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

Test Report No.	**: E06OR-077**
AGR No.	**: A066A-001**
Applicant	**: AM-Tech Co., Ltd.**
Address	**: #898-29, Hokye-Dong, Dongan-Gu, Anyang-Si, Kyunggi-Do, 431-836, Korea**
Manufacturer	**: AM-Tech Co., Ltd.**
Address	**: #898-29, Hokye-Dong, Dongan-Gu, Anyang-Si, Kyunggi-Do, 431-836, Korea**
Type of Equipment	**: Mobile Printer**
FCC ID.	**: UR5MPA0001**
Model Name	**: Mobile Pro Advance**
Serial number	**: N/A**
Total page of Report	**: 40 pages (including this page)**
Date of Incoming	**: May 29, 2006**
Date of issue	**: October 30, 2006**

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.

Prepared by: Young-Min, Choi / Senior Engineer
EMC Div.
ONETECH Corp.

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

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EMC Testing Dept : 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: AM-Tech Co., Ltd.
ADDRESS	: #898-29, Hokye-Dong, Dongan-Gu, Anyang-Si, Kyunggi-Do, 431-836, Korea
CONTACT PERSON	: Mr. Jun Kwun, Kang / General Manager Development Group
TELEPHONE NO	: +82-31-454-9904
FCC ID	: UR5MPA0001
MODEL NAME	: Mobile Pro Advance
SERIAL NUMBER	: N/A
DATE	: October 30, 2006

EQUIPMENT CLASS	***DSS – PART 15 SPREAD SPECTRUM TRANSMITTER***
KIND OF EQUIPMENT	Mobile Printer
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)	FCC PART 15 SUBPART C Section 15.247
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) (1)	Carrier Frequency Separation	Met the Limit / PASS
15.247 (a) (1) (iii)	Minimum Number of Hopping Channels	Met the Limit / PASS
15.247 (a) (1) (iii)	Average Time of Occupancy	Met the Limit / PASS
15.247 (a) (2)	Minimum 6dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Peak Conducted 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
15.209 and 15.109	Radiated Emission Limits	Met the Limit / PASS
15.207 and 15.107	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met requirement / PASS

Note: This test was not performed because the EUT shall not be use in charging mode according to User's manual.

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: 2003 at a distance of 3 meters from EUT to the antenna.

2.6 Test Facility

The Electromagnetic compatibility measurement facilities are located on at 307-51 Daessangryung-Ri, Chowol-Eup, Gwangju-Si, Gyeonggi-Do 464-080 Korea. Description details of test facilities were submitted to the Federal Communications Commission on August 31, 2005 (Registration Number: 92819 and 340658), accredited by KOLAS (Korea Laboratory Accreditation Scheme, No: 85) and approved by TUV, DNV 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 AM-Tech Co., Ltd., Model Mobile Pro Advance (referred to as the EUT in this report) is a Mobile Printer which has a function of battery charging, peripheral device for Class A Computing Device and Bluetooth mode. This test report only covers for Bluetooth mode and peripheral device & battery charging mode will be issued by Verification report.

The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Mobile Printer
OPERATING FREQUENCY	Bluetooth: 2402~2480 MHz
RF OUTPUT POWER	Bluetooth: 2 dBm
NUMBER OF CHANNEL	Bluetooth: 79 Channels
MAX. DATA TRANSFER RATE	Bluetooth: 1 Mbps
MODULATION TYPE	Bluetooth: GFSK
ANTENNA	Bluetooth MFR.: Auto Electronic Corporation., Model No.: AEC_MP_001
ANTENNA CONNECTOR TYPE	Bluetooth: Chip Type Antenna
ANTENNA GAIN	0 dBi
LIST OF EACH OSC. OR CRYSTAL. FREQ.(FREQ.>=1MHz)	14.7456 MHz and 19.6608 MHz
NUMBER OF LAYER	2 Layers: MSR, POWER, S/W, LED, B/T 4 Layers: MAIN
POWER REQUIREMENT	7.4V, 1050mA from a internal rechargeable battery (Lithium-ion)

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

No other model differences have been mentioned.

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	AM TECH	AMTECH HIT MAIN V0.4	N/A
Sub Board	SCSpro Co., Ltd.	SCS-IFM1v0	N/A
Bluetooth Board	N/A	HIT_Bluetooth	N/A
Button Board	AM TECH	HIT BUTTON V0.4	N/A
MSR Board	AM TECH	HIT MSR V0.4	N/A

5.2 Peripheral equipment

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

Model	Manufacturer	FCC ID	Description	Connected to
Mobile Pro Advance	AM-Tech Co., Ltd.	UR5MPA0001	Mobile Printer (EUT)	-
BL60708008	AULT KOREA	N/A	AC/DC Adapter	EUT
PP05LC	DELL Computer	DoC	Laptop PC	-
2225C	HP	DSI6XU2	Printer	Laptop PC
AUD-201	AIR Logic	N/A	Buletooth USB Dongel	Laptop PC

5.3 Mode of operation during the test

-. For the testing, software used to control the EUT for staying in continuous transmitting and receiving mode.

For final testing, the Bluetooth was set at Low Channel (2402MHz), Middle Channel (2441MHz), and High Channel (2480MHz). To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes.

-. According to the manufacturer's specification, the EUT cannot operate transmitting /receiving function when the EUT is in charging mode, so the conducted emission test was not performed.

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5.4 Configuration of Test System

Line Conducted Test: This test was not performed, because the EUT shall not be operated in charging mode according to the manual. This test for charging mode was covered in Test Report for Verification procedure.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2003 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.

5.5 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.

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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)
Stand-by mode	This test was not performed, because the EUT shall not be operated in charging mode according to the manual. This test for charging mode was covered in Test Report for Verification procedure.
Charging mode	
TX mode	

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

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7. TEST DATA FOR BLUETOOTH MODE

7.1. 20dB BANDWIDTH

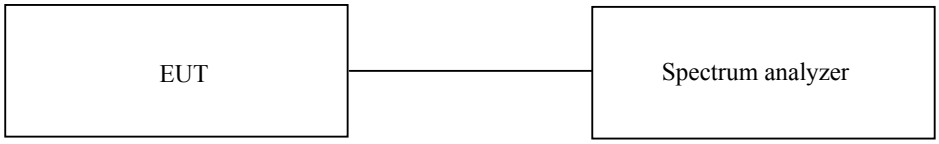
7.1.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

7.1.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 10 kHz, and peak detection was used. The 20dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 20 dB.



7.1.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

7.1.4 Test data

-. Test Date : September 21, 2006

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2402	850	1000	-150
Middle	2441	833	1000	-167
High	2480	850	1000	-150

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

Tested by: Ki-Hong, Nam / Test Engineer

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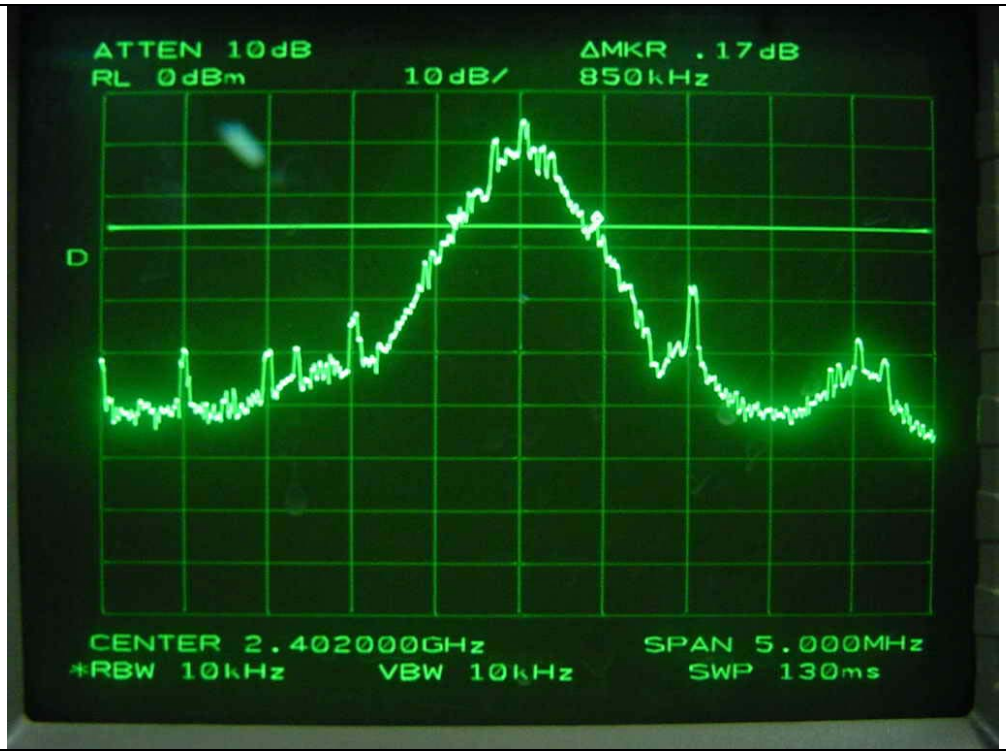
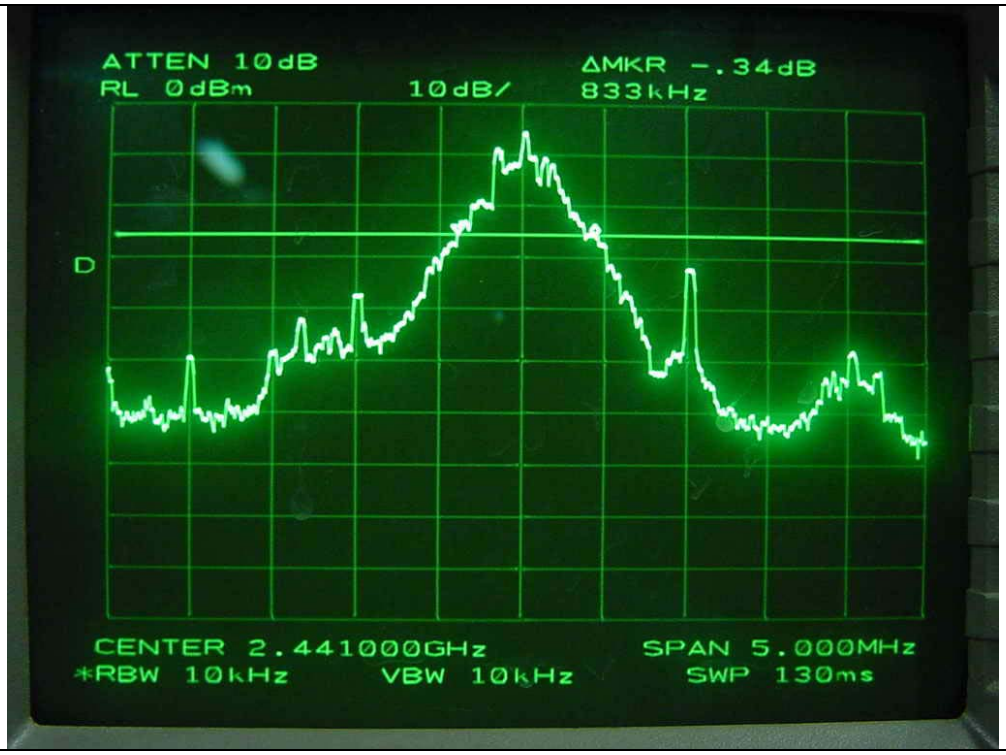


