

# HCT CO., LTD.

## CERTIFICATE OF COMPLIANCE FCC Class II Permissive Change

**Applicant Name:**  
SAMSUNG Electronics Co., Ltd.

**Address:**  
129, Samsung-ro, Yeongtong-gu Suwon-si,  
Gyeonggi-do, 443-742 Rep. of Korea

**Date of Issue:**

December 23, 2013

**Test Site/Location:**

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeo, Icheon-si, Gyeonggi-do, Korea

**Report No.:** HCTR1312FR19

**HCT FRN:** 0005866421

**FCC ID : A3LWEA303I**

**APPLICANT : SAMSUNG Electronics Co., Ltd.**

**FCC Model(s):** WEA303e  
**EUT Type:** WLAN Access Point  
**Monitoring Port 1** Wi-Fi 802.11a (5180~5240) (5.89 dBm)/ Wi-Fi 802.11n\_20 MHz BW (5180~5240) (5.73 dBm)/  
**Max. RF Output Power:** Wi-Fi 802.11n\_40 MHz BW(5190~5230) (3.37 dBm)  
**Monitoring Port 2** Wi-Fi 802.11a (5180~5240) (6.01 dBm)/ Wi-Fi 802.11n\_20 MHz BW (5180~5240) (6.05 dBm)/  
**Max. RF Output Power:** Wi-Fi 802.11n\_40 MHz BW(5190~5230) (3.61 dBm)  
**Service Port 1** Wi-Fi 802.11a (5180~5240) (2.53 dBm)/ Wi-Fi 802.11n\_20 MHz BW (5180~5240) (2.48 dBm)/  
**Max. RF Output Power:** Wi-Fi 802.11n\_40 MHz BW(5190~5230) (2.02 dBm)  
**Service Port 2** Wi-Fi 802.11a (5180~5240) (3.36 dBm)/ Wi-Fi 802.11n\_20 MHz BW (5180~5240) (2.65 dBm)/  
**Max. RF Output Power:** Wi-Fi 802.11n\_40 MHz BW(5190~5230) (1.99 dBm)  
**Service Port 3** Wi-Fi 802.11a (5180~5240) (3.31 dBm)/ Wi-Fi 802.11n\_20 MHz BW (5180~5240) (3.41 dBm)/  
**Max. RF Output Power:** Wi-Fi 802.11n\_40 MHz BW(5190~5230) (2.47 dBm)  
**Frequency Range:** 20 MHz BW: 5180 MHz - 5240 MHz (UNII 1)  
 40 MHz BW: 5190 MHz - 5230 MHz (UNII 1)  
**Modulation type** OFDM  
**FCC Classification:** Unlicensed National Information Infrastructure(UNII)  
**FCC Rule Part(s):** Part 15.407

**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 subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)



**Report prepared by**  
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**Test engineer of RF Team**



**Approved by**  
: Chang Seok Choi  
**Manager of RF Team**

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|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Version

| TEST REPORT NO. | DATE              | DESCRIPTION             |
|-----------------|-------------------|-------------------------|
| HCTR1312FR19    | December 23, 2013 | - First Approval Report |
|                 |                   |                         |
|                 |                   |                         |
|                 |                   |                         |

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## 1. GENERAL INFORMATION

**Applicant:** SAMSUNG Electronics Co., Ltd.  
**Address:** 129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Rep. of Korea  
**FCC ID:** A3LWEA303I  
**EUT Type:** WLAN Access Point  
**Model name(s):** WEA303e  
**Date(s) of Tests:** November 03, 2013 ~ December 12, 2013  
**Place of Tests:** HCT Co., Ltd.  
 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea.  
 (IC Recognition No. : 5944A-3)

## 2. EUT DESCRIPTION

|                                                   |                                                                                                                                        |                                                                                                                              |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT Type</b>                                   | WLAN Access Point                                                                                                                      |                                                                                                                              |
| <b>FCC Model Name</b>                             | WEA303e                                                                                                                                |                                                                                                                              |
| <b>Power Supply</b>                               | Adaptor : 100 V ~ 250 V, POE : 100 V ~ 240 V                                                                                           |                                                                                                                              |
| <b>Frequency Range</b>                            | TX_20 MHz BW:<br>40 MHz BW:<br>RX_20 MHz BW:<br>40 MHz BW:                                                                             | 5180 MHz - 5240 MHz (UNII 1)<br>5190 MHz - 5230 MHz (UNII 1)<br>5180 MHz - 5240 MHz (UNII 1)<br>5190 MHz - 5230 MHz (UNII 1) |
| <b>Monitoring Port 1<br/>Max. RF Output Power</b> | Wi-Fi 802.11a (5180~5240) (5.89 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (5.73 dBm)/<br>Wi-Fi 802.11n_40 MHz BW(5190~5230) (3.37 dBm) |                                                                                                                              |
| <b>Monitoring Port 2<br/>Max. RF Output Power</b> | Wi-Fi 802.11a (5180~5240) (6.01 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (6.05 dBm)/<br>Wi-Fi 802.11n_40 MHz BW(5190~5230) (3.61 dBm) |                                                                                                                              |
| <b>Service Port 1<br/>Max. RF Output Power</b>    | Wi-Fi 802.11a (5180~5240) (2.53 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (2.48 dBm)/<br>Wi-Fi 802.11n_40 MHz BW(5190~5230) (2.02 dBm) |                                                                                                                              |
| <b>Service Port 2<br/>Max. RF Output Power</b>    | Wi-Fi 802.11a (5180~5240) (3.36 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (2.65 dBm)/<br>Wi-Fi 802.11n_40 MHz BW(5190~5230) (1.99 dBm) |                                                                                                                              |
| <b>Service Port 3<br/>Max. RF Output Power</b>    | Wi-Fi 802.11a (5180~5240) (3.31 dBm)/ Wi-Fi 802.11n_20 MHz BW (5180~5240) (3.41 dBm)/<br>Wi-Fi 802.11n_40 MHz BW(5190~5230) (2.47 dBm) |                                                                                                                              |
| <b>Modulation Type</b>                            | OFDM(802.11a, 802.11n)                                                                                                                 |                                                                                                                              |
| <b>Antenna Specification</b>                      | Manufacturer: ACE Technologyacetchnology<br>Antenna type: Patch Antenna<br>Peak Gain : cf. Section 6                                   |                                                                                                                              |

Note : Max. RF output power is a high value between the adaptor results and POE results.

