



## HCT CO., LTD.

Product Compliance Division

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### CERTIFICATE OF COMPLIANCE

#### FCC Part 15.247

**Applicant Name:**

Woongjin System & Technology Co., Ltd.

**Address:**

3<sup>rd</sup> FL. Daeryoung Techno Town 7, 489-11 Gasan-dong,  
Geumcheon-gu, Seoul, Korea

**Date of Testing:**

August 12, 2008

**Test Site/Location:**

HCT.CO., LTD., San 136-1 Ami-ri, Bubal-eup, Icheon-si,  
Kyungki-do, Korea

**Test Report No.:** HCT-R08-134

**HCT FRN:** 0005866421

**FCC ID :** **WLFSTM-7100**

**APPLICANT :** **Woongjin System & Technology Co., Ltd**

**Application Type:** Original Grant

**FCC Rule Part(s):** Part15 subpart C §15.247

**EUT Type:** Industrial PDA

**Model(s):** STM-7100

**Tx Frequency:** 2412-2472 MHz(DSSS/OFDM)

**Rx Frequency:** 2412-2472 MHz(DSSS/OFDM)

**Max. RF Output Power:** Wi-Fi 802.11b( 15.58 dBm) / Wi-Fi 802.11g ( 10.48 dBm)

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT.CO., LTD. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Chang Seok Choi

Report prepared by

: Chang Seok Choi

Test engineer of RF Part

Sang Jun Lee

Approved by

: Sang Jun Lee

Manager of RF Part

HCT PT.15.247 TEST REPORT		FCC Original Grant			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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## 1. GENERAL INFORMATION

**Applicant:** Woongjin System & Technology Co., Ltd

3<sup>rd</sup> FL. Daeryoung Techno Town 7, 489-11 Gasan-dong,  
Geumcheon-gu, Seoul, Korea

**FCC ID:** WLFSTM-7100

**EUT:** Industrial PDA

**Date of Test:** August 12, 2008

**Contact:** Allen Moon\_ Project Manager  
Tel: 82-2-2081 Fax: 82-2-2081-9393

## 2. EUT DESCRIPTION

<b>Product</b>	Industrial PDA
<b>Model Name</b>	STM-7100
<b>Power Supply</b>	DC 7.4 V
<b>Battery type</b>	Standard
<b>Frequency Range</b>	TX: 2412 ~ 2472 MHz RX: 2412 ~ 2472 MHz
<b>Max. RF Output Power</b>	Wi-Fi 802.11b( 15.58 dBm) / Wi-Fi 802.11g ( 10.48 dBm)
<b>Modulation Type</b>	DSSS/CCK(802.11b), OFDM(802.11g)
<b>Antenna Specification</b>	Manufacturer: antenova Antenna type: SMD Antenna Antenna Max gain: 4.4 dBi

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### 3. TEST METHODOLOGY

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz(ANSI C63.4-2003)

#### 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### 3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

#### 3.3 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

#### 3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

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## 4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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## 6. ANTENNA REQUIREMENTS

### According to FCC 47 CFR §15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

\* The antennas of this E.U.T are permanently attached.

\*The E.U.T Complies with the requirement of §15.203

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## 7. TEST RESULT

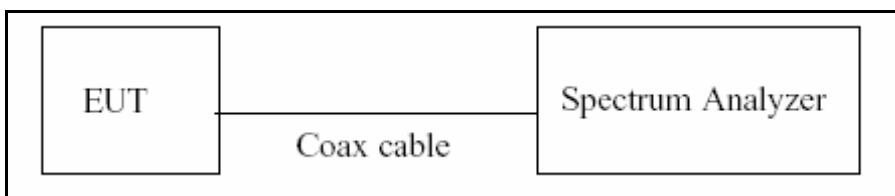
### 7.1 6dB Bandwidth Measurement (802.11b/g)

#### Test Requirements and limit, §15.247(d)

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

**The minimum permissible 6dB bandwidth is 500 kHz.**

#### █ TEST CONFIGURATION



#### █ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to

RBW: 100 KHz

VBW: 100 KHz

SPAN: 40 MHz

Note: Tests were performed all possible data rates and the worst cases were recorded.

#### █ TEST RESULTS

##### Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	8.92	0.500	Pass
2442	7	8.64	0.500	Pass
2472	13	8.96	0.500	Pass

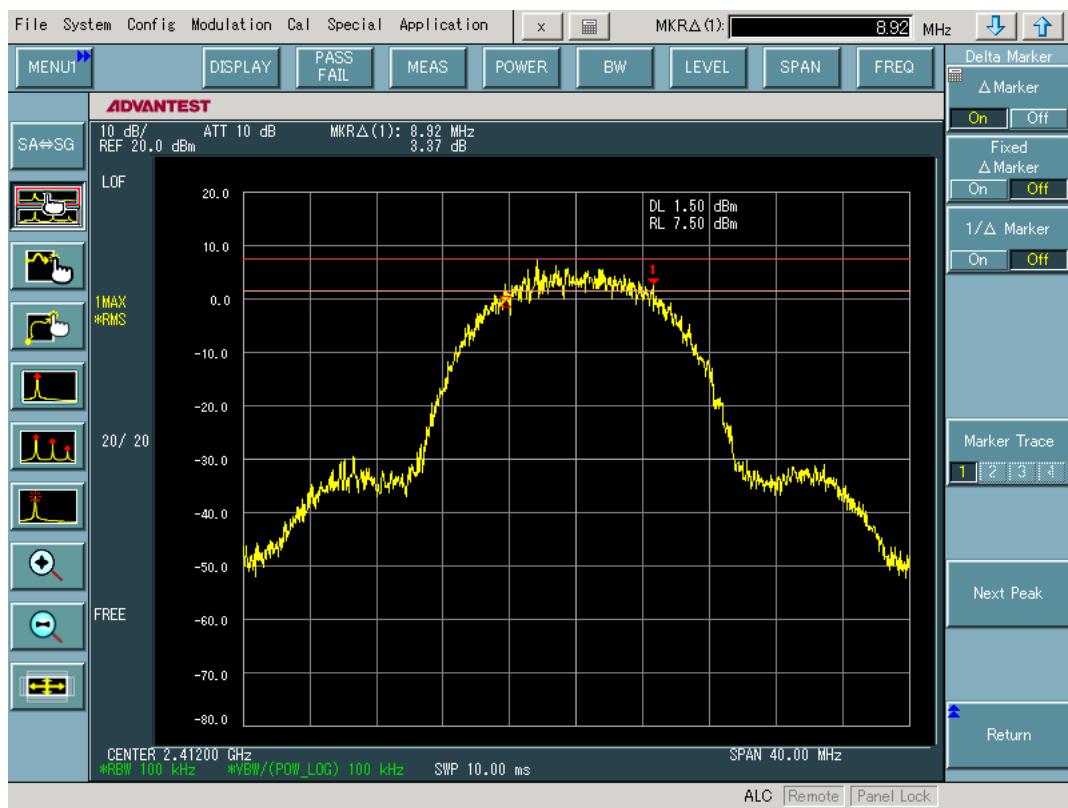
##### Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.56	0.500	Pass
2442	7	16.64	0.500	Pass
2472	13	16.56	0.500	Pass

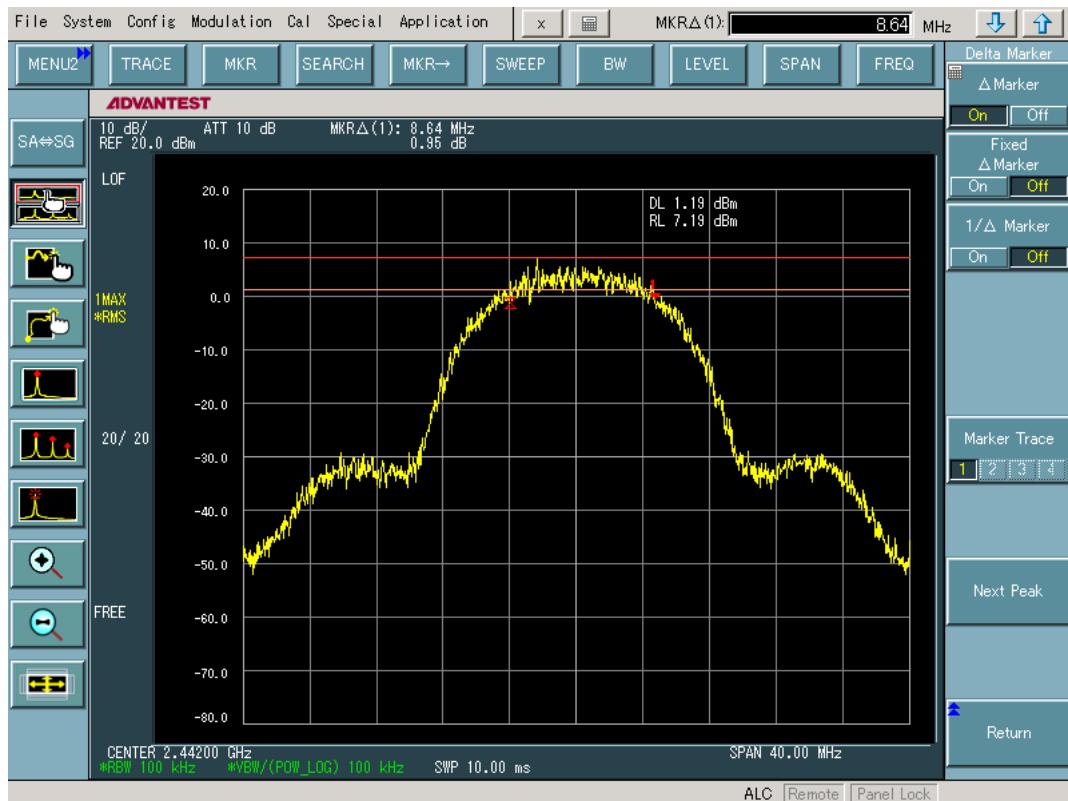
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## RESULT PLOTS

