-19.16
Other Frequencies were not observed up to 25GHz.										
Test Data for Middle Channel										
4874.00*	36.83	Peak	H	31.37	2.58	25.4		45.38	74.00	-28.62
	27.33	Average	H					35.88	54.00	-18.12
Other Frequencies were not observed up to 25GHz.										
Test Data for High Channel										
4924.00*	38.83	Peak	H	31.45	2.55	25.4		47.43	74.00	-26.57
	26.50	Average	H					35.10	54.00	-18.90
Other Frequencies were not observed up to 25GHz.										

Tabulated test data for Restricted Band

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

Tested by: Ki-Hong, Nam / Test Engineer

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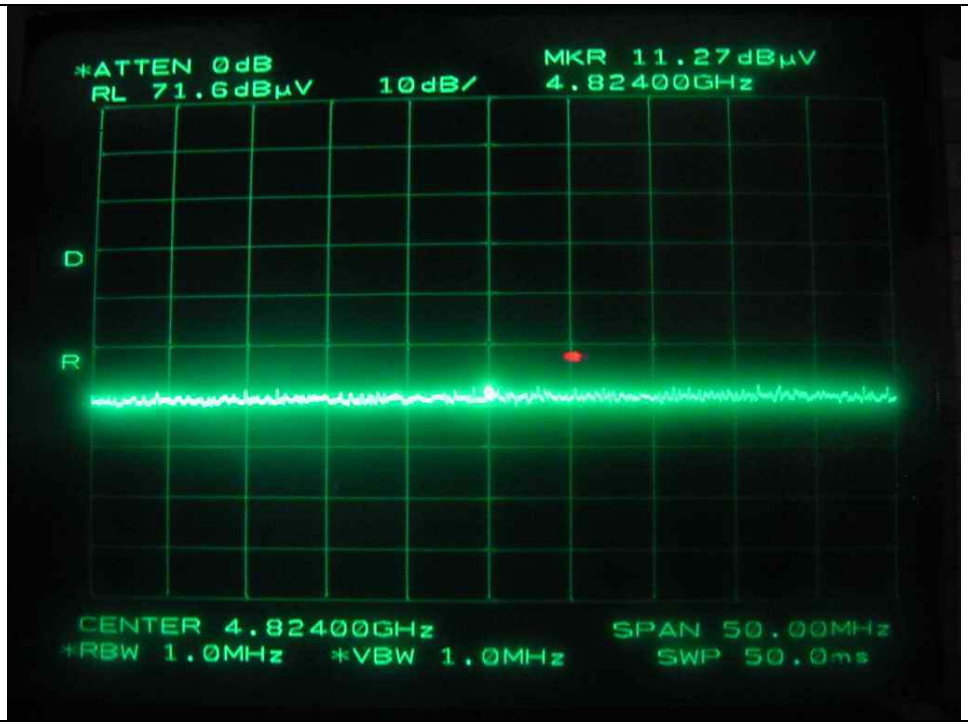
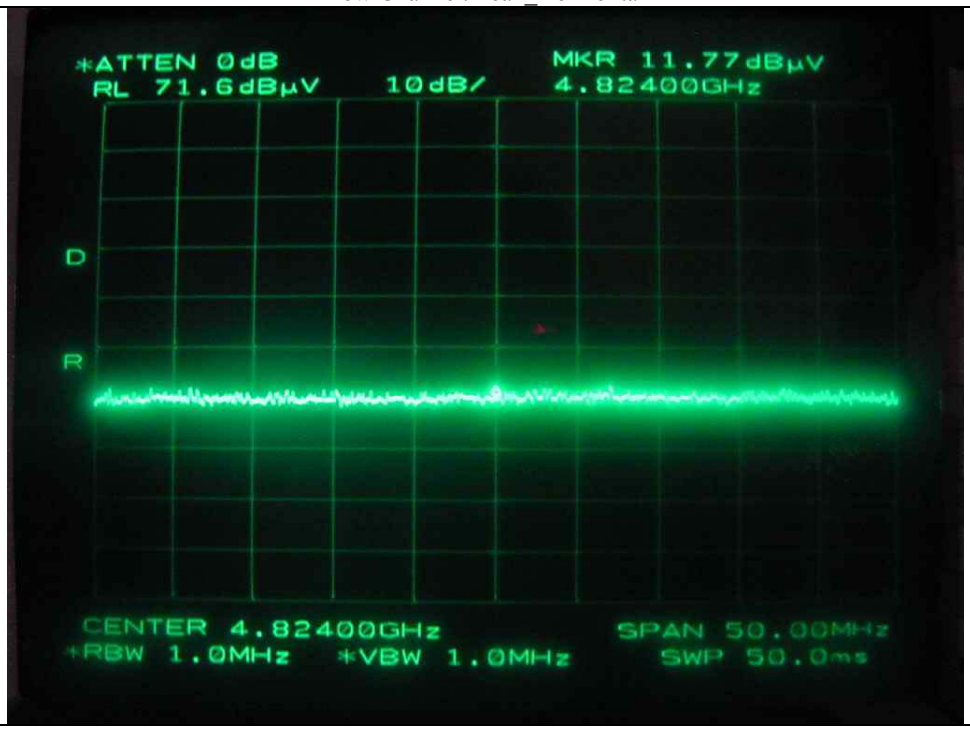


Low Channel: Peak_Horizontal



Low Channel: Peak_Vertical

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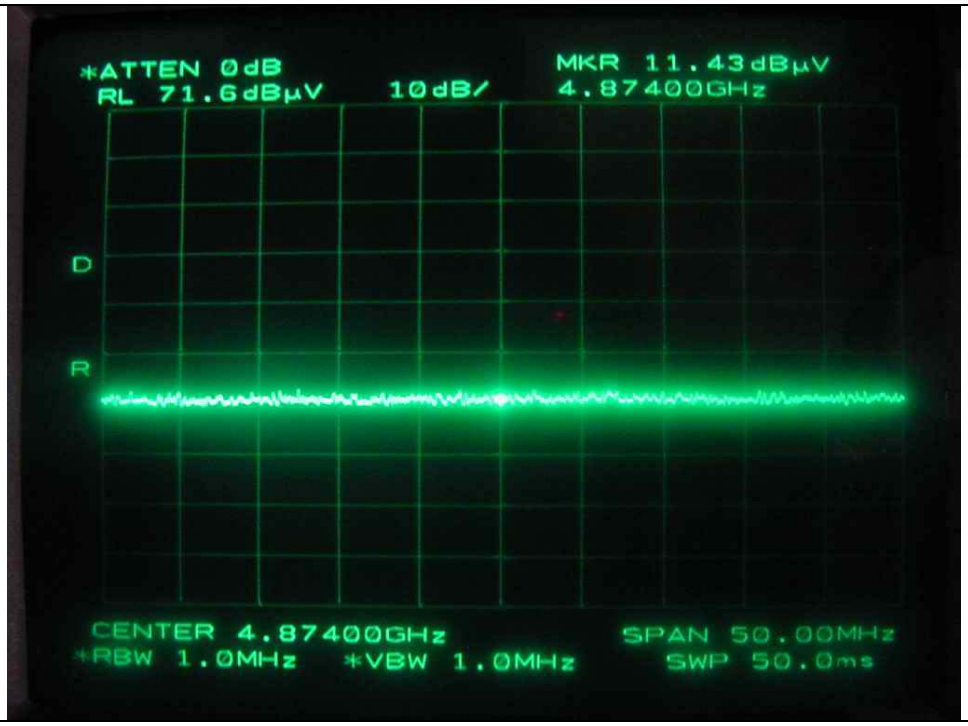
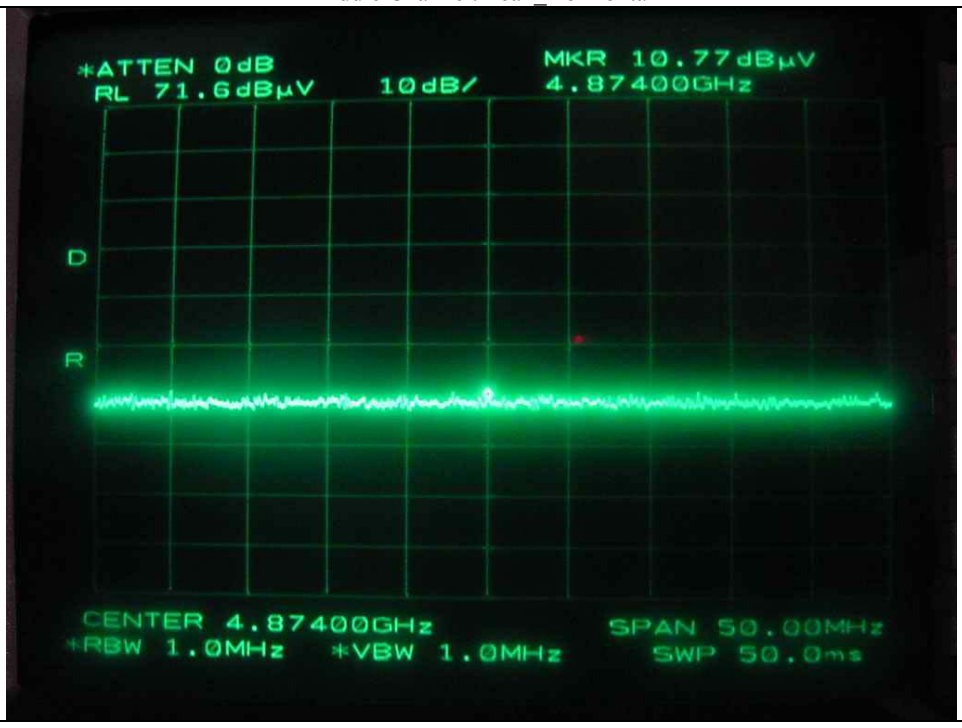