### 3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D01 General UNII Test Procedures v01r03 dated April 08, 2013 entitled “ Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices, the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) – Part 15, Subpart E” were used in the measurement.

#### 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 15.407 under the FCC Rules Part 15 Subpart E.

#### 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)

##### Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033)

#### 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.

|                                        |                                            |                                    |                                                  |
|----------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|
| <b>FCC PT.15.407<br/>TEST REPORT</b>   | <b>FCC CERTIFICATION REPORT</b>            |                                    | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1312FR19 | <b>Date of Issue:</b><br>December 23, 2013 | <b>EUT Type:</b> WLAN Access Point | <b>FCC ID:</b><br>A3LWEA303I                     |

## 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 SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 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 June 21, 2011 (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."

|                                        |                                            |                                    |                                                  |
|----------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|
| <b>FCC PT.15.407<br/>TEST REPORT</b>   | <b>FCC CERTIFICATION REPORT</b>            |                                    | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1312FR19 | <b>Date of Issue:</b><br>December 23, 2013 | <b>EUT Type:</b> WLAN Access Point | <b>FCC ID:</b><br>A3LWEA303I                     |

## 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

### ▣ Directional Gain Calculations

- If any transmit signals are correlated with each other(802.11a),

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi}$$

- If all transmit signals are completely uncorrelated with each other(802.11n)

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N] \text{ dBi}$$

### ▣ Antenna Gain

|         |                          |               |                                    |
|---------|--------------------------|---------------|------------------------------------|
| Service | Antenna Gain             | Ant 1         | 8                                  |
|         |                          | Ant 2         | 8                                  |
|         |                          | Ant 3         | 8                                  |
|         | Directional Antenna Gain | Ant 1 & 2     | 11.01 dBi(802.11a), 8 dBi(802.11n) |
|         |                          | Ant 1 & 2 & 3 | 12.77 dBi(802.11a), 8 dBi(802.11n) |
| Monitor | Antenna Gain             | Ant 1         | 8                                  |
|         |                          | Ant 2         | 8                                  |
|         | Directional Antenna Gain | Ant 1 & 2     | 11.01 dBi(802.11a), 8 dBi(802.11n) |

## 7. SUMMARY OF TEST RESULTS

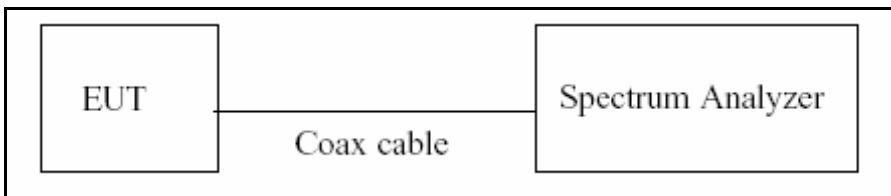
| Test Description                                                             | FCC Part Section(s)            | Test Limit                                                                                                                                                                | Test Condition | Test Result |
|------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------|
| <b>TRANSMITTER MODE(TX)</b>                                                  |                                |                                                                                                                                                                           |                |             |
| 26dB Bandwidth                                                               | NA                             | NA                                                                                                                                                                        | CONDUCTED      | PASS        |
| Maximum Conducted Output Power                                               | §15.407(a)(1)                  | $< 4 + 10 \log_{10} (BW) \text{ dBm}$ (5150-5250 MHz)<br>$< 11 + 10 \log_{10} (BW) \text{ dBm}$ (5250-5350 MHz)<br>$< 11 + 10 \log_{10} (BW) \text{ dBm}$ (5470-5725 MHz) |                | PASS        |
| Peak Power Spectral Density                                                  | §15.407(a)(1), (5)             | $< 4 \text{ dBm/ MHz}$ (5150-5250)<br>$< 11 \text{ dBm/ MHz}$ (5250-5350)<br>$< 11 \text{ dBm/ MHz}$ (5470-5725)                                                          |                | PASS        |
| Peak Excursion                                                               | §15.407(a)(6)                  | $< 13 \text{ dB/ MHz}$ maximum difference                                                                                                                                 |                | PASS        |
| Frequency Stability                                                          | §15.407(g)                     | NA                                                                                                                                                                        |                | PASS        |
| Undesirable Emissions                                                        | §15.407(b)(1), (2), (3)        | $< -27 \text{ dBm/ MHz EIRP}$ (5150-5350 MHz, 5470-5725 MHz)                                                                                                              | RADIATED       | PASS        |
| General Field Strength Limits(Restricted Bands and Radiated Emission Limits) | 15.205, 15.407(b)(1), (5), (6) | Emissions in restricted bands must meet the radiated limits detailed in 15.209                                                                                            |                | PASS        |
| AC Conducted Emissions 150 kHz-30 MHz                                        | 15.207                         | $< \text{FCC 15.207 limits}$                                                                                                                                              | LINE CONDUCTED | PASS        |

## 8. TEST RESULT(Adaptor)

### 8.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver ,if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW  $\geq$  EBW if possible; otherwise, set RBW to the largest available value. Set VBW  $\geq$  RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$ , where  $T$  is defined in section B)1)a), and the number of sweep points across duration  $T$  exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

#### ▣ TEST CONFIGURATION



#### ▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, B)2) in KDB 789033( issued 04/08/2013)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if  $T \leq 6.25$  microseconds. ( $50/6.25 = 8$ )

The zero-span method was used because all measured  $T$  data are  $> 6.25$  microseconds and both RBW and VBW are  $> 50/T$ .