### 6dB Bandwidth plot (802.11b-CH 1\_11 MHz)

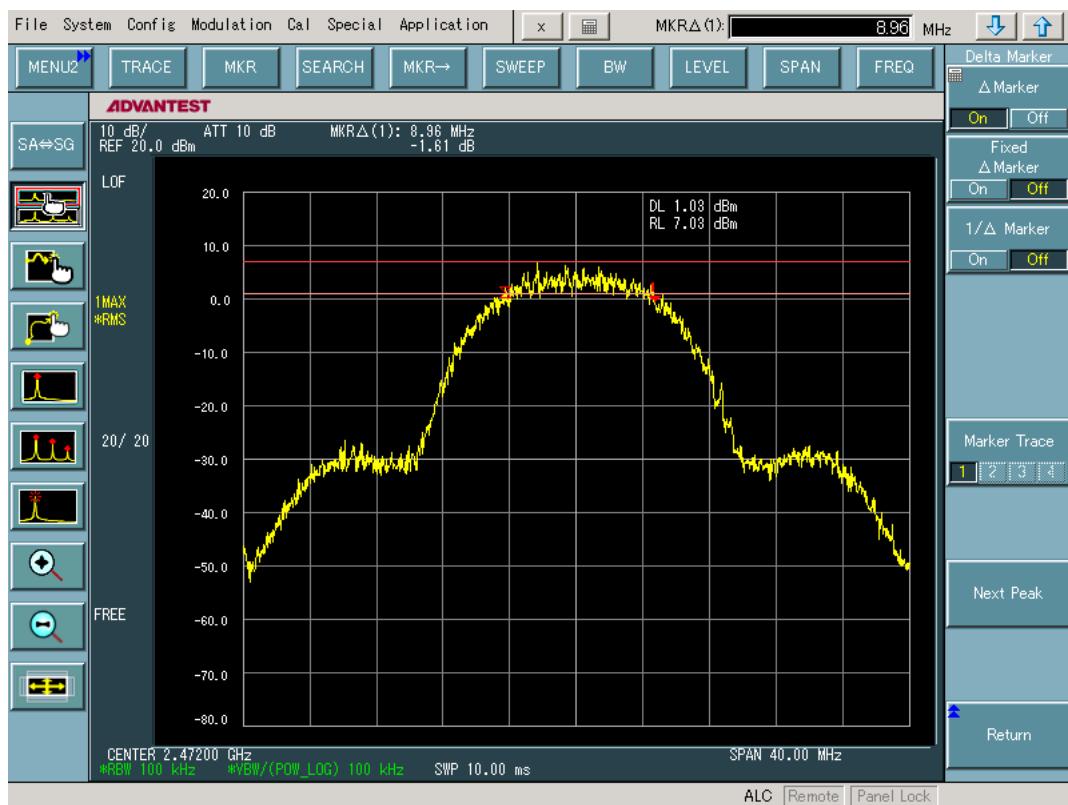


### 6dB Bandwidth plot (802.11b-CH 7\_11 MHz)

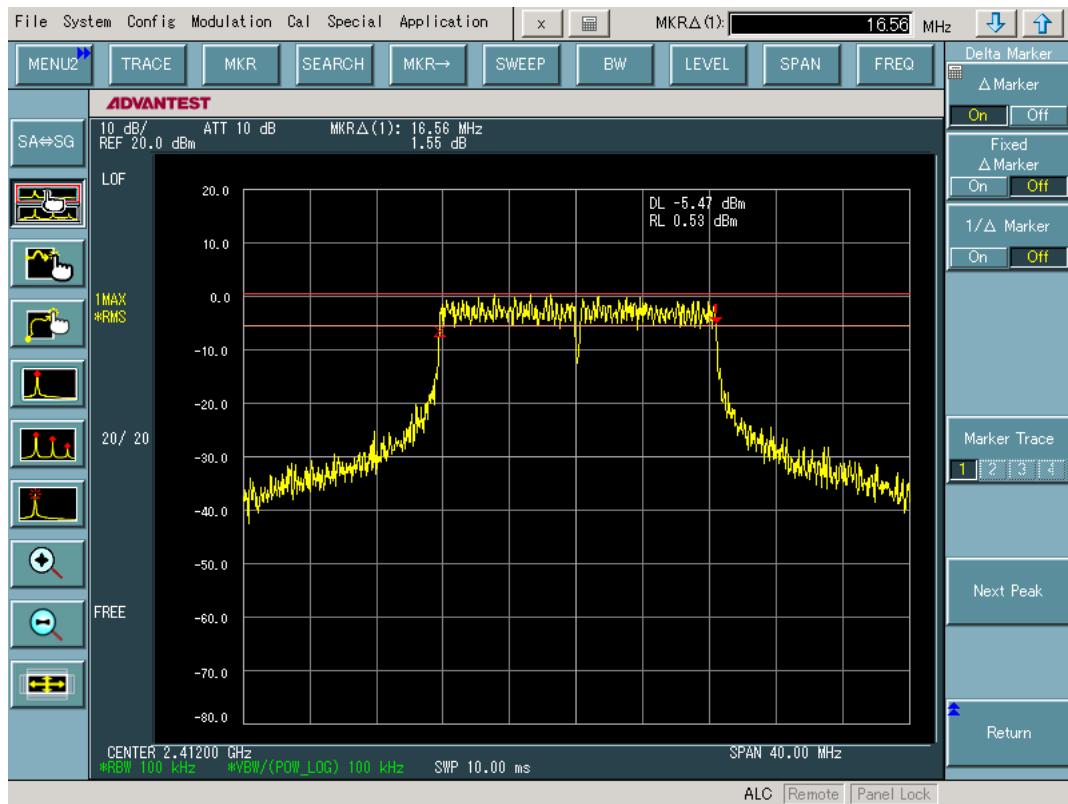


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### 6dB Bandwidth plot (802.11b-CH 13\_11 MHz)

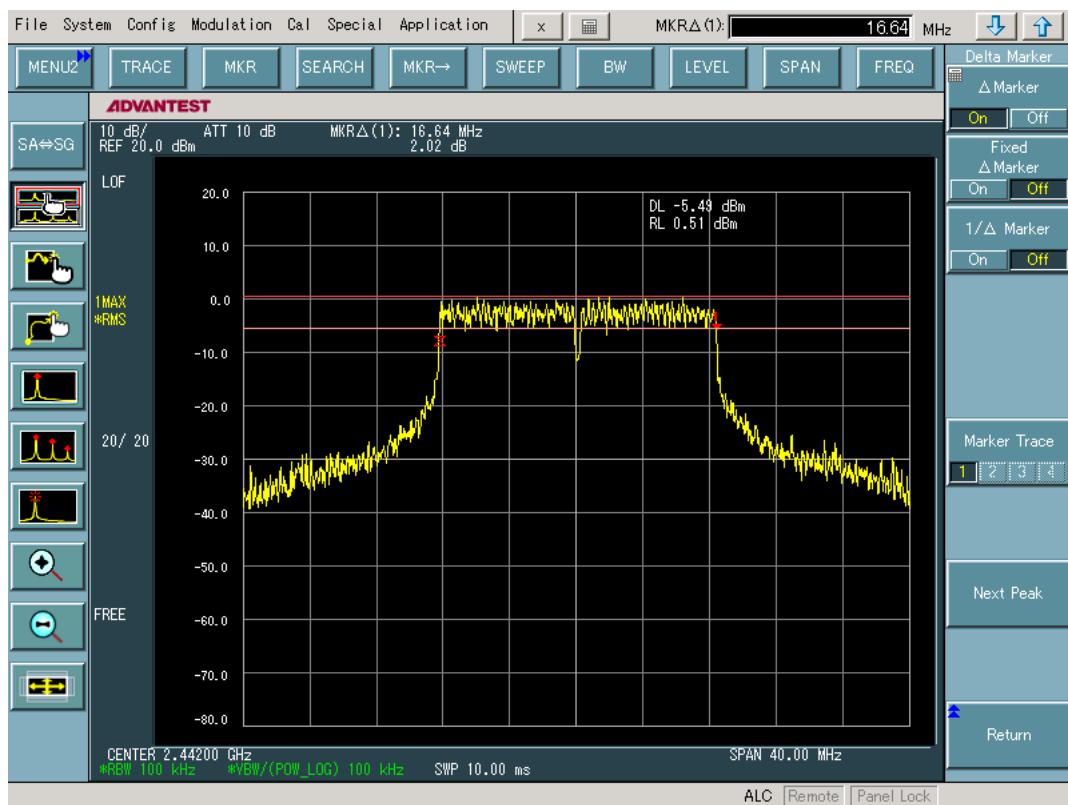


### 6dB Bandwidth plot (802.11g-CH 1\_54 MHz)

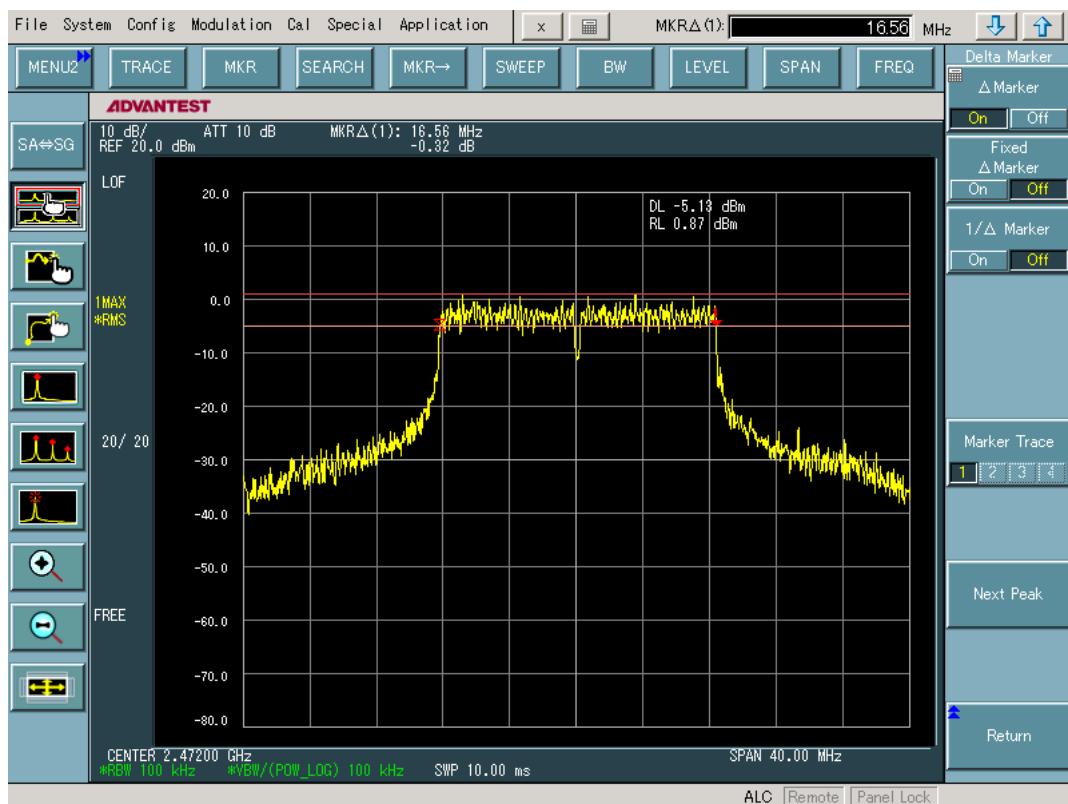


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### 6dB Bandwidth plot (802.11g-CH 7\_54 MHz)



### 6dB Bandwidth plot (802.11g-CH 13\_54 MHz)



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## 7. 2 Output Power Measurement (802.11b/g)

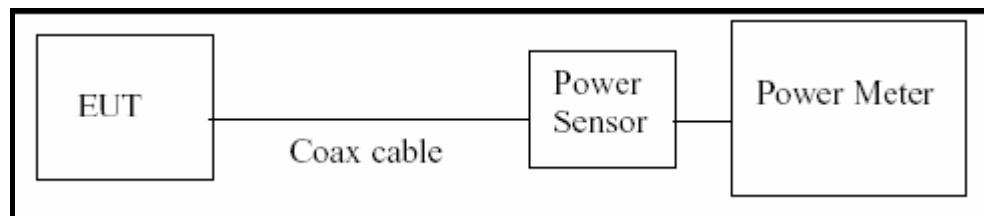
### Test Requirements and limit, §15.247(d)

A transmitter antenna terminal of EUT is connected to the input of a RF power sensor.

Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

**The maximum permissible conducted output power is 1 Watt.**

### TEST CONFIGURATION



Note: Tests were performed all possible data rates and the worst cases were recorded.

### TEST RESULTS

#### Conducted Output Power Measurements

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	14.73	30
		2 Mbps	14.85	
		5.5 Mbps	15.59	
		11 Mbps	15.58	
2442	7	1 Mbps	14.28	30
		2 Mbps	15.01	
		5.5 Mbps	14.83	
		11 Mbps	15.19	
2472	13	1 Mbps	14.61	30
		2 Mbps	14.48	
		5.5 Mbps	15.55	
		11 Mbps	15.43	

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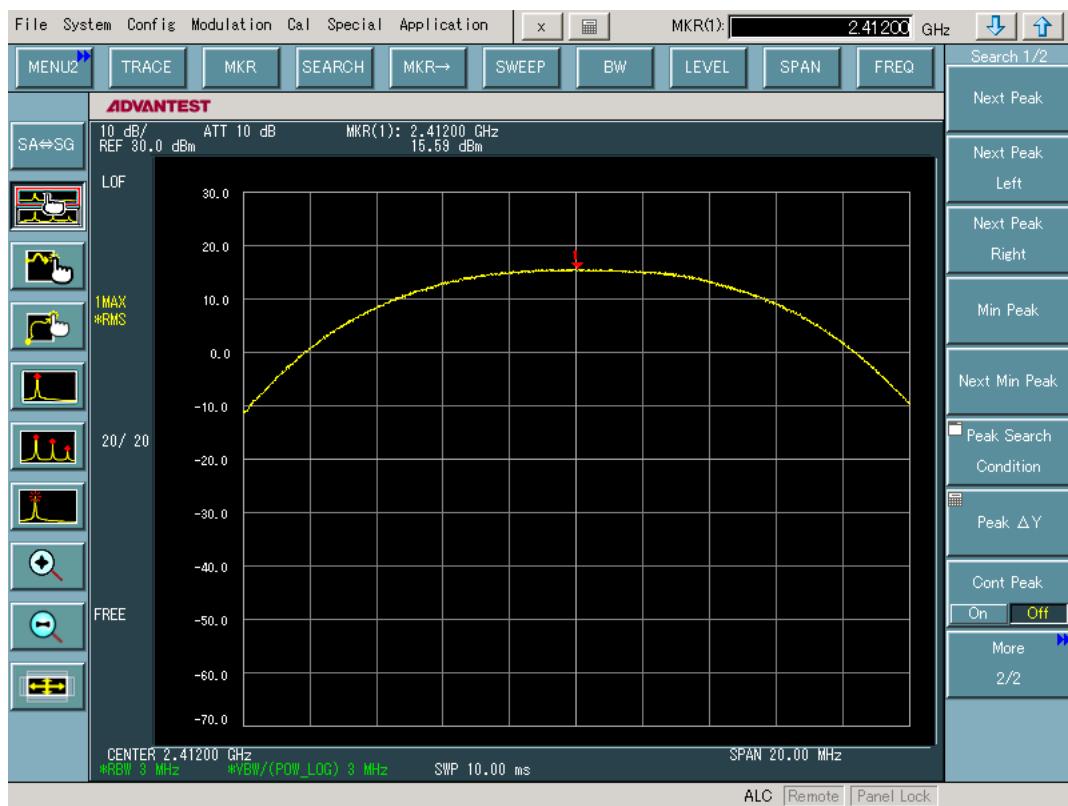
### Conducted Output Power Measurements