Low Channel



Middle Channel

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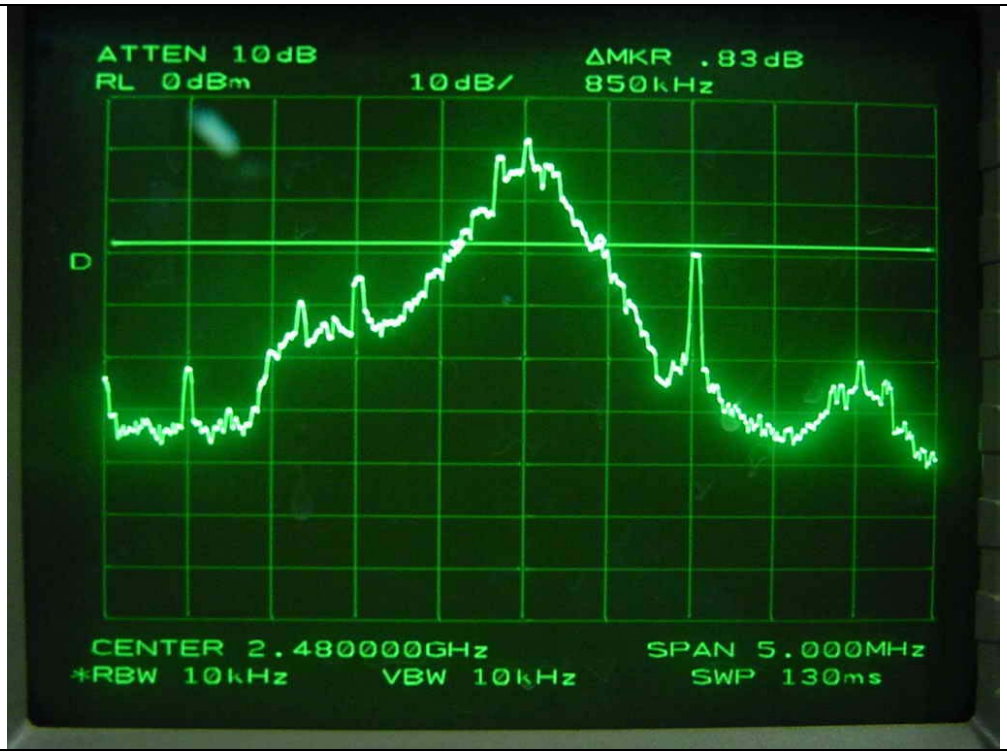

High Channel

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7.2. HOPPING FREQUENCY SEPARATION

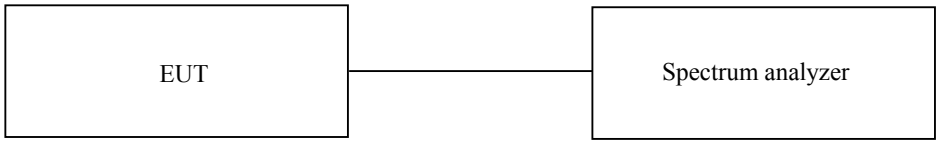
7.2.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

7.2.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 10 MHz. The analyzer is set to peak hold, than a pseudo-random hopping sequence of the transmitter is captured. The mark delta function was used to measure the frequency separation between two adjacent hopping channels.



7.2.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

7.2.4 Test data

-. Test Date : September 21, 2006

-. Test Result : Pass

MEASURED VLAUE (kHz)	LIMIT, 20dB Bandwidth (kHz)	MARGIN (kHz)
1000	850	-150

Tested by: Ki-Hong, Nam / Test Engineer

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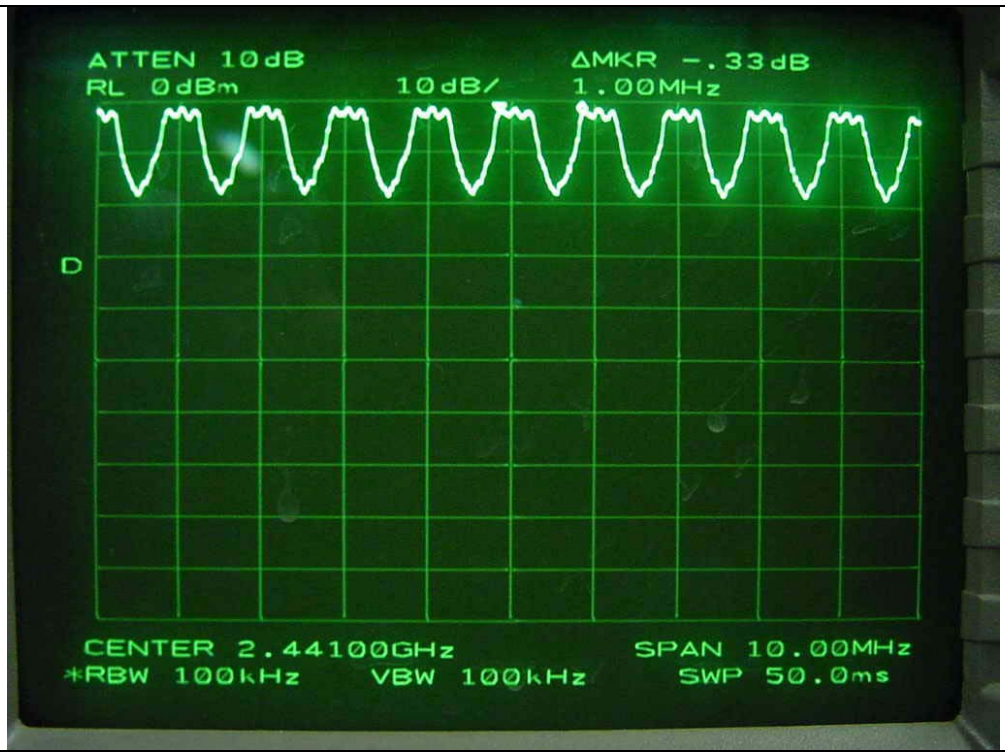

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7.3. NUMBER OF HOPPING CHANNELS

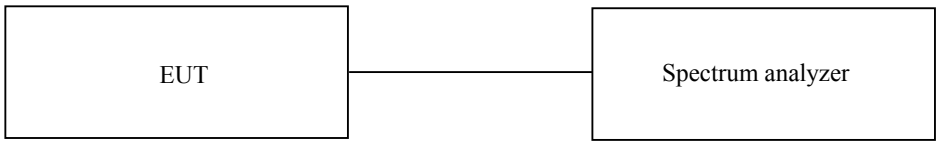
7.3.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

7.3.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The frequency span is set to 100 MHz and the resolution bandwidth is set to 1 MHz. The analyzer is set to peak hold and then complete pseudo-random hopping sequence of the transmitter is captured.



