



## HCT CO., LTD.

Product Compliance Division

TEL : +82 31 639 8518 FAX : +82 31 639 8525

### CERTIFICATE OF COMPLIANCE

#### FCC PART 15.247 Certification

**Applicant Name:**

AXESSTEL INC.

**Address:**

6815 Flanders Drive Ste.210,  
San Diego, CA 92121

**Date of Testing:**

July 21, 2008

**Test Site/Location:**

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

**Test Report No.:** HCT-R08-092

**HCT FRN:** 0005866421

**FCC ID :** PH7MV440

**APPLICANT :** AXESSTEL INC.

**FCC Rule Part(s):**

Part 15 subpart C 15.247

**Application Type:**

Certification

**EUT Type:**

Cellular/PCS CDMA Wireless Gateway with WLAN

**Model(s):**

MV440

**Tx Frequency:**

2412-2462 MHz(DSSS/OFDM)

**Rx Frequency:**

2412-2462 MHz(DSSS/OFDM)

**Max. RF Output Power:**

Wi-Fi 802.11b(19.31 dBm) / Wi-Fi 802.11g (18.18dBm)

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)

**Report prepared by**

**: Youn Seok Jung**

**Test engineer of RF Part**

**Approved by**

**: Sang Jun Lee**

**Manager of RF Part**

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 1 of 40                                     |



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## 1. GENERAL INFORMATION

**Applicant:** AXESSTEL INC.  
6815 Flanders Drive Ste.210,  
San Diego, CA

**FCC ID:** PH7MV440

**EUT:** Cellular/PCS CDMA Wireless Gateway with WLAN

**Date of Test:** July 21, 2008

**Contact:** Tel: 858- 625-2100 Fax: 858- 625- 2110  
E-Mail: dskim@axesstel.com

## 2. EUT DESCRIPTION

|                              |                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------|
| <b>Product</b>               | Cellular/PCS CDMA Wireless Gateway with WLAN                                                              |
| <b>Model Name</b>            | MV440                                                                                                     |
| <b>Power Supply</b>          | DC 7.4 V                                                                                                  |
| <b>Battery type</b>          | Standard                                                                                                  |
| <b>Frequency Range</b>       | TX: 2412 ~ 2462 MHz<br>RX: 2412 ~ 2462 MHz                                                                |
| <b>Max. RF Output Power</b>  | Wi-Fi 802.11b(19.31 dBm) / Wi-Fi 802.11g (18.18dBm)                                                       |
| <b>Modulation Type</b>       | DSSS/CCK(802.11b), OFDM(802.11g)                                                                          |
| <b>Antenna Specification</b> | Manufacturer: Hankook Antenna Co.,LTD<br>Antenna type: sleeve dipole antenna<br>Antenna Max gain: 1.5 dBi |



### 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.

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 4 of 40                                     |



#### 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.

|                                |                              |                                                           |                     |                                                  |
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## 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

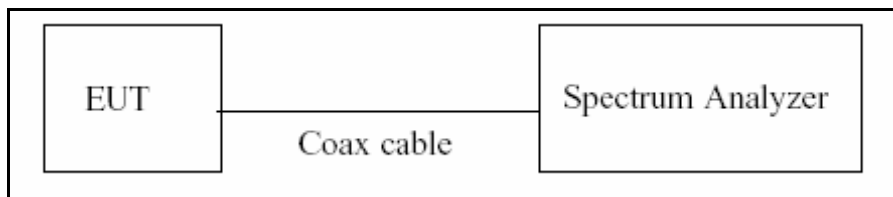
### 7.1 6dB Bandwidth Measurement (802.11b/g)

#### Test Requirments 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

#### ■ TEST RESULTS

Conducted 6dB Bandwidth Measurements for 802.11b

| 802.11b Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 2412            | 1           | 10.96                       | 0.500                      | Pass        |
| 2437            | 6           | 11.44                       | 0.500                      | Pass        |
| 2462            | 11          | 10.88                       | 0.500                      | Pass        |

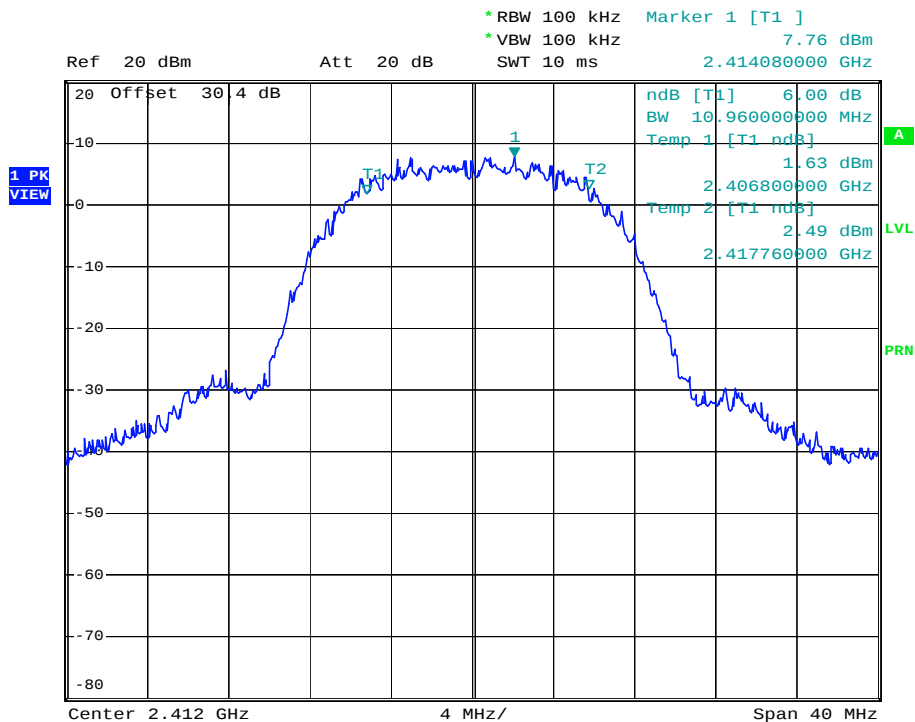
Conducted 6dB Bandwidth Measurements for 802.11g

| 802.11g Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 2412            | 1           | 16.64                       | 0.500                      | Pass        |
| 2437            | 6           | 16.64                       | 0.500                      | Pass        |
| 2462            | 11          | 16.56                       | 0.500                      | Pass        |



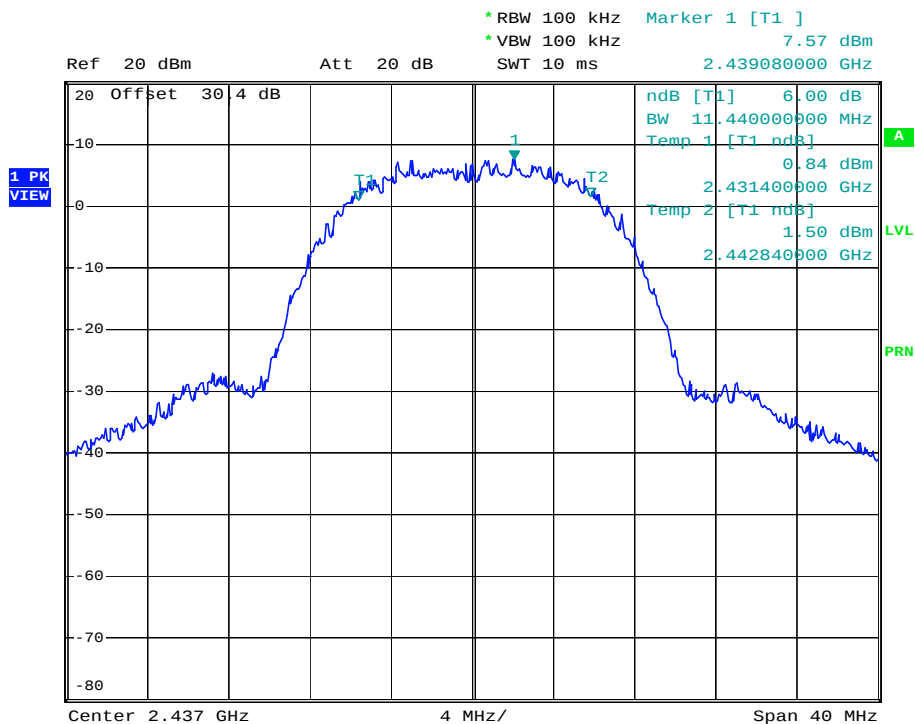
## RESULT PLOTS

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



Date: 18.JUL.2008 11:53:39

### 6dB Bandwidth plot (802.11b-CH 6)

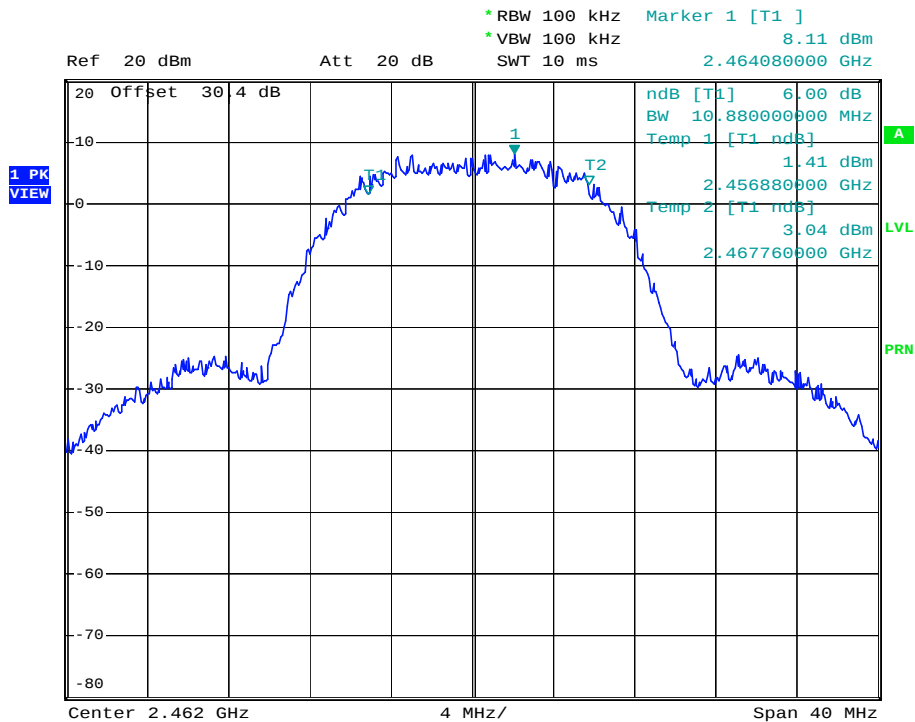


Date: 18.JUL.2008 11:54:29

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
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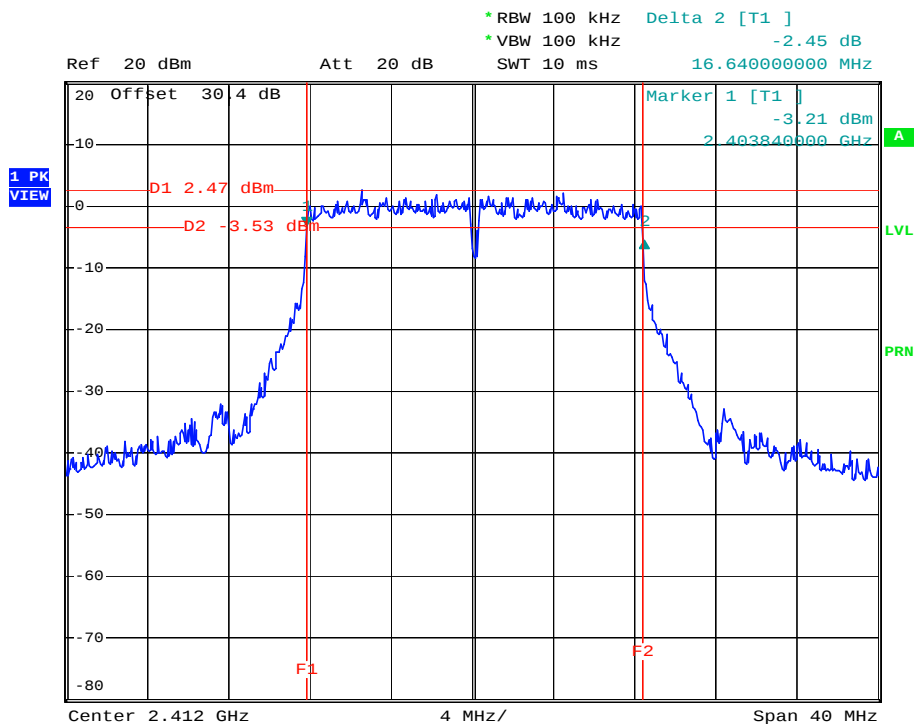