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	14.44	30
		9 Mbps	9.72	
		12 Mbps	9.71	
		18 Mbps	9.72	
		24 Mbps	9.65	
		36 Mbps	10.07	
		48 Mbps	10.19	
		54 Mbps	9.89	
2442	7	6 Mbps	13.98	30
		9 Mbps	9.39	
		12 Mbps	9.57	
		18 Mbps	9.84	
		24 Mbps	10.05	
		36 Mbps	10.05	
		48 Mbps	10.27	
		54 Mbps	9.99	
2472	13	6 Mbps	14.13	
		9 Mbps	9.68	
		12 Mbps	9.83	
		18 Mbps	9.96	
		24 Mbps	9.91	
		36 Mbps	9.83	
		48 Mbps	10.66	
		54 Mbps	10.48	

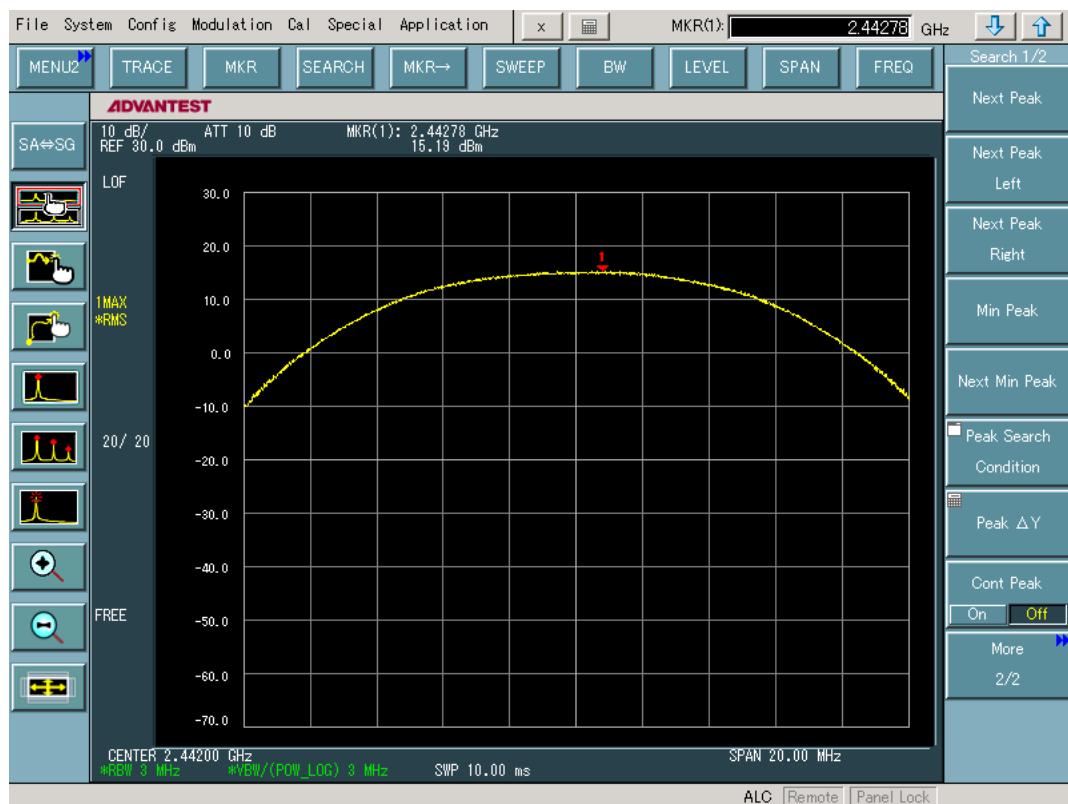
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## RESULT PLOTS

### Conducted Output Power (802.11b-CH 1\_11 MHz)

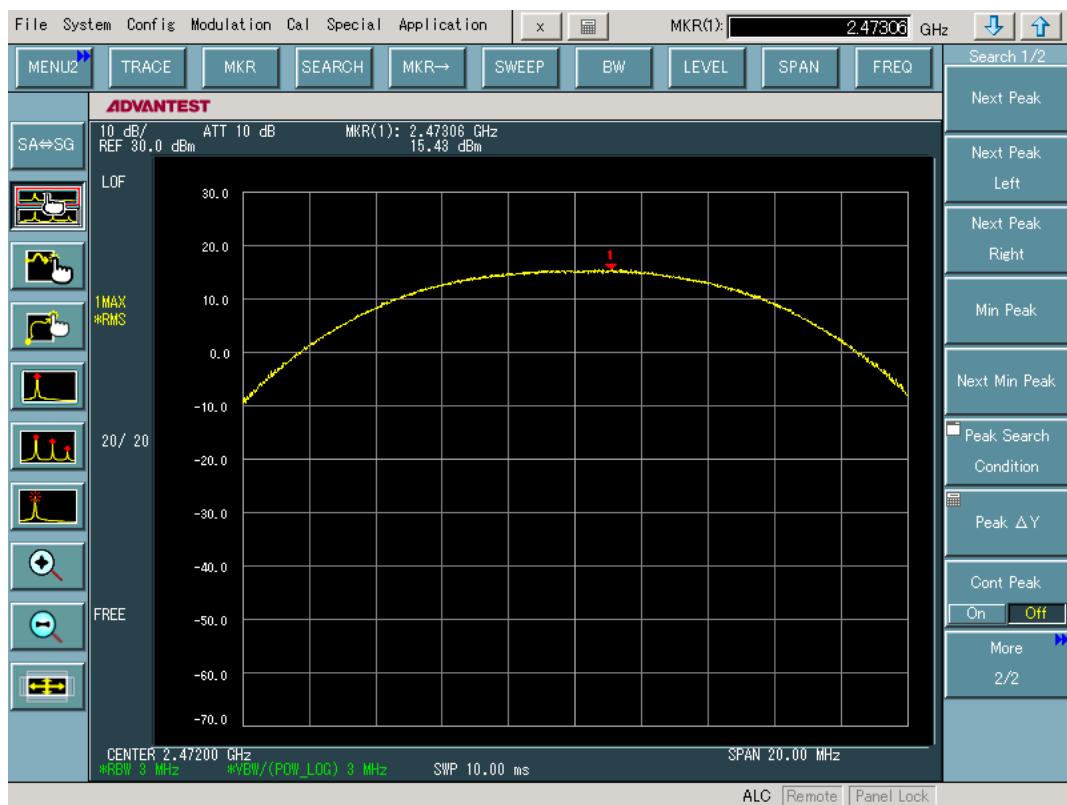


### Conducted Output Power (802.11b-CH 7\_11 MHz)



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### Conducted Output Power (802.11b-CH 13\_11 MHz)

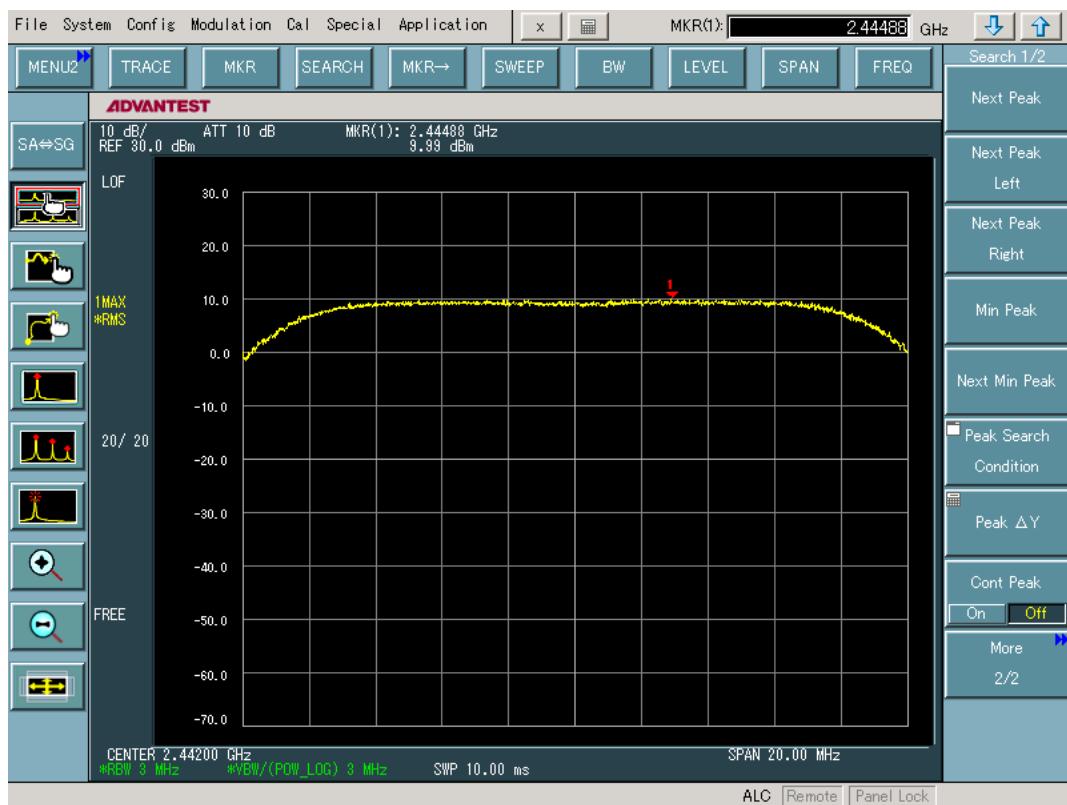


### Conducted Output Power (802.11g-CH 1\_54 MHz)



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### Conducted Output Power (802.11g-CH 7\_54 MHz)



### Conducted Output Power (802.11g-CH 13\_54 MHz)



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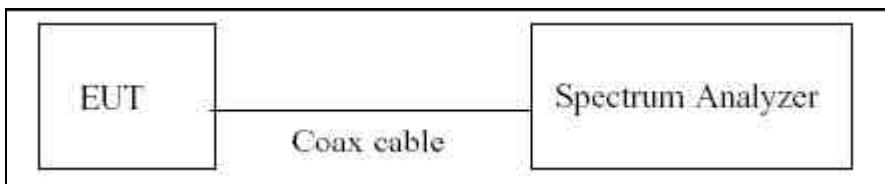
## 7.3 Power Spectral Density (802.11b/g)

### Test Requirements and limit, §15.247(d)

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

**Minimum Standard – The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.**

### TEST CONFIGURATION



### TEST PROCEDURE

The spectrum analyzer is set to :