Middle Channel: Peak_Horizontal



Middle Channel: Peak_Vertical

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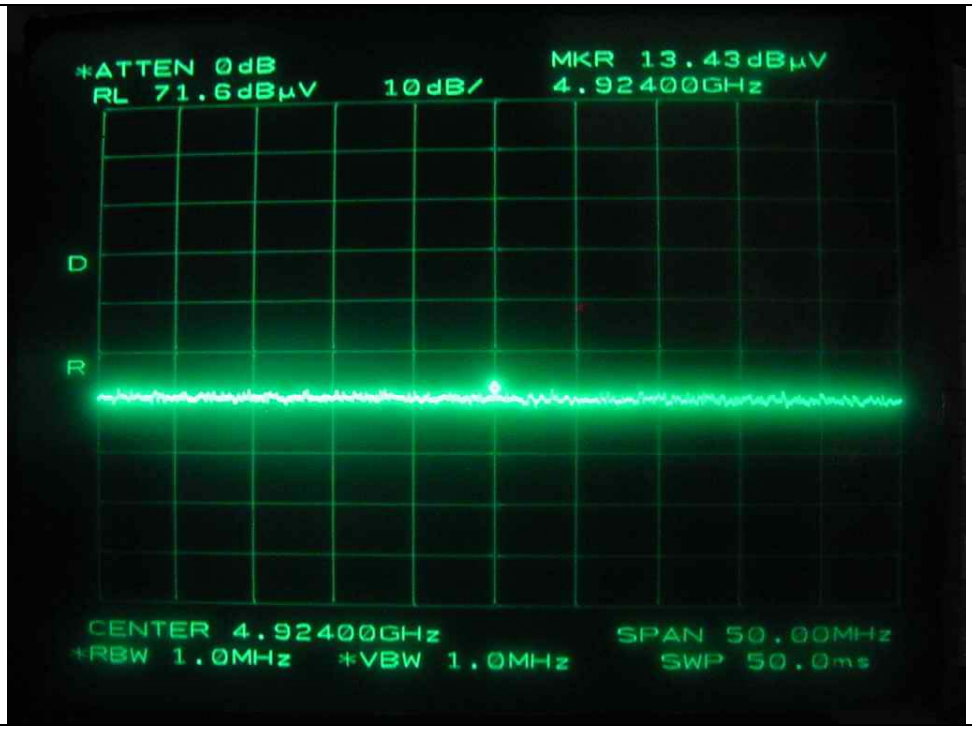
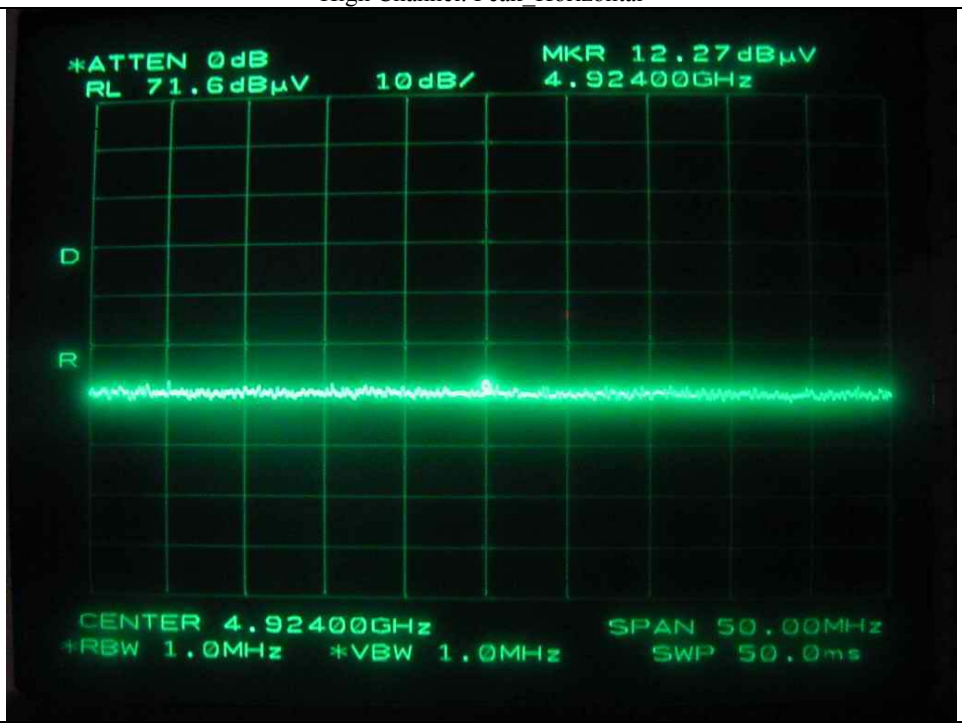


High Channel: Peak_Horizontal



High Channel: Peak_Vertical

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7.7.1 Operating condition: 802.11g Mode

7.7.1.1 Radiated Emission which fall in the Restricted Band

-. Operating Condition : Low Channel

-. Test Date : November 3, 2005
-. Resolution bandwidth : 1 MHz for Peak and Average Mode
-. Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
-. Measurement distance : 3m
-. Result : PASSED BY –3.03dB at 6 Mbps data transfer rate

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)
Data Transfer Rate: 6 Mbps										
2388.58	31.50	Peak	H	27.64	1.33	-		60.47	74.0	-13.53
	34.00	Peak	V					62.97	74.0	-11.03
	20.17	Average	H					49.14	54.0	-4.86
	22.00	Average	V					50.97	54.0	-3.03
Data Transfer Rate: 24 Mbps										
2388.58	29.83	Peak	H	27.64	1.33	-		58.80	74.0	-12.03
	33.00	Peak	V					61.97	74.0	-14.53
	20.00	Average	H					48.97	54.0	-4.93
	21.83	Average	V					50.80	54.0	-3.20
Data Transfer Rate: 48 Mbps										
2388.58	30.83	Peak	H	27.64	1.33	-		59.80	74.0	-14.20
	33.67	Peak	V					62.24	74.0	-11.36
	20.15	Average	H					49.12	54.0	-4.88
	21.95	Average	V					50.92	54.0	-3.08