### 6dB Bandwidth plot (802.11b-CH 11)



Date: 18.JUL.2008 11:55:19

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

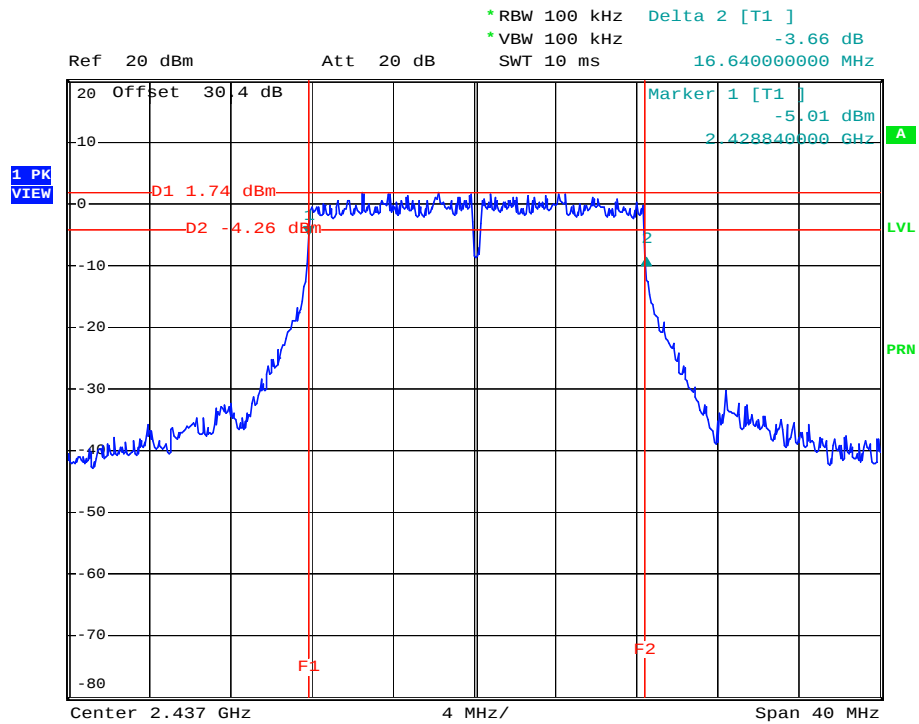


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|                                |                              |                                                           |                     |                                                  |
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|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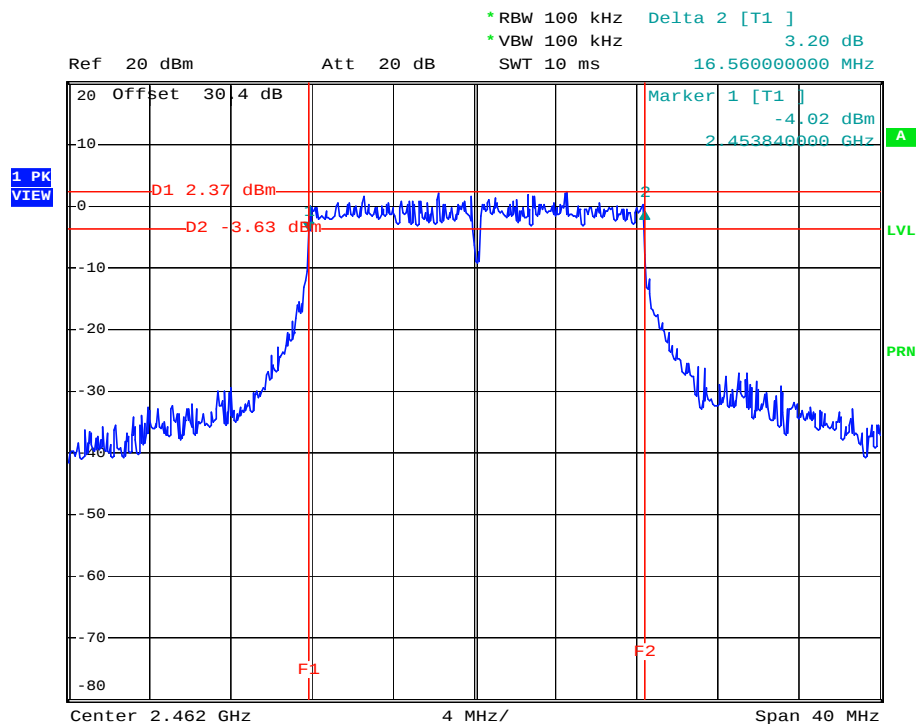


### 6dB Bandwidth plot (802.11g-CH 6)



Date: 18.JUL.2008 11:43:31

### 6dB Bandwidth plot (802.11g-CH 11)



Date: 18.JUL.2008 11:38:32

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
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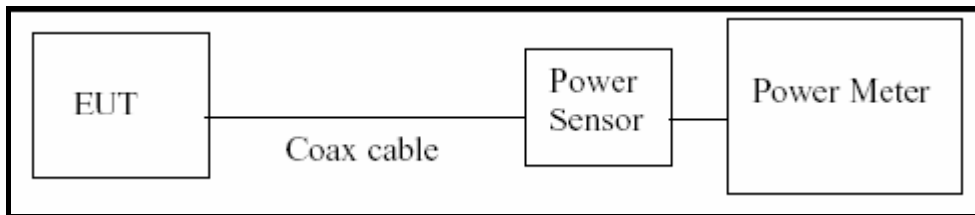
## 7.2 Output Power Measurement (802.11b/g)

### 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<br>(Mbps) | Measured<br>Power (dBm) | Limit (dBm) |
|----------------|-------------|----------------|-------------------------|-------------|
| Frequency[MHz] | Channel No. |                |                         |             |
| 2412           | 1           | 11 Mbps        | 18.83                   | 30          |
| 2437           | 6           | 11 Mbps        | 18.66                   | 30          |
| 2462           | 11          | 11 Mbps        | 19.31                   | 30          |

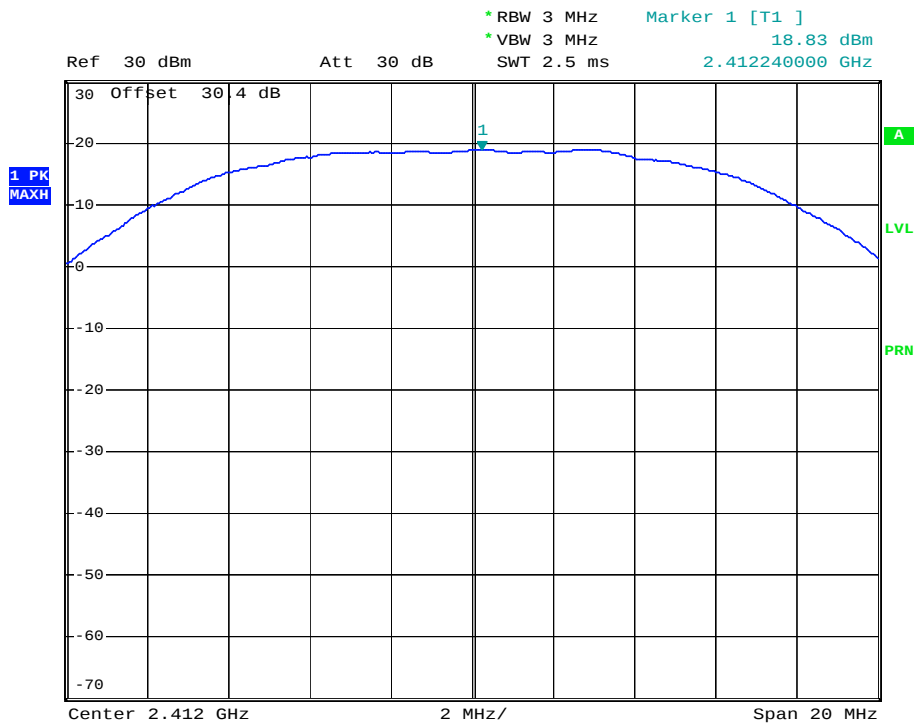
Conducted Output Power Measurements

| 802.11g Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 2412           | 1           | 54 Mbps        | 18.18                  | 30             |
| 2437           | 6           | 54 Mbps        | 17.54                  | 30             |
| 2462           | 11          | 54 Mbps        | 18.04                  | 30             |



