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

Test Report No.	**: E05OR-001**
Applicant	**: Altgen Co., Ltd.**
Address	**: 376-2, Seogyo-Dong, Mapo-Gu, Seoul Korea 121-869**
Manufacturer	**: JAS Teletec**
Address	**: 504-29, JAS B/D Younnam-Dong, Mapo-Gu, Seoul Korea**
Type of Equipment	**: Bluetooth MP3 Phone**
FCC ID.	**: TM8PAN300VT**
Model Name	**: PAN-300VT**
Serial number	**: None**
Total page of Report	**: 39 pages (including this page)**
Date of Incoming	**: July 14, 2005**
Date of issuing	**: October 04, 2005**

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	: Altgen Co., Ltd.
ADDRESS	: 376-2, Seogyo-Dong, Mapo-Gu, Seoul Korea 121-869
CONTACT PERSON	: Mr.Davin Weon / Manager
TELEPHONE NO	: +82-2-325-4446
FCC ID	: TM8PAN300VT
MODEL NAME	: PAN-300VT
SERIAL NUMBER	: N/A
DATE	: October 04, 2005

EQUIPMENT CLASS	***DSS-Part 15 Spread Spectrum Transmitter***
KIND OF EQUIPMENT	Bluetooth MP3 Phone
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	No
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.

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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) (1)	Maximum Peak Conducted Output Power	Met the Limit / PASS
15.247 (b) (5)	Radio Frequency Exposure Level	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	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, General Requirement	Met the Limit / PASS
15.207 and 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: 2003. 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 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyeonggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Federal Communications Commission on April 04, 2003 (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 Altgen Co., Ltd., Model: PAN-300VT (referred to as the EUT in this report) is a Bluetooth MP3 Phone. The EUT has function for MP3 Playback, Phone, FM Radio Reception, and supports USB2.0. The device is composite device, which has function for DSS-Spread Spectrum Type and JBP- Part 15 Class B Computing Device peripheral. So the report for Equipment Type, JBP shall be issued another test report number. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Portable Device
OPERATING FREQUENCY	2.402 ~ 2.4800 GHz
OUTPUT POWER	Typ. 1dBm
ANTENNA	Inserted into the main board
ANTENNA GAIN	2.15 dBi
CHANNEL	79 Channels
SPREAD SPECTRUM TYPE	FHSS
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	FHHS RF Module: 32, 12.288, 10 MHz Main Board and Core Board: 19.2MHz, 12MHz x 2
USED BOARD NAME	Main Board, Core Board, RF Module
NUMBER OF LAYER	Main Board: 4 Layers, Core Board: 6 Layers RF Module: 4 Layers
USED BLUETOOTH MODULE	Manufacturer: LG Innotek Co., Ltd, Model: LBMA-2T86A
POWER REQUIREMENT	3.7V Li-ion Battery
EXTERNAL CONNECTOR	USB, Audio IN/Out 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

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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	Altgen Co., Ltd.	N/A	N/A
CORE BOARD	Altgen Co., Ltd.	N/A	N/A
LCD	N/A	N/A	N/A
RF MODULE	LG Innotek Co., Ltd	LBMA-2T86A	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
PAN-300VT	JAS Teletec	TM8PAN300VT	Bluetooth MP3 Phone (EUT)	HOST
PLL011	Dell Computer Corp.	DoC	Laptop PC (HOST)	EUT

5.4 Mode of operation during the test

The EUT was connected with a laptop PC and then the PC controlled channel changing only. The EUT continuously transmitted max. power level at each channel.

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5.5 Configuration of Test System

Line Conducted Test: The power cord of the HOST 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: 2003 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: 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.

5.6 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 mounted on the main board in 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	
Battery Charging Mode	X

According to the product specification, the device shall be operated by battery, but the battery in the EUT shall be charged by USB port and the EUT cannot transmit RF carrier at that charging time.

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	
Receiving and Transmitting mode	X

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7. 20dB BANDWIDTH

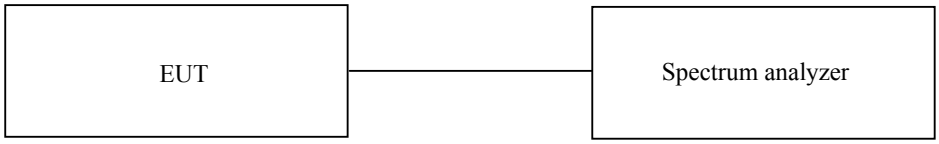
7.1 Operating environment

Temperature : 24°C

Relative humidity : 51 %

7.2 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.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

7.4 Test data

-. Test Date : August 26, 2005

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (kHz)	LIMIT (kHz)	MARGIN (kHz)
Low	2402	942	1000	-58
Middle	2441	933	1000	-67
High	2480	933	1000	-67

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

Tested by: Ki-Hong, Nam / Test Engineer

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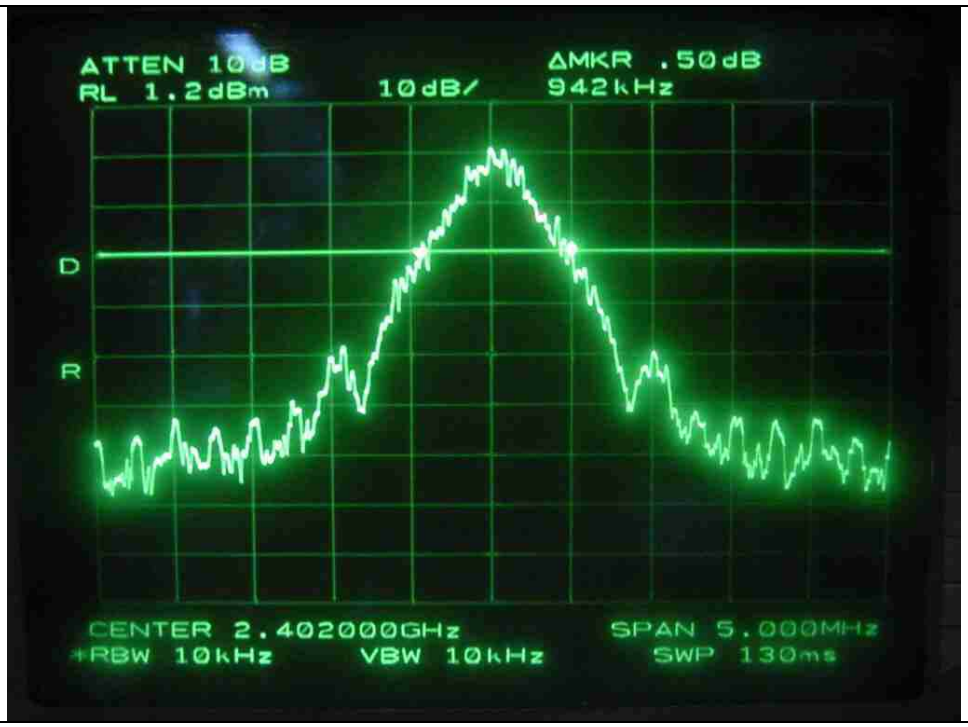
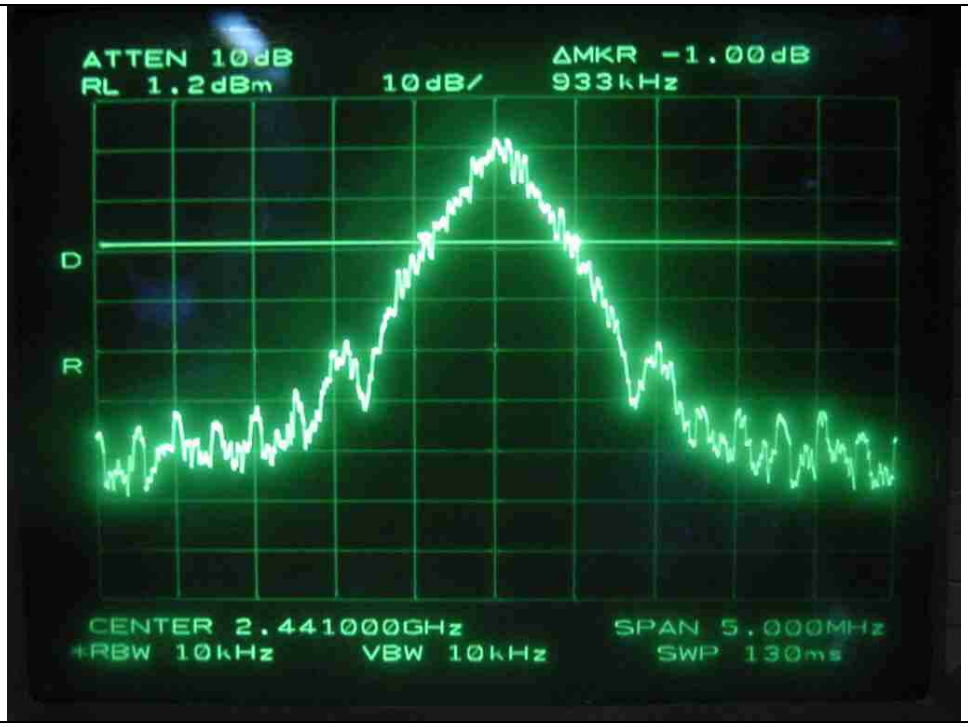
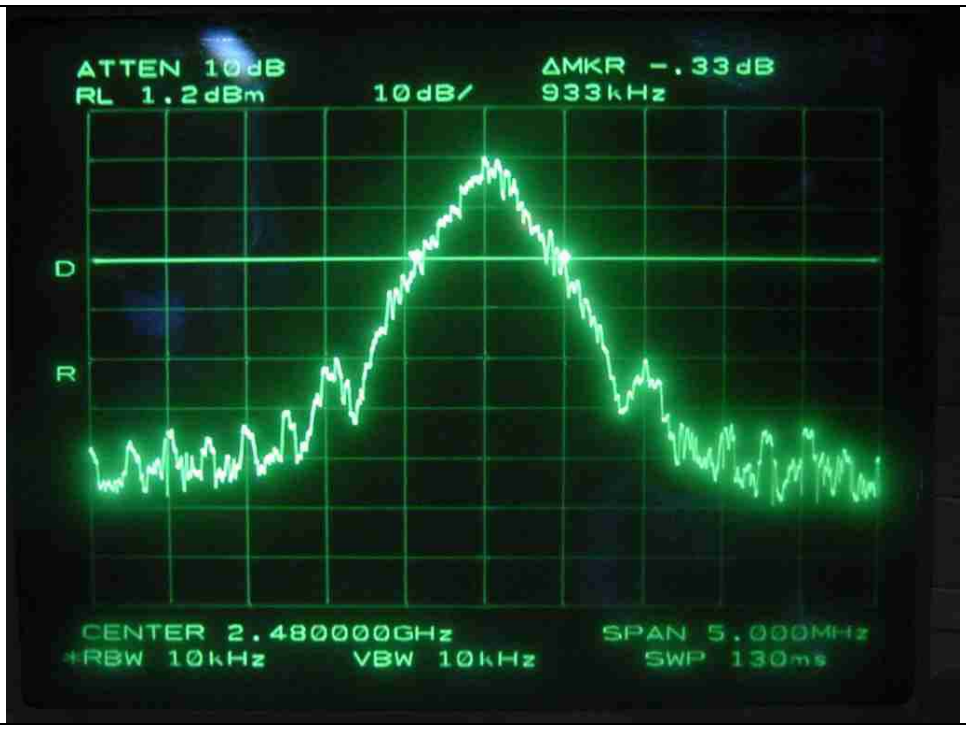