1. Span = 300 KHz
2. RBW = 3 KHz (7dB/div)
3. VBW = 3 KHz
4. Sweep = 100 sec

### TEST RESULTS

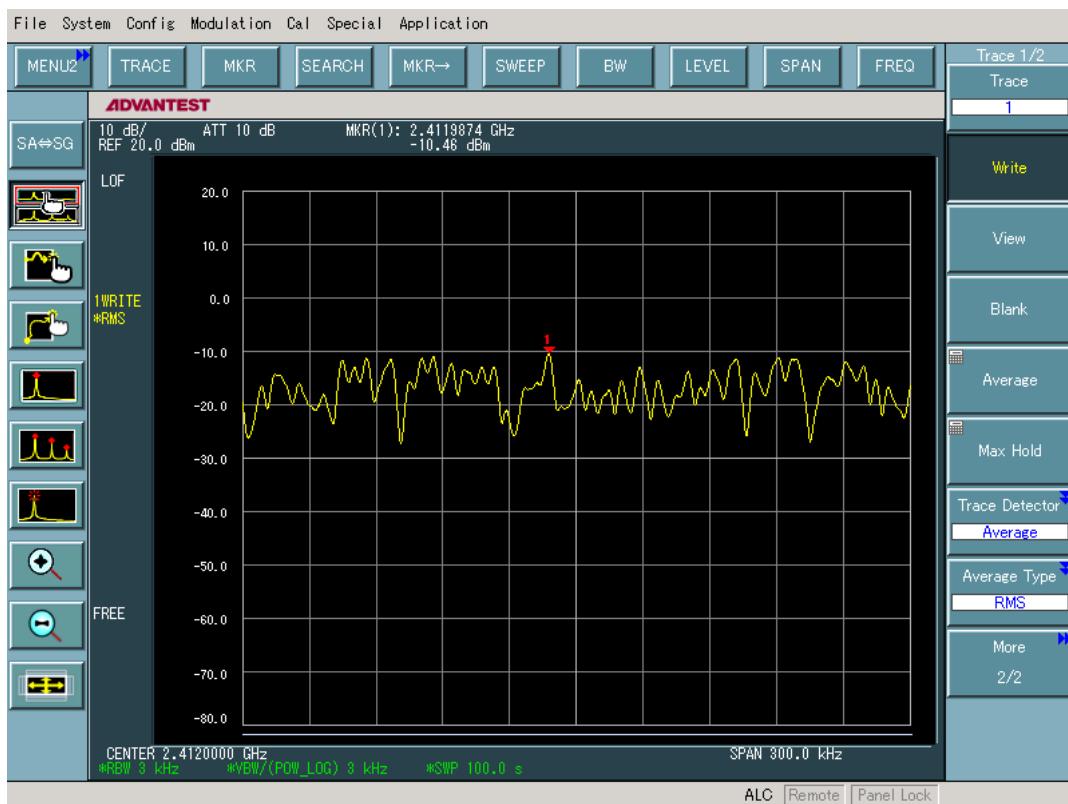
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result	
			Power Density (dBm)	Pass/Fail
2412	1	802.11b	-10.46	Pass
2442	7		-10.52	Pass
2472	13		-10.61	Pass
2412	1	802.11g	-23.48	Pass
2442	7		-23.78	Pass
2472	13		-23.83	Pass

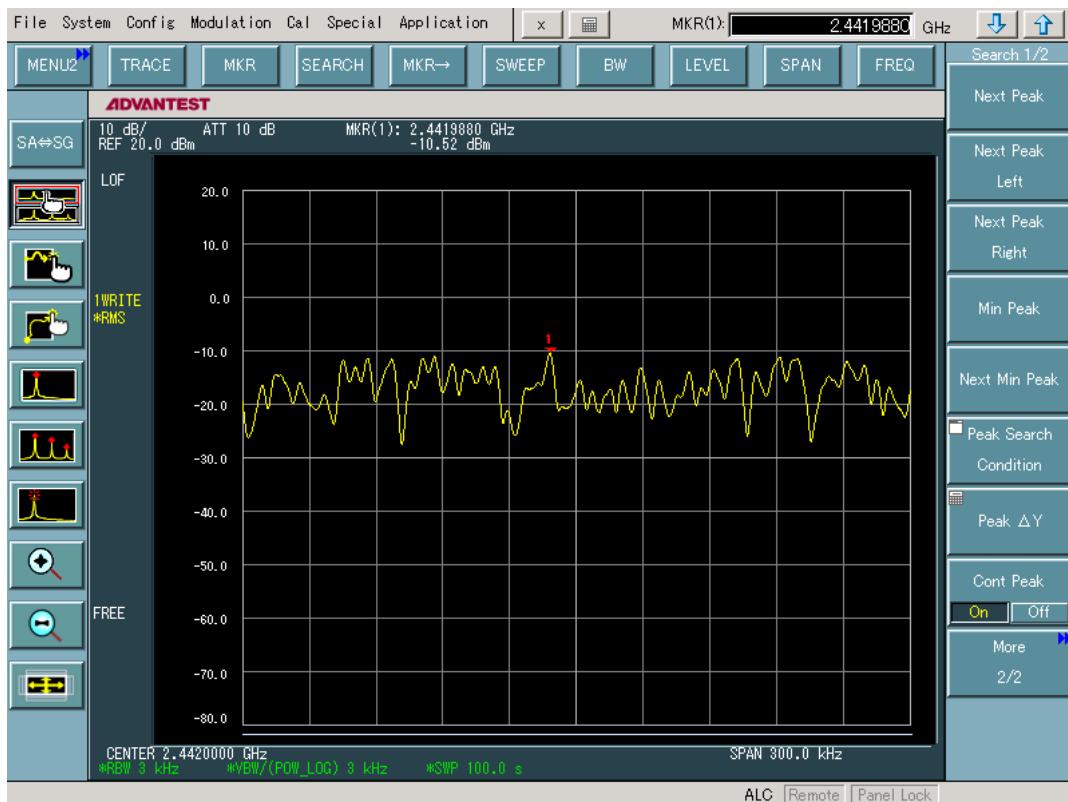
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### Power Spectral Density (802.11b-CH 1\_11 MHz)

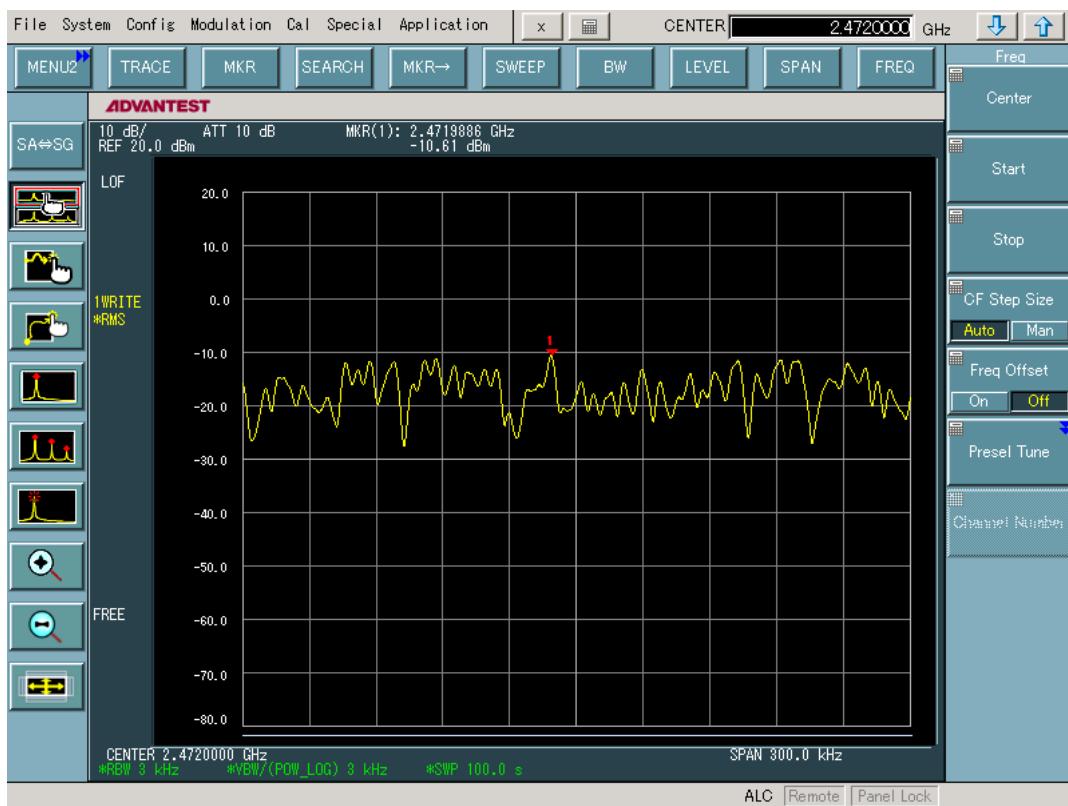


### Power Spectral Density (802.11b-CH 7\_11 MHz)

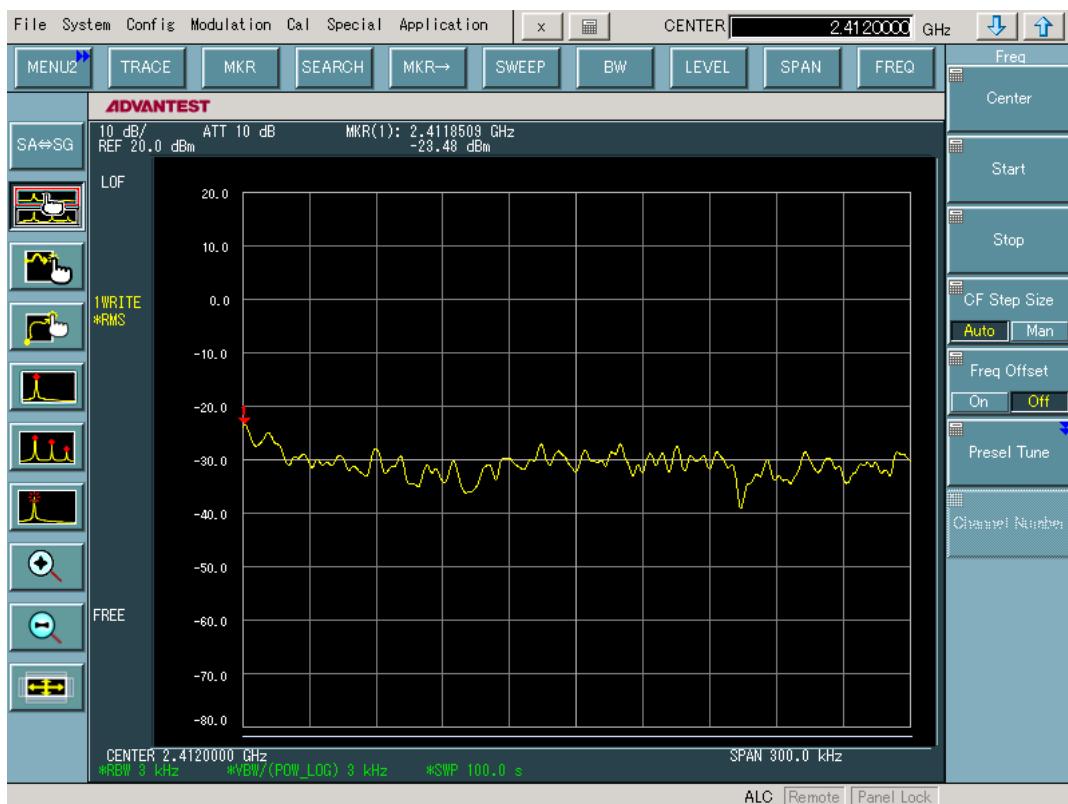


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### Power Spectral Density (802.11b-CH 13\_11 MHz)