7.3.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

7.3.4 Test data

-. Test Date : September 21, 2006

-. Test Result : Pass

MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 15	64

Tested by: Ki-Hong, Nam / Test Engineer

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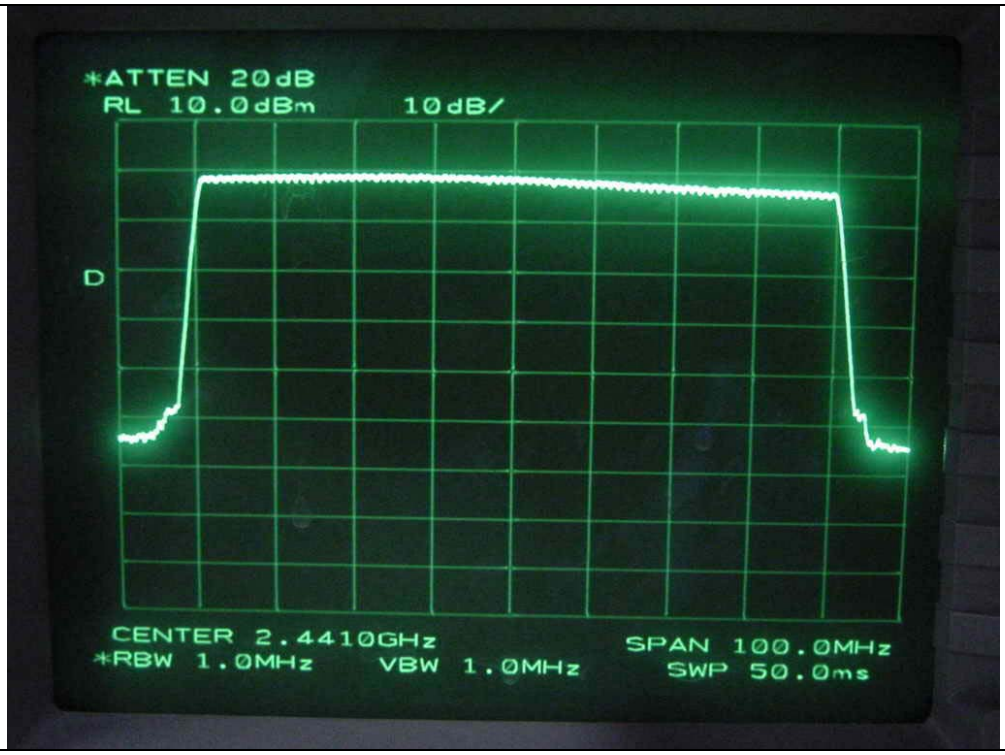

Total number of hopping channel: 28+30+21 = 79

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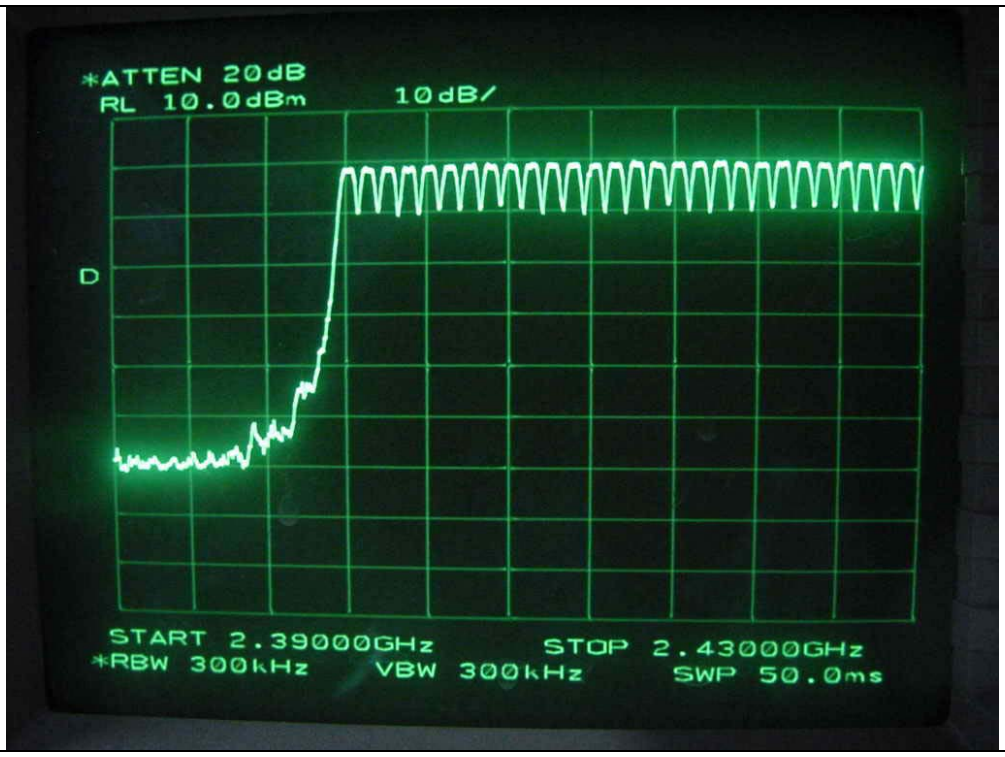
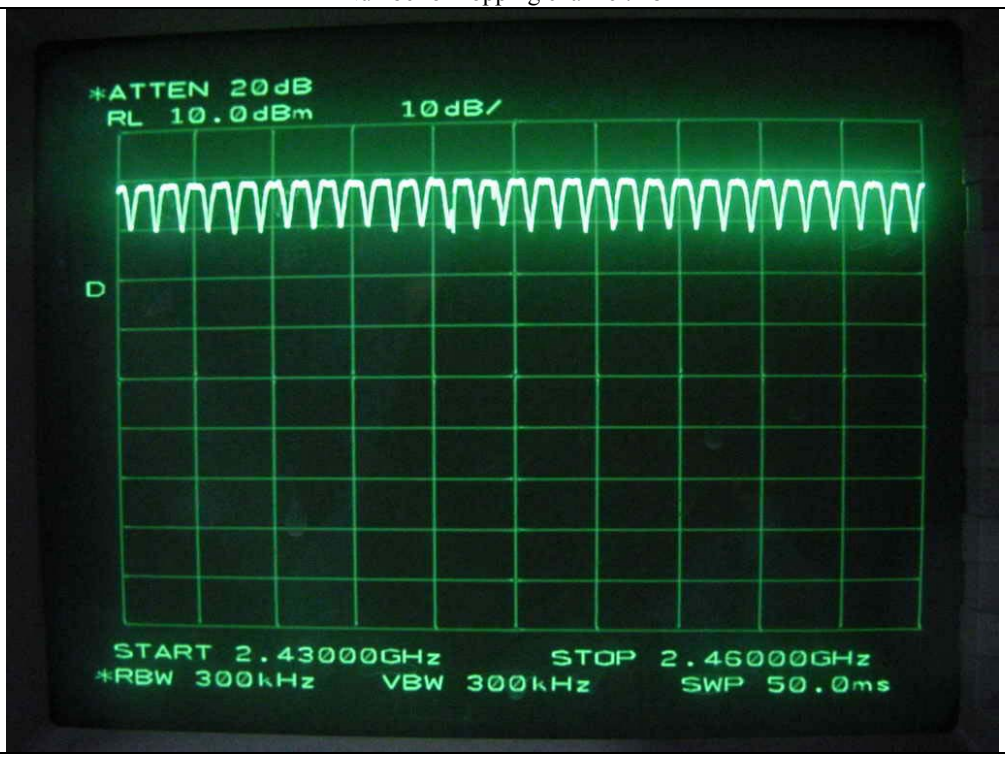


Number of hopping channel: 28



Number of hopping channel: 30

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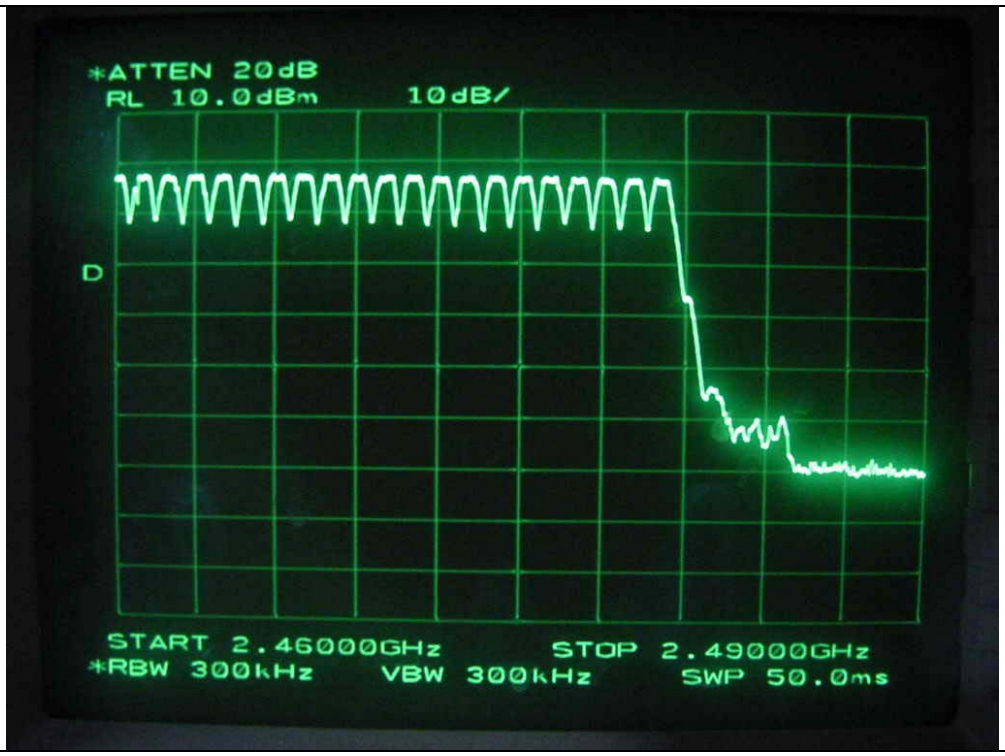

Number of hopping channel: 21

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7.4 TIME OF OCCUPANCY

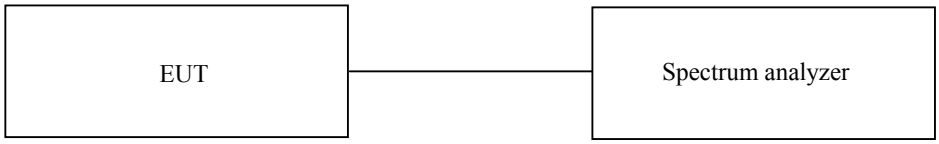
7.4.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

7.4.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The transmitter is set to operate in its normal frequency hopping mode. The center frequency of the spectrum analyzer is set to one of hopping channels near the center of the operating band and span is set to zero Hz. The sweep time is set to display one complete pulse. The mark delta function is used to measure the duration of the pulses.



7.4.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

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7.4.4 Test data

-. Test Date : September 21, 2006

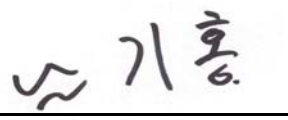
The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels.