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep  $> 100$
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
8. Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10 \cdot \log(1/\text{Duty Cycle})$

▣ Duty Cycle Factor

Monitoring Port

| Mode              | Data Rate | T <sub>on</sub><br>(ms) | T <sub>total</sub><br>(ms) | Duty Cycle | Duty Cycle Factor |
|-------------------|-----------|-------------------------|----------------------------|------------|-------------------|
| 802.11a           | 6         | 2.020                   | 2.070                      | 0.97584541 | 0.106             |
|                   | 9         | 1.353                   | 1.401                      | 0.96573876 | 0.151             |
|                   | 12        | 1.020                   | 1.068                      | 0.95505618 | 0.200             |
|                   | 18        | 0.686                   | 0.732                      | 0.93715847 | 0.282             |
|                   | 24        | 0.523                   | 0.569                      | 0.91915641 | 0.366             |
|                   | 36        | 0.354                   | 0.400                      | 0.88500000 | 0.531             |
|                   | 48        | 0.271                   | 0.316                      | 0.85759494 | 0.667             |
|                   | 54        | 0.243                   | 0.288                      | 0.84375000 | 0.738             |
| 802.11n_20 MHz BW | 6.5       | 1.885                   | 1.930                      | 0.97668394 | 0.102             |
|                   | 13        | 0.962                   | 1.008                      | 0.95436508 | 0.203             |
|                   | 19.5      | 0.654                   | 0.700                      | 0.93428571 | 0.295             |
|                   | 26        | 0.498                   | 0.544                      | 0.91544118 | 0.384             |
|                   | 39        | 0.347                   | 0.392                      | 0.88520408 | 0.530             |
|                   | 52        | 0.267                   | 0.312                      | 0.85576923 | 0.676             |
|                   | 58.5      | 0.243                   | 0.289                      | 0.84083045 | 0.753             |
|                   | 65        | 0.224                   | 0.268                      | 0.83582090 | 0.779             |
| 802.11n_40 MHz BW | 13.5      | 0.926                   | 0.960                      | 0.96458333 | 0.157             |
|                   | 27        | 0.482                   | 0.516                      | 0.93410853 | 0.296             |
|                   | 40.5      | 0.335                   | 0.368                      | 0.91032609 | 0.408             |
|                   | 54        | 0.260                   | 0.292                      | 0.89041096 | 0.504             |
|                   | 81        | 0.187                   | 0.220                      | 0.85000000 | 0.706             |
|                   | 108       | 0.147                   | 0.180                      | 0.81666667 | 0.880             |
|                   | 121.5     | 0.136                   | 0.168                      | 0.80952381 | 0.918             |
|                   | 135       | 0.128                   | 0.160                      | 0.80000000 | 0.969             |

# Service Port

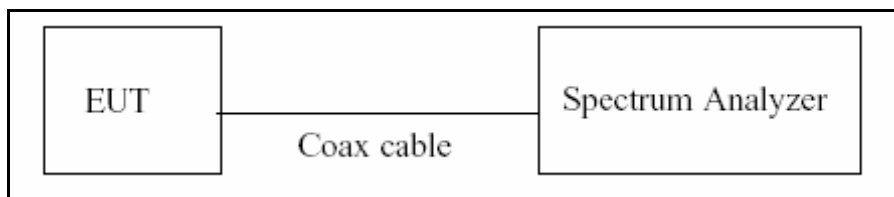
| Mode              | Data Rate | T <sub>on</sub><br>(ms) | T <sub>total</sub><br>(ms) | Duty Cycle | Duty Cycle Factor |
|-------------------|-----------|-------------------------|----------------------------|------------|-------------------|
| 802.11a           | 6         | 1.335                   | 1.405                      | 0.95017794 | 0.222             |
|                   | 9         | 0.909                   | 0.957                      | 0.94984326 | 0.223             |
|                   | 12        | 0.690                   | 0.735                      | 0.93877551 | 0.274             |
|                   | 18        | 0.466                   | 0.512                      | 0.91015625 | 0.409             |
|                   | 24        | 0.354                   | 0.400                      | 0.88500000 | 0.531             |
|                   | 36        | 0.243                   | 0.288                      | 0.84375000 | 0.738             |
|                   | 48        | 0.187                   | 0.232                      | 0.80603448 | 0.936             |
|                   | 54        | 0.171                   | 0.216                      | 0.79166667 | 1.015             |
| 802.11n_20 MHz BW | 6.5       | 1.269                   | 1.317                      | 0.96355353 | 0.161             |
|                   | 13        | 0.655                   | 0.701                      | 0.93437946 | 0.295             |
|                   | 19.5      | 0.446                   | 0.492                      | 0.90650407 | 0.426             |
|                   | 26        | 0.348                   | 0.393                      | 0.88549618 | 0.528             |
|                   | 39        | 0.244                   | 0.289                      | 0.84429066 | 0.735             |
|                   | 52        | 0.192                   | 0.236                      | 0.81355932 | 0.896             |
|                   | 58.5      | 0.176                   | 0.220                      | 0.80000000 | 0.969             |
|                   | 65        | 0.159                   | 0.204                      | 0.77941176 | 1.082             |
| 802.11n_40 MHz BW | 13.5      | 0.630                   | 0.664                      | 0.94879518 | 0.228             |
|                   | 27        | 0.334                   | 0.368                      | 0.90760870 | 0.421             |
|                   | 40.5      | 0.236                   | 0.268                      | 0.88059701 | 0.552             |
|                   | 54        | 0.188                   | 0.220                      | 0.85454545 | 0.683             |
|                   | 81        | 0.135                   | 0.168                      | 0.80357143 | 0.950             |
|                   | 108       | 0.112                   | 0.144                      | 0.77777778 | 1.091             |
|                   | 121.5     | 0.104                   | 0.136                      | 0.76470588 | 1.165             |
|                   | 135       | 0.096                   | 0.128                      | 0.75000000 | 1.249             |

## 8.2 26 dB BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033(issued 04/08/2013), at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

### ▣ TEST CONFIGURATION



### ▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to( Page 3 in KDB 789033, issued 04/08/2013)

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

# Monitoring Port Ant.1

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.92                       | N/A                        | Pass        |
| 5200            | 40          | 22.94                       | N/A                        | Pass        |
| 5240            | 48          | 22.73                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.87                       | N/A                        | Pass        |
| 5200            | 40          | 24.24                       | N/A                        | Pass        |
| 5240            | 48          | 24.43                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 49.70                       | N/A                        | Pass        |
| 5230            | 46          | 48.40                       | N/A                        | Pass        |

# Monitoring Port Ant.2

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.11                       | N/A                        | Pass        |
| 5200            | 40          | 23.82                       | N/A                        | Pass        |
| 5240            | 48          | 22.32                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.85                       | N/A                        | Pass        |
| 5200            | 40          | 24.05                       | N/A                        | Pass        |
| 5240            | 48          | 24.18                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 45.90                       | N/A                        | Pass        |
| 5230            | 46          | 46.49                       | N/A                        | Pass        |