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

Tested by: Ki-Hong, Nam / Test Engineer

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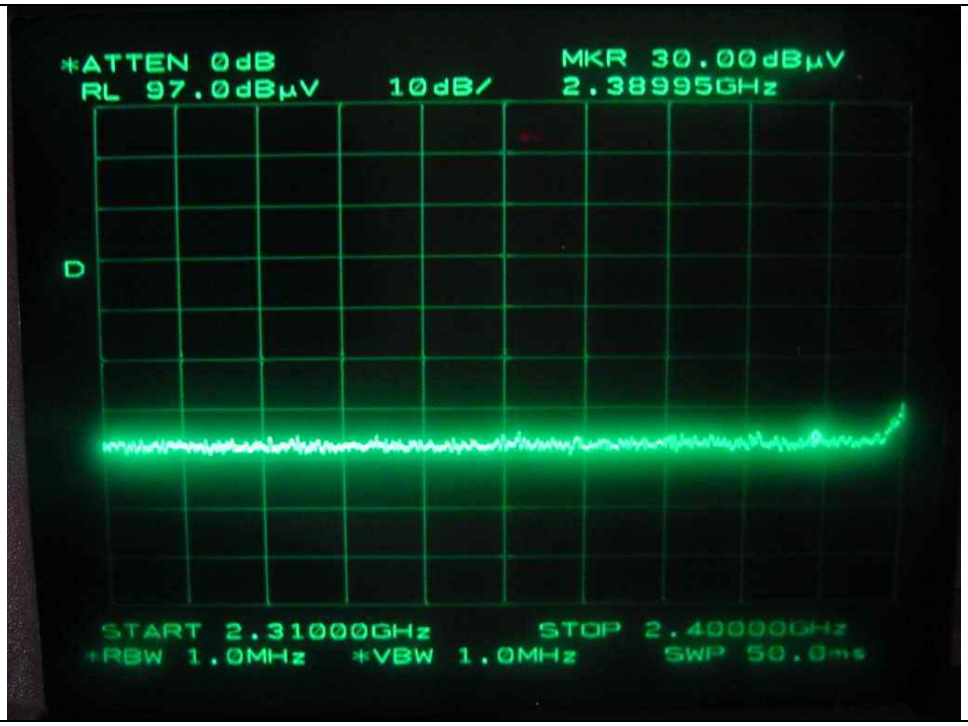
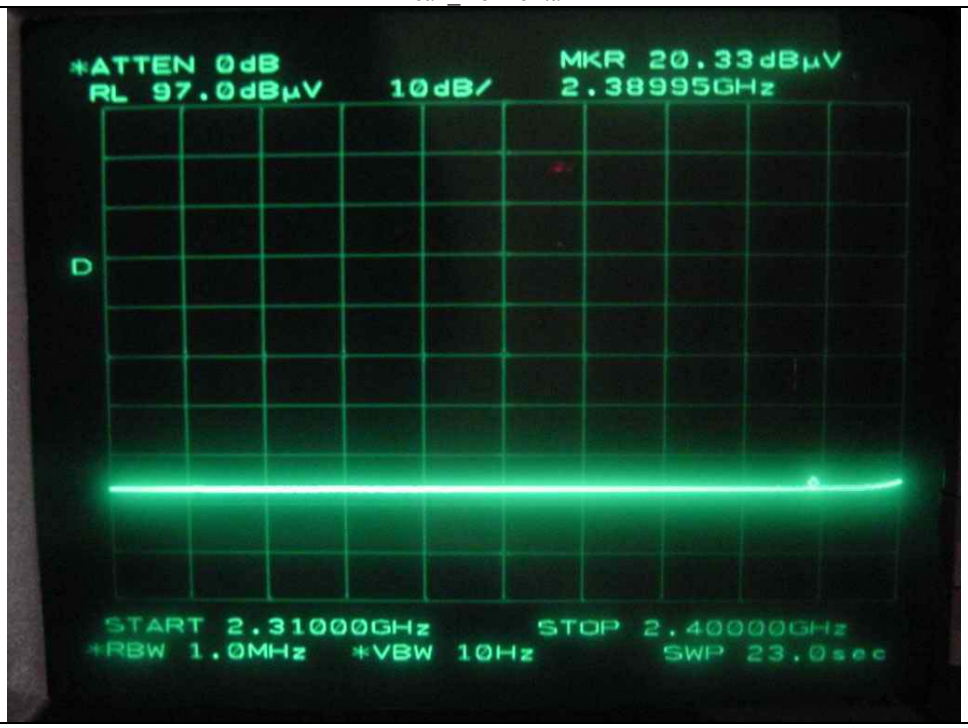
EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



Peak_Horizontal



Average_Horizontal

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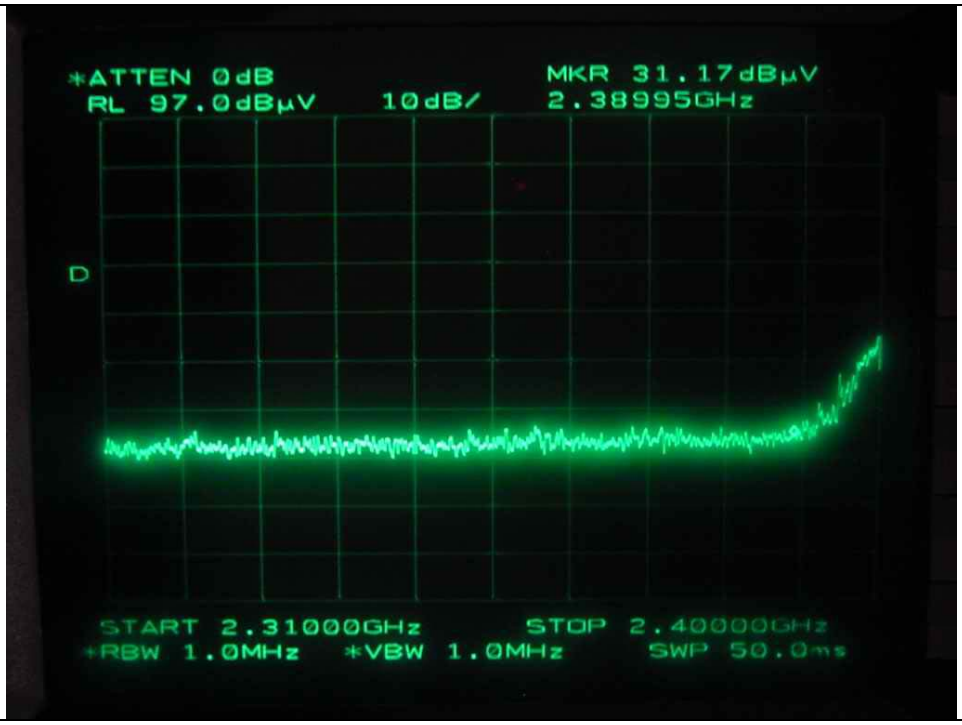
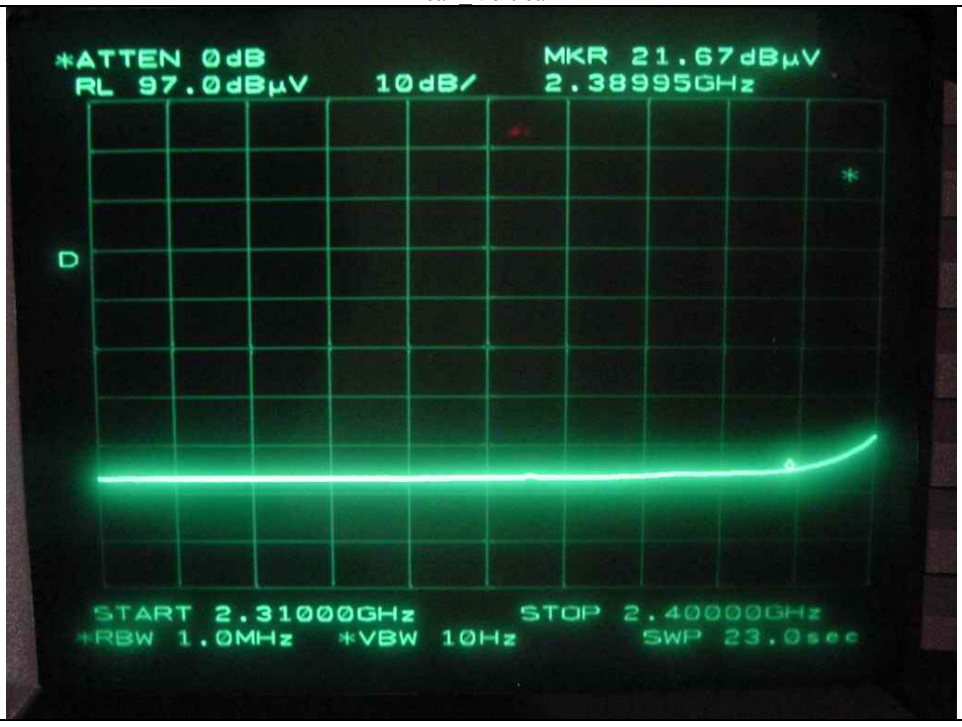


Peak_Vertical



Average_Vertical

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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

-. Operating Condition : High Channel

-. Test Date : November 3, 2005
-. Resolution bandwidth : 1 MHz for Peak and Average Mode
-. Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
-. Measurement distance : 3m
-. Result : PASSED BY –3.58dB at 6 Mbps data transfer rate

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)
Data Transfer Rate: 6 Mbps										
2484.00	31.33	Peak	H	27.59	1.33	-		60.25	74.0	-13.75
	34.00	Peak	V					62.92	74.0	-11.08
	20.33	Average	H					49.25	54.0	-4.75
	21.50	Average	V					50.42	54.0	-3.58
Data Transfer Rate: 18 Mbps										
2484.00	31.00	Peak	H	27.59	1.33	-		59.92	74.0	-14.08
	33.50	Peak	V					62.42	74.0	-11.58
	20.00	Average	H					48.92	54.0	-5.08
	21.50	Average	V					50.42	54.0	-3.58
Data Transfer Rate: 54 Mbps										
2484.00	31.00	Peak	H	27.59	1.33	-		59.92	74.0	-14.08
	33.00	Peak	V					61.92	74.0	-12.08
	19.95	Average	H					48.87	54.0	-5.13
	20.83	Average	V					49.75	54.0	-4.25