Low Channel



Middle Channel



High Channel

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8. HOPPING FREQUENCY SEPARATION

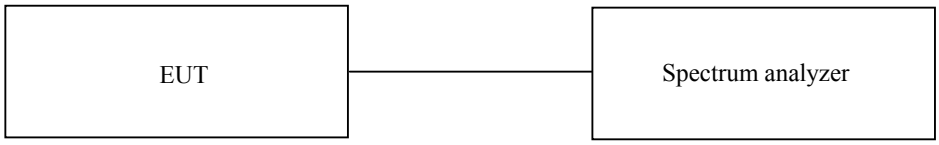
8.1 Operating environment

Temperature : 24°C

Relative humidity : 51 %

8.2 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 , then 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.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

8.4 Test data

-. Test Date : August 26, 2005

-. Test Result : Pass

MEASURED VLAUE (kHz)	LIMIT, 20dB Bandwidth (kHz)	MARGIN (kHz)
1020	944	-76

Tested by: Ki-Hong, Nam / Test Engineer

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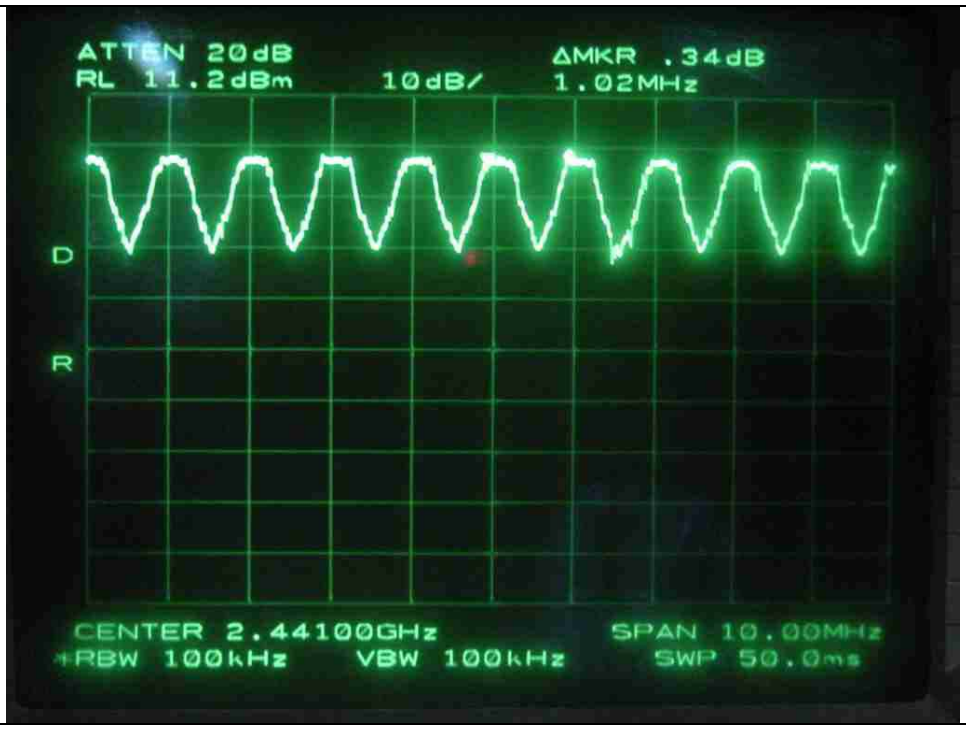

ATTEN 20dB
RL 11.2dBm
10dB/
ΔMKR .34dB
1.02MHz
D
R
CENTER 2.44100GHz
SPAN 10.00MHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms

9. NUMBER OF HOPPING CHANNELS

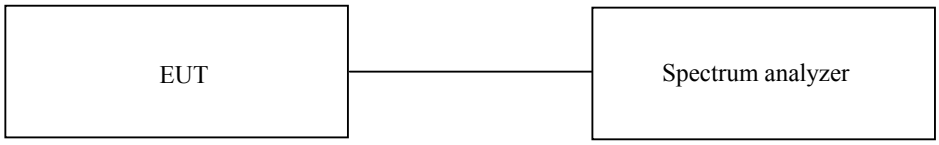
9.1 Operating environment

Temperature : 25°C

Relative humidity : 51 %

9.2 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.



9.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

9.4 Test data

-. Test Date : August 26, 2005

-. Test Result : Pass

MEASURED VLAUE (Number)	LIMIT (Number)	MARGIN (Number)
79	Minimum of 75	4

Tested by: Ki-Hong, Nam / Test Engineer

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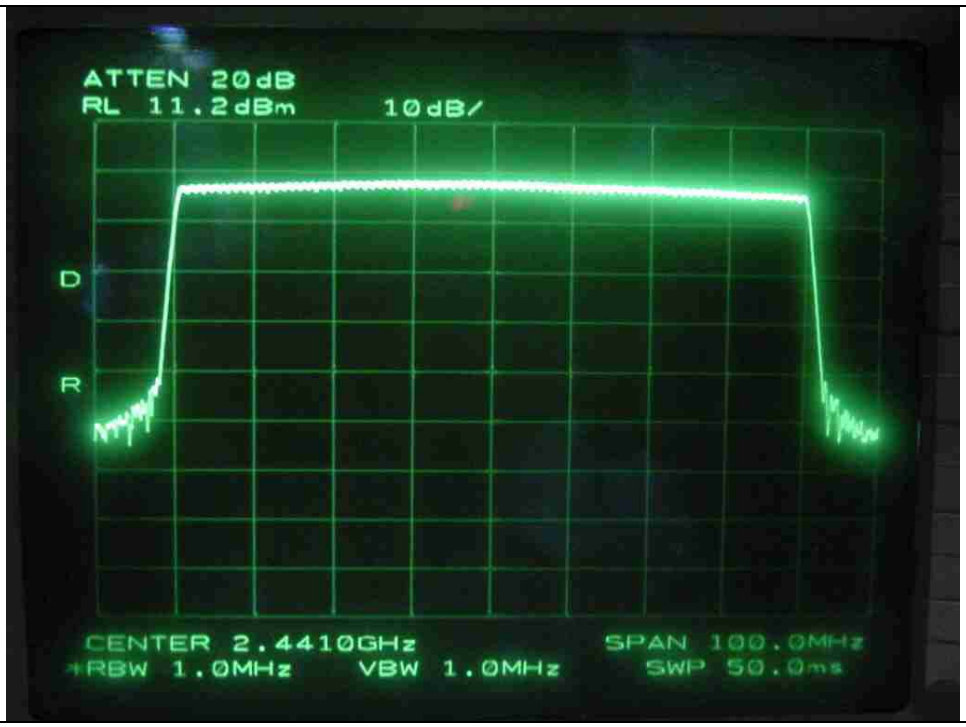
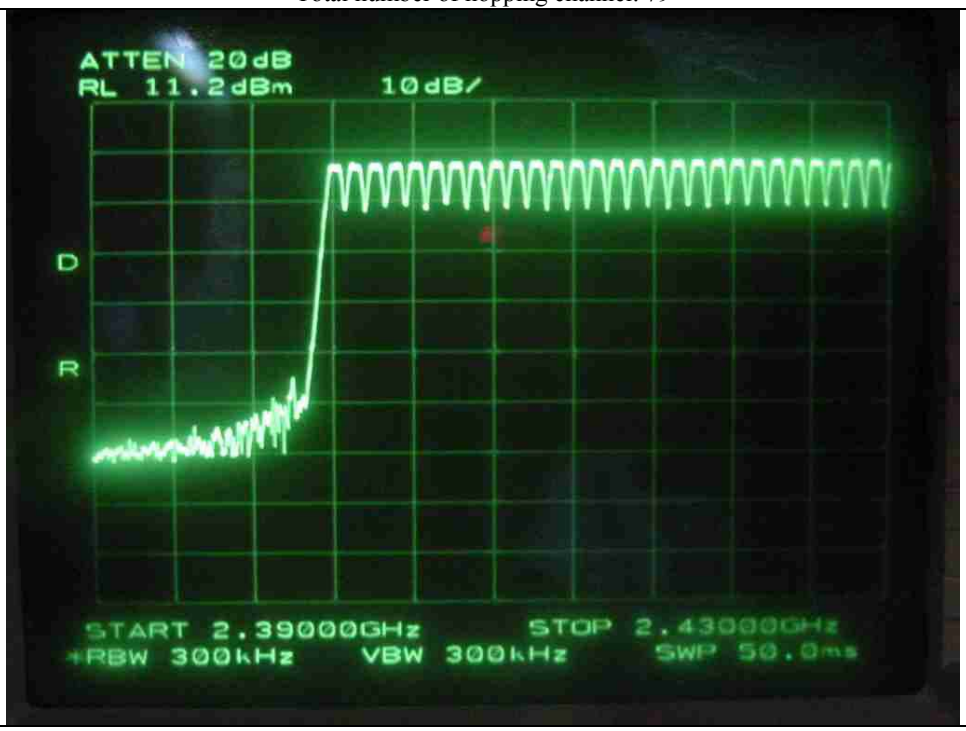