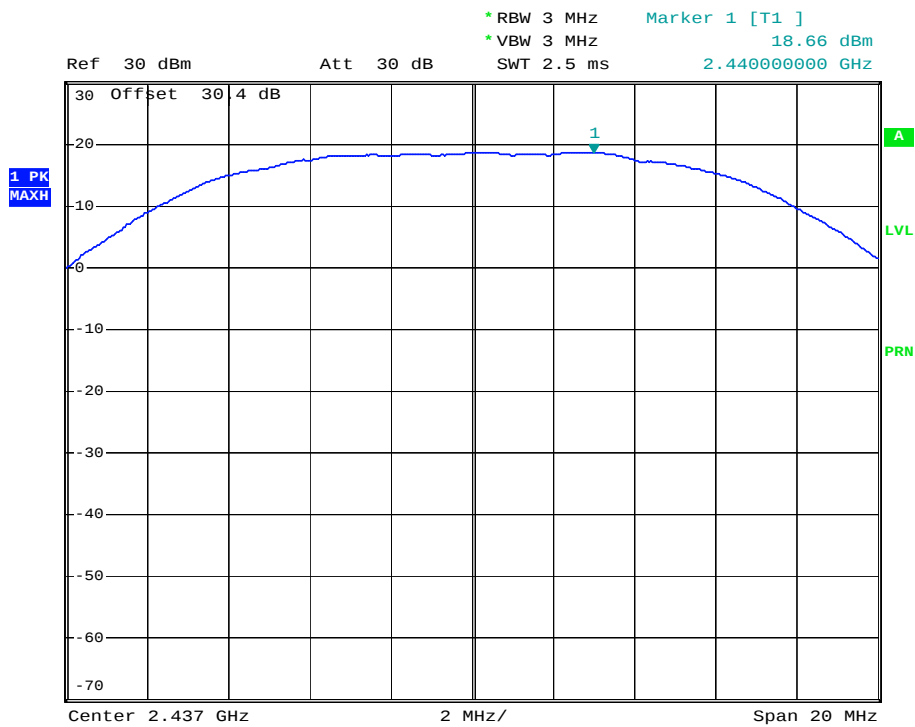
## RESULT PLOTS

### Conducted Output Power (802.11b-CH 1)



Date: 18.JUL.2008 12:06:57

### Conducted Output Power (802.11b-CH 6)

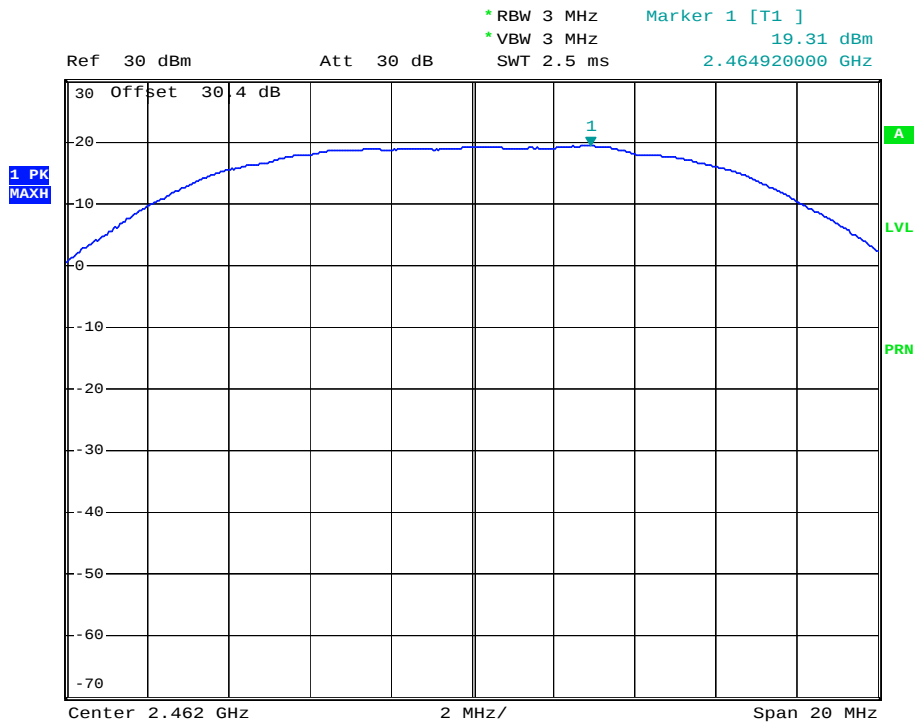


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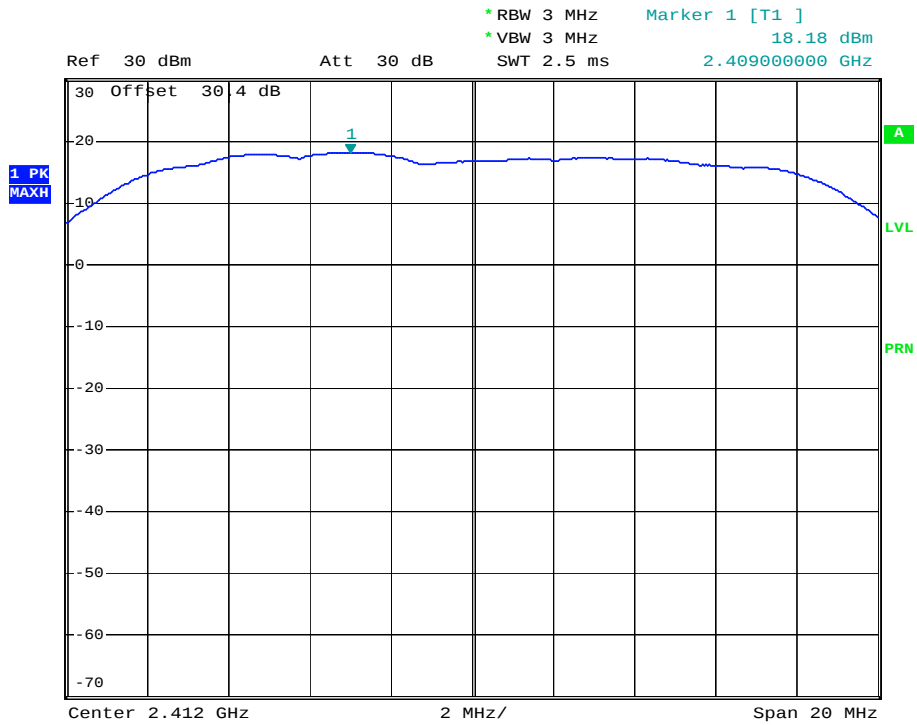


### Conducted Output Power (802.11b-CH 11)



Date: 18.JUL.2008 11:25:56

### Conducted Output Power (802.11g-CH 1)

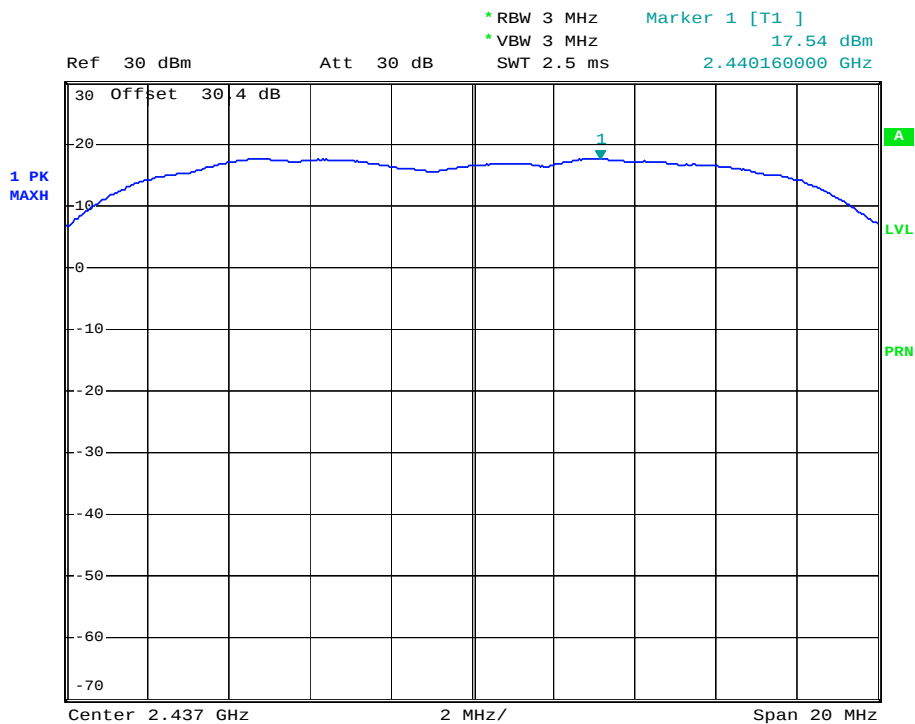


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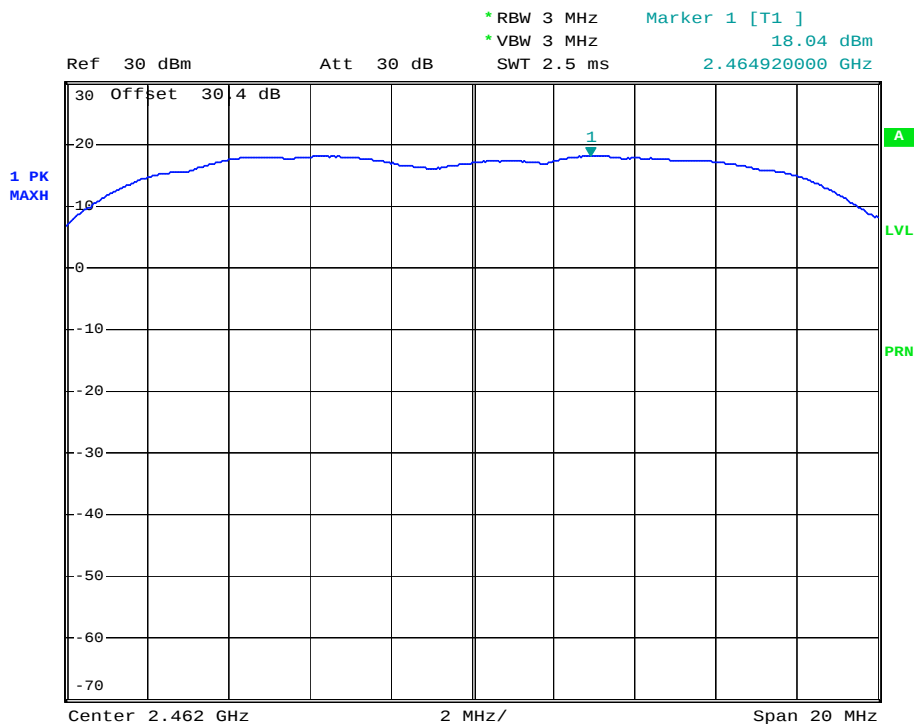


### Conducted Output Power (802.11g-CH 6)



Date: 18.JUL.2008 11:28:19

### Conducted Output Power (802.11g-CH 11)



Date: 18.JUL.2008 11:29:06

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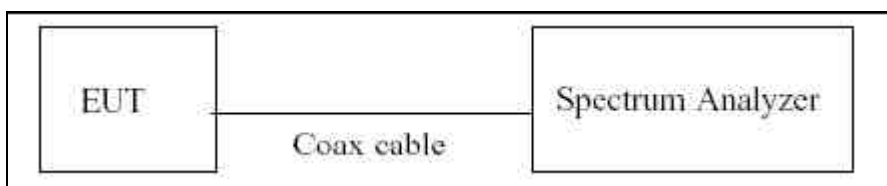
### 7.3 Power Spectral Density (802.11b/g)