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

Tested by: Ki-Hong, Nam / Test Engineer

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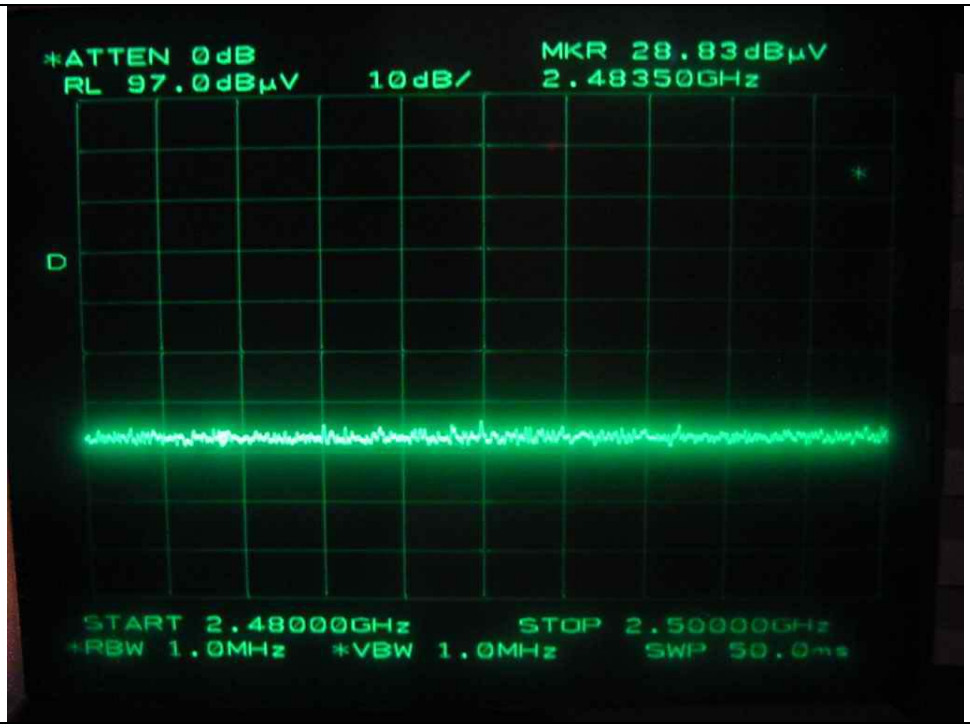
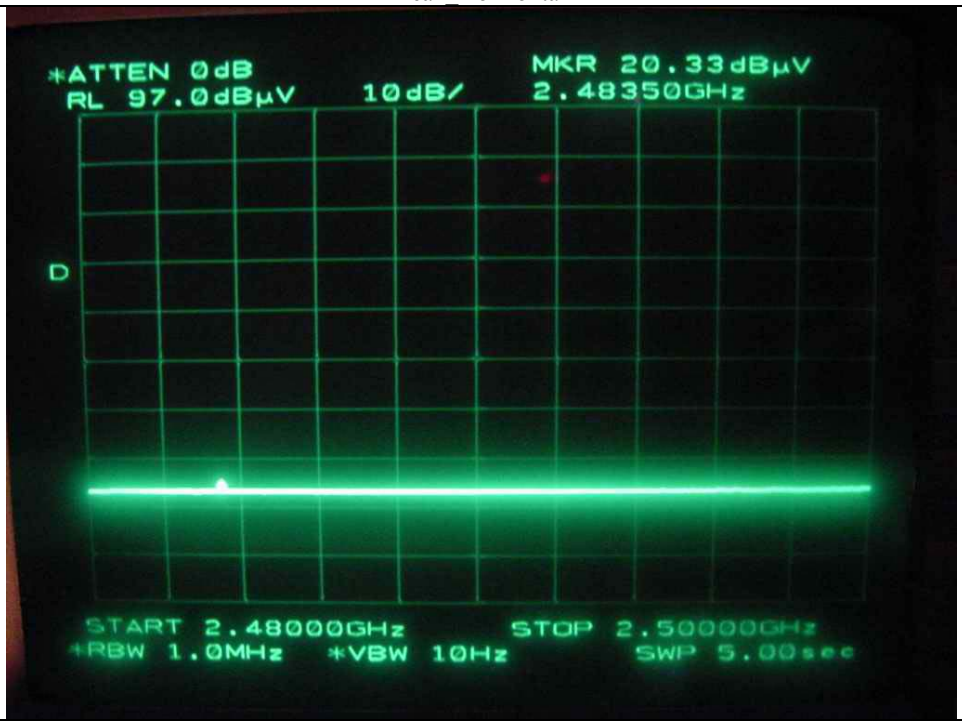
EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)



Peak_Horizontal



Average_Horizontal

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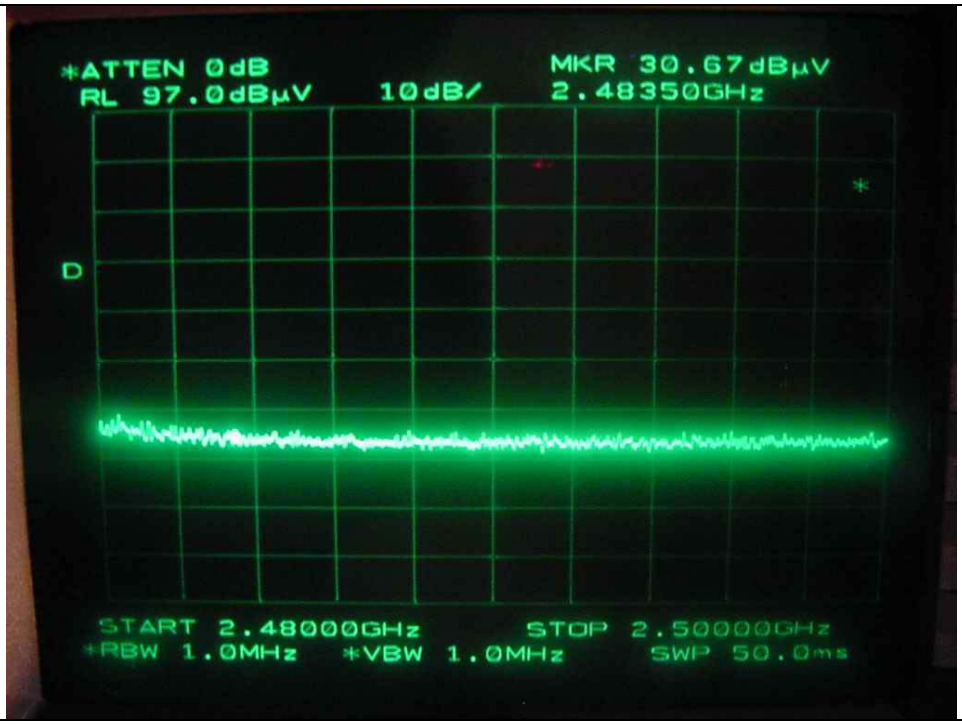
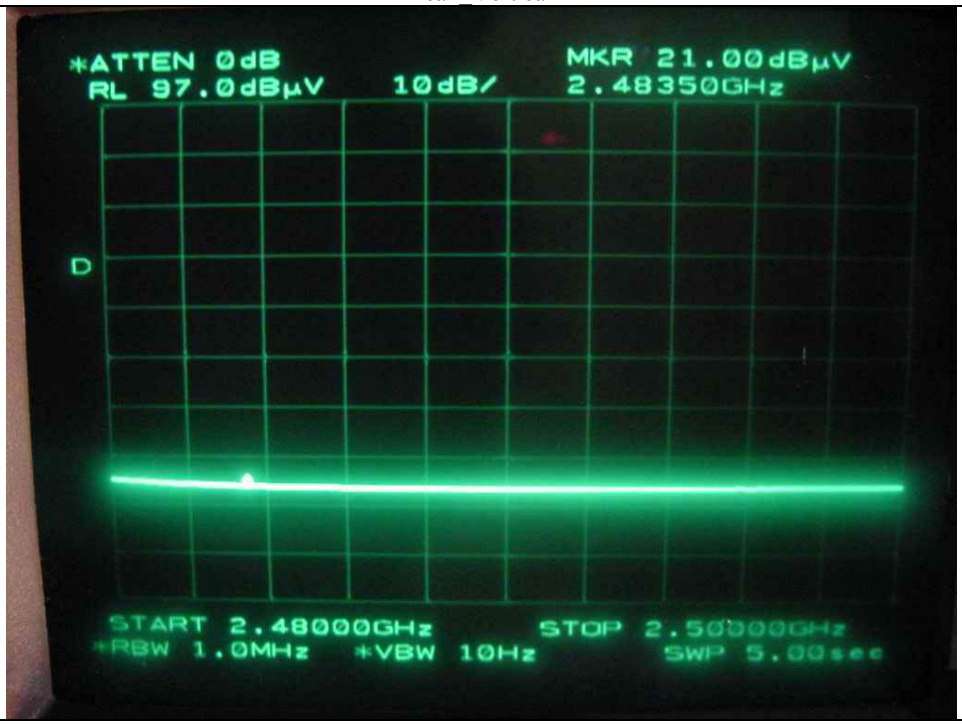