For DH1 packet type, the EUT needs 1 time slot for transmitting and 1 time slot for receiving and DH3 packet type, the EUT needs 3 times slots for transmitting and 1 time slot for receiving, and DH5 packet needs 5times slots for transmitting and 1 time slot for receiving. So The EUT has each channel for 10.13 times per second (=1600/2/79) for DH1, and 5.06 times (=1600/4/79) for DH3, and 3.38 times (= 1600/6/79) for DH5.

Packet Type	Pulse Time (ms)	Hops per second with channels	Period Time (ms)	Total Dwell Time (ms)	Limit (ms)	Test Result
DH1	0.5917	10.13	31.6	189.41	400	PASS
DH3	1.8667	5.06	31.6	298.48	400	PASS
DH5	3.0917	3.38	31.6	330.22	400	PASS

Total dwell time is calculated as following.

Total Dwell Time = Pulse time * Hops per second with channels * period time



Tested by: Ki-Hong, Nam / Test Engineer

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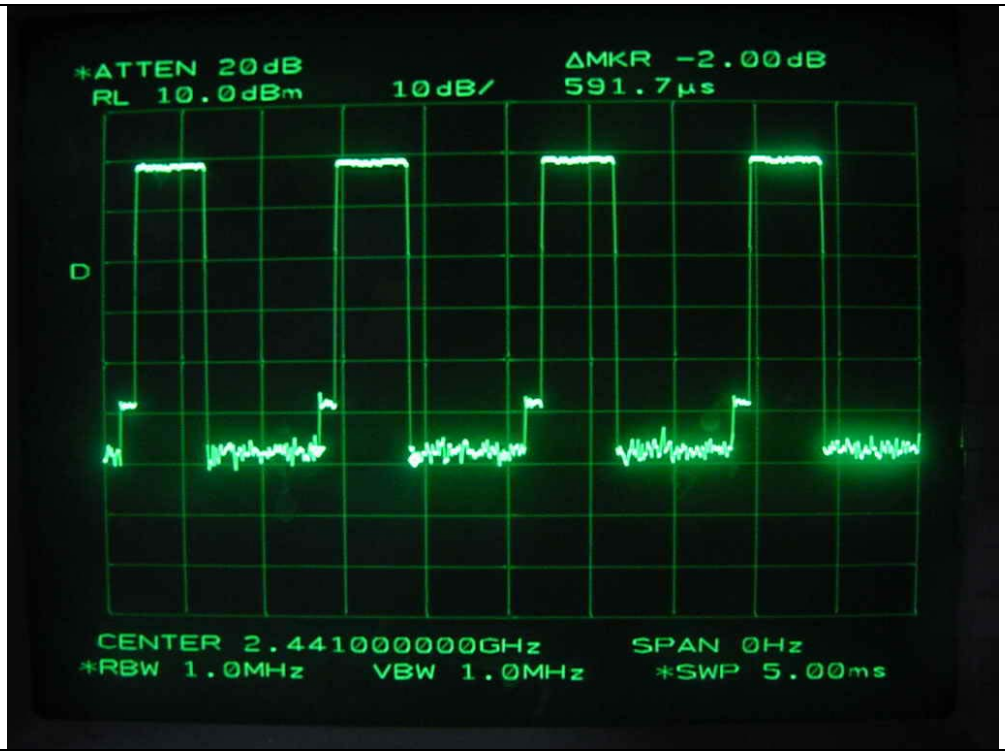
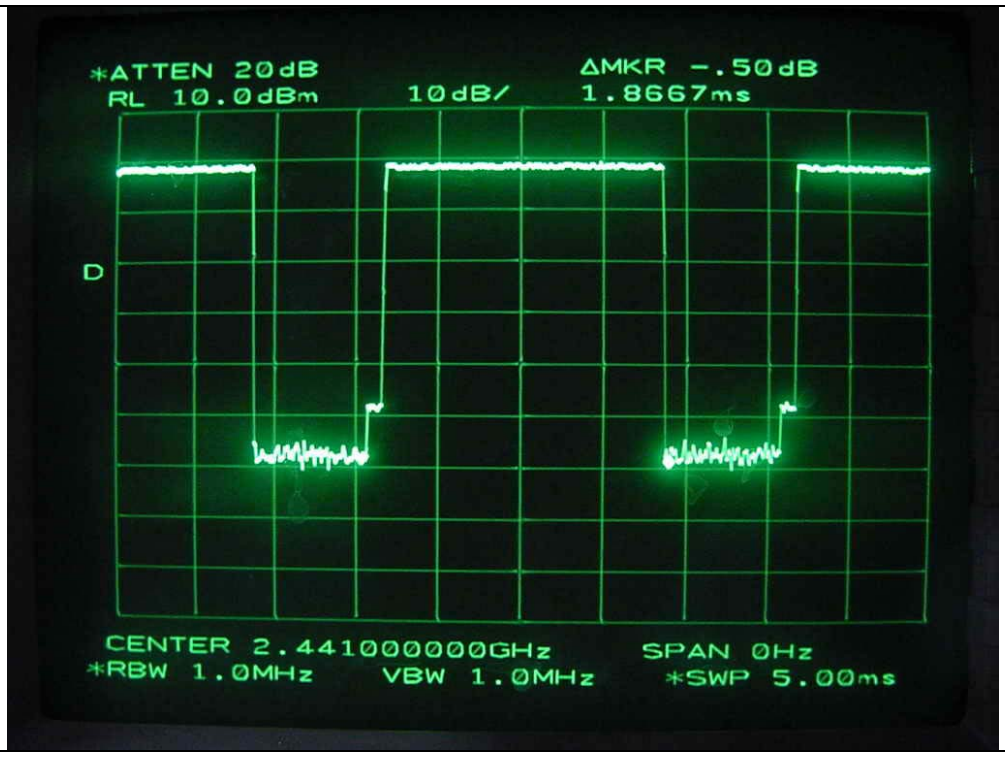


DH1



DH3

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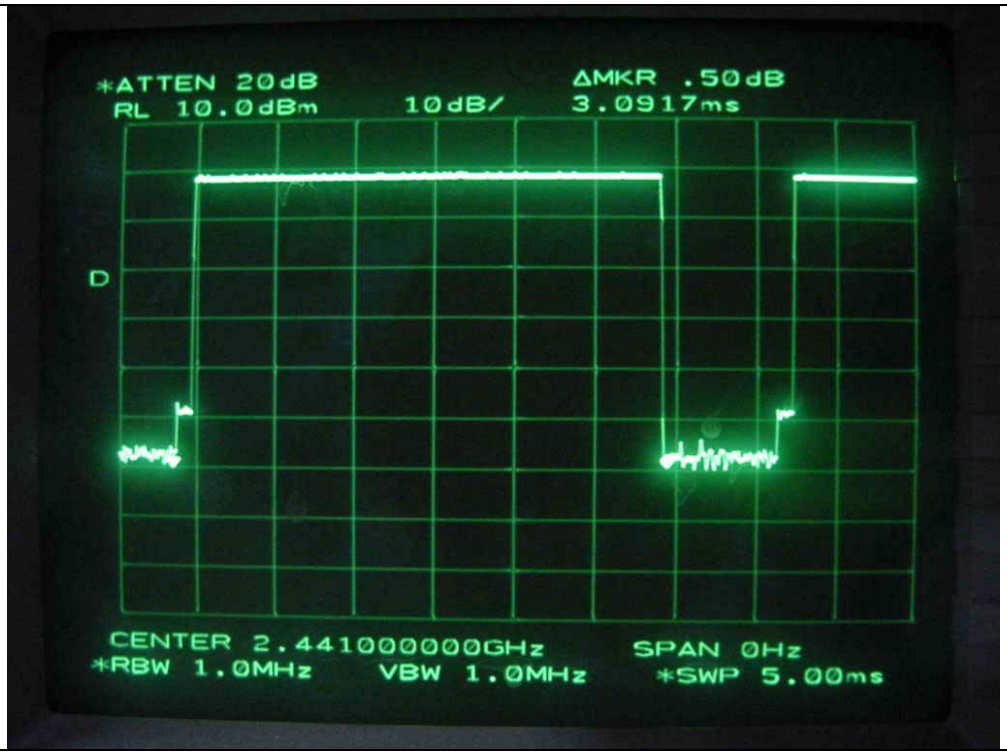

DH5

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7.5 MAXIMUM PEAK OUTPUT POWER

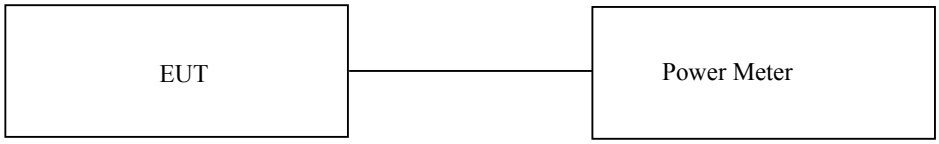
7.5.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

7.5.2 Test set-up

The maximum peak output power was measured with the power meter connected to the antenna output of the EUT. The EUT was operating in transmit mode at the appropriate center frequency.