#### 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 = 1000 sec

#### ■ TEST RESULTS

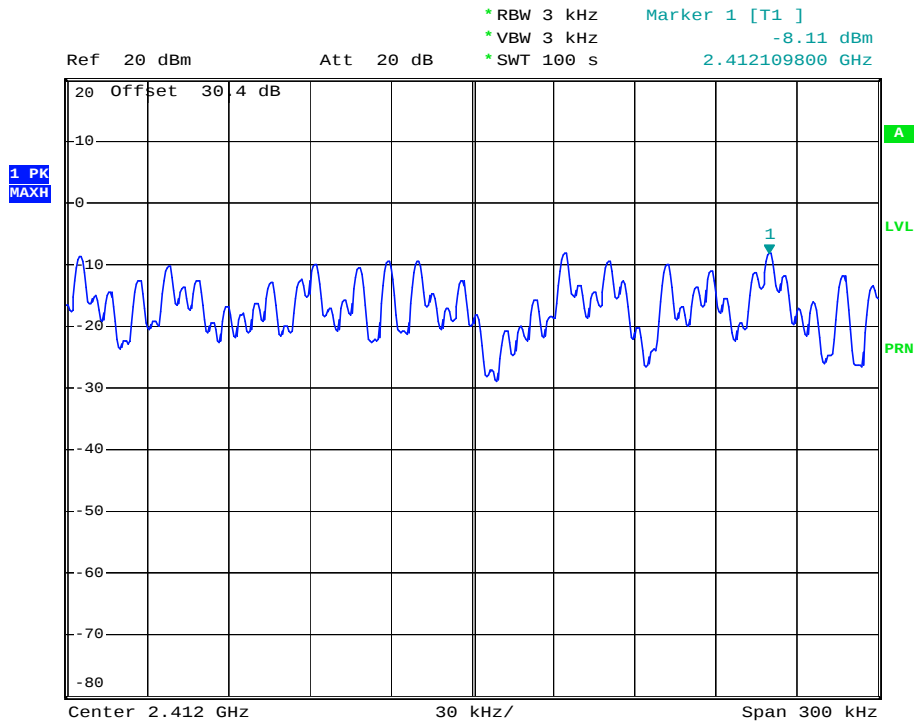
Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode    | Test Result         |           |
|-----------------|-------------|---------|---------------------|-----------|
|                 |             |         | Power Density (dBm) | Pass/Fail |
| 2412            | 1           | 802.11b | -8.11               | Pass      |
| 2437            | 6           |         | -8.24               | Pass      |
| 2462            | 11          |         | -7.69               | Pass      |
| 2412            | 1           | 802.11g | -13.76              | Pass      |
| 2437            | 6           |         | -13.60              | Pass      |
| 2462            | 11          |         | -12.78              | Pass      |



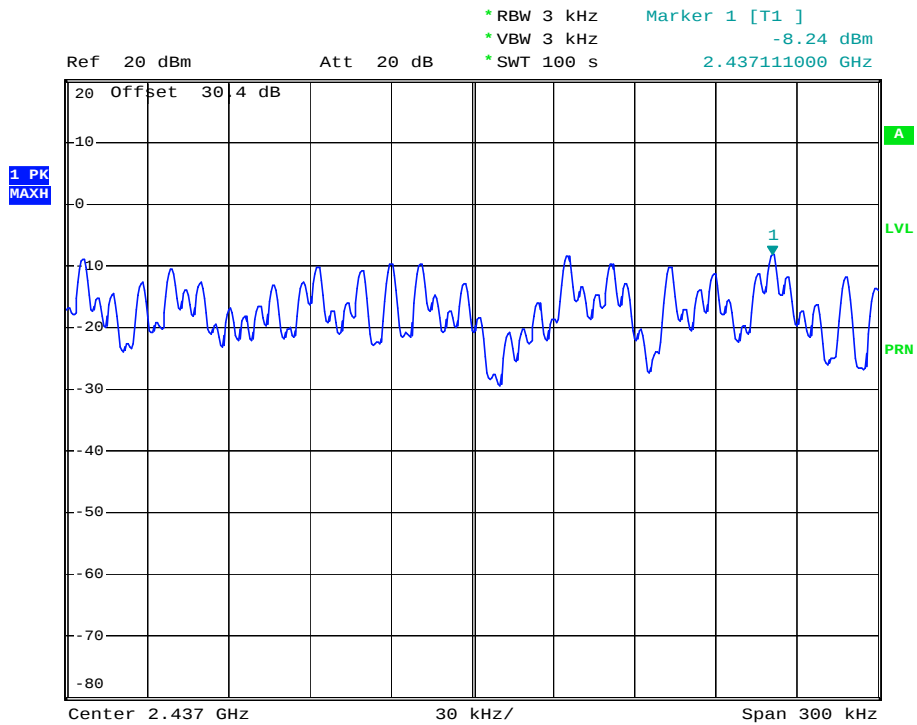
## RESULT PLOTS

### Power Spectral Density (802.11b-CH 1)



Date: 18.JUL.2008 11:16:41

### Power Spectral Density (802.11b-CH 6)

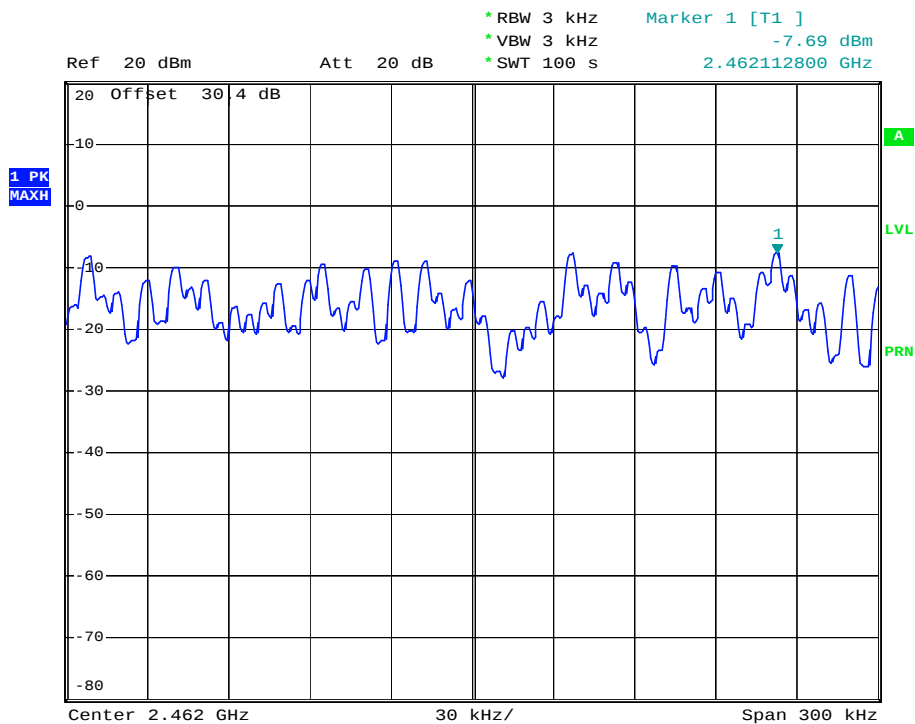


Date: 18.JUL.2008 11:09:06

|                                |                              |                                                           |                     |                                                  |
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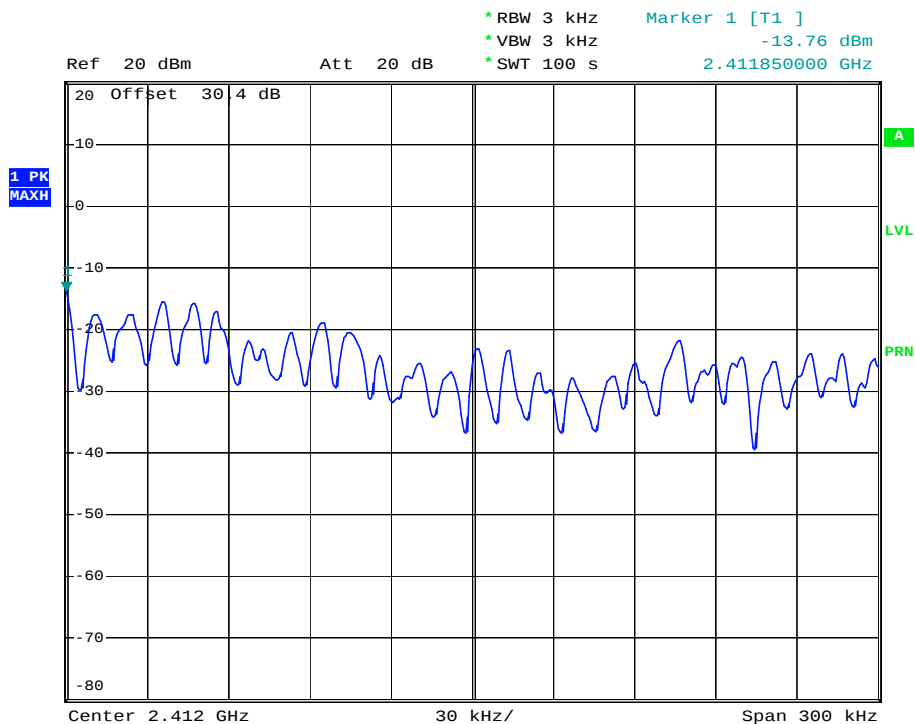


### Power Spectral Density (802.11b-CH 11)



Date: 18.JUL.2008 11:04:35

### Power Spectral Density (802.11g-CH 1)

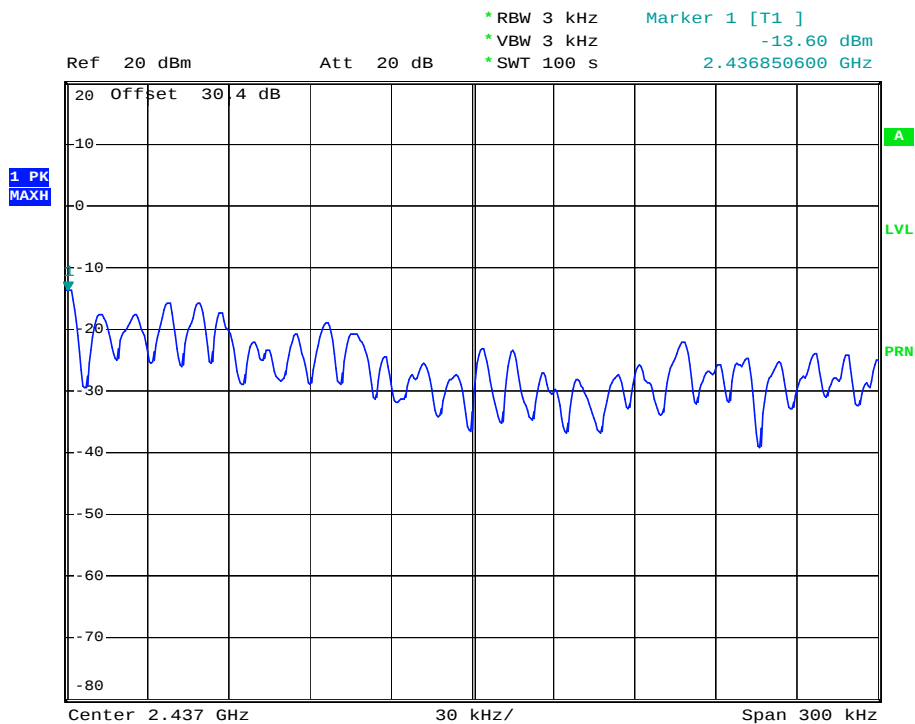


Date: 18.JUL.2008 10:57:26

|                                |                              |                                                           |                     |                                                  |
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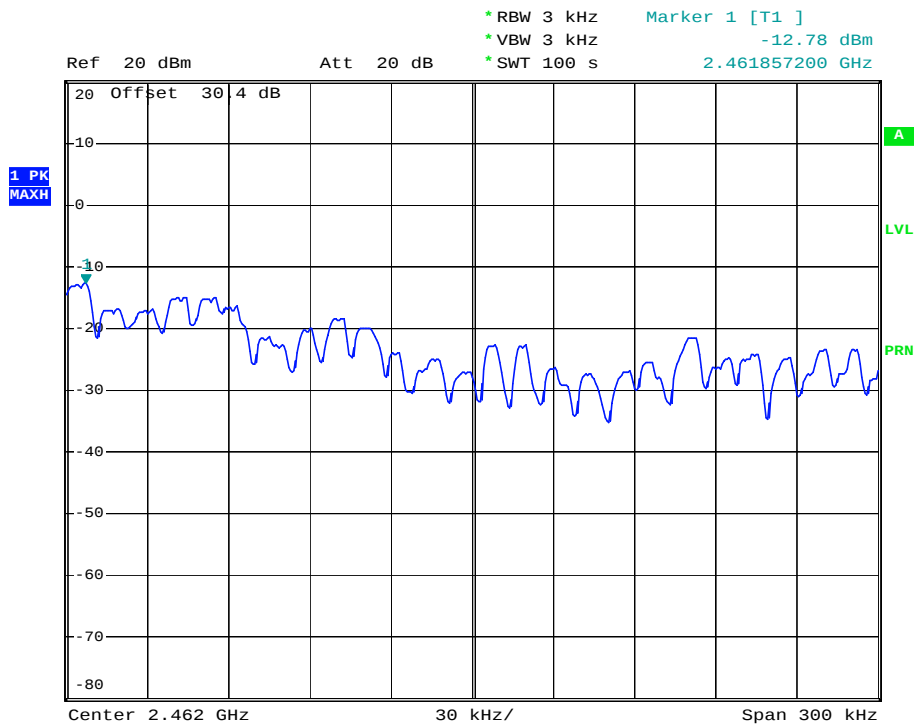