Peak_Vertical



Average_Vertical

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EMC Testing Dept : 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-Kun, Kyunggi-Do 464-860 Korea. (TEL: 82-31-765-8289 FAX: 82-31-766-2904)

7.7.1.2 Spurious & Harmonic Radiated Emission

-. Test Date : November 3, 2005
-. 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 ~ 40 GHz
-. Measurement distance : 3m
-. Result : PASSED BY –18.49 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										
4824.00*	38.33	Peak	V	31.30	2.62	25.4		46.84	74.00	-27.16
	27.00	Average	H					35.51	54.00	-18.49
Other Frequencies were not observed up to 25GHz.										
Test Data for Middle Channel										
4874.00*	37.33	Peak	H	31.37	2.58	25.4		45.88	74.00	-28.12
	26.83	Average	H					35.38	54.00	-18.62
Other Frequencies were not observed up to 25GHz.										
Test Data for High Channel										
4924.00*	37.67	Peak	H	31.45	2.55	25.4		46.27	74.00	-27.73
	26.67	Average	H					35.27	54.00	-18.73
Other Frequencies were not observed up to 25GHz.										

Tabulated test data for Restricted Band

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

Tested by: Ki-Hong, Nam / Test Engineer

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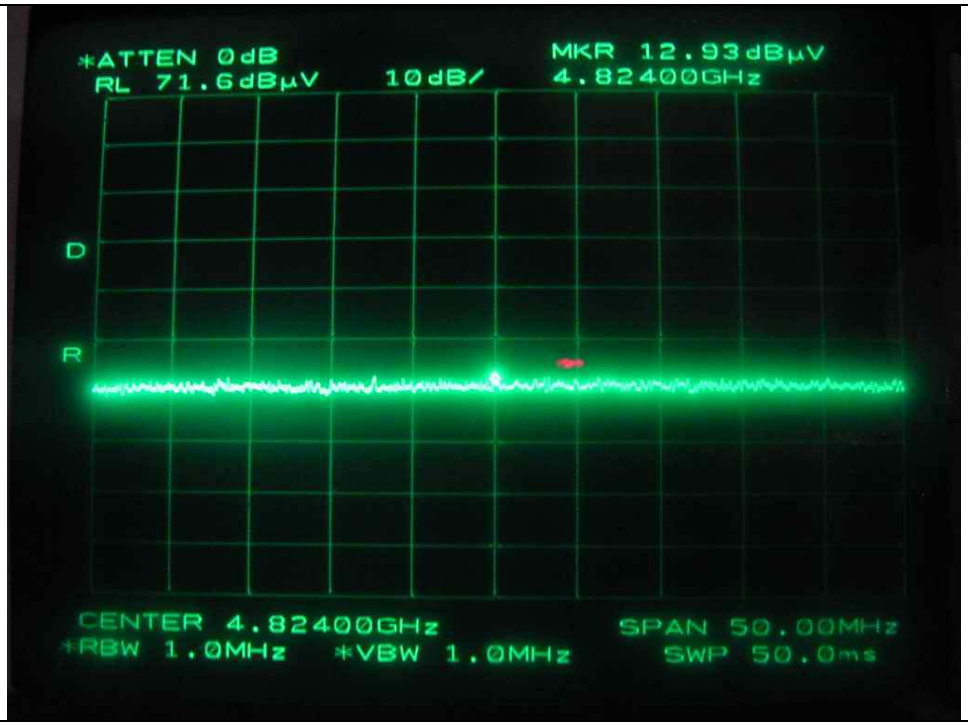
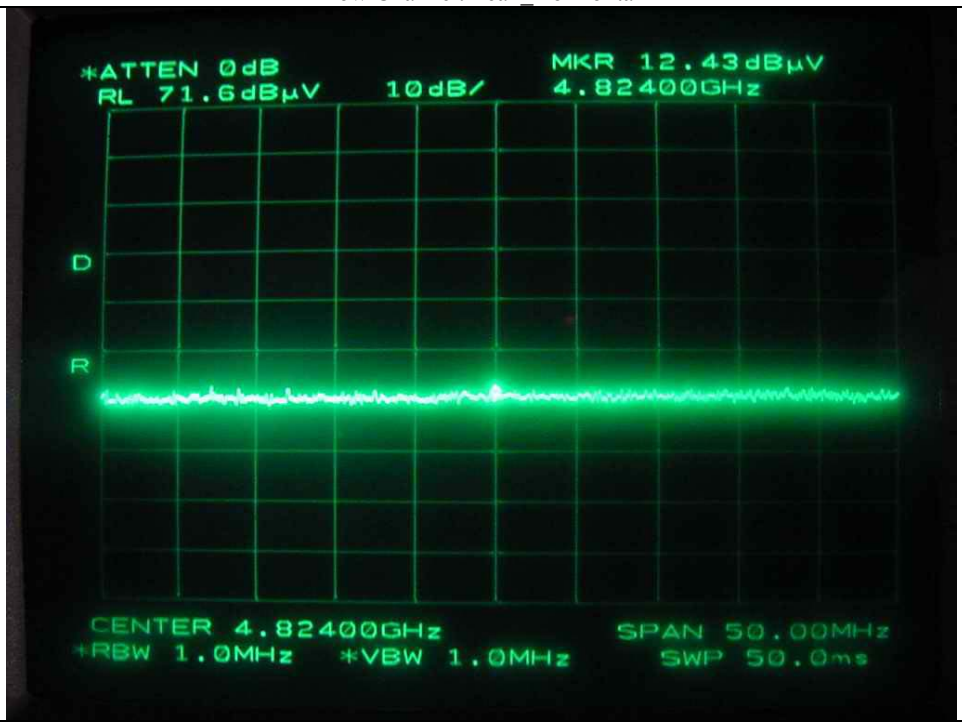


Low Channel: Peak_Horizontal



Low Channel: Peak_Vertical

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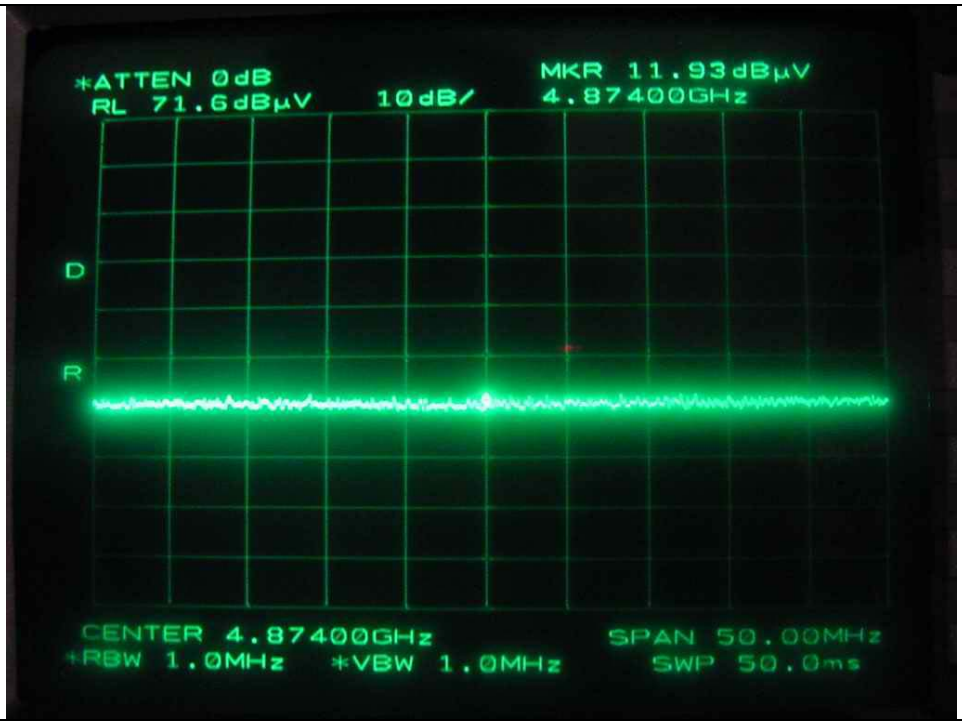
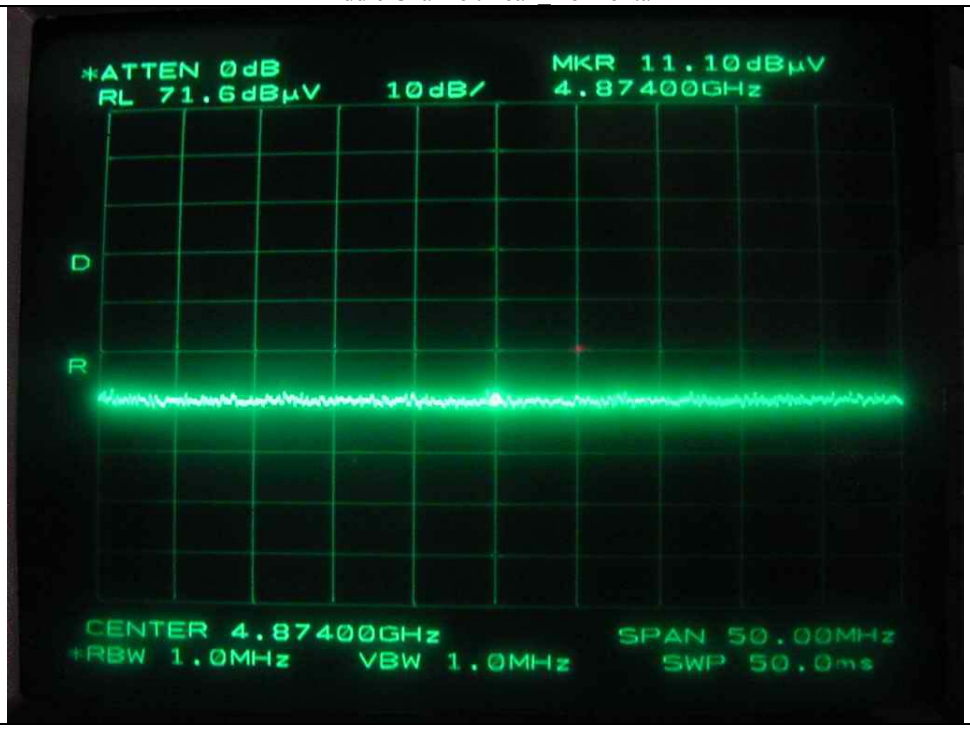