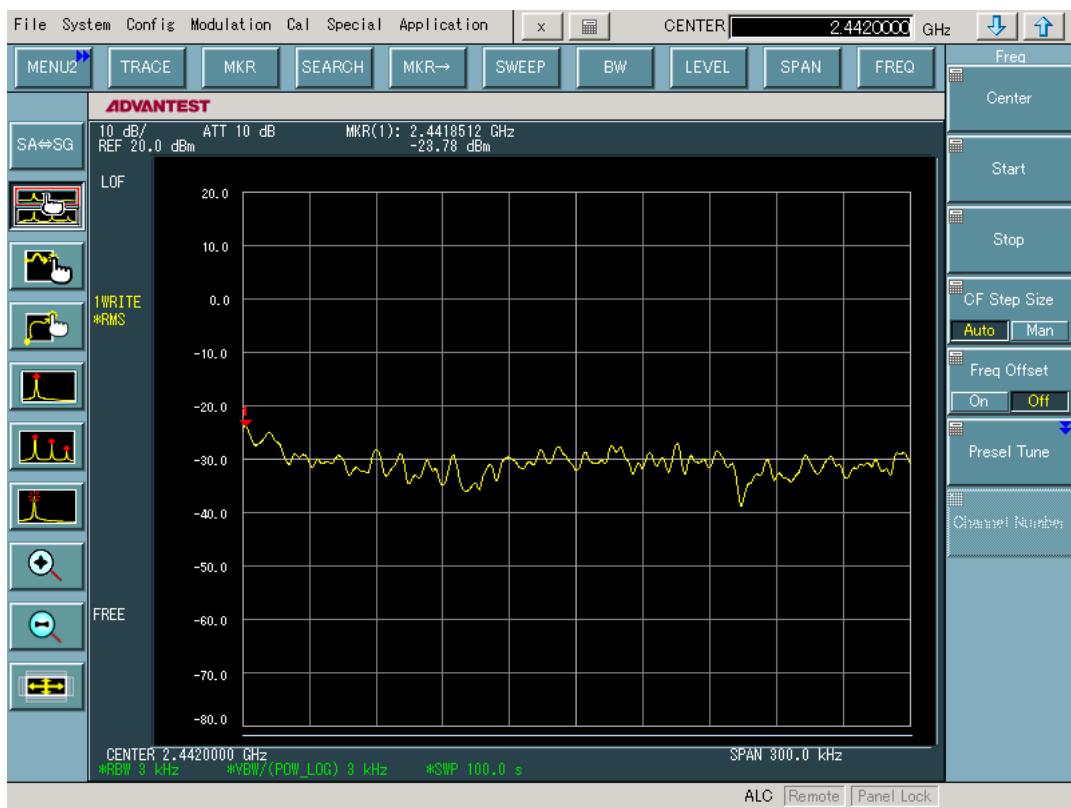


### Power Spectral Density (802.11g-CH 1\_54 MHz)

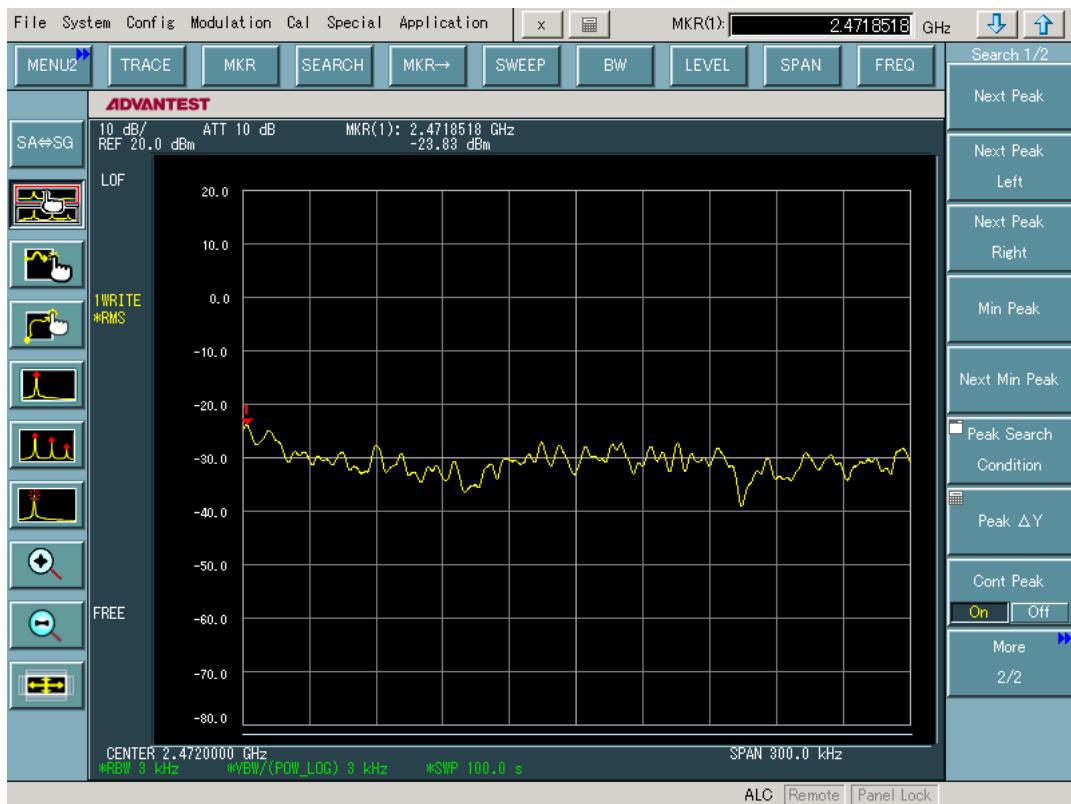


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### Power Spectral Density (802.11g-CH 7\_54 MHz)



### Power Spectral Density (802.11g-CH 13\_54 MHz)



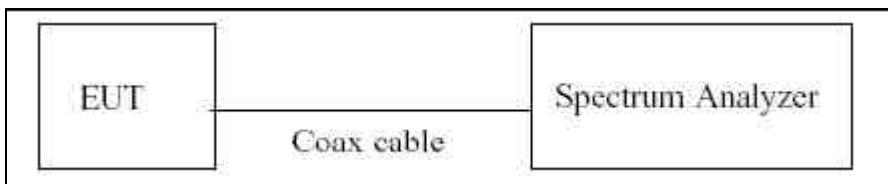
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## 7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

### Test Requirements and limit, §15.247(d)

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### TEST CONFIGURATION



### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

The resolution bandwidth and the video bandwidth are set to 100 kHz.

The spectrum from 30 MHz to the 10<sup>th</sup> harmonic is investigated with the transmitter set to the lowest, middle, and highest channels for conducted spurious emissions.

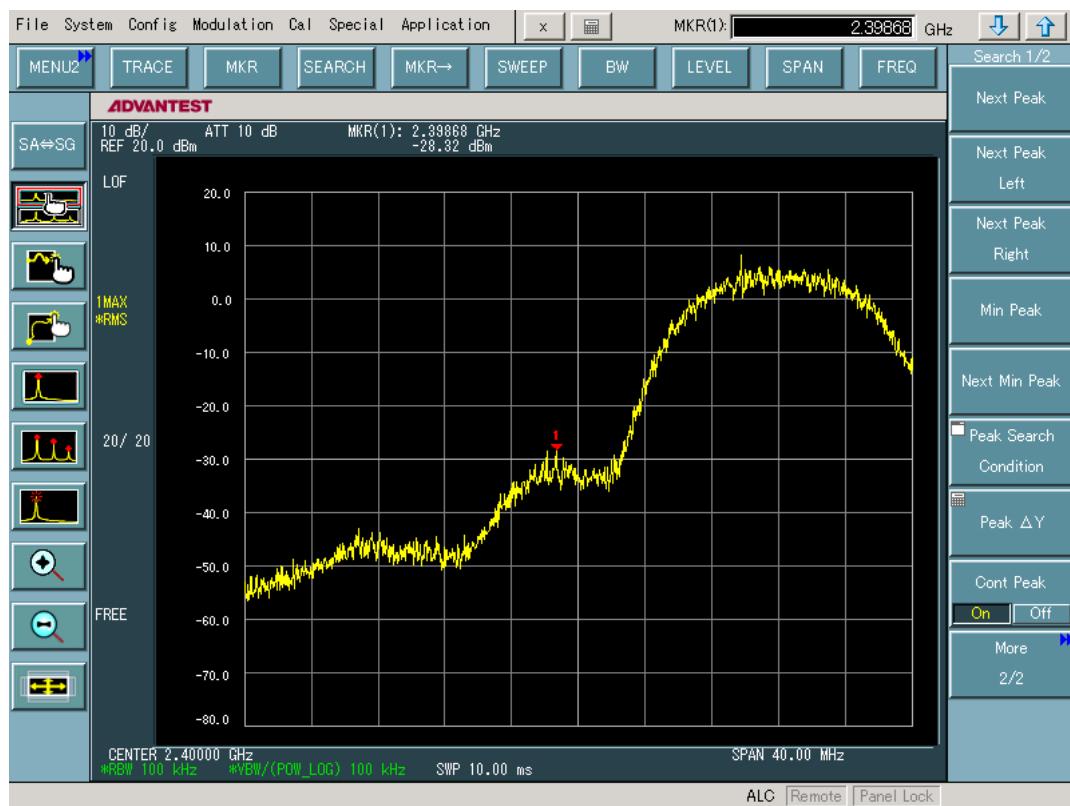
### TEST RESULTS

Refer to the plots below.

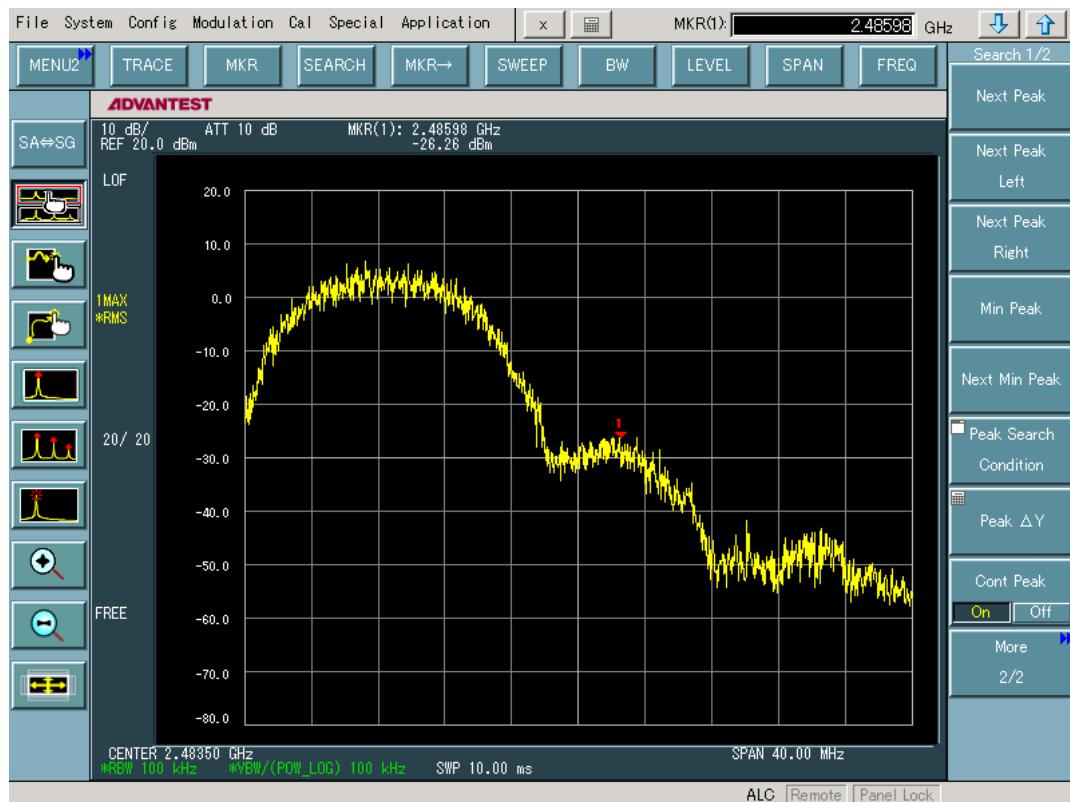
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### BandEdge (802.11b-CH 1\_11 MHz)