### Power Spectral Density (802.11g-CH 6)



Date: 18.JUL.2008 10:38:03

### Power Spectral Density (802.11g-CH11)



Date: 18.JUL.2008 10:32:58

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 19 of 40                                    |

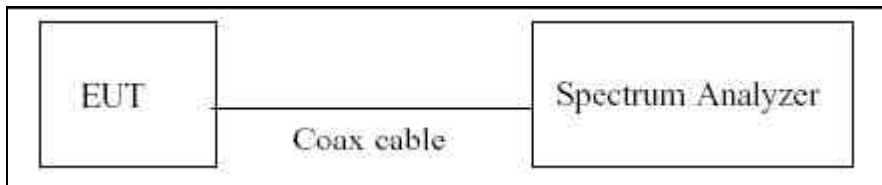


## 7.4 Out of Band Emissions at the Band Edge/ Conducted Spurious Emissions

### Test Requirments 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.

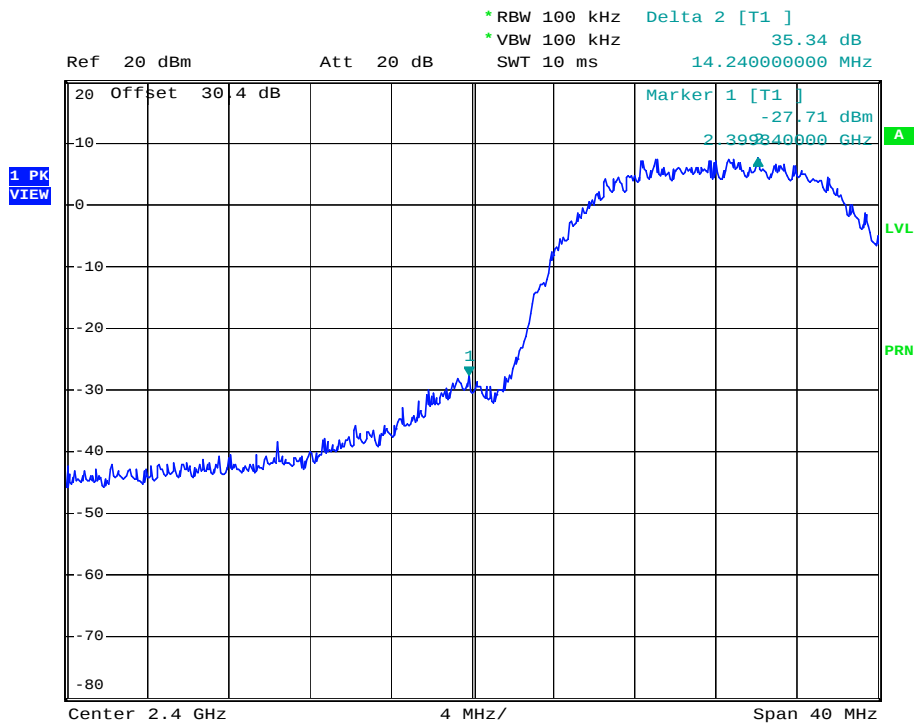
he resolution bandwidth is set to 100 kHz and the video bandwidth is set to 100 kHz.

The spectrum from 30 MHz to 10<sup>th</sup> harmonics is investigated with the transmitter set to the lowst, middle, and highest channels.



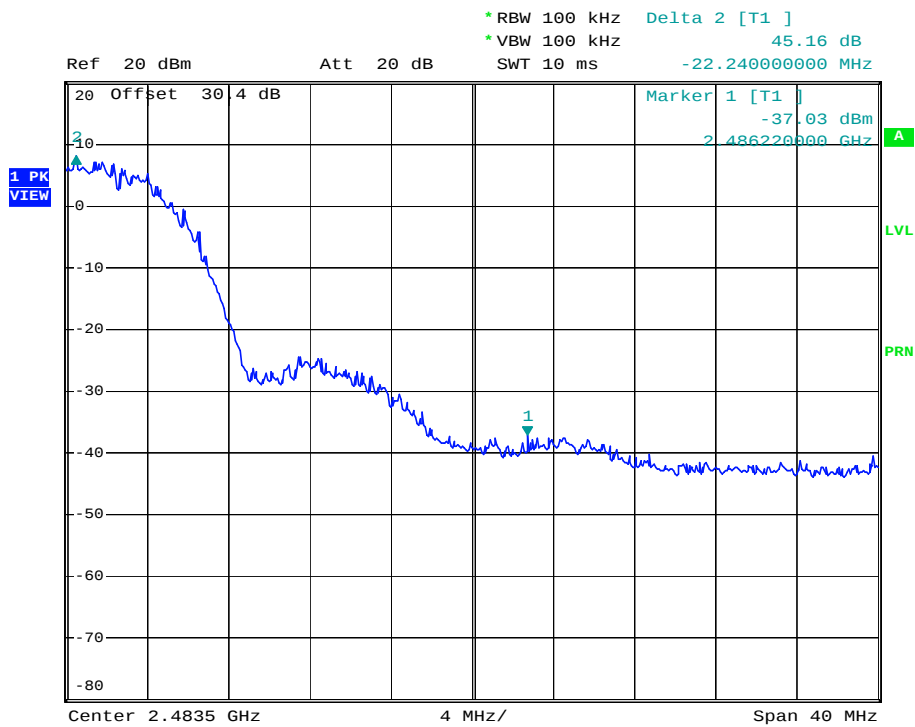
## RESULT PLOTS

### BandEdge (802.11b-CH1)



Date: 18.JUL.2008 12:05:43

### BandEdge (802.11b-CH11)

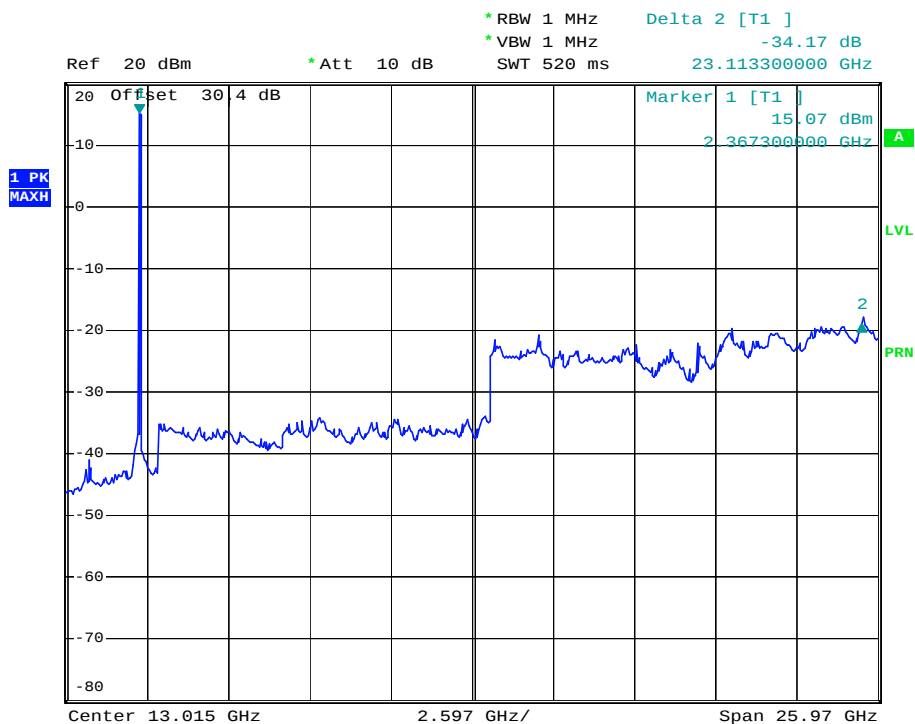


Date: 18.JUL.2008 12:04:09

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 21 of 40                                    |