Middle Channel: Peak_Horizontal



Middle Channel: Peak_Vertical

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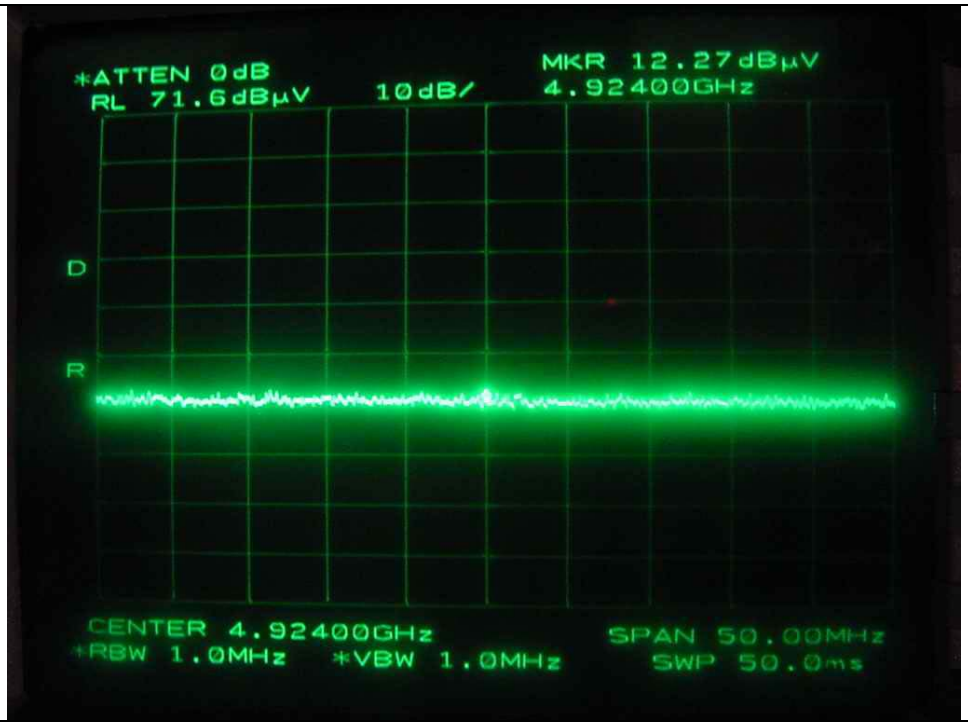
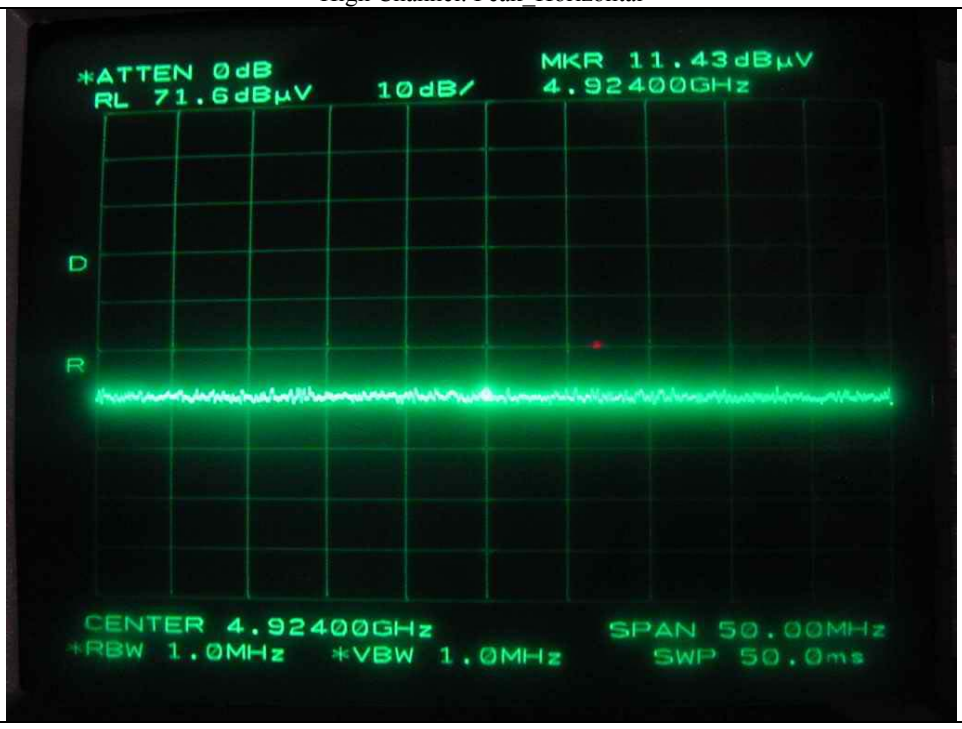


High Channel: Peak_Horizontal



High Channel: Peak_Vertical

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8. UNDESIRABLE EMISSIONS

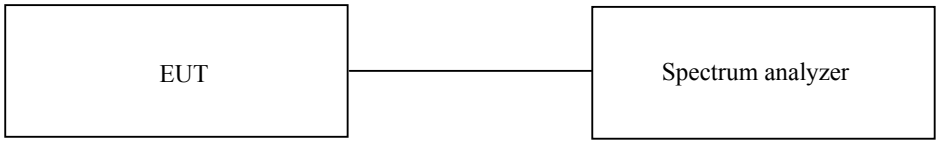
8.1 Operating environment

Temperature : 19°C

Relative humidity : 35 %

8.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. For measurements above 1GHz, the resolution and video bandwidth is set to 1 MHz for peak measurement and video bandwidth is set to 10 Hz for average measurement.



8.3 Test data

Please refer to test report issued by the ADT.

8.4 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 40GHz 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.

8.5 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 19, 2006
■ -	8449B	Hewlett-Packard	Preamplifier	3008A00833	June 19, 2006
□ -	83051A	Agilent	Preamplifier	3950M00201	June 10, 2005
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	June 19, 2006
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	June 6, 2006
■ -	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.

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8.6 Test Data for Radiated Emission

8.6.1 Radiated Emission which fall in the Restricted Band

-. Test Date : November 3, 2005
-. Resolution bandwidth : 1 MHz for Peak and Average Mode
-. Video bandwidth : 1 MHz for Peak Mode, 10Hz for Average Mode
-. Operating Frequency : 5725 – 5850MHz
-. Measurement distance : 3m
-. Result : PASSED

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)
It was not observed any emissions from the EUT.										