# Service Port Ant.1

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.89                       | N/A                        | Pass        |
| 5200            | 40          | 22.21                       | N/A                        | Pass        |
| 5240            | 48          | 21.81                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.25                       | N/A                        | Pass        |
| 5200            | 40          | 23.11                       | N/A                        | Pass        |
| 5240            | 48          | 22.70                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 47.82                       | N/A                        | Pass        |
| 5230            | 46          | 46.71                       | N/A                        | Pass        |

# Service Port Ant.2

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.96                       | N/A                        | Pass        |
| 5200            | 40          | 21.81                       | N/A                        | Pass        |
| 5240            | 48          | 21.71                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.30                       | N/A                        | Pass        |
| 5200            | 40          | 22.28                       | N/A                        | Pass        |
| 5240            | 48          | 22.93                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 44.37                       | N/A                        | Pass        |
| 5230            | 46          | 44.81                       | N/A                        | Pass        |

# Service Port Ant.3

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.69                       | N/A                        | Pass        |
| 5200            | 40          | 22.15                       | N/A                        | Pass        |
| 5240            | 48          | 21.68                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.38                       | N/A                        | Pass        |
| 5200            | 40          | 23.20                       | N/A                        | Pass        |
| 5240            | 48          | 23.06                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 45.82                       | N/A                        | Pass        |
| 5230            | 46          | 44.86                       | N/A                        | Pass        |

Note :

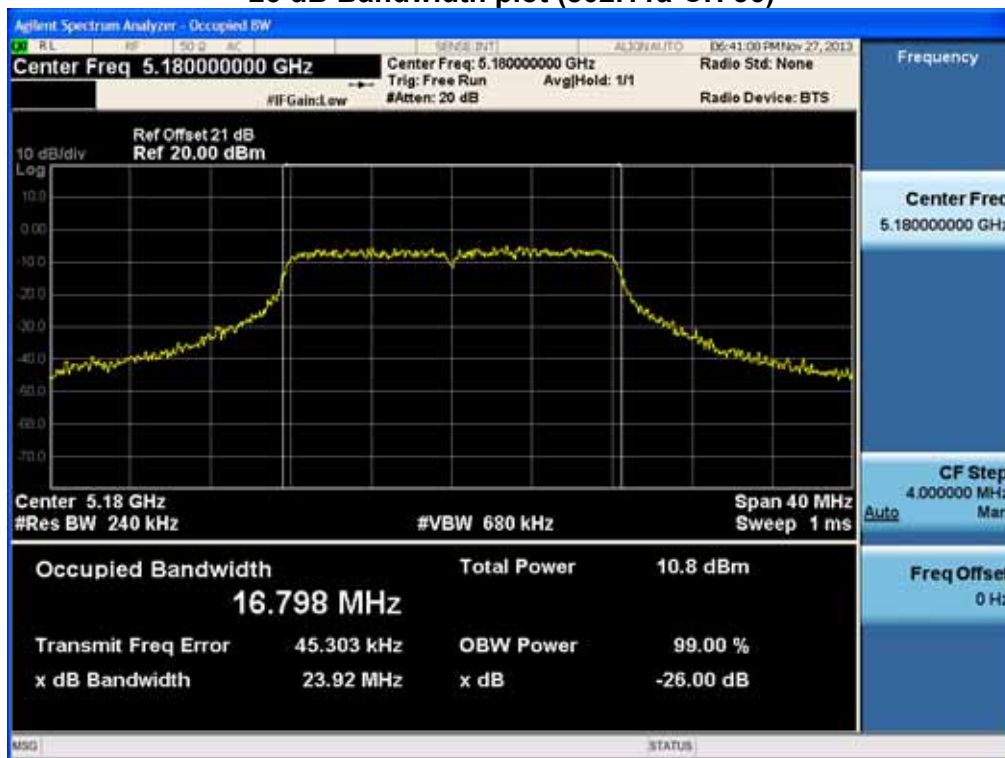
1. In order to simplify the report, attached plots were only the most wide channel.

## Monitoring Port Ant.1

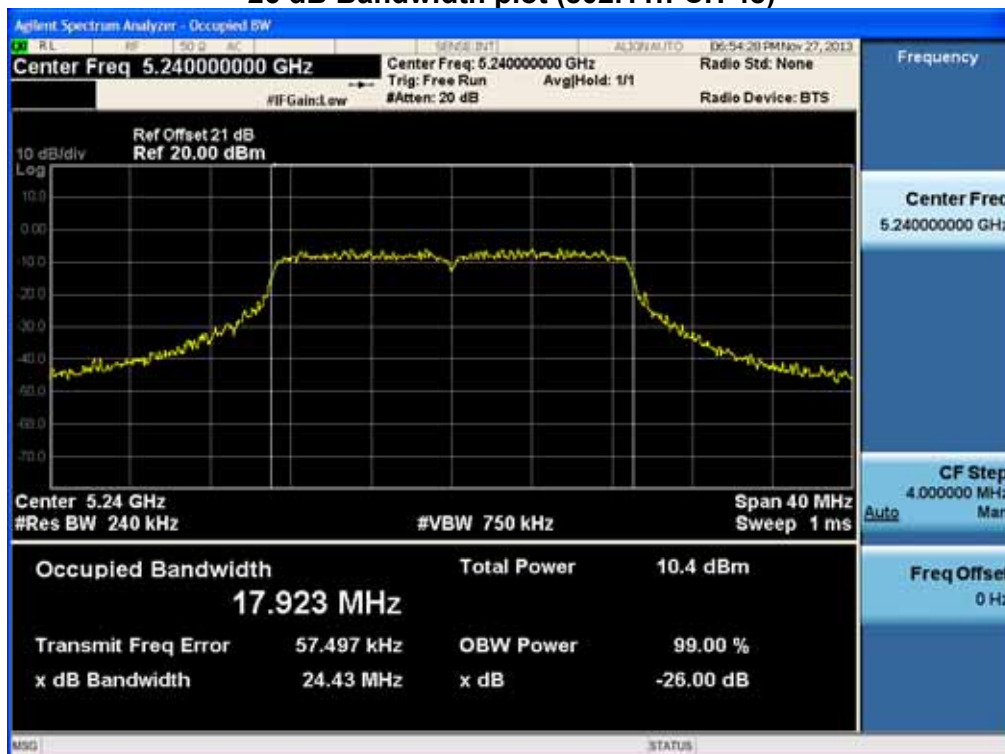
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 36)