Total number of hopping channel: 79



Number of hopping channel: 28

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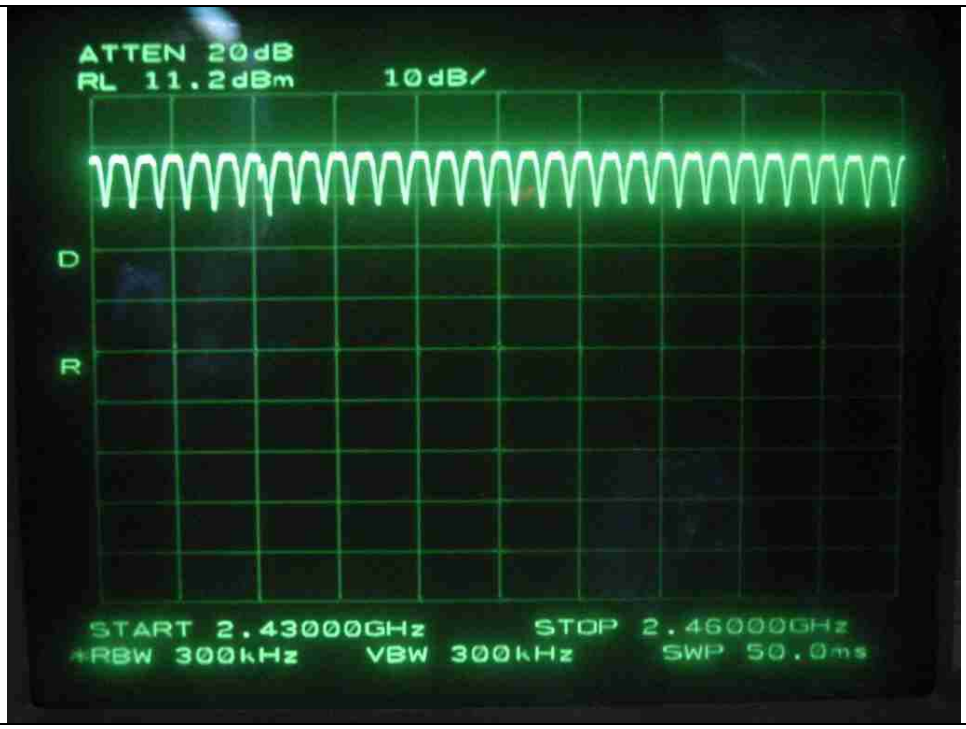
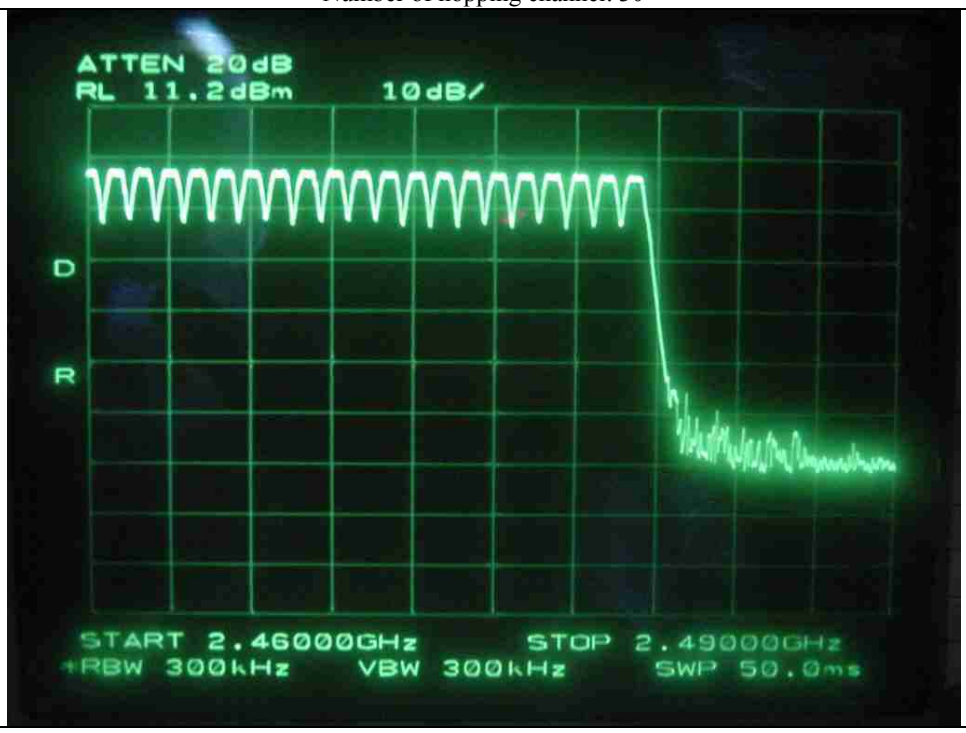


Number of hopping channel: 30



Number of hopping channel: 21

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10. TIME OF OCCUPANCY

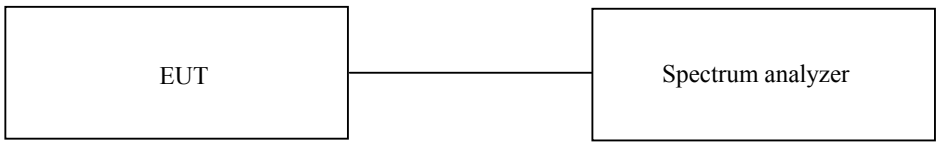
10.1 Operating environment

Temperature : 25°C

Relative humidity : 51 %

10.2 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.