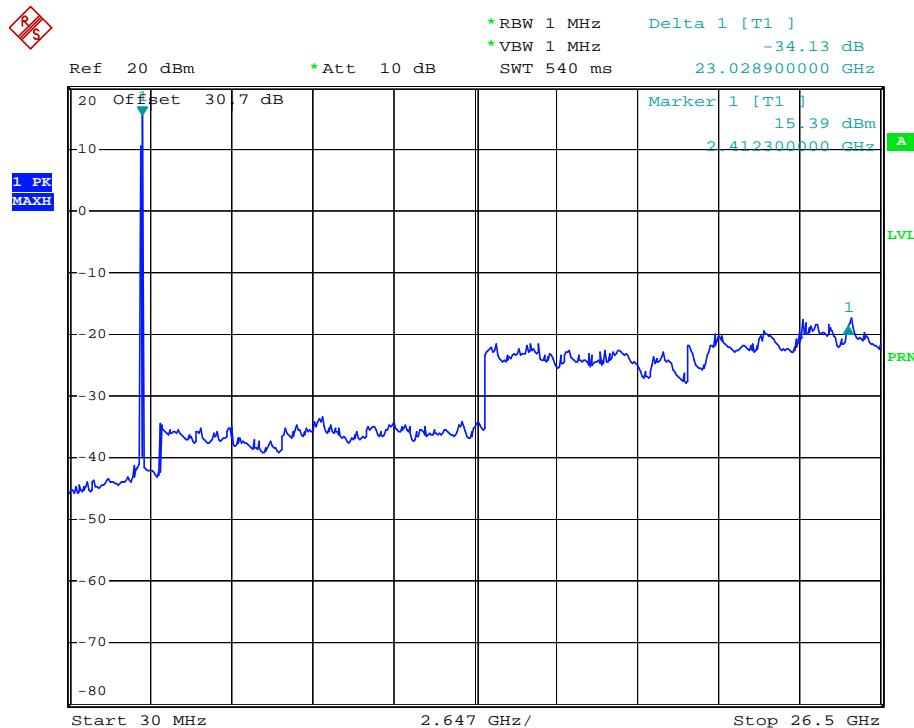


### BandEdge (802.11b-CH 13\_11 MHz)



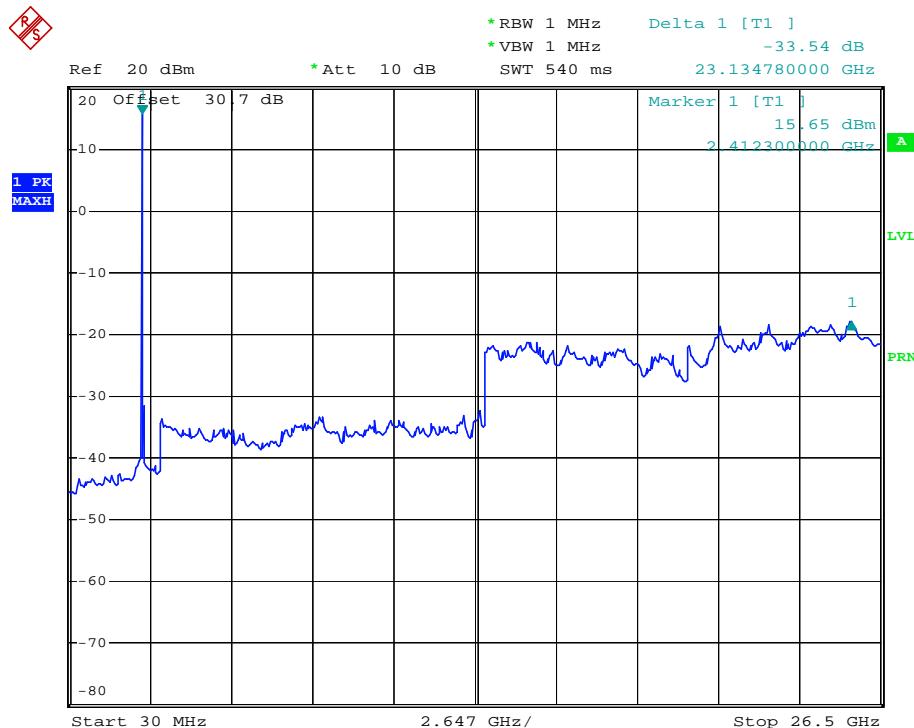
HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 21 of 40

### Conducted Spurious Emission (802.11b-CH 1\_11 MHz)



Date: 20.AUG.2008 09:05:46

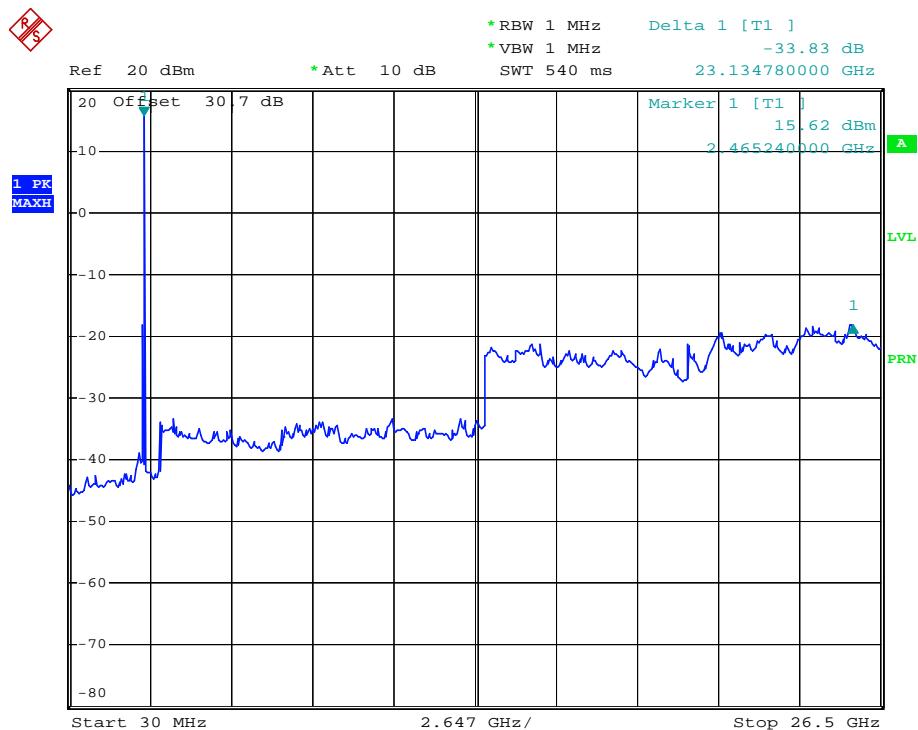
### Conducted Spurious Emission (802.11b-CH 7\_11 MHz)



Date: 20.AUG.2008 09:05:06

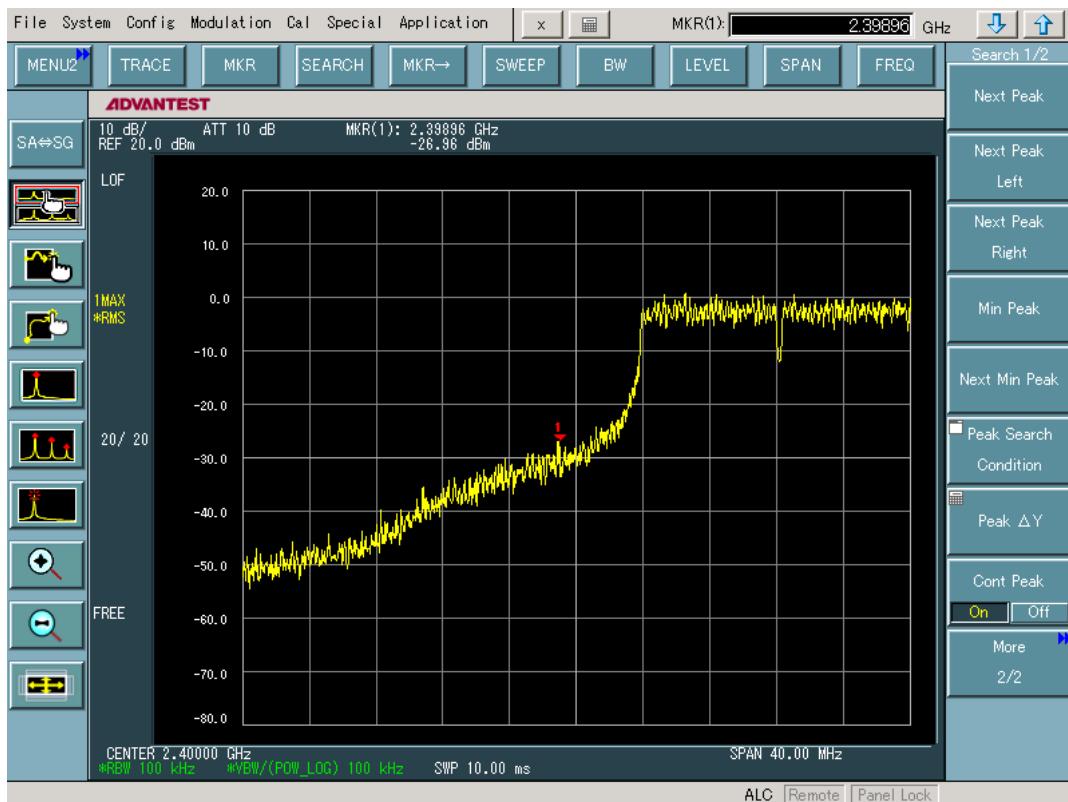
HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA		FCC ID: WLFSTM-7100	Page 22 of 40

### Conducted Spurious Emission (802.11b-CH 13\_11 MHz)



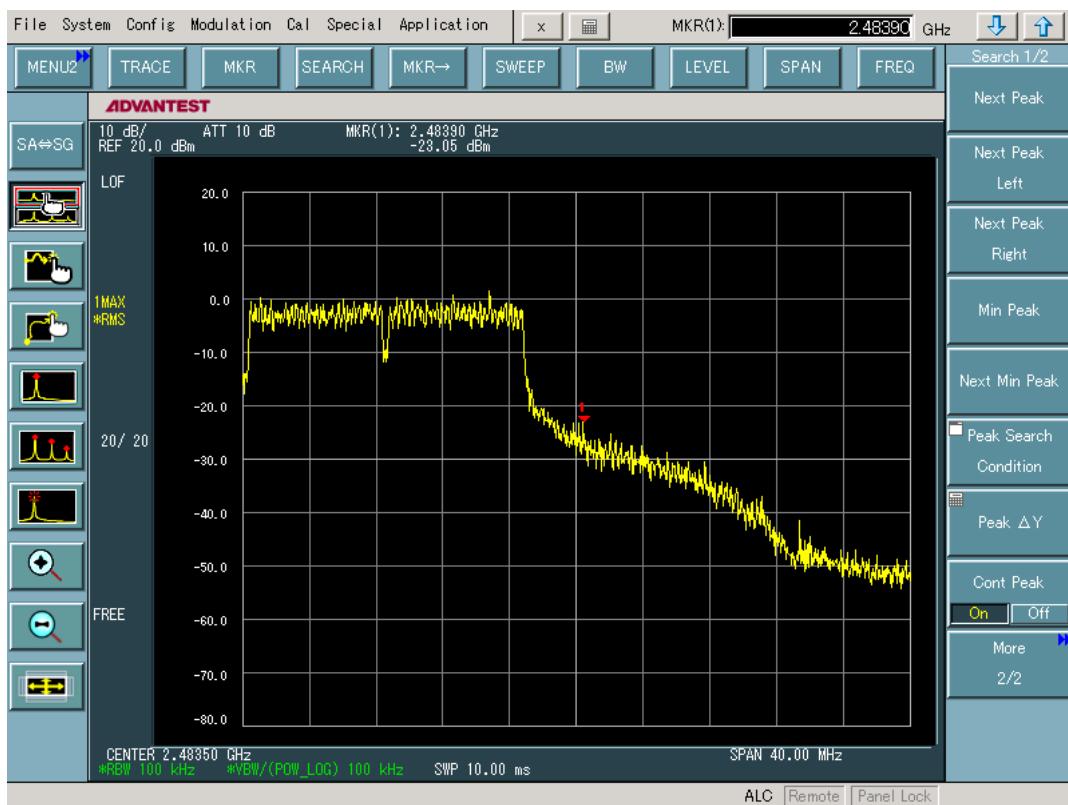
Date: 20.AUG.2008 09:06:44

### BandEdge (802.11g-CH 1\_54 MHz)

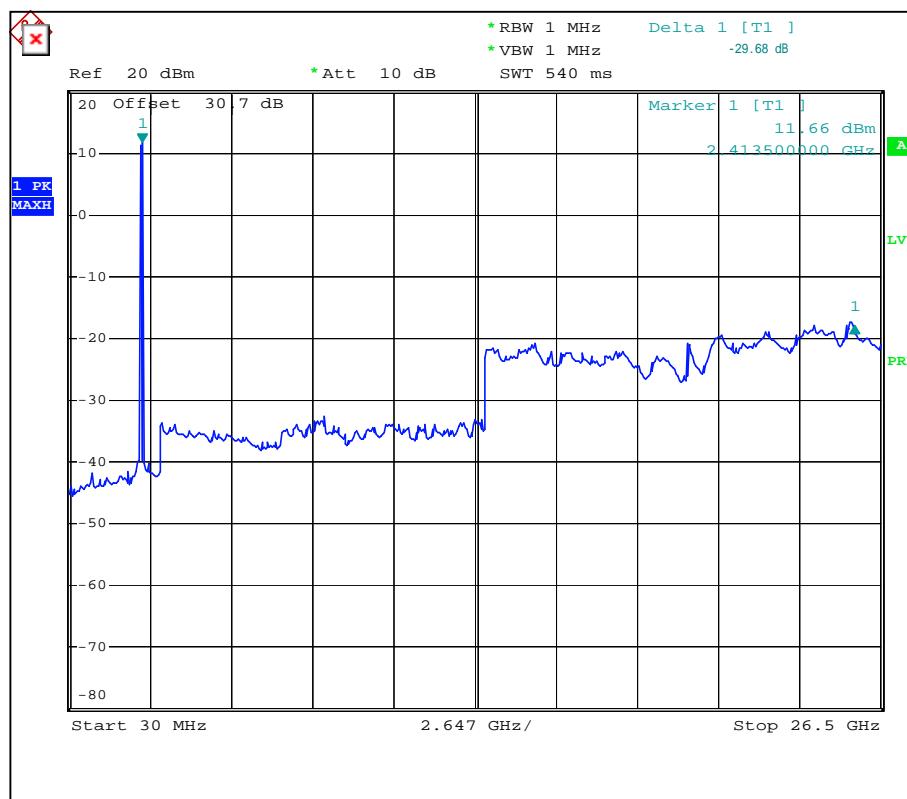


HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No.	Test Dates:	EUT Type:	FCC ID:	Page 23 of 40	
HCT-R08-134	August 12, 2008	Industrial PDA	WLFSTM-7100		