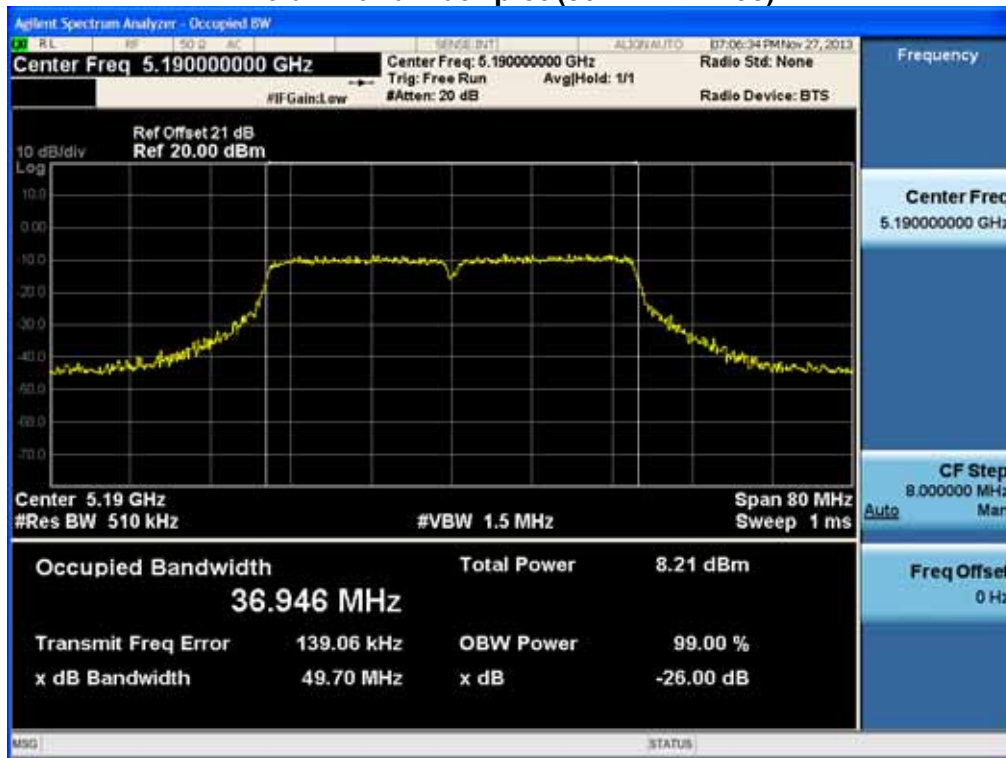


26 dB Bandwidth plot (802.11n-CH 48)



40 MHz BW

26 dB Bandwidth plot (802.11n-CH 38)



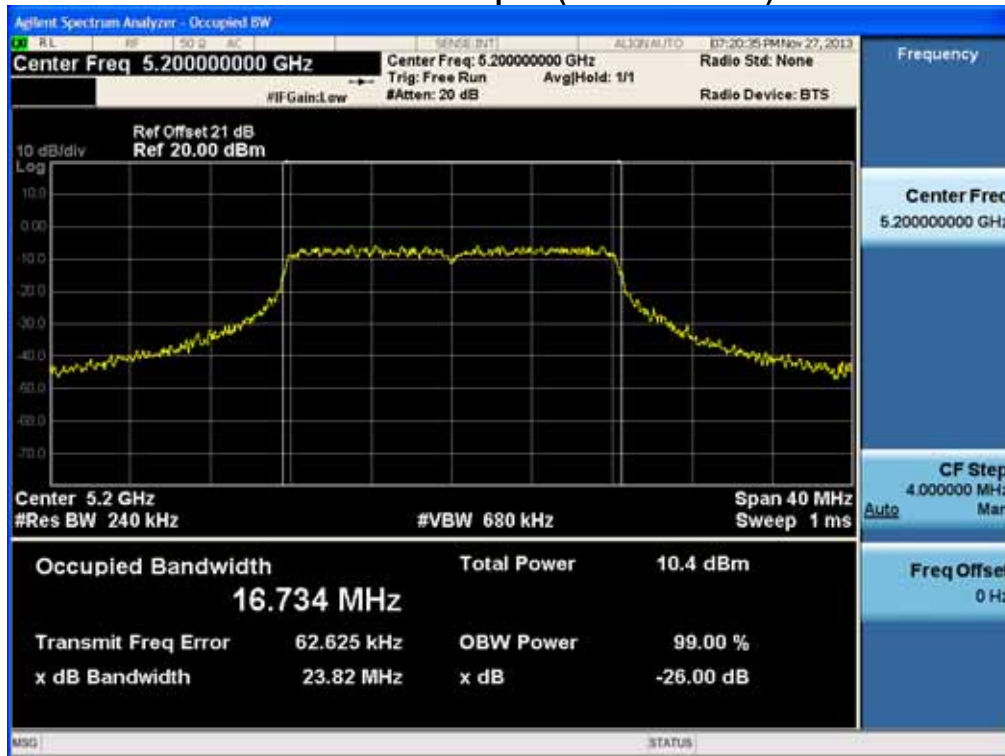
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.2