10.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

10.4 Test data

-. Test Date : August 26, 2005

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	0.395	10.13	31.6	126.40	400	PASS
DH3	1.65	5.06	31.6	263.83	400	PASS
DH5	2.85	3.38	31.6	304.40	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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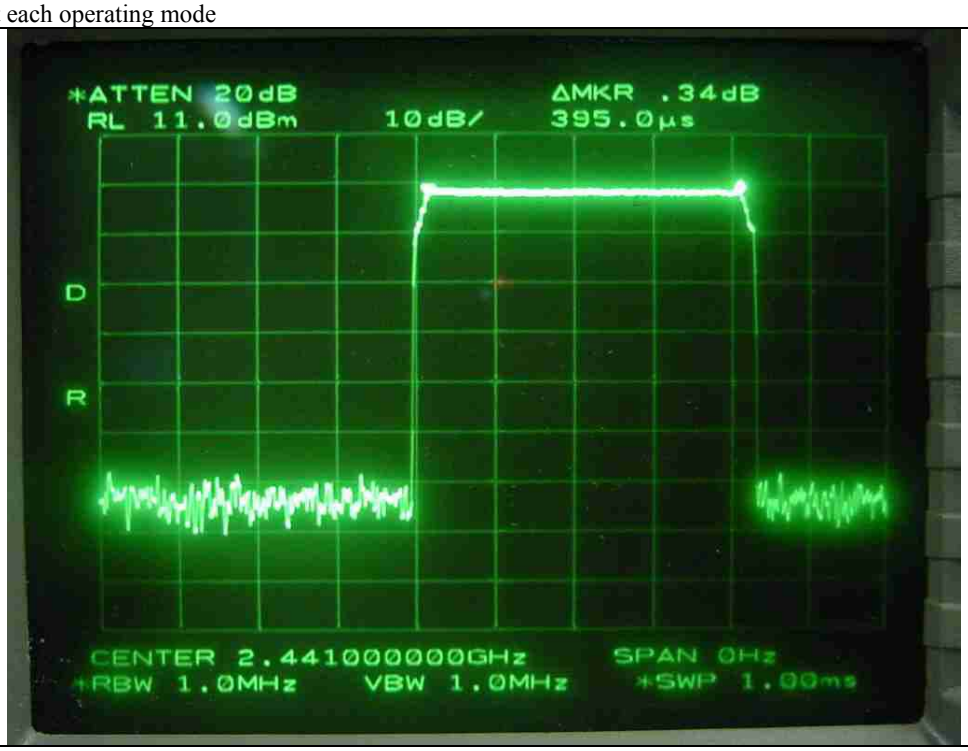
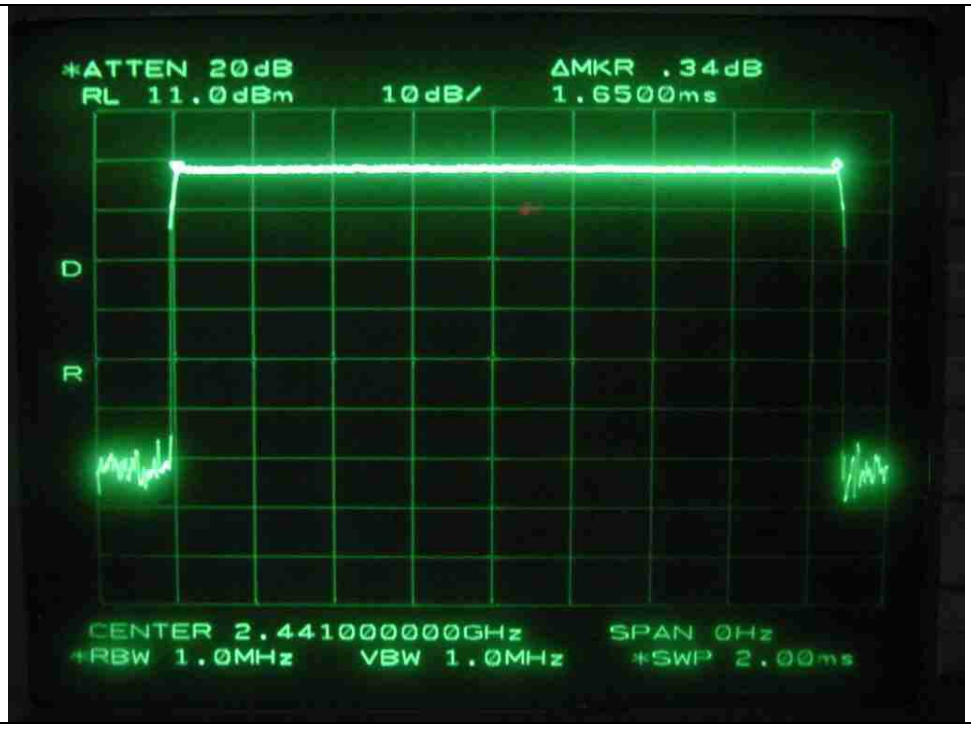
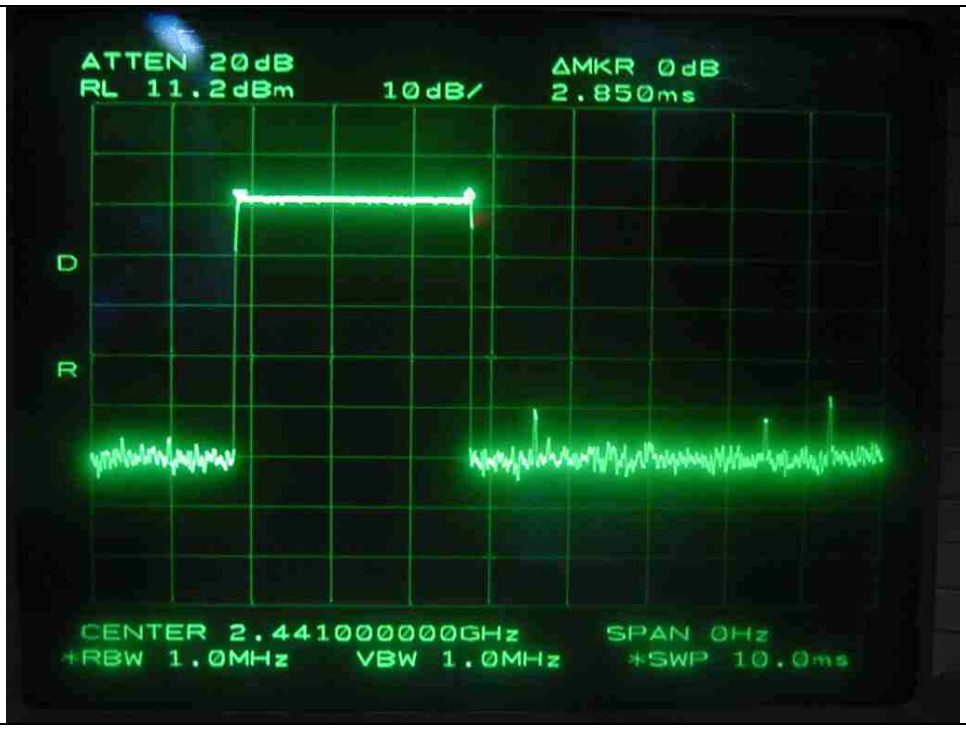
Pulse Time at each operating mode



DH1



DH3


ATTEN 20dB
RL 11.2dBm
10dB/
ΔMKR 0dB
2.850ms
D
R
CENTER 2.441000000GHz
SPAN 0Hz
RBW 1.0MHz
VBW 1.0MHz
SWP 10.0ms

DH5

11. MAXIMUM PEAK OUTPUT POWER

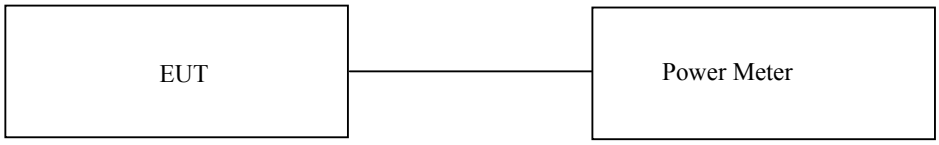
11.1 Operating environment

Temperature : 24°C

Relative humidity : 51 %

11.2 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.



11.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

11.4 Test data

-. Test Date : August 26, 2005

-. Test Result : Pass

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2402	-1.97	30.0	-31.97
Middle	2441	-0.80	30.0	-30.80
High	2480	-2.63	30.0	-32.63