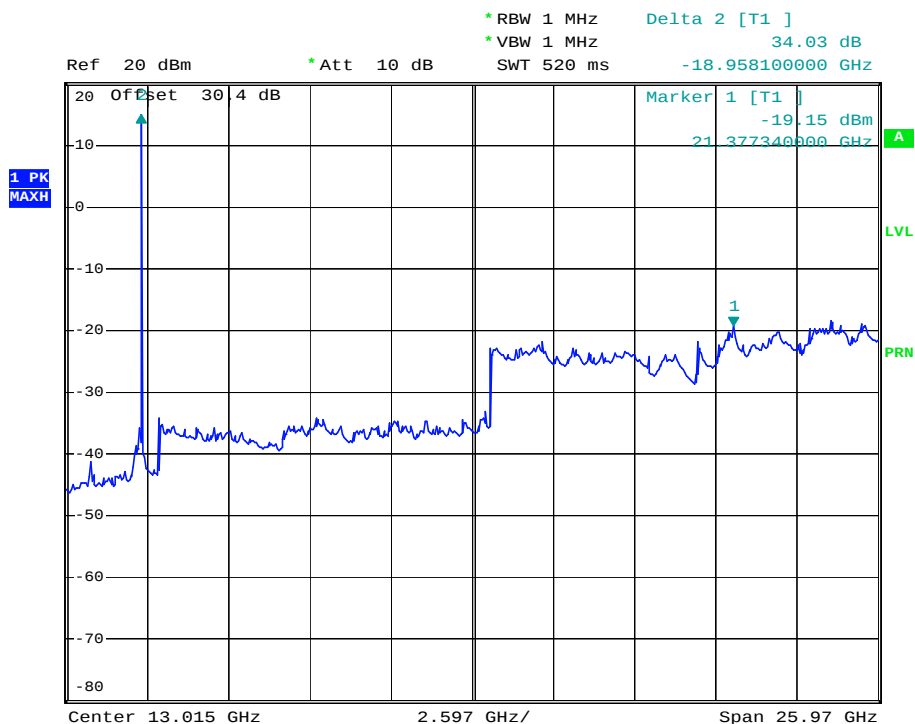


### Conducted Spurious Emission (802.11b-CH1)



Date: 18.JUL.2008 12:16:52

### Conducted Spurious Emission (802.11b-CH6)

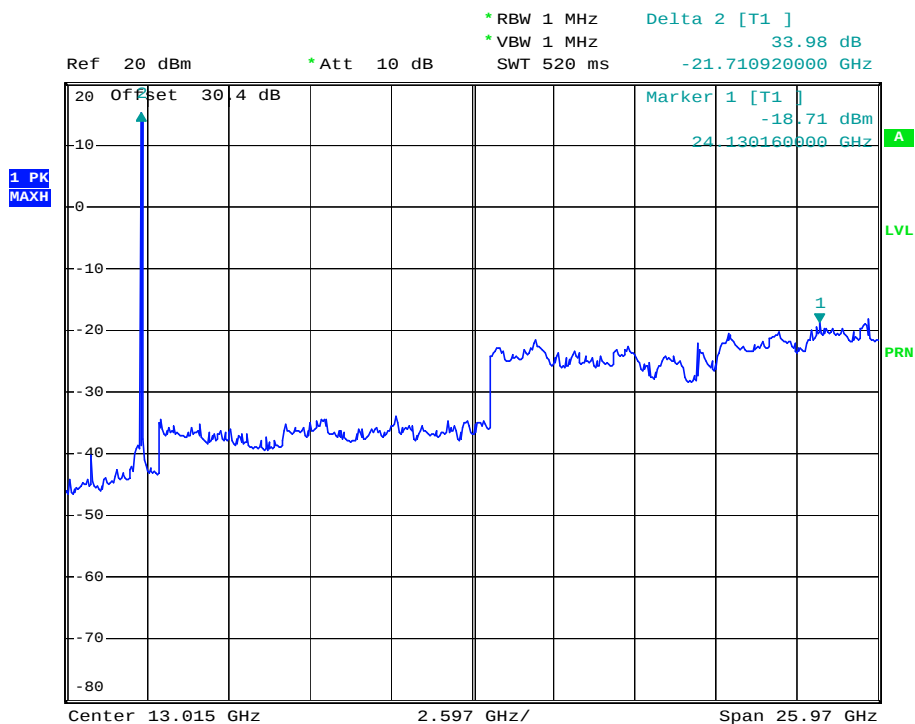


Date: 18.JUL.2008 12:17:28

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 22 of 40                                    |

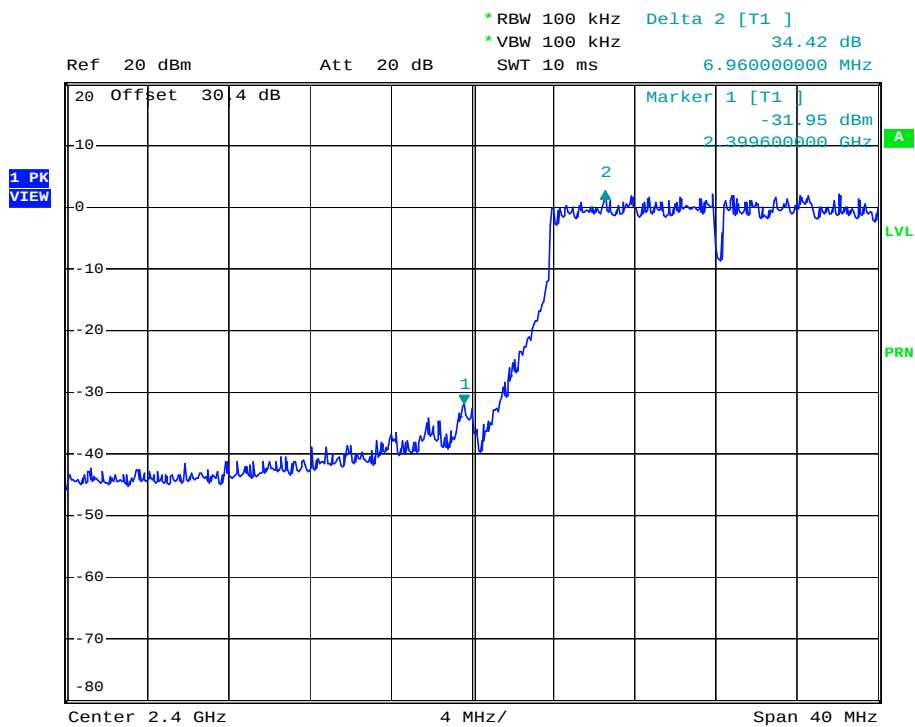


### Conducted Spurious Emission (802.11b-CH11)



Date: 18.JUL.2008 12:17:59

### BandEdge (802.11g-CH1)

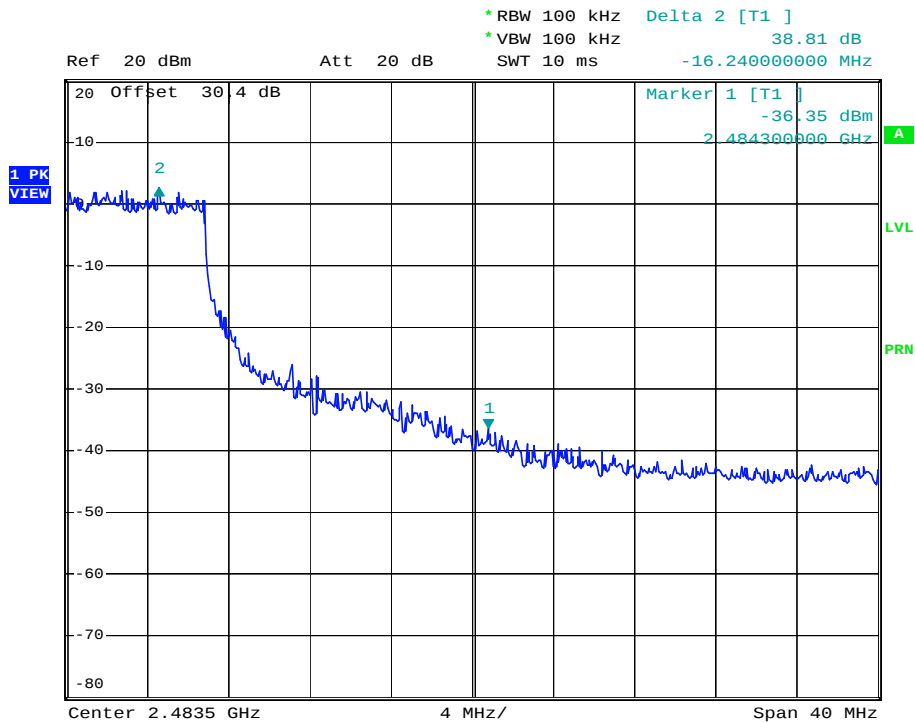


Date: 18.JUL.2008 12:12:19

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 23 of 40                                    |

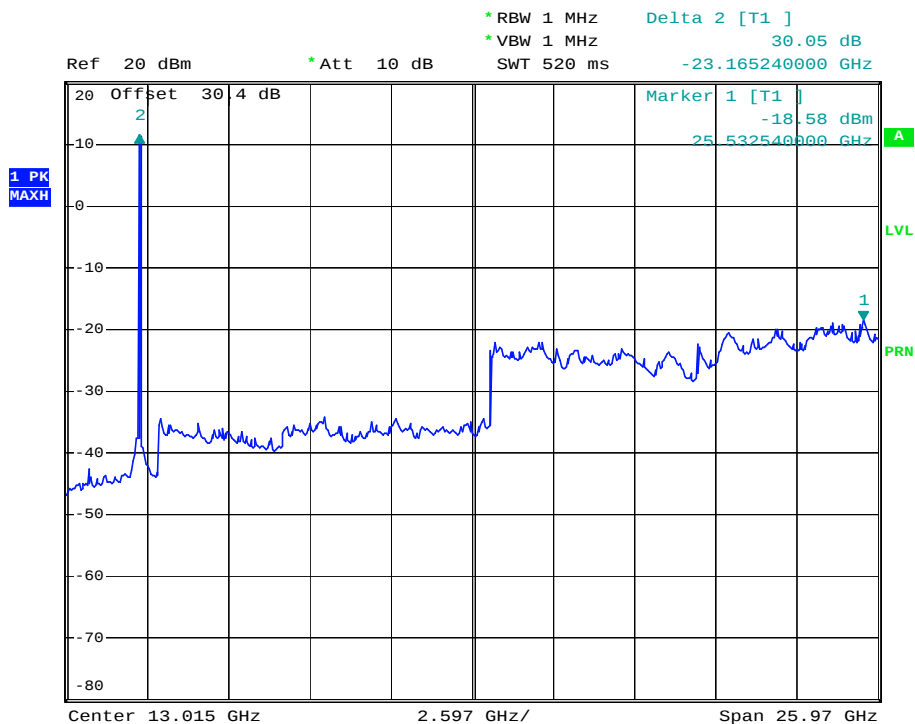


## BandEdge (802.11g-CH11)



Date: 18.JUL.2008 12:13:26

## Conducted Spurious Emission (802.11g-CH1)

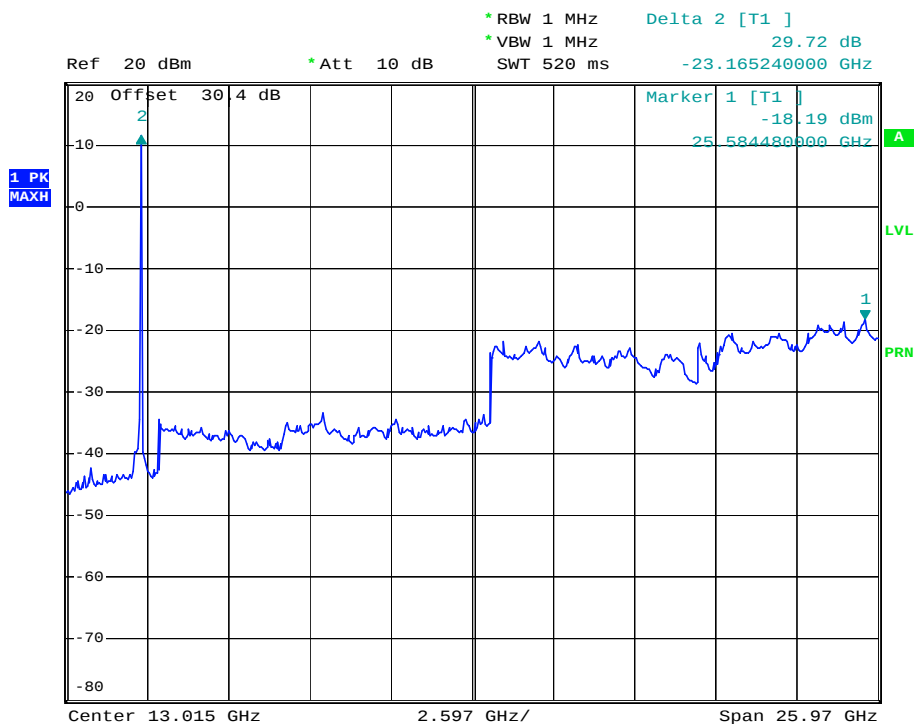


Date: 18.JUL.2008 12:16:07

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 24 of 40                                    |