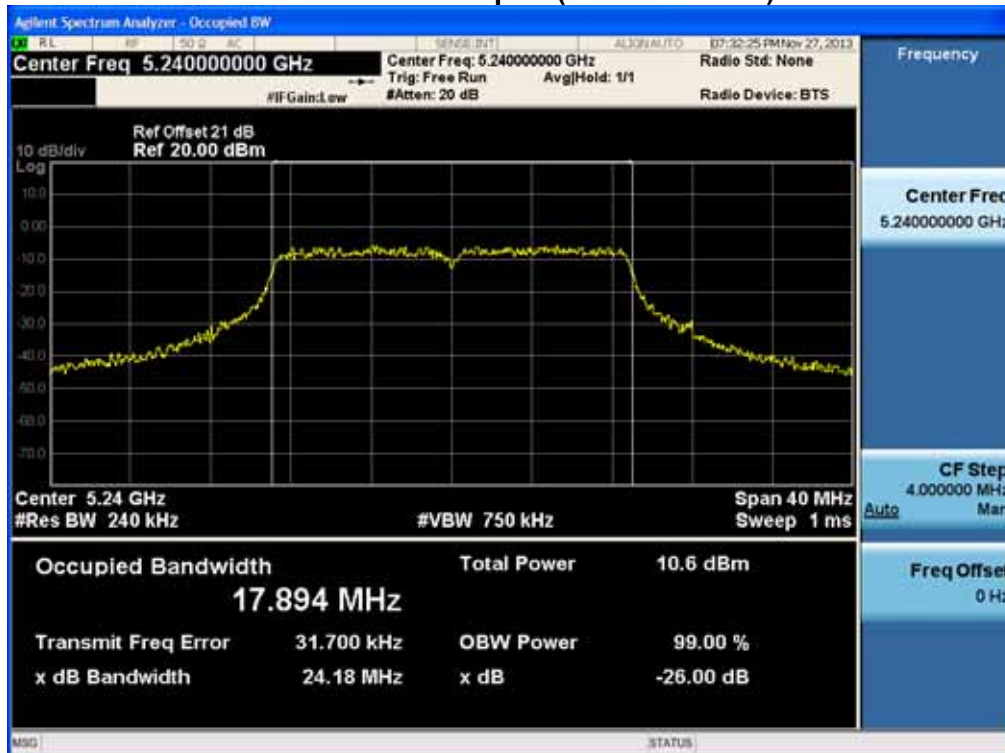
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

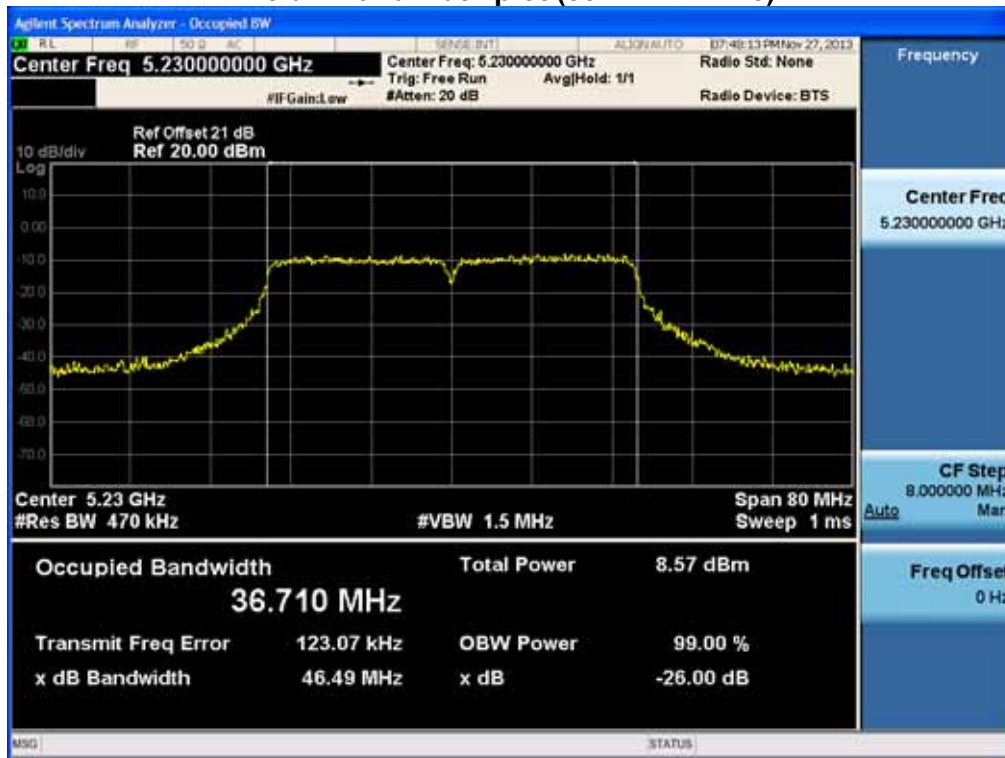


26 dB Bandwidth plot (802.11n-CH 48)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 46)



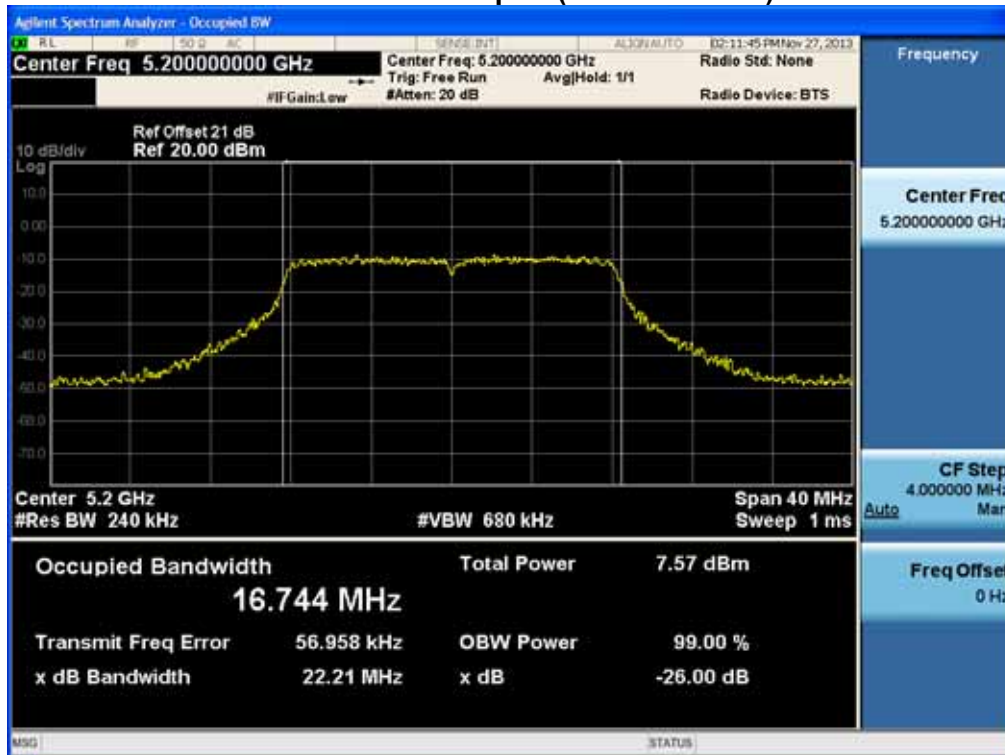
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.1