Tested by: Ki-Hong, Nam / Test Engineer

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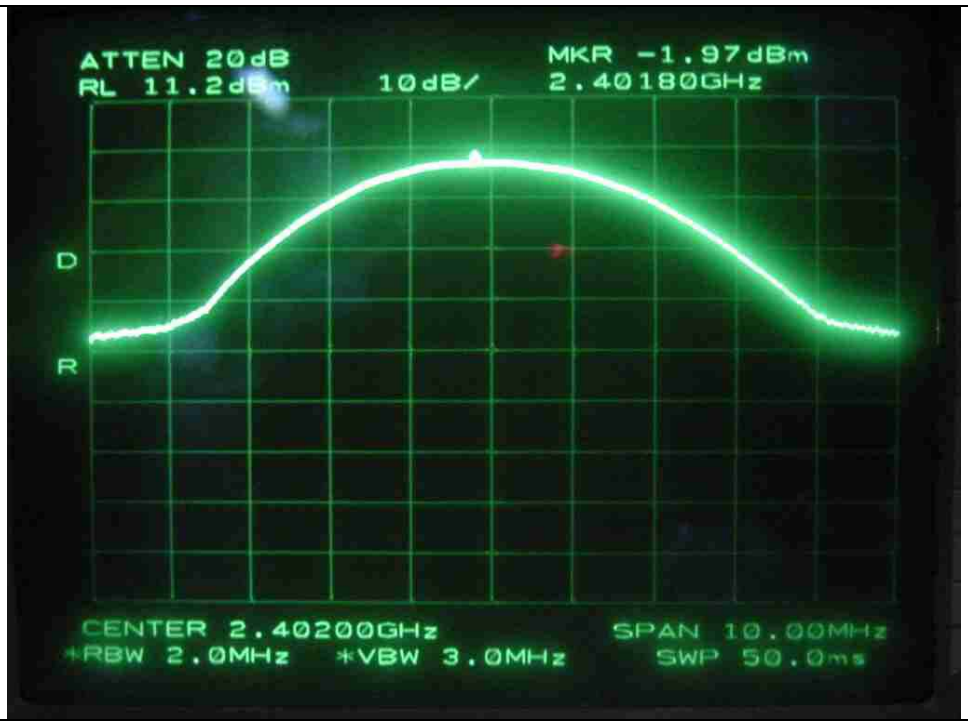
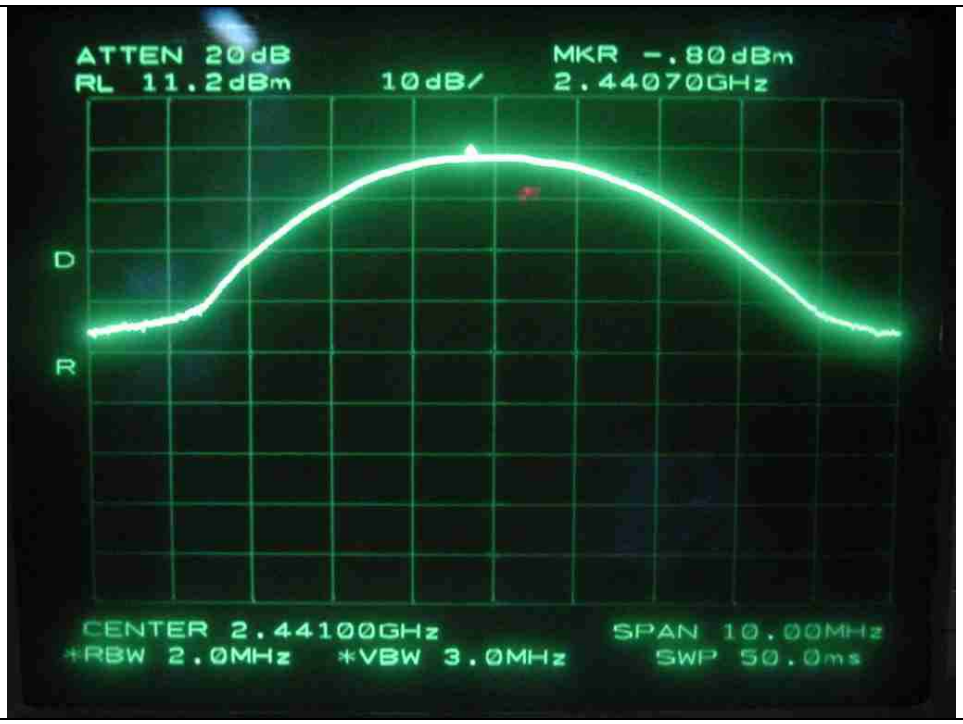
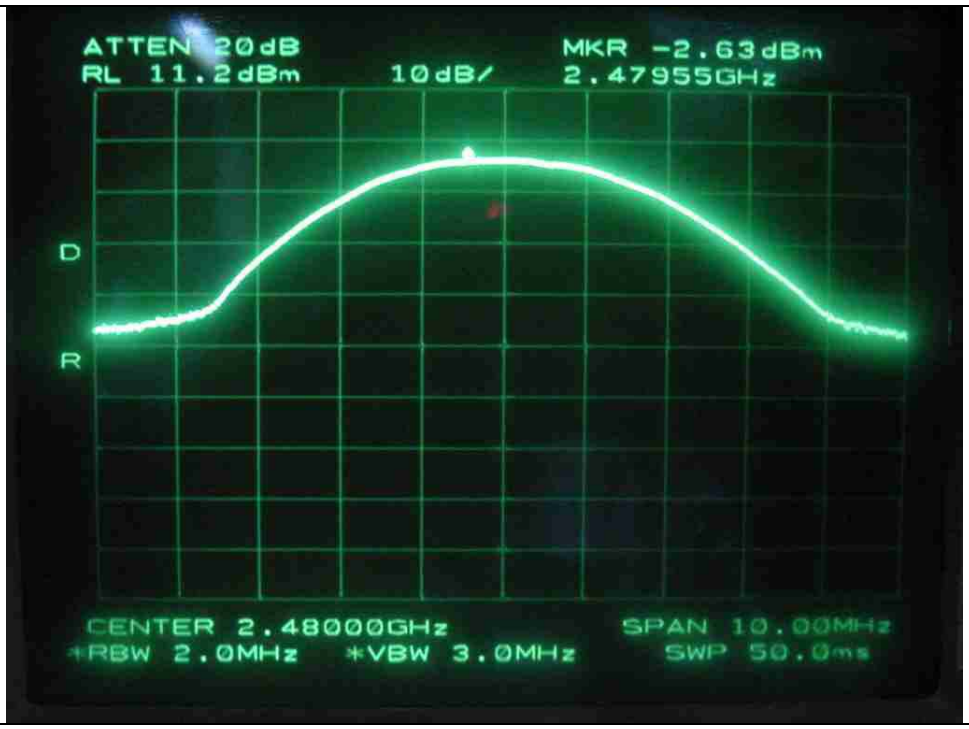


Low Channel



Middle Channel



High Channel

12. RADIO FREQUENCY EXPOSURE

12.1 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.

12.2 EUT Description

Kind of EUT	Bluetooth MP3 Phone
Operating Frequency Band	☐ WLAN: 2412 ~ 2462 MHz ☐ WLAN: 5180 ~ 5320 MHz / 5500 ~ 5700 MHz ☐ WLAN: 5745 ~ 5825 MHz ■ Bluetooth: 2402 ~ 2480MHz
Device Category	■ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☐ Others
Max. Output Power	-0.80 dBm (0.83mW) @2441MHz
Used Antenna	Single Antenna
Used Antenna Gain	2.15dBi
Exposure Evaluation Applied	☐ MPE ☐ SAR ■ N/A

12.3 Test Result

According to the rule, §1.1307(b) (1) and §2.1093, portable devices using 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) = 60/2.441 = 24.58mW.

SO, THE DEVICE MEETS THE RF EXPOSURE REQUIREMENT.

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13. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

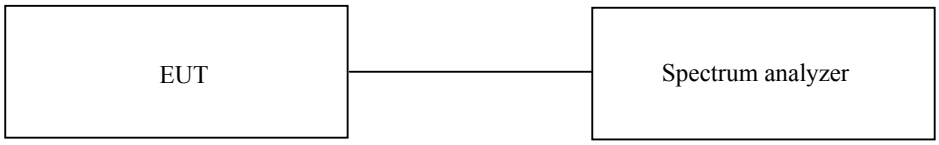
13.1 Operating environment

Temperature : 24 °C

Relative humidity : 41 %

13.2 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.



13.3 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.

13.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	Hewlett-Packard	Spectrum Analyzer	3650A00756	July 19, 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.

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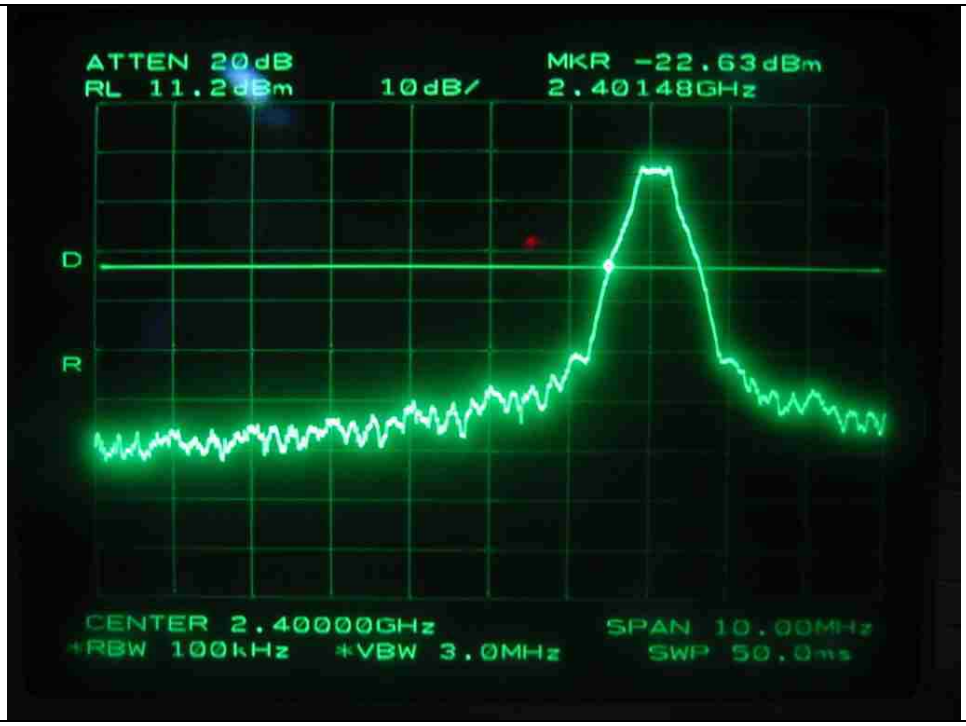
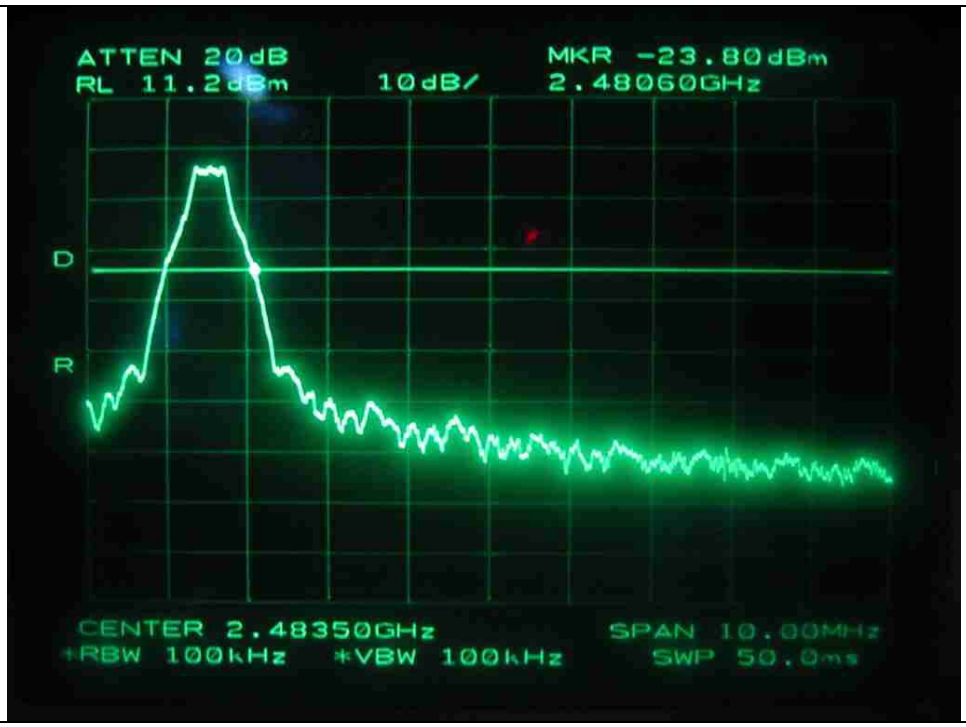
13.5. Test data