7.5.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

7.5.4 Test data

-. Test Date : September 21, 2006

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2402	0.00	30.0	-30.00
Middle	2441	-0.17	30.0	-30.17
High	2480	-2.83	30.0	-32.83

Tested by: Ki-Hong, Nam / Test Engineer

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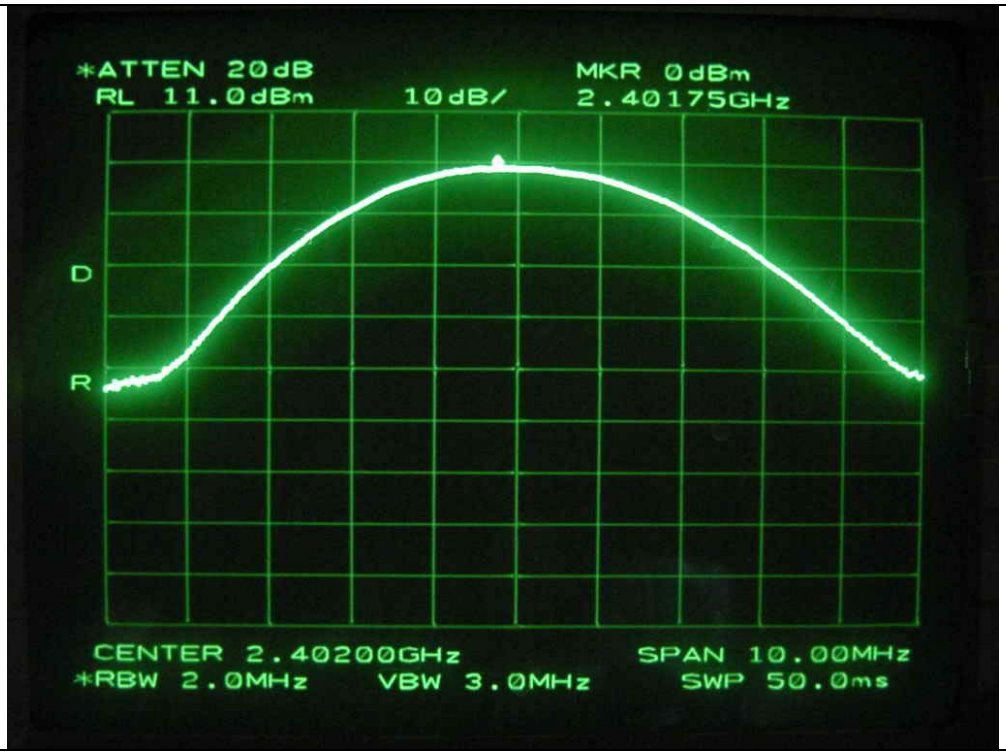
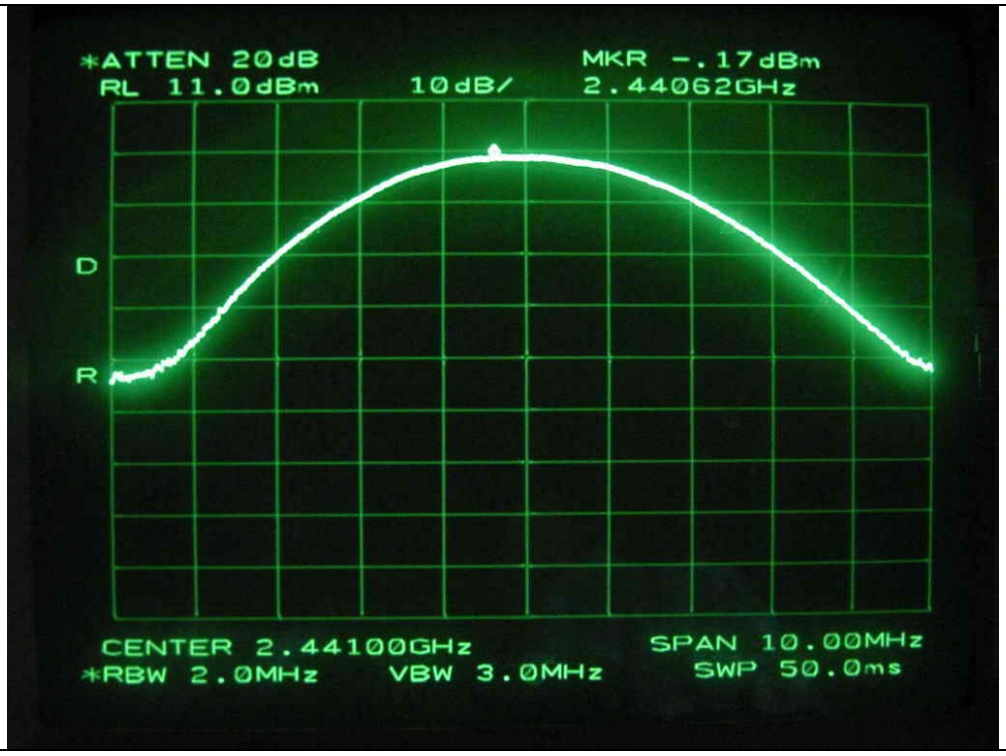


Low Channel



Middle Channel

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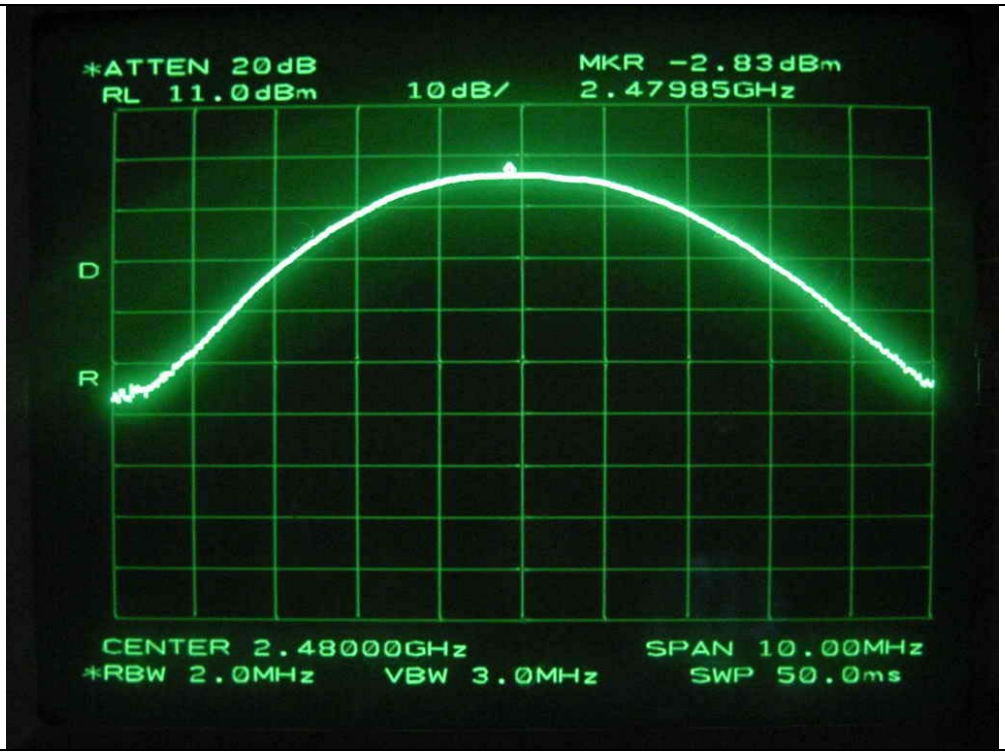

High Channel

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7.6 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

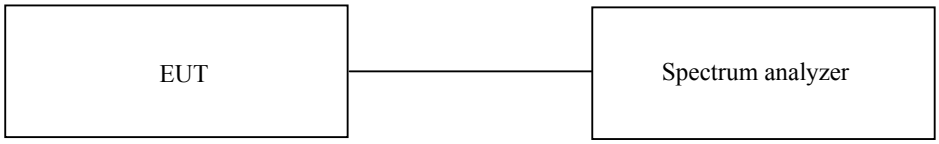
7.6.1 Operating environment

Temperature : 25°C

Relative humidity : 51 %

7.6.2 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.



7.6.3 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.

7.6.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	June 22, 2006
■ -	8447D	Hewlett-Packard	Amplifier	2727A04987	June 14, 2006
□ -	83051A	Agilent	Preamplifier	3950M00201	June 23, 2006
■ -	F-40-5000-RF	RLC Electronics	Highpass Filter	0425	July 14, 2006
■ -	MA220	HD	Turn Table	N/A	N/A
■ -	HD240	HD	Antenna Mast	N/A	N/A
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	July 03, 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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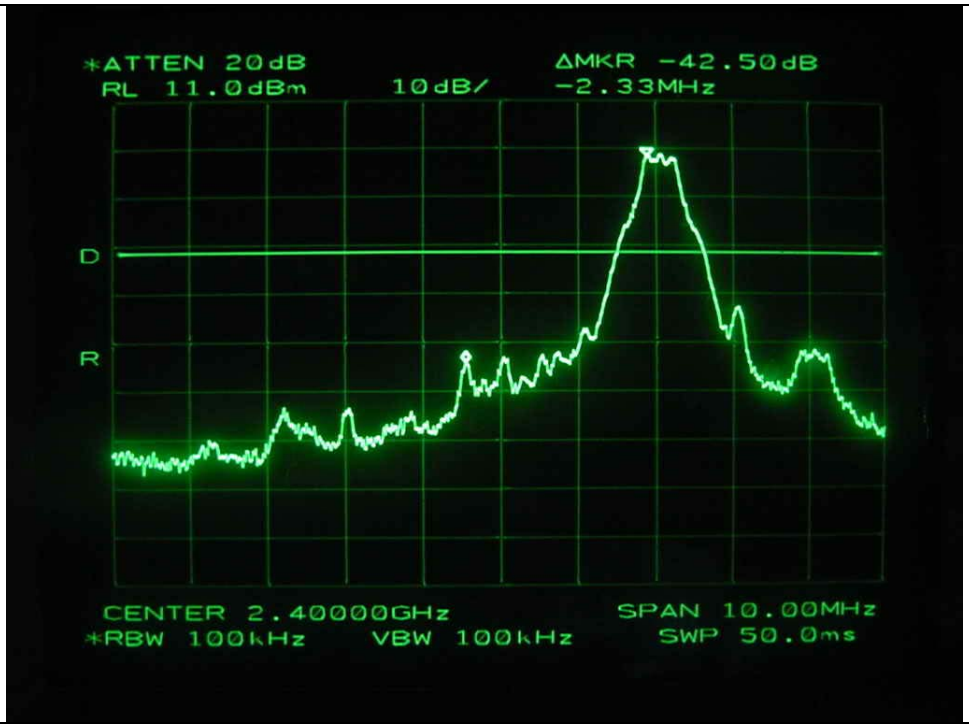
7.6.5. Test data