Tabulated test data for Restricted Band

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

Tested by: Ki-Hong, Nam / Test Engineer

HEAD OFFICE : #505 SK APT. Factory 223-28, Sangdaewon 1 Dong, Jungwon-Gu, Seongnam-City, Kyunggi-Do, 462-121, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
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8.6.2 Spurious & Harmonic Radiated Emission

-. Test Date : November 3, 2005
-. 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 ~ 40 GHz
-. Measurement distance : 3m
-. Result : PASSED BY –12.67 dB at High 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										
11490.00*	36.29	Peak	V	39.22	4.66	28.8		51.37	74.00	-22.63
	25.46	Average	H					35.51	54.00	-18.49
Other Frequencies were not observed up to 25GHz.										
Test Data for Middle Channel										
11570.00*	37.96	Peak	H	39.13	4.61	28.8		52.90	74.00	-21.10
	26.29	Average	H					41.23	54.00	-12.77
Other Frequencies were not observed up to 25GHz.										
Test Data for High Channel										
11610.00*	36.96	Peak	H	39.08	4.59	28.8		51.83	74.00	-22.17
	26.46	Average	H					41.33	54.00	-12.67
Other Frequencies were not observed up to 25GHz.										

Tabulated test data for Restricted Band

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

Tested by: Ki-Hong, Nam / Test Engineer

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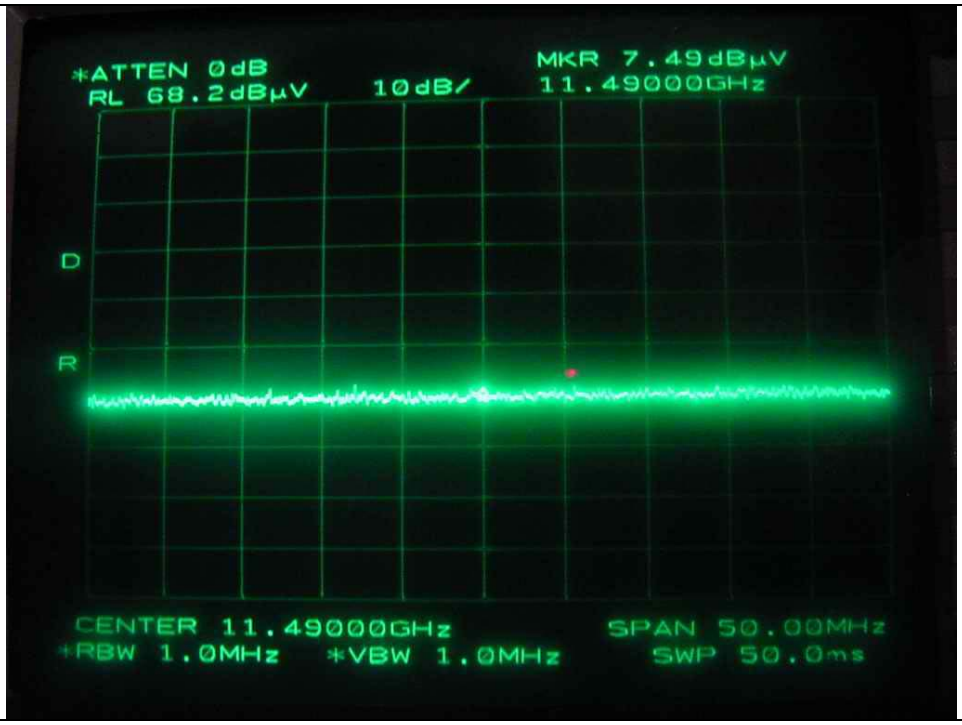
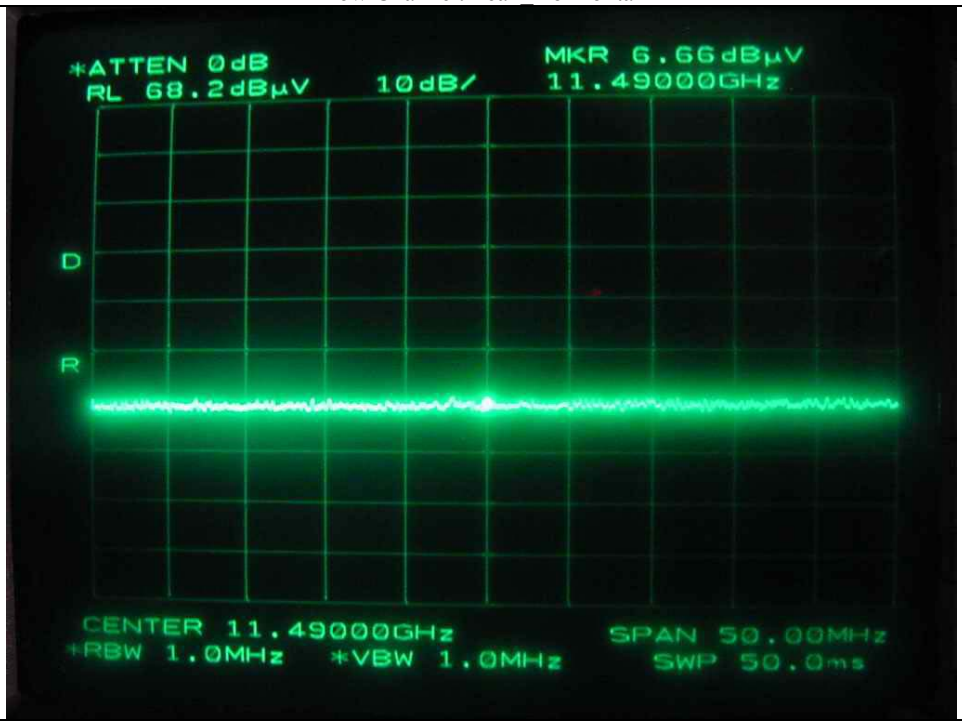


Low Channel: Peak_Horizontal



Low Channel: Peak_Vertical

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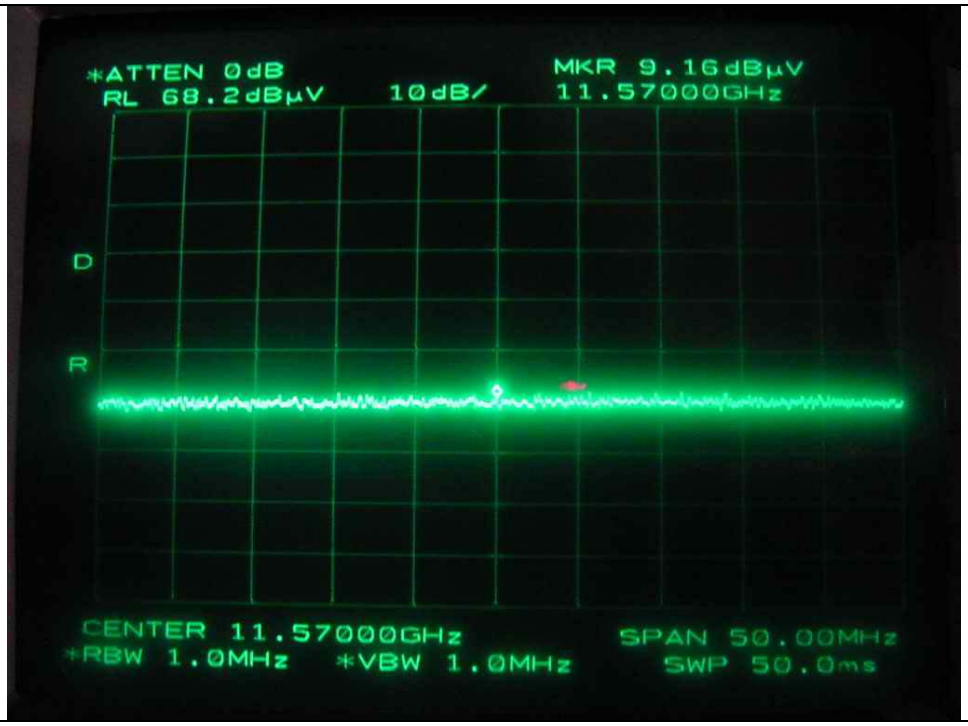
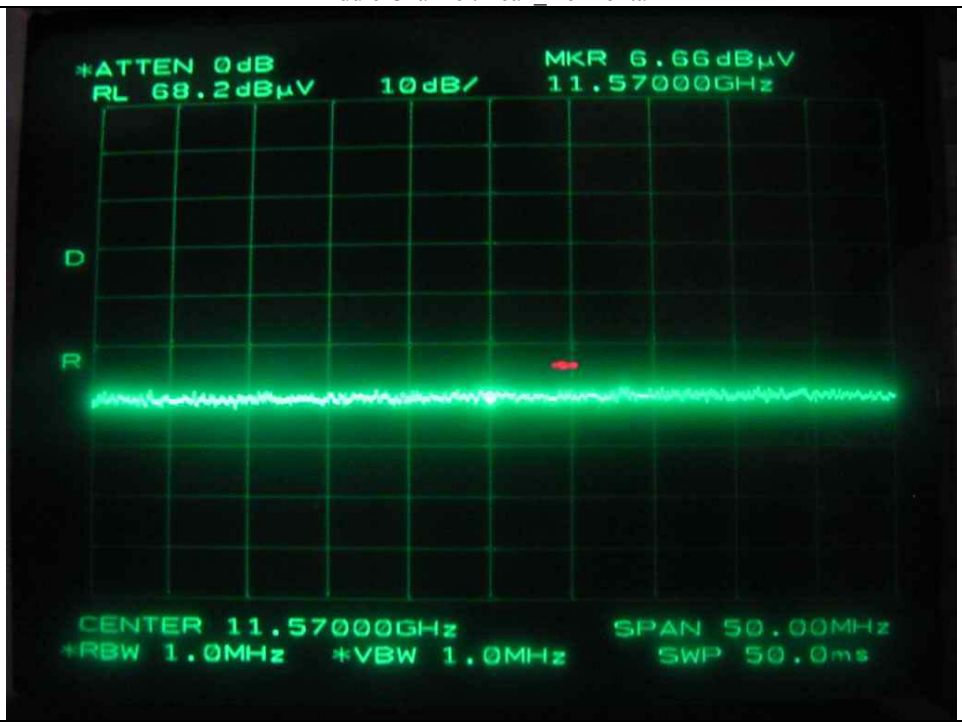