13.5.1. Test data for conducted emission



Low Channel



High Channel

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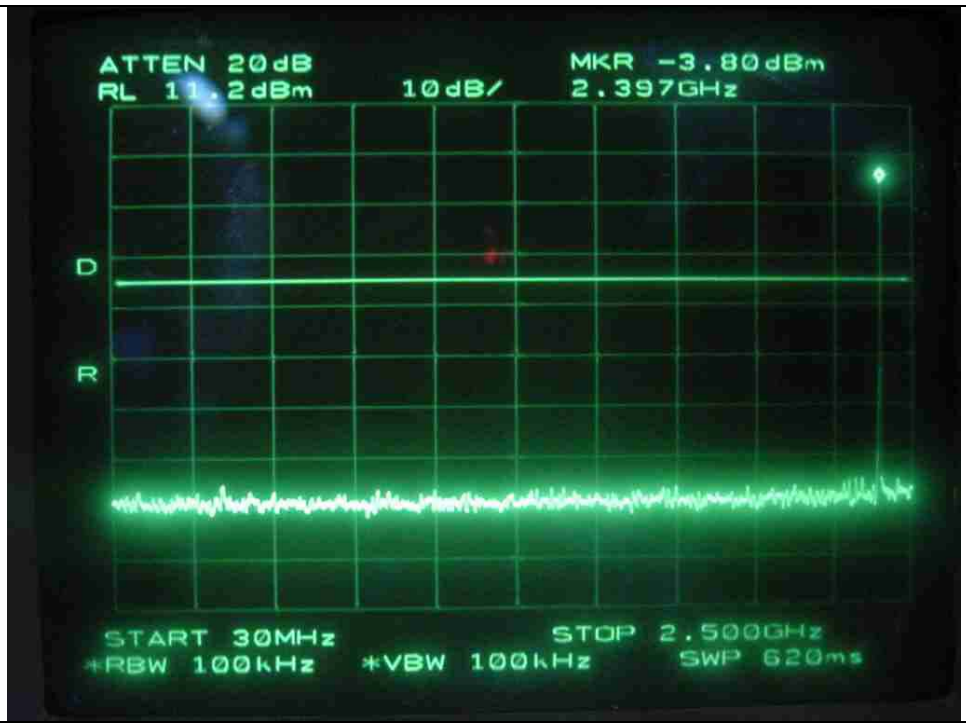
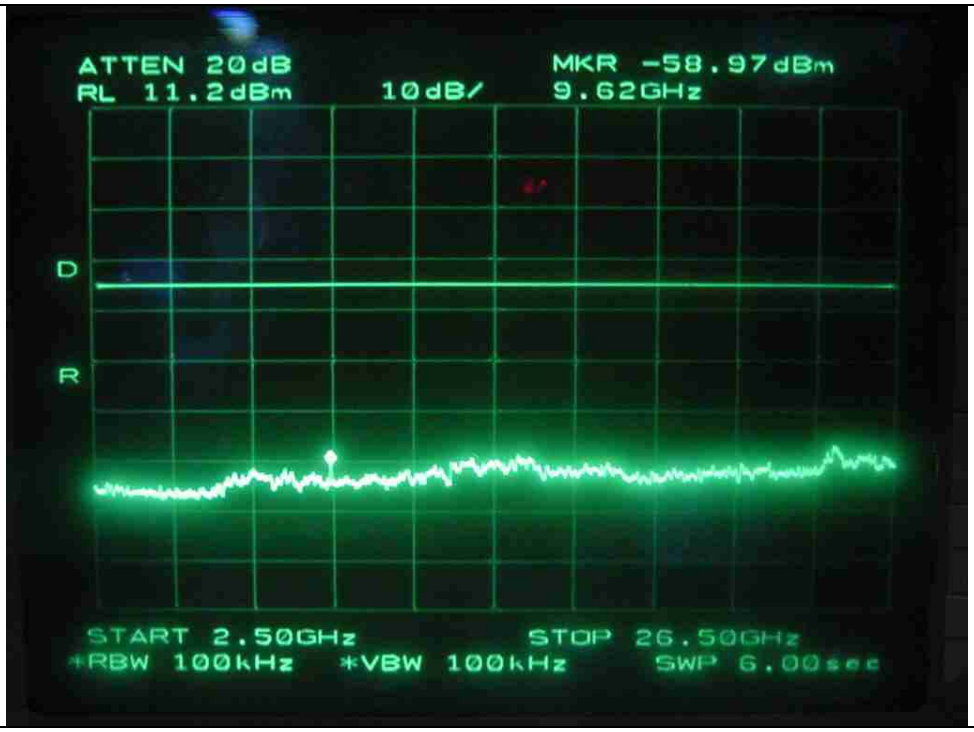


Low Channel



Low Channel

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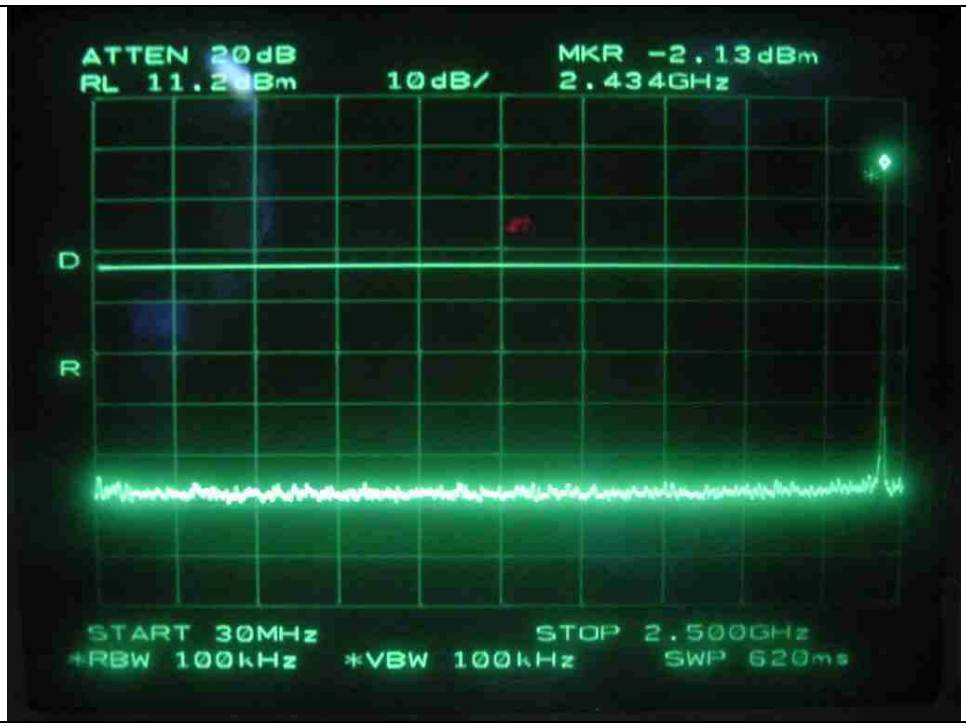
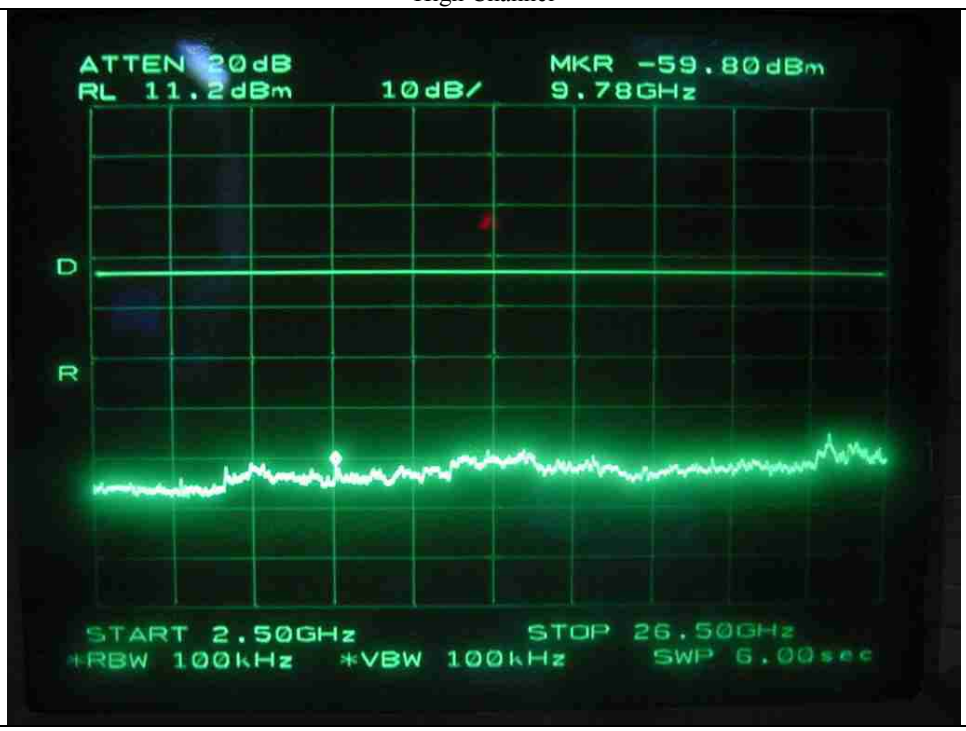