### BandEdge (802.11g-CH 13\_54 MHz)

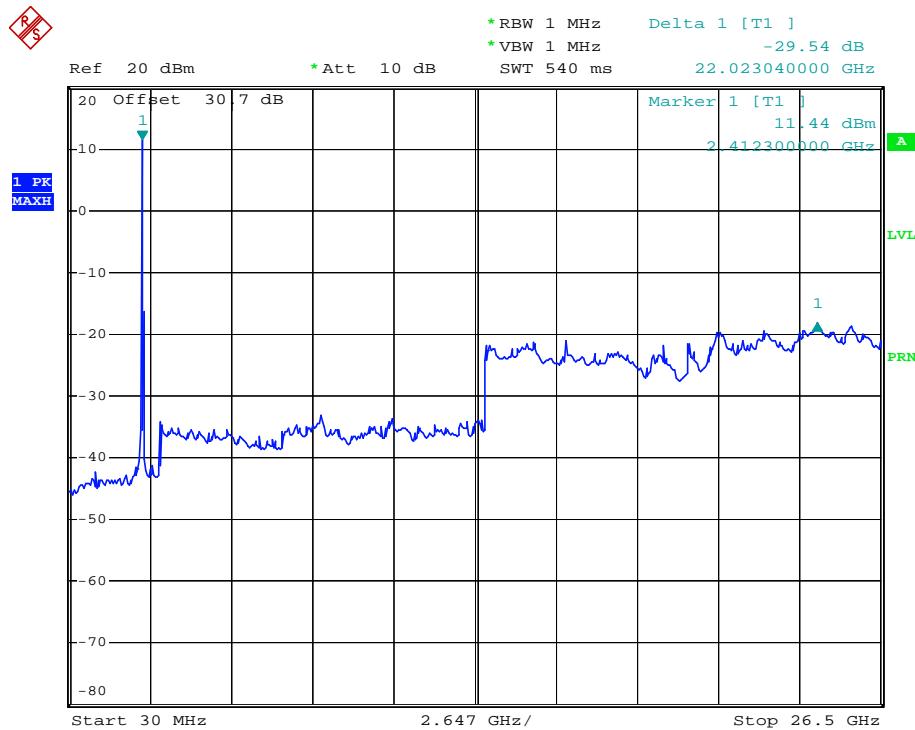


### Conducted Spurious Emission (802.11g-CH 1\_54 MHz)



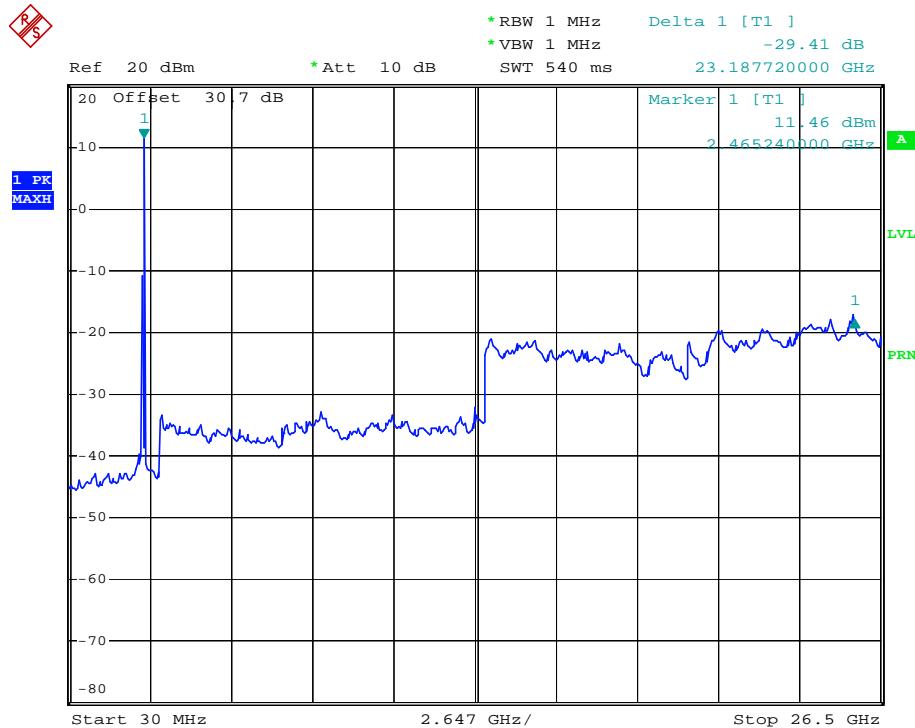
HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>	
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA		FCC ID: WLFSTM-7100	Page 24 of 40	

### Conducted Spurious Emission (802.11g-CH 7\_54 MHz)



Date: 20.AUG.2008 09:31:58

### Conducted Spurious Emission (802.11g-CH 13\_54 MHz)



Date: 20.AUG.2008 09:21:50

HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA		FCC ID: WLFSTM-7100	Page 25 of 40



## 7.5 Radiated Measurement.

### 7.5.1 Radiated Spurious Emissions.

#### Test Requirements and limit, §15.247(d)

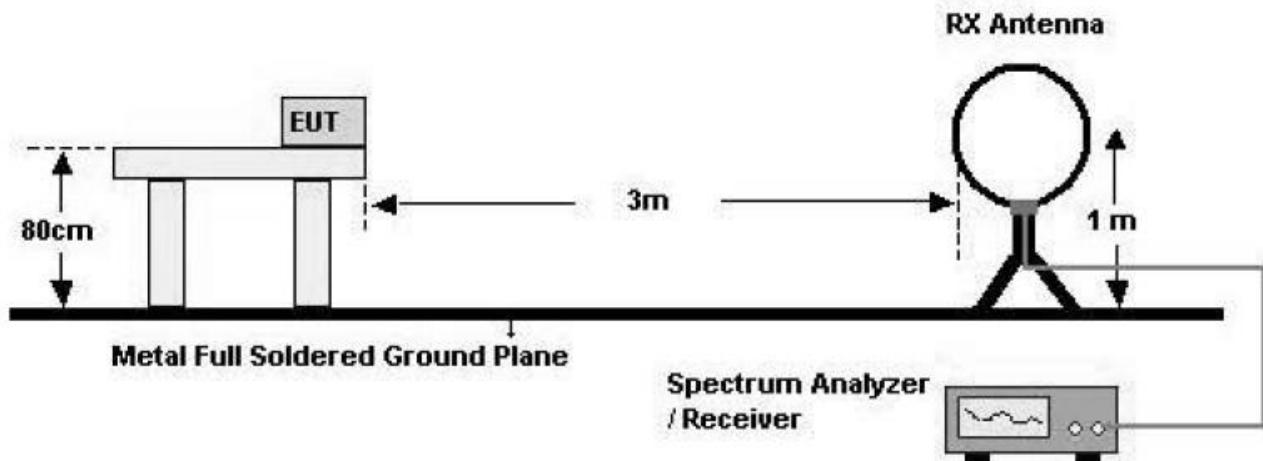
1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed

Frequency (MHz)	Field Strength (mV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

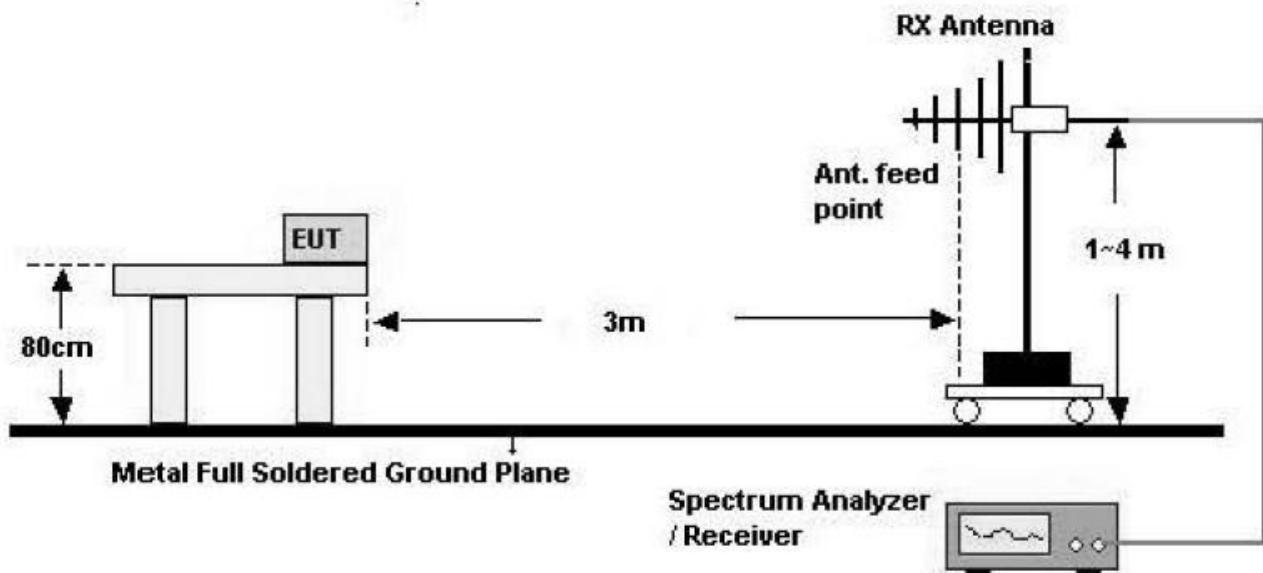
HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 26 of 40

## Test Configuration

### Below 30 MHz

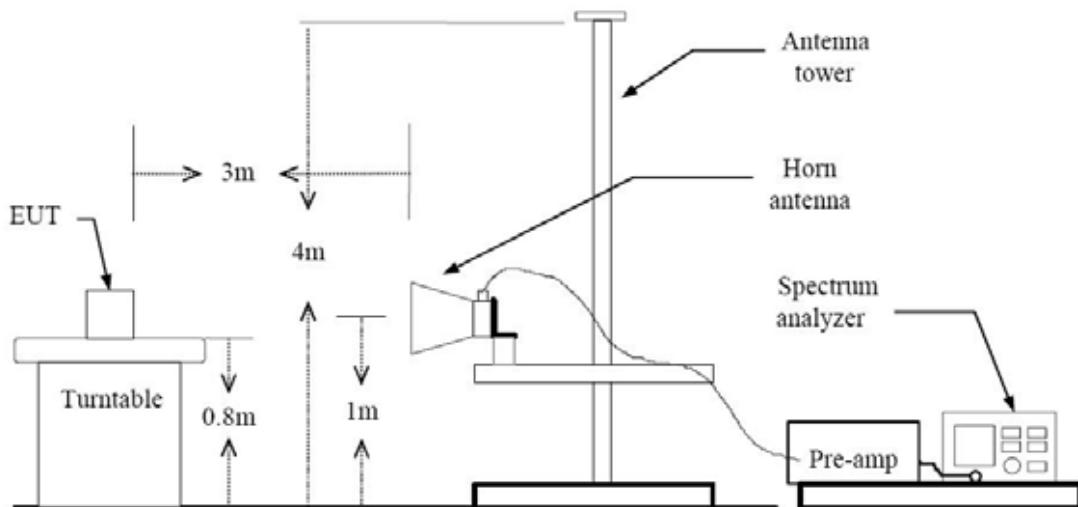


### 30 MHz - 1 GHz



HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 27 of 40

## Above 1 GHz



## TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.

HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA		FCC ID: WLFSTM-7100	Page 28 of 40