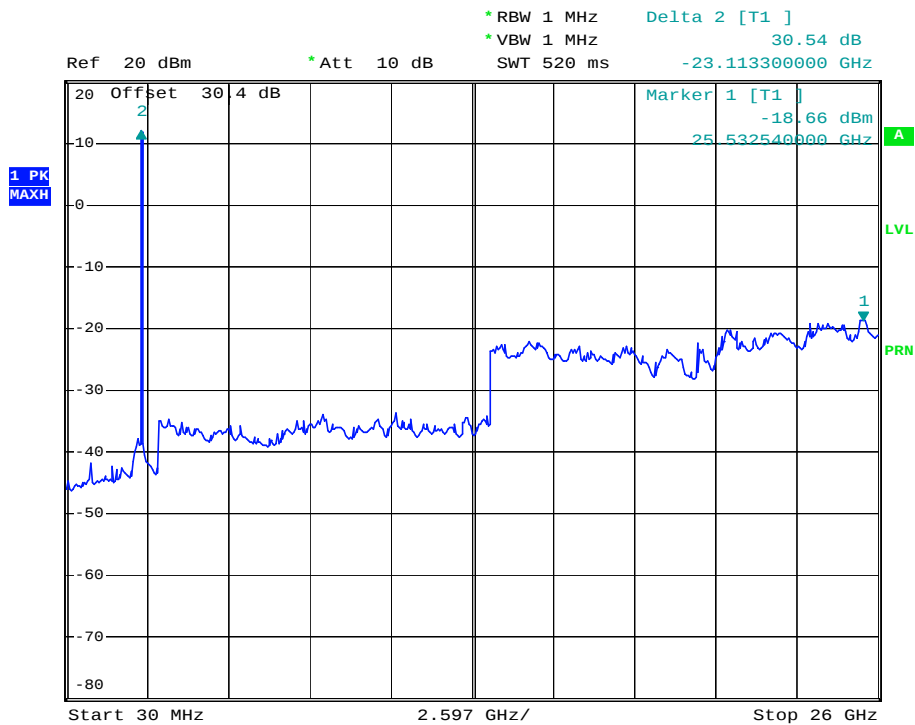


### Conducted Spurious Emission (802.11g-CH6)



Date: 18.JUL.2008 12:15:32

### Conducted Spurious Emission (802.11g-CH11)



Date: 18.JUL.2008 12:14:41

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 25 of 40                                    |



## 7.5 Radiated Measurement.

### 7.5.1 Radiated Spurious Emissions.

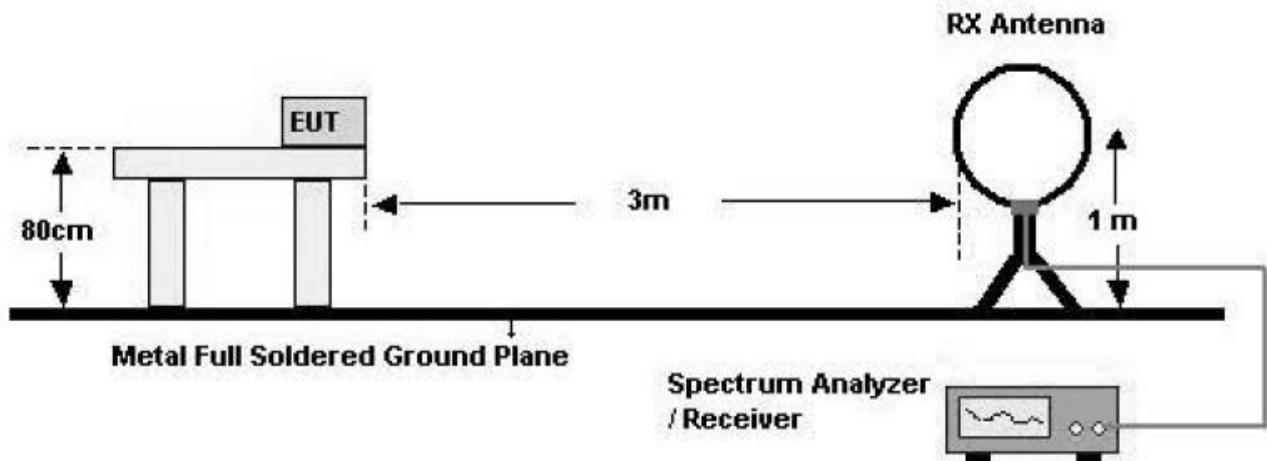
#### Test Requirments and limit, §15.247(d)

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

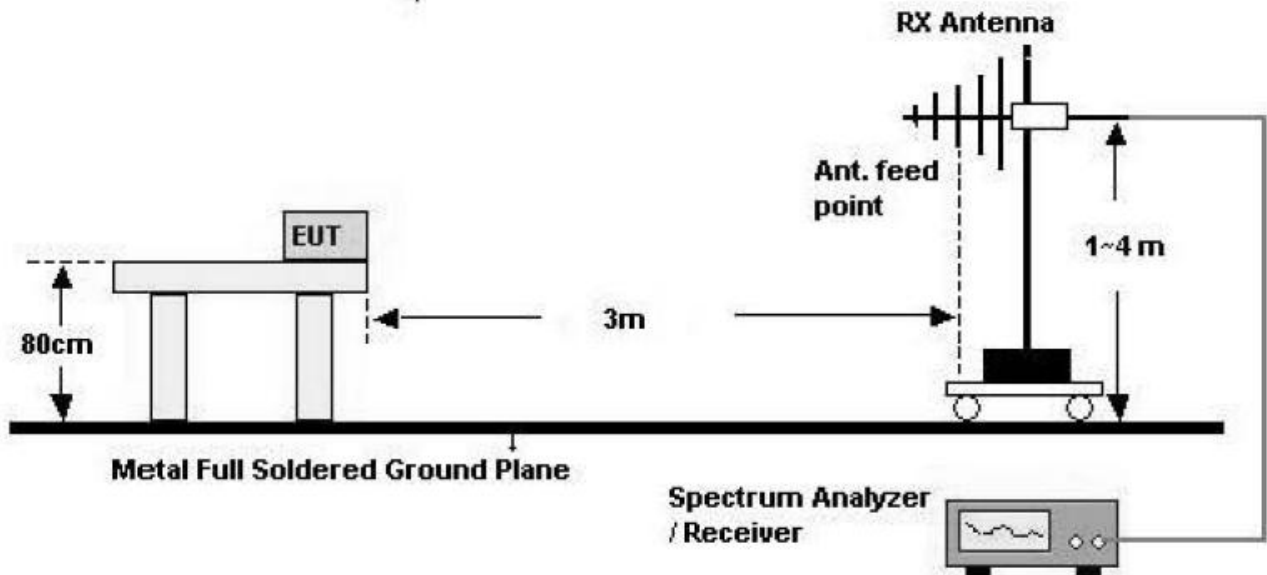
| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 0.009 – 0.490   | 2400/F(KHz)           | 300                      |
| 0.490 – 1.705   | 24000/F(KHz)          | 30                       |
| 1.705 – 30    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

## Test Configuration

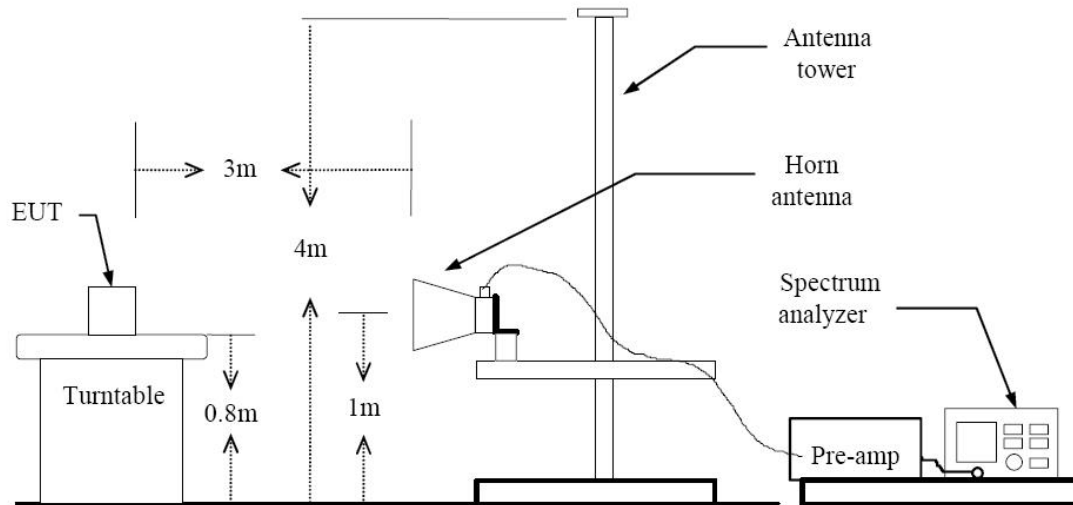
### Below 30 MHz



### 30 MHz - 1 GHz



## 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.



## 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<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 29 of 40                                    |



## TEST RESULTS

### Below 1 GHz

**Operation Mode:** Normal Link

| Frequency<br>MHz | Reading<br>dBuV | Ant. Factor<br>dB | Cable Loss<br>dB | ANT POL<br>(H/V) | Total<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB |
|------------------|-----------------|-------------------|------------------|------------------|-----------------|-----------------|--------------|
| 55.9             | 14.2            | 13.0              | 1.7              | H                | 28.9            | 40.0            | 11.1         |
| 55.9             | 17.1            | 13.0              | 1.7              | V                | 31.8            | 40.0            | 8.2          |
| 108.8            | 17.0            | 9.4               | 2.5              | H                | 28.9            | 43.5            | 14.6         |
| 499.0            | 7.8             | 17.1              | 5.3              | H                | 30.2            | 46.0            | 15.8         |

### 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.



## Above 1 GHz

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

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP G<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4824               | 43.56           | -4.75                | V                 | 38.81             | 74                | 35.19          | PK     |
| 4824               | 30.94           | -4.75                | V                 | 26.19             | 54                | 27.81          | AV     |
| 7236               | 46.40           | 1.31                 | V                 | 47.71             | 74                | 26.29          | PK     |
| 7236               | 34.85           | 1.31                 | V                 | 36.16             | 54                | 17.84          | 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.



|                     |          |
|---------------------|----------|
| Operation Mode:     | 802.11 b |
| Transfer Rate:      | 11 Mbps  |
| Operating Frequency | 2437     |
| Channel No.         | 06       |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP G<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4874               | 49.37           | -4.62                | V                 | 44.75             | 74                | 29.25          | PK     |
| 4874               | 36.49           | -4.62                | V                 | 31.87             | 54                | 22.13          | AV     |
| 7311               | 47.26           | 1.58                 | V                 | 48.84             | 74                | 25.16          | PK     |
| 7311               | 35.15           | 1.58                 | V                 | 36.73             | 54                | 17.27          | 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.



|                     |          |
|---------------------|----------|
| Operation Mode:     | 802.11 b |
| Transfer Rate:      | 11 Mbps  |
| Operating Frequency | 2462     |
| Channel No.         | 11       |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP G<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 4924               | 56.49           | -4.50                | V                 | 51.99             | 74                | 22.01          | PK     |
| 4924               | 43.56           | -4.50                | V                 | 39.06             | 54                | 14.94          | AV     |
| 7386               | 55.27           | 1.85                 | V                 | 57.12             | 74                | 16.88          | PK     |
| 7386               | 43.44           | 1.85                 | V                 | 45.29             | 54                | 8.71           | 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 MH.
  - b. AV Setting 1 GHz- 26 GHz, RBW = 1 MHz, VBW = 10 Hz.