High Channel



High Channel

13.5.2. Test data for radiated emission

13.5.2.1. Radiated Emission which fall in the Restricted Band

-. Test Date : September 9, 2005
-. 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 (dB/m)	Cable Loss	Amp Gain	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Test Data for Low Channel									
2310~2390	It was not observed any emission from the EUT.								
Test Data for High Channel									
2483.5~2500	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

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13.5.2.2. Spurious & Harmonic Radiated Emission

-. Test Date : September 9, 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 ~ 25 GHz
-. Measurement distance : 1m
-. Result : PASSED BY –5.48 dB at Low Channel

Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Amp Gain	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Test Data for Low Channel									
It was not observed any emissions from the EUT up to 25GHz.									
Test Data for Middle Channel									
It was not observed any emissions from the EUT up to 25GHz.									
Test Data for High Channel									
It was not observed any emissions from the EUT 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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14. PEAK POWER SPECTRUL DENSITY

14.1 Operating environment

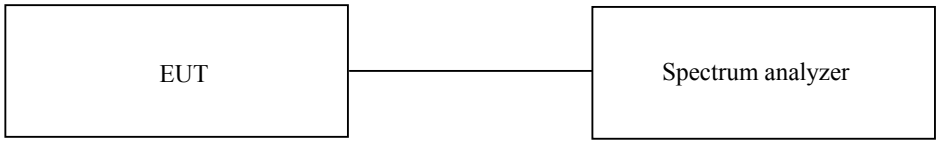
Temperature : 26°C

Relative humidity : 43 %

14.2 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.



14.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	8564E	HP	Spectrum Analyzer	3650A00756	July 19, 2005

All test equipment used is calibrated on a regular basis.

14.4 Test data

-. Test Date : August 26, 2005

-. Result : PASSED BY –19.97 dB at Middle Channel

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2402	-13.30	8.0	-21.30
Middle	2441	-11.97	8.0	-19.97
High	2480	-13.97	8.0	-21.97

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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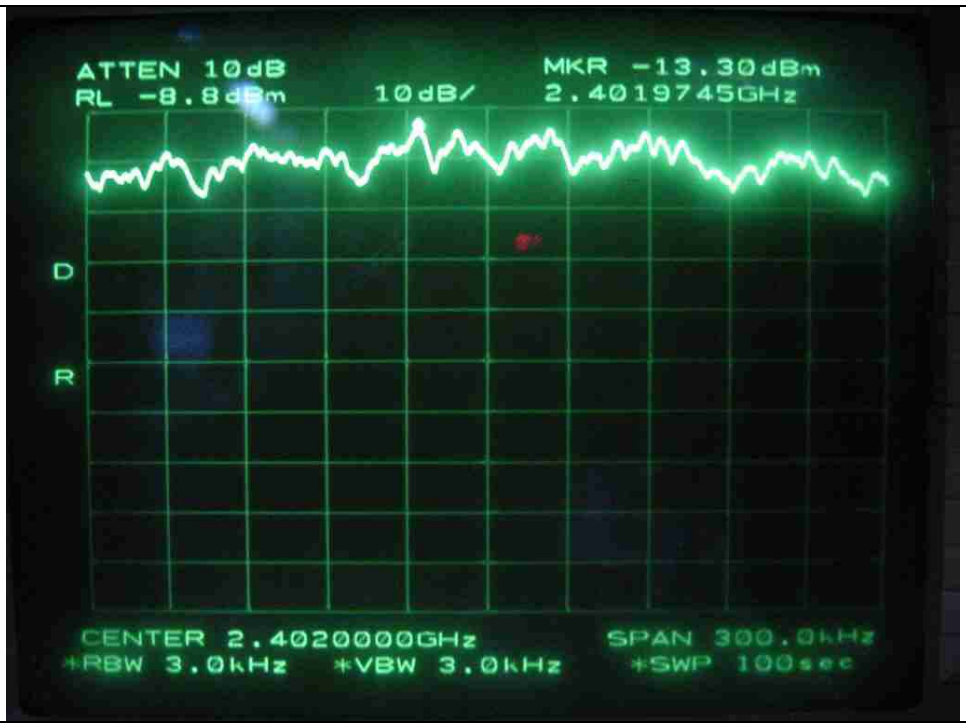
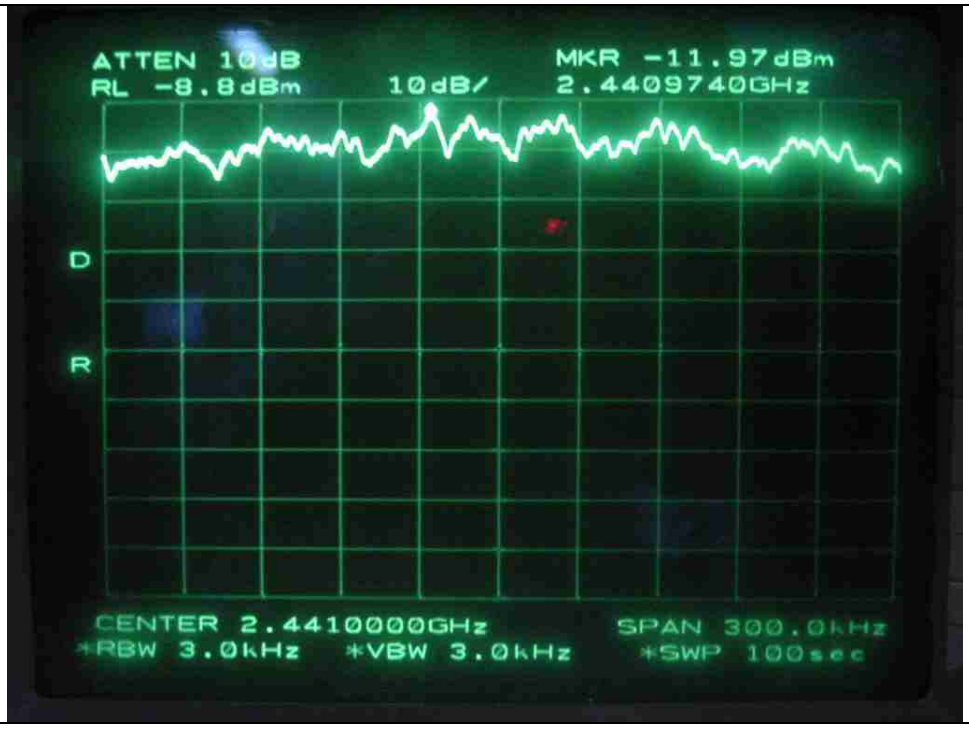
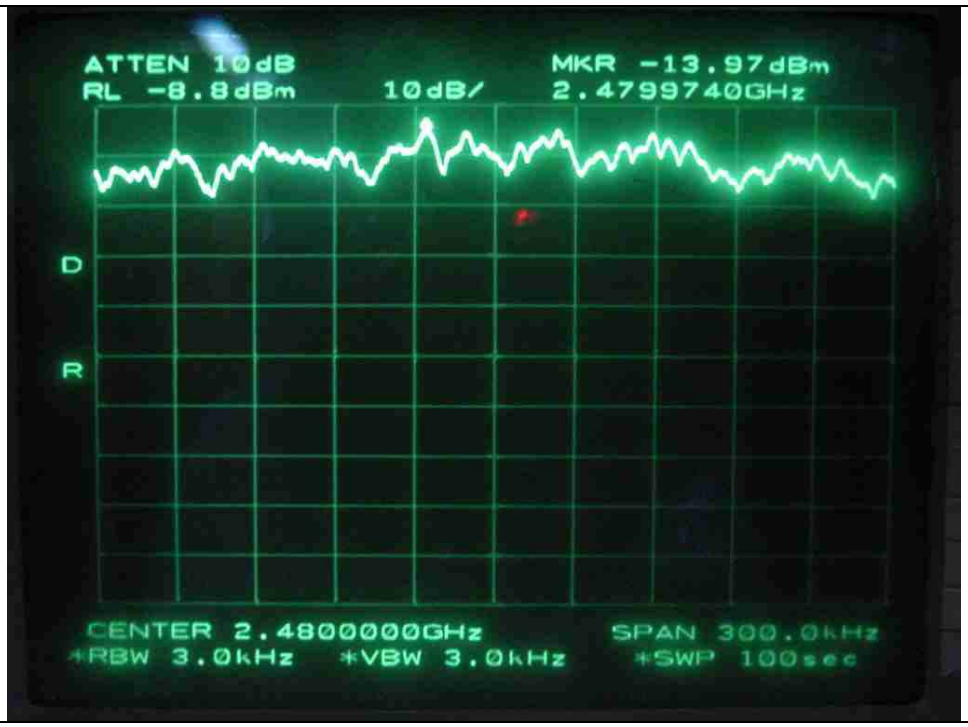