## TEST RESULTS

### 9 kHz – 30MHz

**Operation Mode:** Normal Link

The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

#### Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor

HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA		FCC ID: WLFSTM-7100	Page 29 of 40



## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal Link

Frequency [MHz]	Reading [dBuV]	ANT POL	Factor		Limit [dBuV/m]	Result [dBuV/m]
			A.N [dB/m]	C.L [dB]		
48.1	16.4	V	12.5	1.6	40.0	30.5
67.1	19.9	V	10.3	1.9	40.0	32.1
118.5	18.2	H	10.9	2.6	40.0	31.7
170.2	16.2	V	12.1	3.1	40.0	31.4
178.4	16.1	H	10.9	3.2	40.0	30.2
224.9	17.1	H	10.2	3.6	40.0	30.9
253.5	25.2	H	11.2	3.8	47.0	40.2
312.0	23.7	H	13.0	4.3	47.0	41.0
390.9	21.9	V	14.7	4.6	47.0	41.2
467.9	20.4	H	16.5	5.1	47.0	42.0
479.5	19.7	H	16.6	5.2	47.0	41.5
502.6	18.6	H	17.0	5.3	47.0	40.9

### Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Quasi peak detector mode.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 30 of 40



## Above 1 GHz

Operation Mode:	802.11 b
Transfer Rate:	11 Mbps
Operating Frequency	2412
Channel No.	01

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4824	46.84	-4.75	V	42.09	74	31.91	PK
4824	34.64	-4.75	V	29.89	54	24.11	AV
7236	47.91	1.31	V	49.22	74	24.78	PK
7236	34.21	1.31	V	35.52	54	18.48	AV

### Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz- 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 31 of 40



Operation Mode:	802.11 b
Transfer Rate:	11 Mbps
Operating Frequency	2442
Channel No.	07

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4874	46.77	-4.62	V	42.15	74	31.85	PK
4874	34.54	-4.62	V	29.92	54	24.08	AV
7311	45.79	1.58	V	47.37	74	26.63	PK
7311	33.03	1.58	V	34.61	54	19.39	AV

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz- 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 32 of 40



Operation Mode:	802.11 b
Transfer Rate:	11 Mbps
Operating Frequency	2472
Channel No.	13

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4924	50.62	-4.50	V	46.12	74	27.88	PK
4924	38.92	-4.50	V	34.42	54	19.58	AV
7386	47.13	1.85	V	48.98	74	25.02	PK
7386	33.73	1.85	V	35.58	54	18.42	AV

**Notes:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz- 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 33 of 40



## 7.5.2 Radiated Restricted Band Edge Measurements

### Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

Operation Mode:	802.11 g
Transfer Rate:	54 Mbps
Operating Frequency	2472
Channel No.	13

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
2483.98	46.75	-9.76	V	36.99	74	37.01	PK
2483.98	33.57	-9.76	V	23.81	54	30.19	AV
2487.69	46.16	-9.74	V	36.42	74	37.58	PK
2487.69	33.31	-9.74	V	23.57	54	30.43	AV
2493.72	45.41	-9.72	V	35.69	74	38.31	PK
2493.72	32.76	-9.72	V	23.04	54	30.96	AV

### Notes:

1. Spectrum setting:
  - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - b. AV Setting 1 GHz- 26 GHz, RBW = 1 MHz, VBW = 10 Hz.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 34 of 40



## 7.6 POWERLINE CONDUCTED EMISSIONS

### Test Requirements and limit, §15.247(d)

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference groundplane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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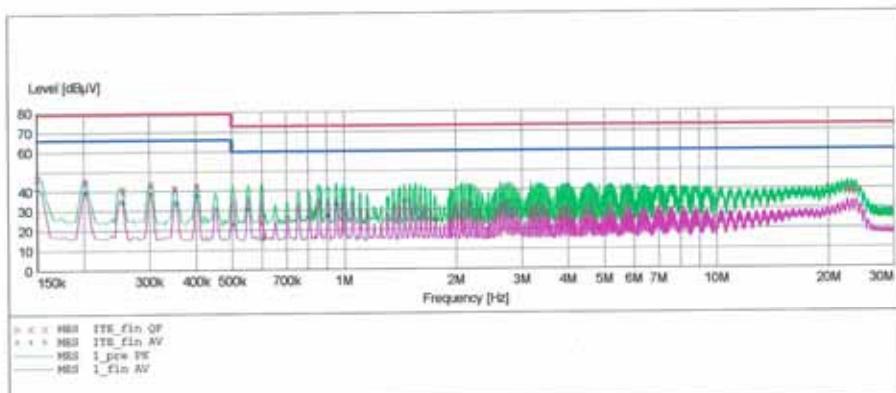
## RESULT PLOTS

### Conducted emissions (Line 1 / Mid CH)

**HCT**  
**EMC**  
 EUT: STM-7100  
 Manufacturer: WOONGIN ST  
 Operating Condition: NORMAL MODE  
 Test Site: SHIELD ROOM  
 Operator: DS-KIM  
 Test Specification: KN22 CLASS A  
 Comment: H (PDA)

#### SCAN TABLE: "KN 22 CLASS A"

Short Description:		EN 55022 Voltage				
Start	Stop	Step	Detector	Meas.	IF	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



#### MEASUREMENT RESULT: "ITE\_fin QP"

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.150000	47.10	10.0	79	31.9	---	---
0.202000	44.90	10.0	79	34.1	---	---
0.254000	40.40	10.0	79	38.6	---	---
0.302000	43.70	10.0	79	35.3	---	---
0.350000	40.90	10.0	79	38.1	---	---
0.402000	42.70	10.0	79	36.3	---	---
0.600000	24.30	10.1	73	48.7	---	---
2.076000	20.90	10.3	73	52.1	---	---
3.180000	28.70	10.4	73	44.3	---	---
22.448000	39.20	12.5	73	33.8	---	---
23.132000	39.00	12.5	73	34.0	---	---
23.756000	38.70	12.6	73	34.3	---	---

HCT PT.15.247 TEST REPORT		FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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MEASUREMENT RESULT: "ITE\_fin AV"

3/24/2008 5:08PM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line dB	PE
0.150000	41.20	10.0	66	24.8	----	----
0.202000	39.40	10.0	66	26.6	----	----
0.254000	34.60	10.0	66	31.4	----	----
0.302000	38.70	10.0	66	27.3	----	----
0.354000	34.10	10.0	66	31.9	----	----
0.402000	37.80	10.0	66	28.2	----	----
0.504000	23.10	10.1	60	36.9	----	----
0.552000	30.90	10.1	60	29.1	----	----
0.604000	15.70	10.1	60	44.3	----	----
0.904000	27.20	10.1	60	32.8	----	----
0.952000	32.80	10.1	60	27.2	----	----
1.456000	34.80	10.2	60	25.2	----	----

<b>HCT PT.15.247 TEST REPORT</b>		<b>FCC Original Equipment</b>			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCT-R08-134	Test Dates: August 12, 2008	EUT Type: Industrial PDA	FCC ID: WLFSTM-7100	Page 37 of 40	

## Conducted emissions (Line 2 / Mid CH )

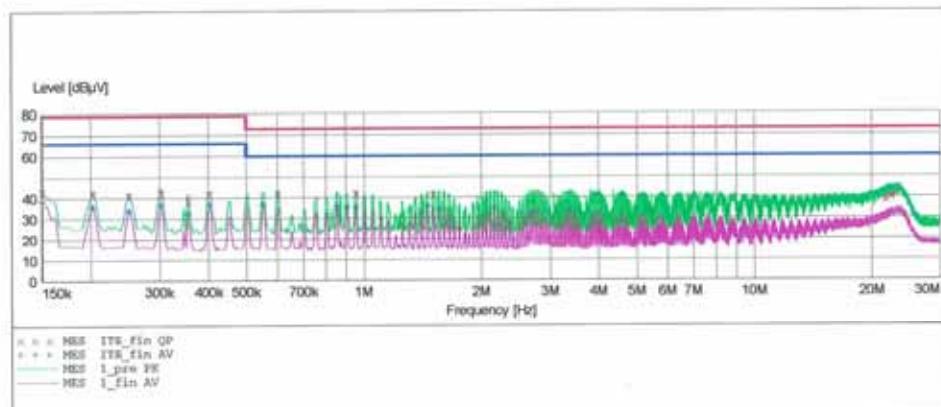
HCT

EMC

EUT: STM-7100  
 Manufacturer: WOONGIN ST  
 Operating Condition: NORMAL MODE  
 Test Site: SHIELD ROOM  
 Operator: DS-KIM  
 Test Specification: KN22 CLASS A  
 Comment: N (PDA)

### SCAN TABLE: "KN 22 CLASS A"

Short Description:			EN 55022 Voltage			
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



### MEASUREMENT RESULT: "ITE\_fin\_QP"

3/24/2008 5:04PM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line dB	PE
0.150000	43.30	10.0	79	35.7	---	---
0.202000	42.30	10.0	79	36.7	---	---
0.250000	41.10	10.0	79	37.9	---	---
0.302000	42.90	10.0	79	36.1	---	---
0.354000	38.70	10.0	79	40.3	---	---
0.402000	42.10	10.0	79	36.9	---	---
0.600000	42.10	10.1	73	30.9	---	---
0.952000	41.90	10.1	73	31.1	---	---
1.508000	41.60	10.2	73	31.4	---	---
21.780000	39.20	12.4	73	33.8	---	---
22.368000	40.60	12.4	73	32.4	---	---
23.056000	41.40	12.5	73	31.6	---	---

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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MEASUREMENT RESULT: "ITE\_fin AV"

3/24/2008 5:04PM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.150000	38.70	10.0	66	27.3	---	---
0.202000	35.90	10.0	66	30.1	---	---
0.250000	33.90	10.0	66	32.1	---	---
0.302000	36.90	10.0	66	29.1	---	---
0.354000	32.60	10.0	66	33.4	---	---
0.402000	36.80	10.0	66	29.2	---	---
0.552000	37.10	10.1	60	22.9	---	---
0.852000	36.00	10.1	60	24.0	---	---
0.904000	35.60	10.1	60	24.4	---	---
0.956000	35.50	10.1	60	24.5	---	---
1.456000	35.90	10.2	60	24.1	---	---
2.160000	35.20	10.3	60	24.8	---	---

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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## 8. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Due	Serial No.
Rohde & Schwarz	ESCI/ EMI Test Receiver	Annual	08/24/2009	100033
Rohde & Schwarz	ESH2-Z5/ LISN	Annual	04/20/2009	861741/013
Rohde & Schwarz	ESH3-Z6/ LISN	Annual	03/19/2009	100329
Schwarzbeck	VULB 9160/ TRILOG Antenna	Biennial	04/20/2009	9160-3150
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	ESH3-Z2/ PULSE LIMITER	Annual	10/03/2008	375.8810.352
MITEQ	AMF-60-0010 1800-35-20P	Annual	01/15/2009	1200937
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	03/30/2009	147
Schwarzbeck	BBHA9170/ SHF-EHF Horn Antenna	Biennial	03/20/2009	BBHA9170342
Rohde & Schwarz	6502/Loop Antenna	Biennial	12/26/2009	9009-2536
Rohde & Schwarz	FSP/Spectrum Analyzer	Annual	07/31/2009	839117/011
ADVANTEST	R3671/Spectrum Analyzer	Annual	06/14/2009	150900068
Agilent	E4416A /Power Meter	Annual	01/22/2009	GB41291412
Wainwright Instrument	WRCJ2400/2483.5 / Band Rejection Filter	Annual	07/10/2009	1
DIGITAL	EP-3010 /DC POWER SUPPLY	Annual	01/10/2009	3110117

HCT PT.15.247 TEST REPORT	FCC Original Equipment			<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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