7.6.5.1. Test data for conducted emission



Low Channel

High Channel

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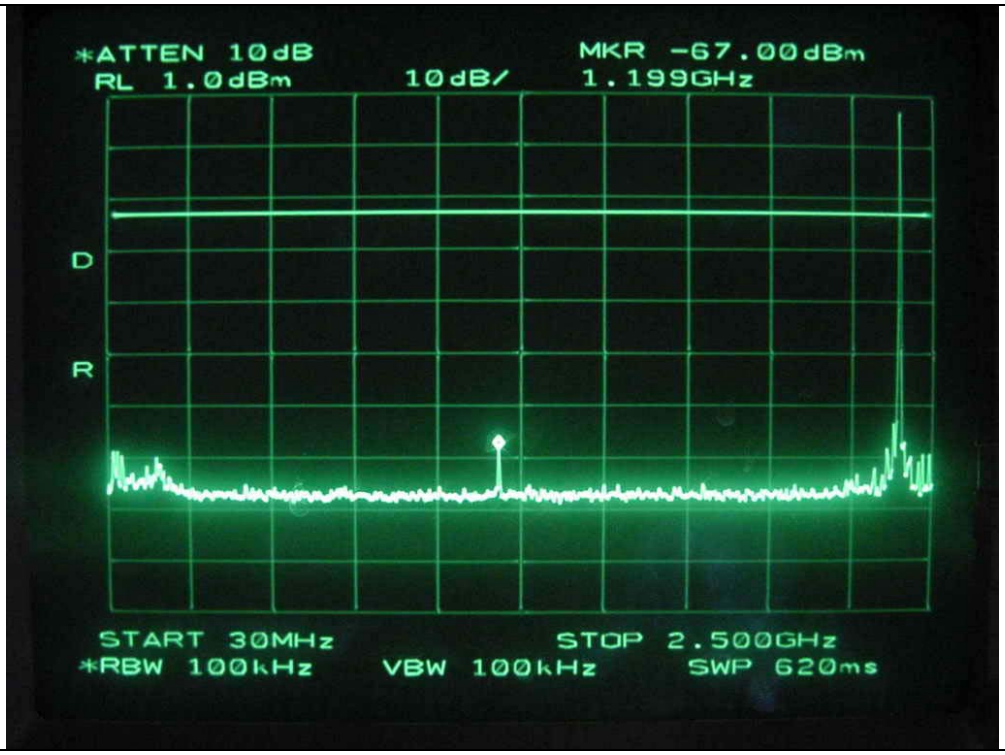
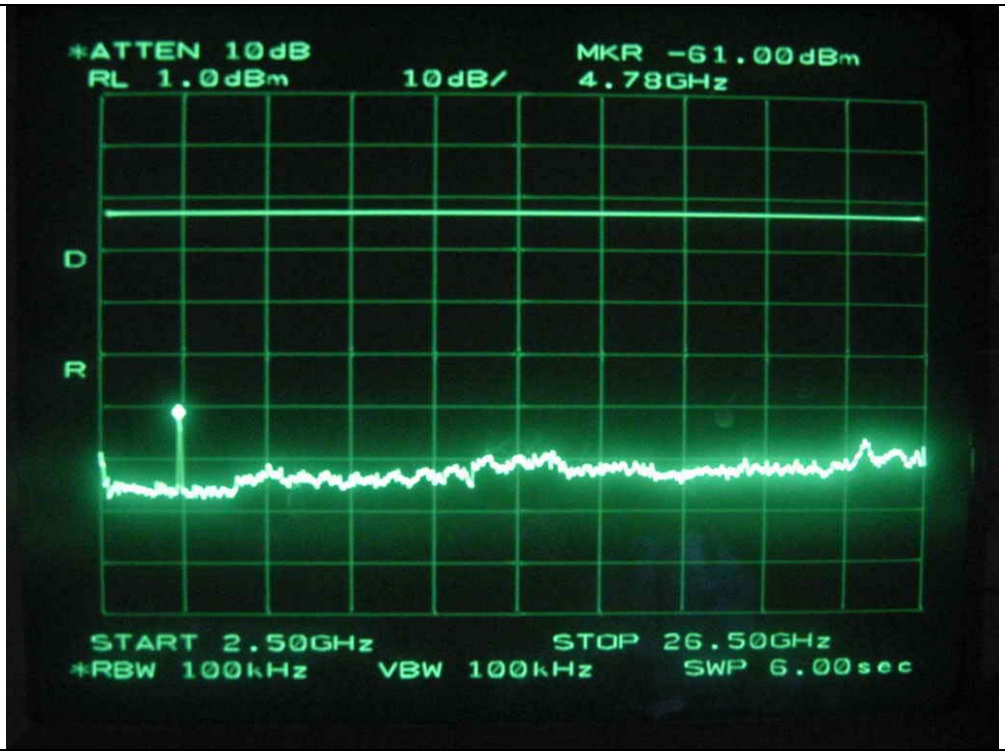


Low Channel



Low Channel

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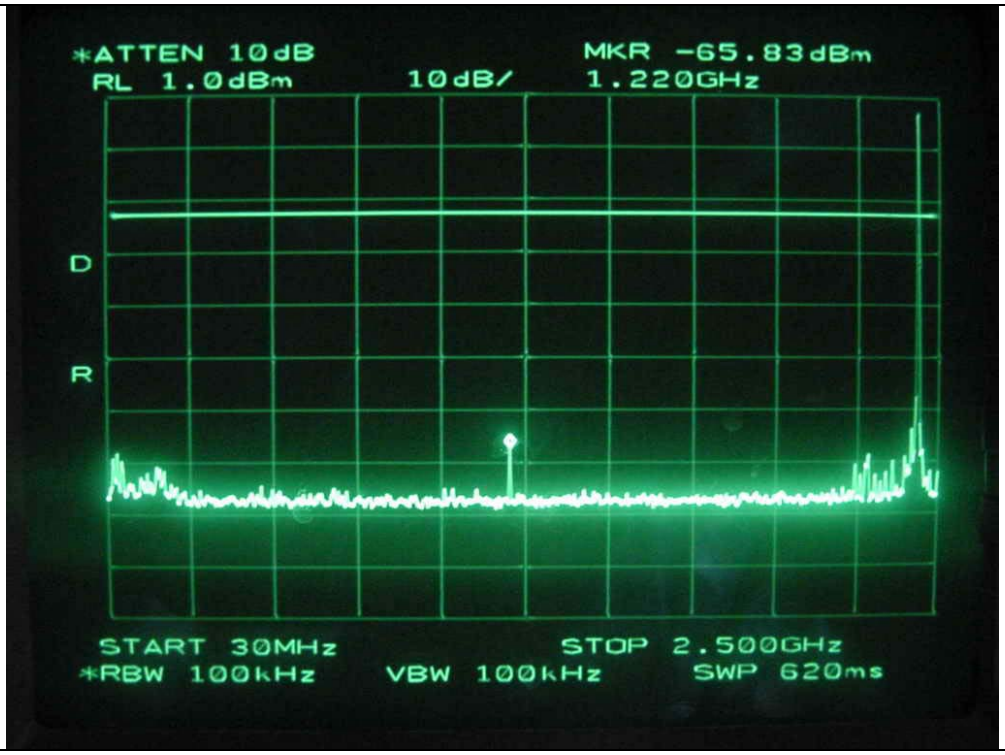
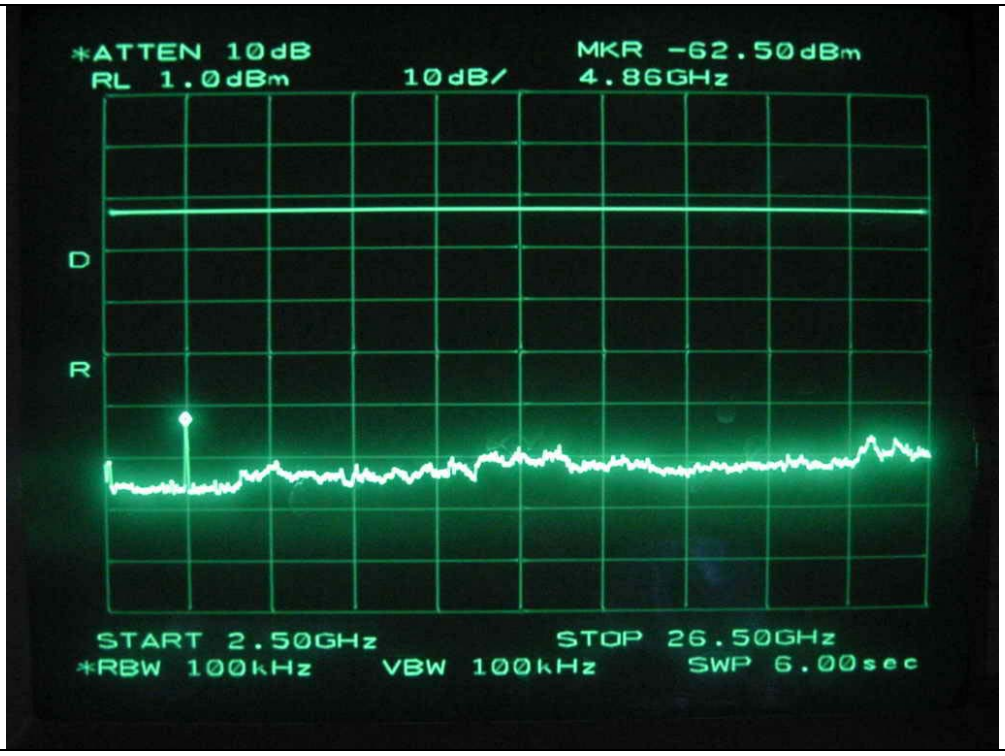