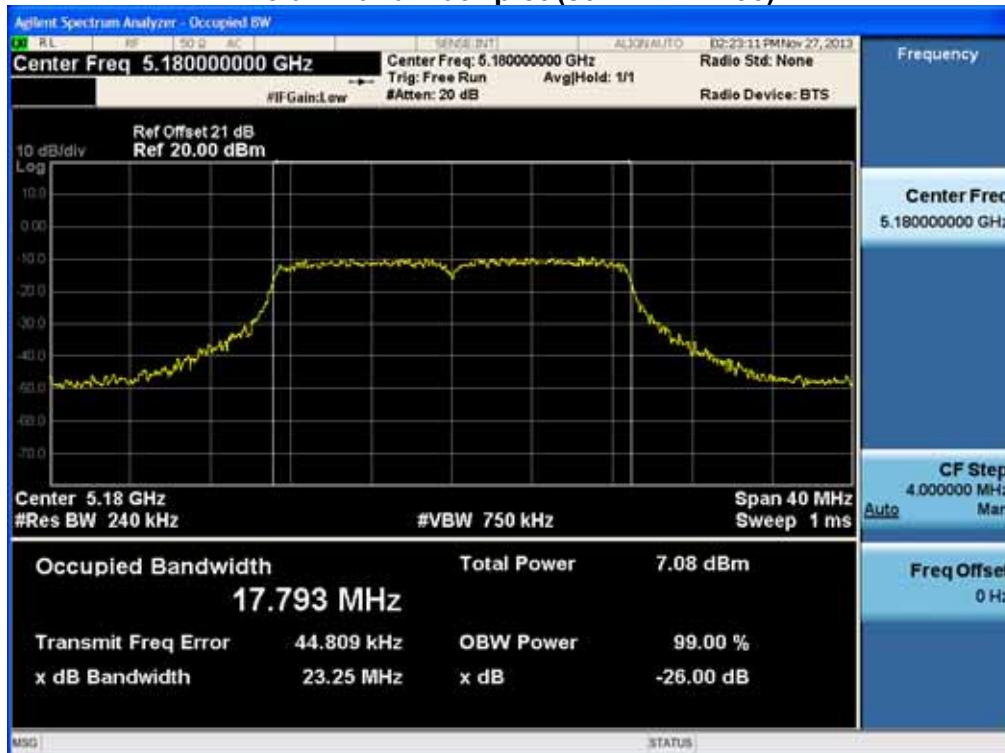
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

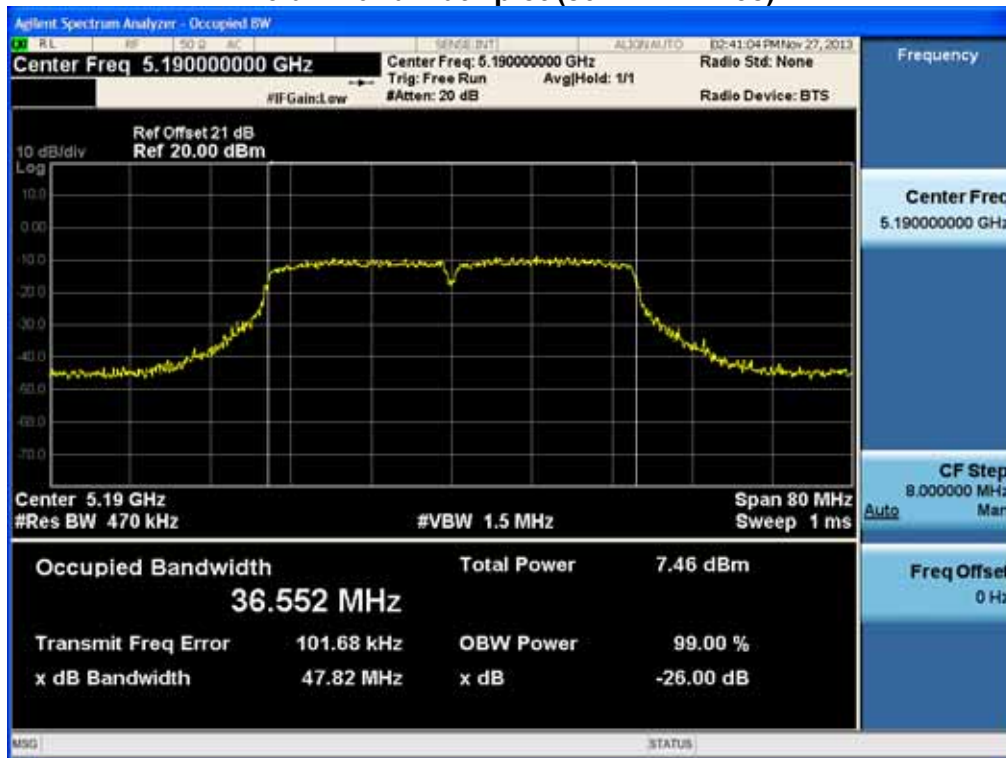


26 dB Bandwidth plot (802.11n-CH 36)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 38)



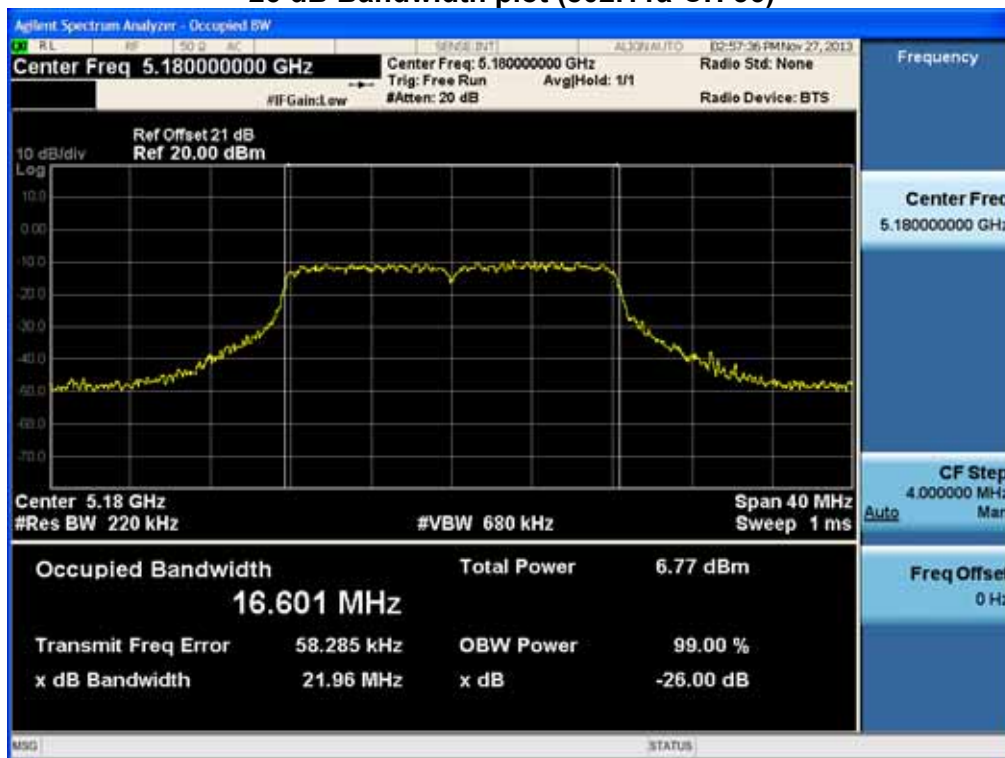
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.2