## 7.5.2 Radiated Restricted Band Edge Measurements

### Test Requirments 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 | 2462     |
| Channel No.         | 11       |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL-AMP G<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 2484.49            | 65.31           | -9.76                | V                 | 55.55             | 74                | 18.45          | PK     |
| 2484.49            | 42.93           | -9.76                | V                 | 33.17             | 54                | 20.83          | AV     |
| 2489.40            | 53.92           | -9.74                | V                 | 44.18             | 74                | 29.82          | PK     |
| 2489.40            | 42.93           | -9.74                | V                 | 33.19             | 54                | 20.81          | AV     |
| 2498.78            | 51.09           | -9.70                | V                 | 41.39             | 74                | 32.61          | PK     |
| 2498.78            | 39.47           | -9.70                | V                 | 29.77             | 54                | 24.23          | 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.



## 7.7 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.



## ■ RESULT PLOTS

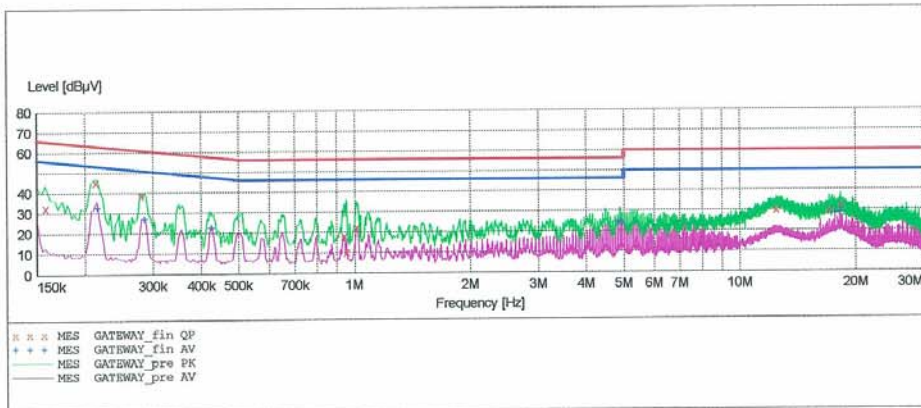
HCT

EMC TEST LAB.

EUT: MV440  
Manufacturer: AXESSTEL  
Operating Condition: WIFI MODE  
Test Site: SHIELD ROOM  
Operator: YH, LEE  
Test Specification: CISPR 22 CLASS B  
Comment: H

### SCAN TABLE: "CISPR 22 Voltage"

| Short Description: |           | CISPR 22 Voltage |          |            |           |            |  |
|--------------------|-----------|------------------|----------|------------|-----------|------------|--|
| Start              | Stop      | Step             | Detector | Meas. Time | IF Bandw. | Transducer |  |
| Frequency          | Frequency | Width            |          |            |           |            |  |
| 150.1 kHz          | 500.0 kHz | 2.5 kHz          | MaxPeak  | 10.0 ms    | 9 kHz     | None       |  |
|                    |           |                  | Average  |            |           |            |  |
| 500.0 kHz          | 5.0 MHz   | 4.0 kHz          | MaxPeak  | 10.0 ms    | 9 kHz     | None       |  |
|                    |           |                  | Average  |            |           |            |  |
| 5.0 MHz            | 30.0 MHz  | 4.0 kHz          | MaxPeak  | 10.0 ms    | 9 kHz     | None       |  |
|                    |           |                  | Average  |            |           |            |  |



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

7/7/2008 10:19PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.157600         | 32.70         | 10.0         | 66            | 32.9         | ---  | --- |
| 0.212600         | 45.20         | 10.0         | 63            | 17.9         | ---  | --- |
| 0.280100         | 38.80         | 10.0         | 61            | 22.0         | ---  | --- |
| 0.940000         | 18.30         | 10.1         | 56            | 37.7         | ---  | --- |
| 0.952000         | 10.30         | 10.1         | 56            | 45.7         | ---  | --- |
| 1.012000         | 22.40         | 10.1         | 56            | 33.6         | ---  | --- |
| 12.448000        | 30.30         | 11.5         | 60            | 29.7         | ---  | --- |
| 17.084000        | 29.90         | 12.1         | 60            | 30.1         | ---  | --- |
| 18.364000        | 32.50         | 12.2         | 60            | 27.5         | ---  | --- |



**MEASUREMENT RESULT: "GATEWAY\_fin AV"**

7/7/2008 10:19PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.215100         | 32.90         | 10.0         | 53            | 20.1         | ---  | --- |
| 0.285100         | 27.30         | 10.0         | 51            | 23.4         | ---  | --- |
| 0.425100         | 22.70         | 10.0         | 47            | 24.7         | ---  | --- |
| 4.824000         | 24.50         | 10.6         | 46            | 21.5         | ---  | --- |
| 4.892000         | 24.60         | 10.6         | 46            | 21.4         | ---  | --- |
| 4.956000         | 23.80         | 10.6         | 46            | 22.2         | ---  | --- |
| 17.696000        | 28.40         | 12.2         | 50            | 21.6         | ---  | --- |
| 18.244000        | 30.60         | 12.2         | 50            | 19.4         | ---  | --- |
| 18.304000        | 29.00         | 12.2         | 50            | 21.0         | ---  | --- |

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 37 of 40                                    |



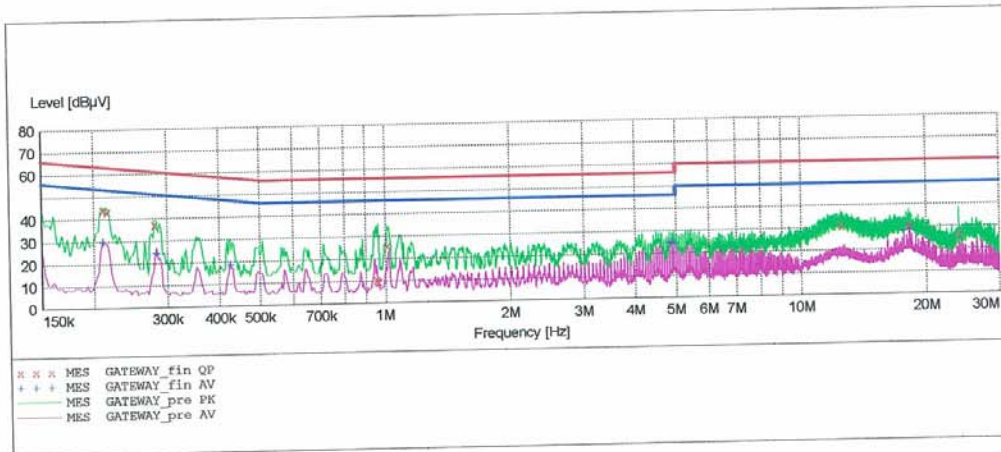
HCT

EMC TEST LAB.

EUT: MV440  
 Manufacturer: AXESSTEL  
 Operating Condition: WIFI MODE  
 Test Site: SHIELD ROOM  
 Operator: YH, LEE  
 Test Specification: CISPR 22 CLASS B  
 Comment: N

SCAN TABLE: "CISPR 22 Voltage"

| Short Description: |                |            | CISPR 22 Voltage |            |           |            |
|--------------------|----------------|------------|------------------|------------|-----------|------------|
| Start Frequency    | Stop Frequency | Step Width | Detector         | Meas. Time | IF Bandw. | Transducer |
| 150.1 kHz          | 500.0 kHz      | 2.5 kHz    | MaxPeak          | 10.0 ms    | 9 kHz     | None       |
|                    |                |            | Average          |            |           |            |
| 500.0 kHz          | 5.0 MHz        | 4.0 kHz    | MaxPeak          | 10.0 ms    | 9 kHz     | None       |
|                    |                |            | Average          |            |           |            |
| 5.0 MHz            | 30.0 MHz       | 4.0 kHz    | MaxPeak          | 10.0 ms    | 9 kHz     | None       |
|                    |                |            | Average          |            |           |            |



MEASUREMENT RESULT: "GATEWAY\_fin\_QP"

7/7/2008 10:59PM

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE  |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.210100      | 44.20      | 10.0      | 63         | 19.0      | ---  | --- |
| 0.215100      | 43.40      | 10.0      | 63         | 19.6      | ---  | --- |
| 0.280100      | 37.40      | 10.0      | 61         | 23.4      | ---  | --- |
| 0.952000      | 10.40      | 10.1      | 56         | 45.6      | ---  | --- |
| 0.964000      | 9.80       | 10.1      | 56         | 46.2      | ---  | --- |
| 1.012000      | 25.80      | 10.1      | 56         | 30.2      | ---  | --- |
| 12.520000     | 30.90      | 11.5      | 60         | 29.1      | ---  | --- |
| 18.248000     | 30.70      | 12.2      | 60         | 29.3      | ---  | --- |
| 24.000000     | 26.50      | 12.6      | 60         | 33.5      | ---  | --- |



**MEASUREMENT RESULT: "GATEWAY\_fin AV"**

7/7/2008 10:59PM

| Frequency<br>MHz | Level<br>dBuV | Transd<br>dB | Limit<br>dBuV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.210100         | 30.10         | 10.0         | 53            | 23.1         | ---  | --- |
| 0.282600         | 24.70         | 10.0         | 51            | 26.0         | ---  | --- |
| 0.425100         | 18.90         | 10.0         | 47            | 28.4         | ---  | --- |
| 4.824000         | 24.60         | 10.6         | 46            | 21.4         | ---  | --- |
| 4.892000         | 25.10         | 10.6         | 46            | 20.9         | ---  | --- |
| 4.960000         | 24.30         | 10.6         | 46            | 21.7         | ---  | --- |
| 17.696000        | 28.60         | 12.2         | 50            | 21.4         | ---  | --- |
| 18.244000        | 30.60         | 12.2         | 50            | 19.4         | ---  | --- |
| 18.304000        | 28.90         | 12.2         | 50            | 21.1         | ---  | --- |

|                                |                              |                                                           |                     |                                                  |
|--------------------------------|------------------------------|-----------------------------------------------------------|---------------------|--------------------------------------------------|
| HCT PT.15.247<br>TEST REPORT   | FCC CERTIFICATION REPORT     |                                                           |                     | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCT-R08-092 | Test Dates:<br>July 21, 2008 | EUT Type:<br>Cellular/PCS CDMA Wireless Gateway with WLAN | FCC ID:<br>PH7MV440 | Page 39 of 40                                    |



## 8. LIST OF TEST EQUIPMENT

| Manufacturer          | Model / Equipment                  | Cal Interval | Calibration Due | Serial No.   |
|-----------------------|------------------------------------|--------------|-----------------|--------------|
| Rohde & Schwarz       | ESCI/ EMI Test Receiver            | Annual       | 08/24/ 2008     | 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       | FSP30/Spectrum Analyzer            | Annual       | 07/31/2008      | 839117/011   |
| Agilent               | E4440A/Spectrum Analyzer           | Annual       | 01/08/2009      | US45303008   |
| Agilent               | E4416A /Power Meter                | Annual       | 01/22/2009      | GB41291412   |
| Wainwright Instrument | WHF3.3/18G-10EF / High Pass Filter | Annual       | 06/28/2009      | 1            |
| Hewlett Packard       | 11636B/Power Divider               | Annual       | 01/14/2009      | 11377        |
| DIGITAL               | EP-3010 /DC POWER SUPPLY           | Annual       | 01/10/2009      | 3110117      |