Low Channel



Middle Channel



High Channel

15. RADIATED EMISSION TEST, GENERAL REQUIREMENT

15.1 Operating environment

Temperature : 23°C

Relative humidity : 42 %

15.2 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.

15.3 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

15.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.
■ -	ESVS10	Rohde & Schwarz	EMI Test Receiver	827864/005	Dec. 01, 2004
■ -	85650A	Hewlett Packard	Quasi-Peak Adapter	3107A01542	July 18, 2005
■ -	85680B	Hewlett-Packard	Spectrum Analyzer	3001A04955	Apr. 13, 2005
■ -	85685A	Hewlett-Packard	RF Preselector	3107A01264	Apr. 13, 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
■ -	VHA9103	Schwarzbeck	Biconical Antenna	91031852	Jan. 31, 2005
■ -	9108-A(494)	Schwarzbeck	Log Periodic Antenna	62281001	Feb. 02, 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.

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15.5 Test data

-. Test Date : September 27, 2005
-. Resolution bandwidth : 120 kHz
-. Frequency range : 30MHz ~ 1000MHz
-. Measurement distance : 3m
-. Operating Condition : Max Transmitting Mode at Low / Middle / High Channel
-. Result : PASSED BY –6.11 dB at 330.36 MHz

Frequency (MHz)	Reading (dBuV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBuV/m)	Limits (dBuV/m)	Margin (dB)
147.36	17.70	V	14.97	1.20	35.00	43.50	-8.50
152.65	16.36	V	15.11	1.50	33.80	43.50	-9.70
213.12	15.49	H	16.26	1.60	34.65	43.50	-8.85
289.64	13.97	H	20.04	1.30	37.69	46.00	-8.31
330.36	21.74	V	14.11	2.00	39.89	46.00	-6.11
538.46	14.91	H	18.18	2.10	38.44	46.00	-7.56

Tabulated test data for Radiated Electromagnetic Field

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, 462-705, Korea (TEL: 82-31-746-8500 FAX: 82-31-746-8700)
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)

16. CONDUCTED EMISSION TEST

16.1 Operating environment

Temperature : 21°C

Relative humidity : 49 %

16.2 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.

16.3 Measurement uncertainty

Conducted emission, quasi-peak detect : ±3.0 dB

Conducted emission, average detect : ±3.0 dB

16.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Due Cal.
■ -	ESHS10	Rohde & Schwarz	EMI Test Receiver	834467/007	May 19, 2005
■ -	NSLK 8128	Schwarzbeck	AMN	8128-216	June 07, 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.

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16.5 Test data

-. Test Date : September 06, 2005

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15MHz ~ 30MHz

-. Operating Condition : Battery Charging Mode

-. Result : PASSED BY –6.61 dB at 2.035 MHz with Average detector mode

Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission level	Detect Mode	Limits		Emission level	Limits	
0.175	H	53.75	P	64.72	-10.97	-	-	-
0.955	H	41.20	P	56.00	-14.80	-	-	-
1.255	H	42.16	P	56.00	-13.84	-	-	-
1.735	H	44.76	P	56.00	-11.24	-	-	-
2.035	N	46.12	P	56.00	-9.88	39.39	46.00	-6.61
3.650	N	47.59	P	56.00	-8.41	39.00	46.00	-7.00

Line Conducted Emissions Tabulated Data

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

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

Tested by: Ki-Hong, Nam / Test Engineer

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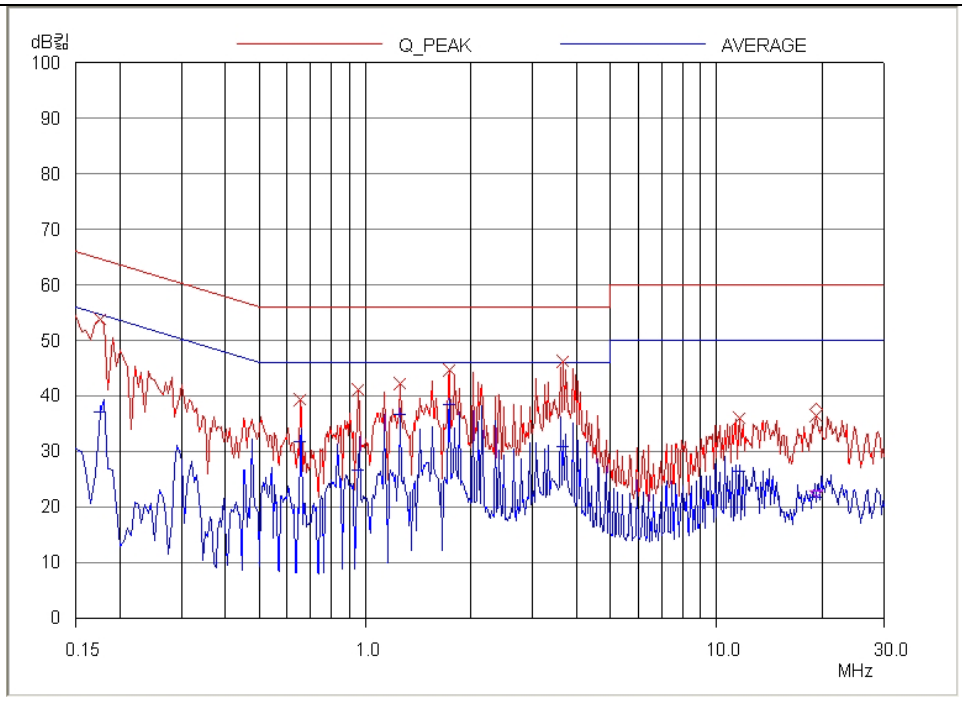
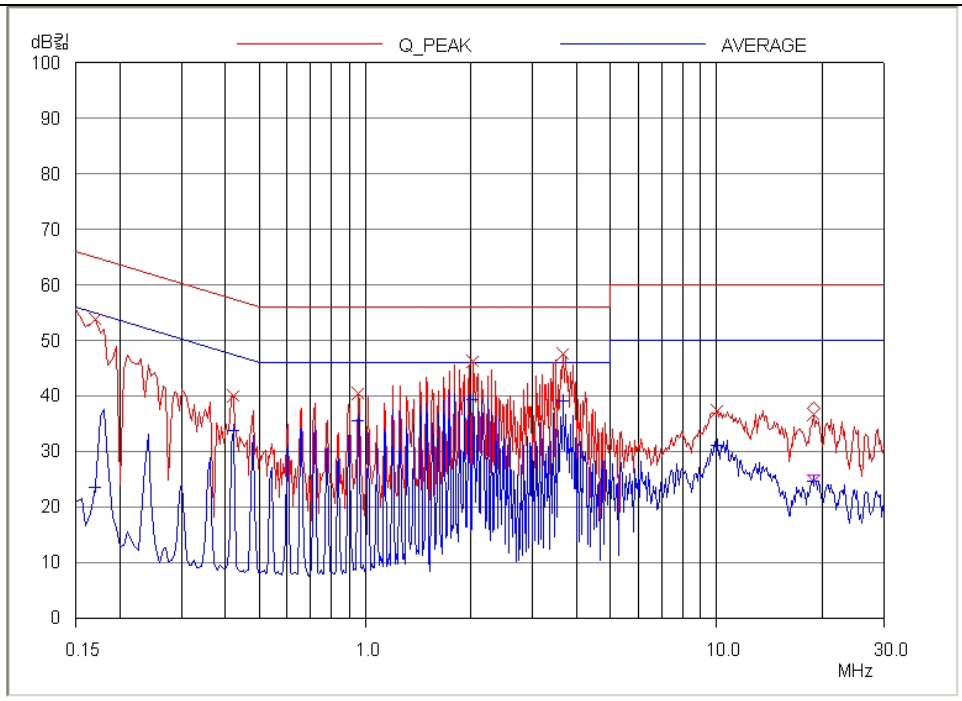


HOT LINE



NEUTRAL LINE

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