Middle Channel



Middle Channel

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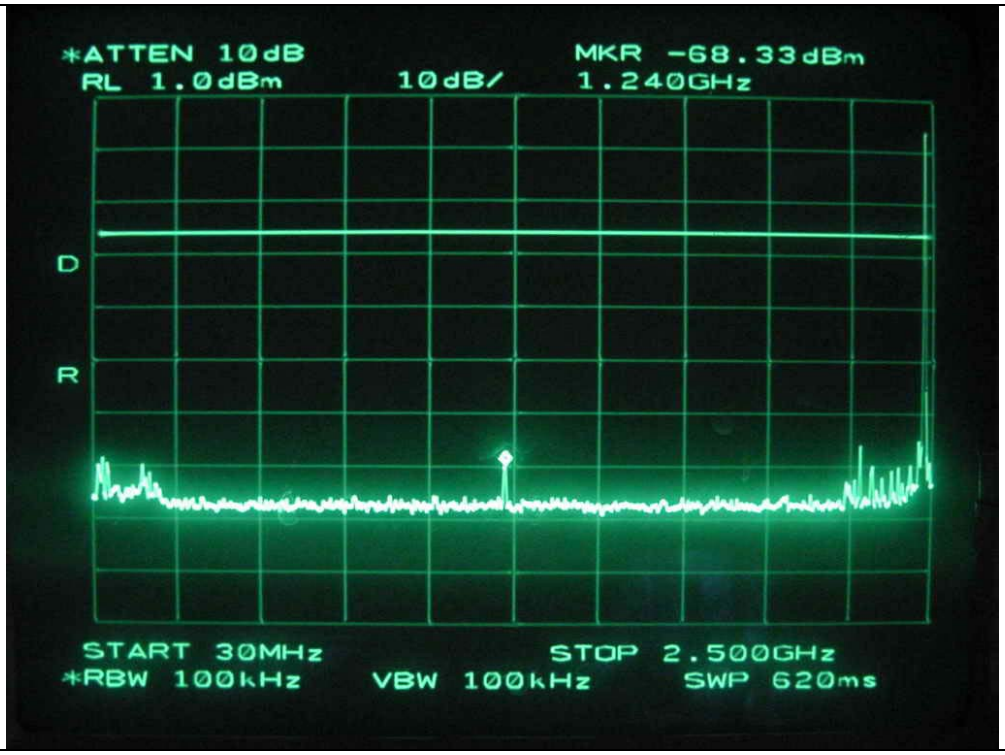
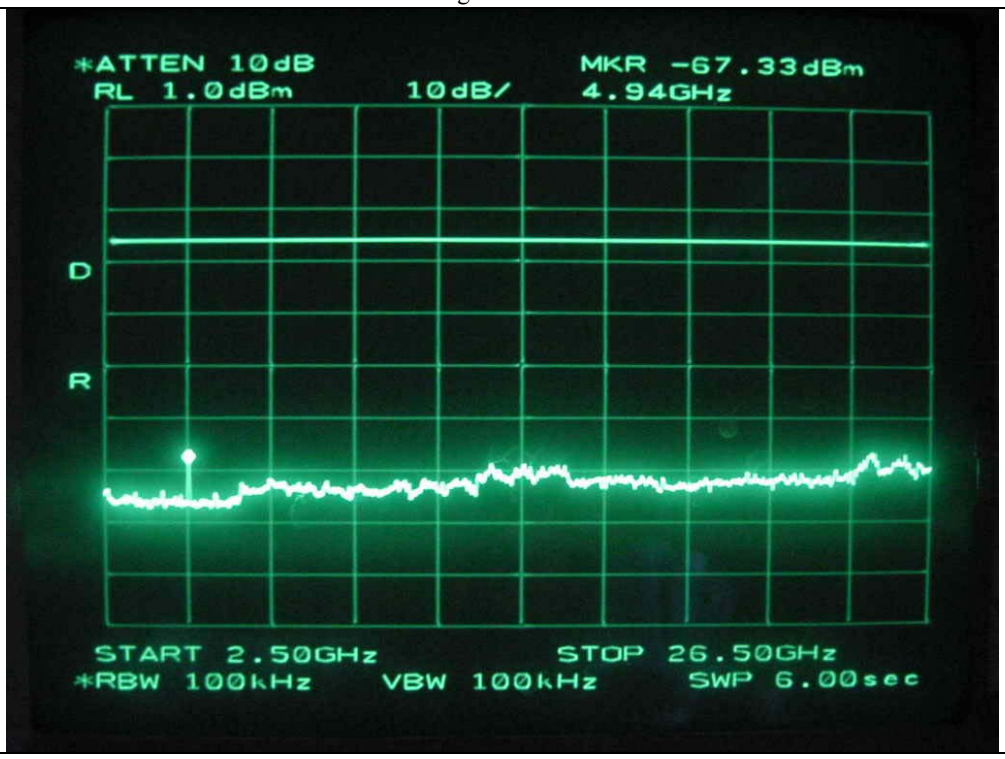


High Channel



High Channel

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7.6.5.2. Test data for radiated emission

7.6.5.2.1. Radiated Emission which fall in the Restricted Band

-. Test Date : September 29, 2006
-. 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 : 1m
-. Operating Condition : Low / High Channel
-. 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)
Test Data for Low Channel										
2389.87	38.50	Peak	H	27.64	1.33	26.1		41.37	74.00	-32.63
	27.00	Average	H					29.87	54.00	-24.13
	38.33	Peak	V					41.20	74.00	-32.80
	27.67	Average	V					30.54	54.00	-23.46
Test Data for High Channel										
2483.53	38.00	Peak	H	27.59	1.33	26.1		40.82	74.00	-33.19
	27.67	Average	H					30.49	54.00	-23.52
	38.67	Peak	V					41.49	74.00	-32.52
	27.50	Average	V					30.32	54.00	-23.69

Tabulated test data for Restricted Band

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

Tested by: Ki-Hong, Nam / Test Engineer

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7.6.5.2.2. Spurious & Harmonic Radiated Emission

-. Test Date : September 29, 2006
-. 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 : 1m
-. 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)
Test Data for Low Channel										
2402.00	55.33	Peak	H	27.30	1.50			84.13	-	
	60.17	Peak	V					88.97	-	
4804.00*	38.00	Peak	H	31.60	3.30	26.10		46.80	74.00	-27.20
	27.00	Average	H					35.80	54.00	-18.20
	38.50	Peak	V					47.30	74.00	-26.70
	26.50	Average	V					35.30	54.00	-18.70
Test Data for Middle Channel										
2441.00	54.50	Peak	H	27.42	1.50			83.42	-	
	59.83	Peak	V					88.75	-	
4882.00*	37.83	Peak	H	31.74	3.38	26.10		46.85	74.00	-27.15
	27.00	Average	H					36.02	54.00	-17.98
	37.17	Peak	V					46.19	74.00	-27.81
	26.67	Average	V					35.69	54.00	-18.31

Tabulated test data for Restricted Band

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

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-Continued

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 High Channel										
2480.00	53.25	Peak	H	27.53	1.50			82.28	-	
	59.17	Peak	V					88.20	-	
4960.00*	37.67	Peak	H	31.87	3.46	26.10		46.90	74.00	-27.10
	26.67	Average	H					35.90	54.00	-18.10
	36.83	Peak	V					46.06	74.00	-27.94
	26.50	Average	V					35.73	54.00	-18.27

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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7.7 PEAK POWER SPECTRUL DENSITY

7.7.1 Operating environment

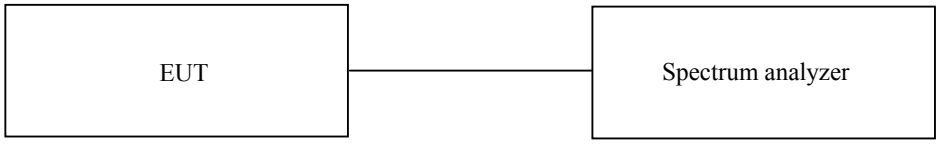
Temperature : 22°C

Relative humidity : 41 %

7.7.2 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 same as above resolution, 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.



7.7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	June 22, 2006

All test equipment used is calibrated on a regular basis.

7.7.4 Test data

-. Test Date : September 21, 2006

-. Result : PASSED BY –20.00 dB at Low and Middle Channels

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2402	-12.00	8.0	-20.00
Middle	2441	-12.00	8.0	-20.00
High	2480	-15.00	8.0	-23.00

Tabulated test data for Peak Power Spectral Density.

Remark: See next page for measurement data.