Middle Channel: Peak_Horizontal



Middle Channel: Peak_Vertical

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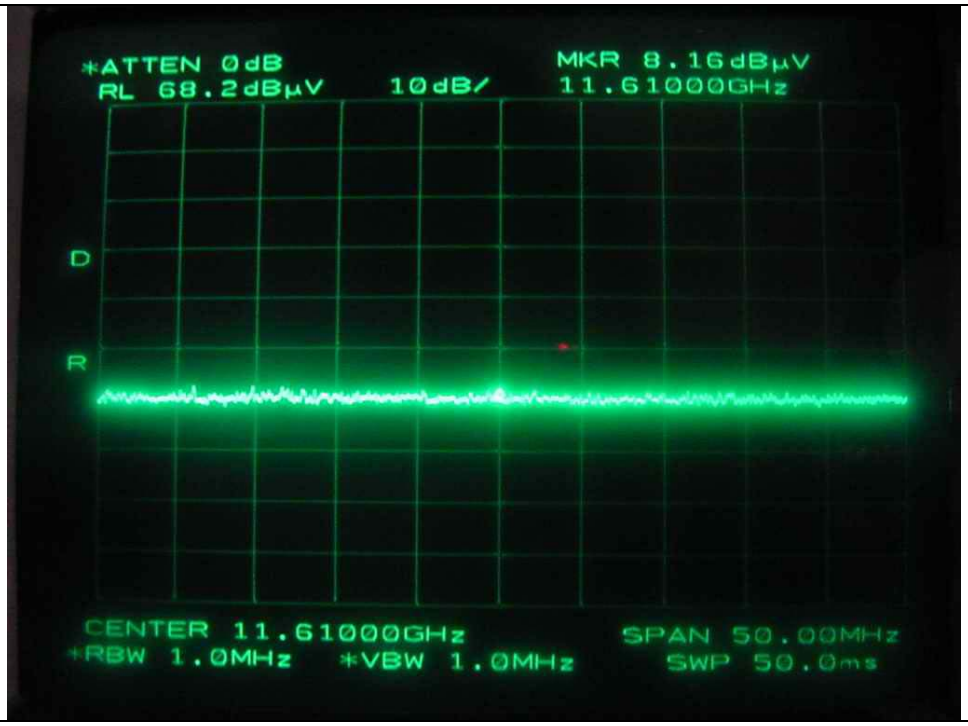
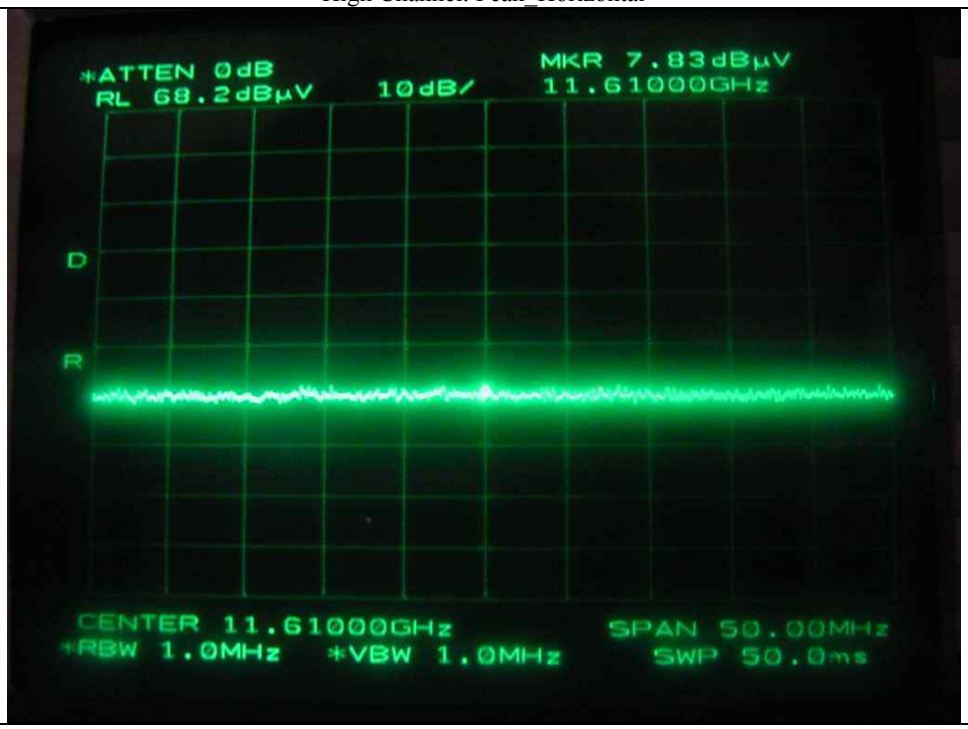


High Channel: Peak_Horizontal



High Channel: Peak_Vertical

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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 1mW/cm².

The electric field generated for a 1mW/cm²exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 3770$, because 1mW/ cm² = 10W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377Ω

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

Combing 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 (mW) = P (W) / 1000, d (cm) = 100 * d (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/cm²

9.2 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Operating Mode	Peak Output Power		Antenna Gain	Calculated RF Exposure
	(dBm)	(mW)	dBi	Separation Distance (cm)
802.11b	16.2	41.687	12.0	7.25
802.11g	14.2	26.303	12.0	5.76
802.11a	12.0	16.069	12.0	4.50

Remark The numeric antenna gain for the EUT is 15.85.

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."

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10. RADIATED EMISSION TEST, GENERAL REQUIREMENT

10.1 Operating environment

Temperature : 16°C

Relative humidity : 47 %

10.2 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.

10.3 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

10.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Dec. 13, 2005
■ -	85650A	Hewlett Packard	Quasi-Peak Adapter	3107A01542	Mar. 28, 2006
■ -	8568B	Hewlett-Packard	Spectrum Analyzer	3109A05456	Mar. 28, 2006
■ -	85685A	Hewlett-Packard	RF Preselector	3107A01264	Mar. 28, 20065
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 19, 2006
■ -	83051A	Hewlett-Packard	Microwave Preamplifier	3950M00201	June 10, 2006
☐ -	8449B	Hewlett-Packard	RF Amplifier	3008A00833	June 10, 2006
☐-	8447F	Hewlett-Packard	RF Amplifier	3113A04554	June 10, 2006
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	VHA9103	Schwarz beck	Biconical Antenna	91031852	Jan. 30, 2006
■ -	UHALP9018A	Schwarz beck	Log Periodic Antenna	62281001	Feb. 1, 2006
■ -	BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	June 6, 2006
■ -	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.

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10.5 Test data

-. Test Date : November 3, 2005
-. Resolution bandwidth : 120 kHz
-. Frequency range : 30MHz ~ 1000MHz
-. Measurement distance : 3m
-. Operating Condition : Tx Mode
-. Test result : Passed by -4.45 dB at 264.21 MHz

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
165.14	19.10	H	15.48	2.40	36.98	43.52	-6.54
231.14	19.50	H	16.69	3.10	39.29	46.02	-6.73
264.21	20.60	V	17.51	3.46	41.57	46.02	-4.45
297.21	15.60	V	20.04	3.77	39.41	46.02	-6.61
330.19	22.53	H	14.11	4.04	40.68	46.02	-5.34
627.40	13.90	H	18.99	5.52	38.41	46.02	-7.61

Tabulated test data for Radiated Electromagnetic Field

Remark: “H”: Horizontal, “V”: Vertical

802.11b, 802.11g and 802.11a each mode was tested, but the worst emissions were recorded in this test report.

Tested by: Ki-Hong, Nam / Test Engineer

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