Tested by: Ki-Hong, Nam / Test Engineer

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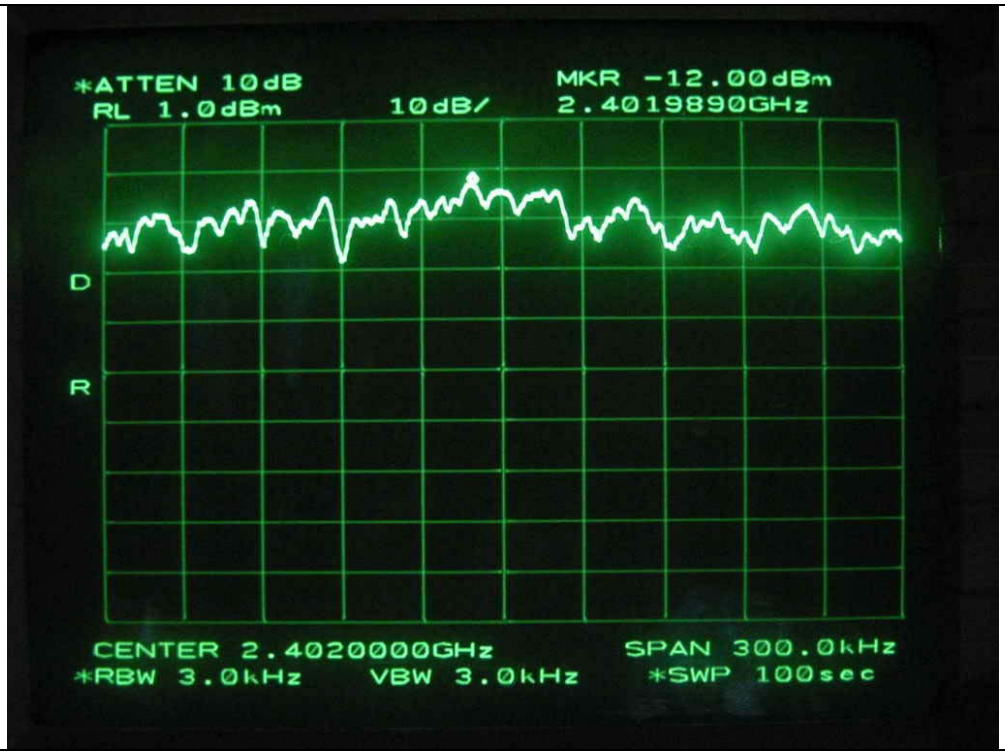
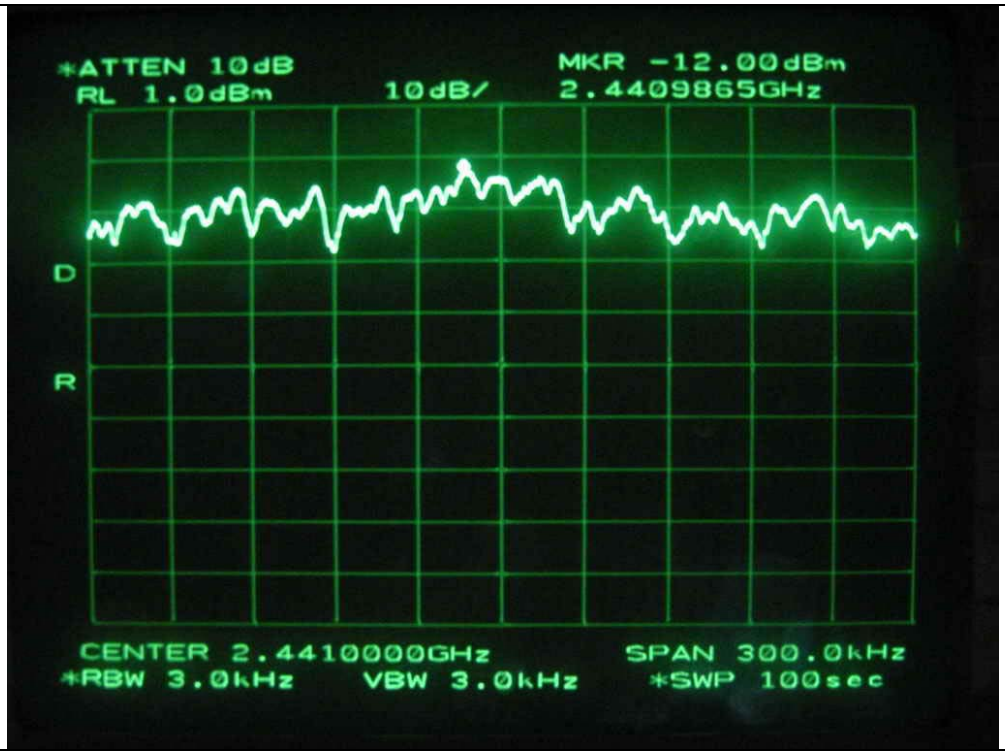


Low Channel



Middle Channel

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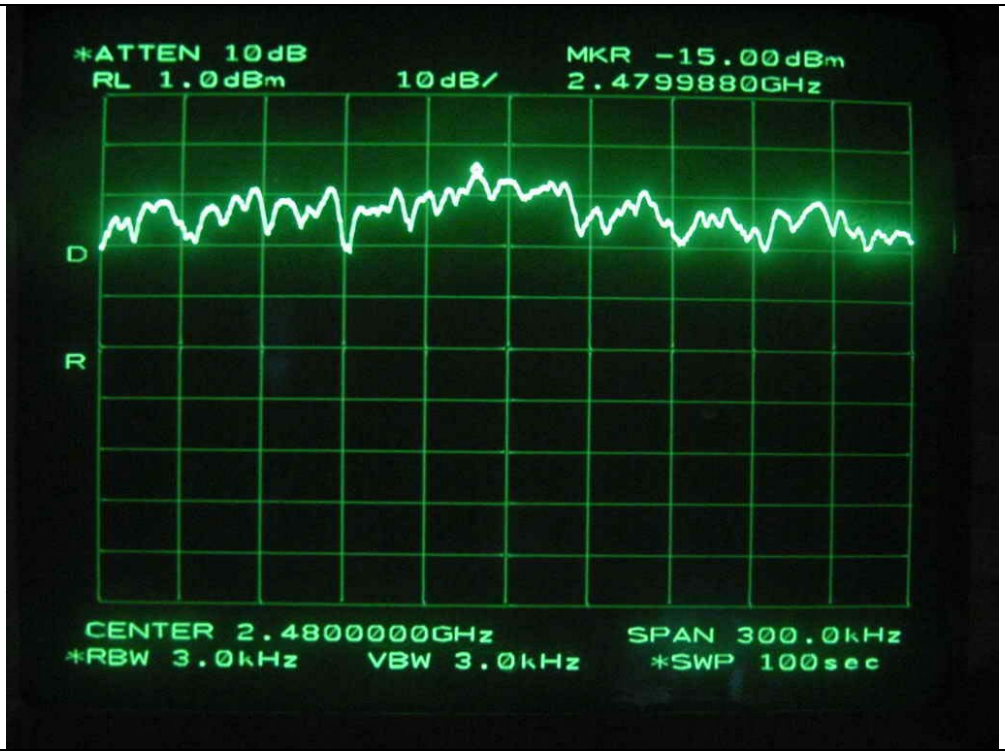

High Channel

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8. RADIO FREQUENCY EXPOSURE

8.1 RF Exposure Limit

According to the FCC rule §1.1310, the limit for General Population/Uncontrolled exposure is 1mW/cm² for the device operating 1,500~100,000 MHz.

8.2 EUT Description

Kind of EUT	Mobile Printer with Bluetooth
Operating Frequency Band	☐ WLAN: 2400 ~ 2483.5 MHz ☐ WLAN: 5180 ~ 5320 MHz / 5500 ~ 5700 MHz ☐ WLAN: 5745 ~ 5825 MHz ■ Bluetooth: 2400 ~ 2483.5 MHz
Device Category	■ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Max. Output Power	0 dBm (1mW) @2402MHz
Used Antenna	Chip Type Antenna
Used Antenna Gain	Bluetooth: 0 dBi
Exposure Evaluation Applied	☐ MPE ☐ SAR ■ N/A

8.3 Test Result

According to the rule, §1.1307(b) (1) and §2.1093, PORTABLE devices using WLAN and Bluetooth technology according to §15.247 are exempt from the regulation.

Also, SAR evaluation is not required for the PORTABLE Device while its maximum output power is lower than threshold: 60/f(GHz) = 60/2.402 = 24.98mW.

So, the EUT meets the RF exposure requirement.

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9. RADIATED EMISSION TEST

9.1 Operating environment

Temperature : 22°C

Relative humidity : 41 %

9.2 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.

9.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 300 MHz : ± 4.43 dB

Radiated emission electric field intensity, 300 MHz ~ 1000 MHz : ± 3.80 dB

Measurement uncertainty is calculated in accordance with WECC 19-1990. The measurement uncertainty is given with a confidence of 95% with the coverage factor, k=2.

9.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Dec 20, 2005
■ -	MA240	HD GmbH	Antenna Master	N/A	N/A
■ -	HD100	HD GmbH	Position Controller	N/A	N/A
■ -	DS420S	HD GmbH	Turn Table	N/A	N/A
■ -	VHA9103	Schwarzbeck	Biconical Antenna	91031852	Feb 13, 2006
■ -	9108-A(494)	Schwarzbeck	Log Periodic Antenna	62281001	Feb 13, 2006

All test equipment used is calibrated on a regular basis.

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9.5 Test data

-. Test Date : September 19, 2006

-. Operating Condition : Bluetooth Mode

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30MHz ~ 1000MHz

-. Measurement distance : 3m

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Detector Mode	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
324.40	22.40	H	Q.P.	15.37	4.00	41.77	47.00	-5.23
328.00	17.20	H	Q.P.	15.47	4.02	36.69	47.00	-10.31
329.30	22.00	H	Q.P.	15.50	4.03	41.53	47.00	-5.47
339.17	18.00	H	Q.P.	15.76	4.11	37.87	47.00	-9.13
368.88	10.10	H	Q.P.	16.29	4.28	30.67	47.00	-16.33
437.50	9.49	V	Q.P.	17.85	4.48	31.82	47.00	-15.18

Tabulated test data for Radiated Electromagnetic Field

Remark: “H”: Horizontal, “V”: Vertical. “O.P.”: Quasi-Peak Detector Mode

Tested by: Ki-Hong, Nam / Test Engineer

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