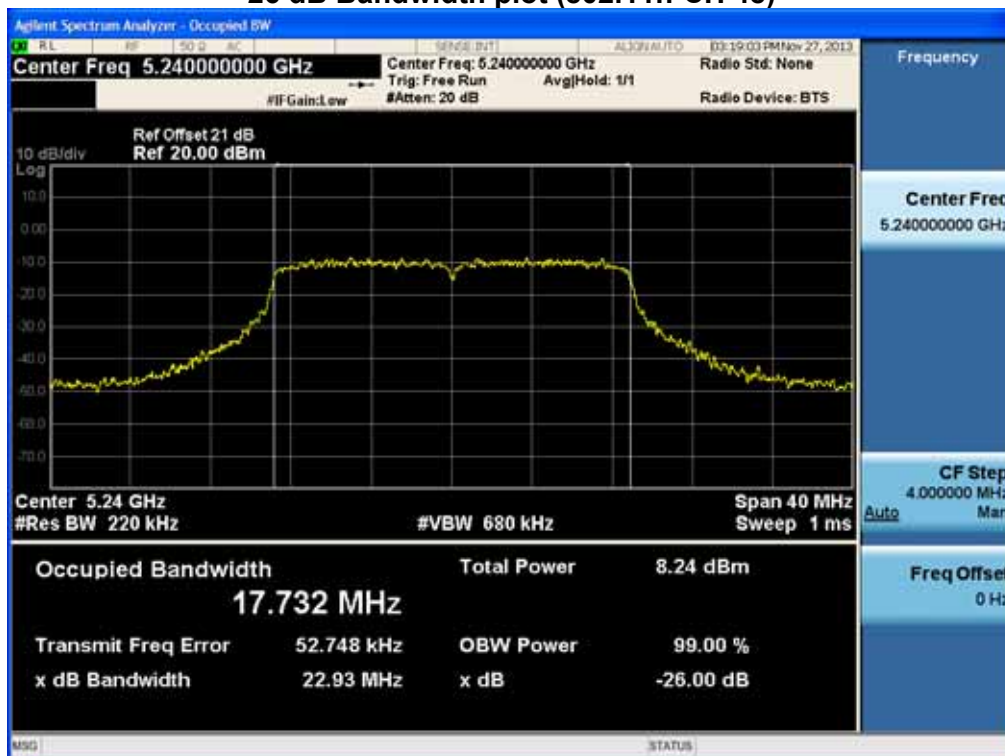
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 36)

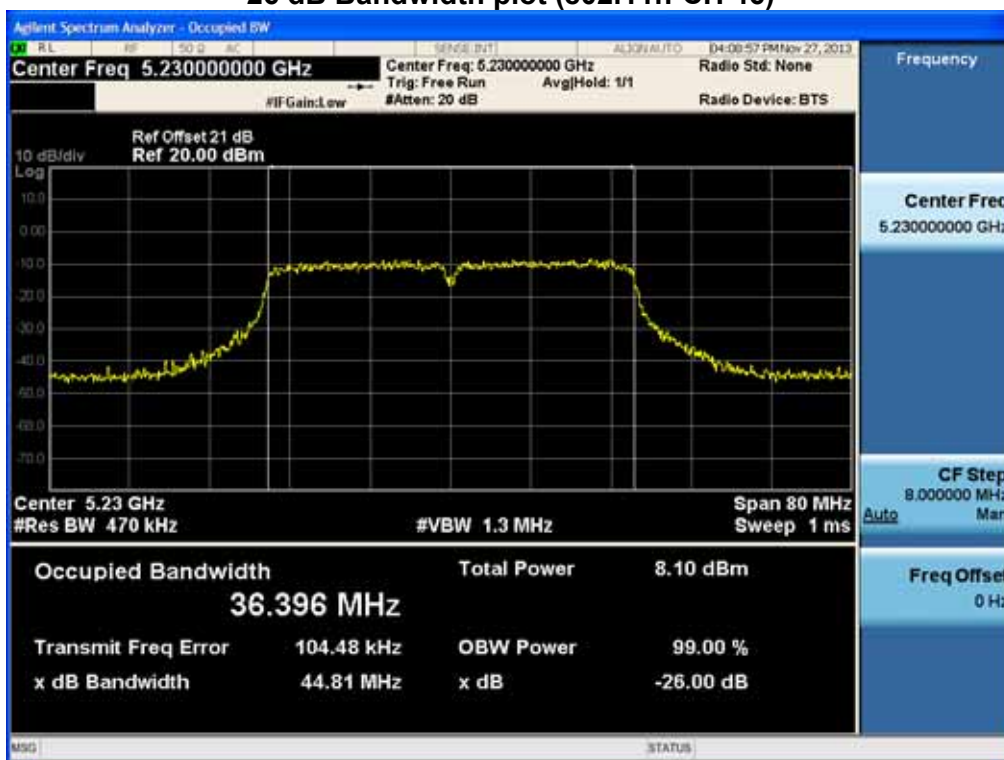


26 dB Bandwidth plot (802.11n-CH 48)



40 MHz BW

## 26 dB Bandwidth plot (802.11n-CH 46)



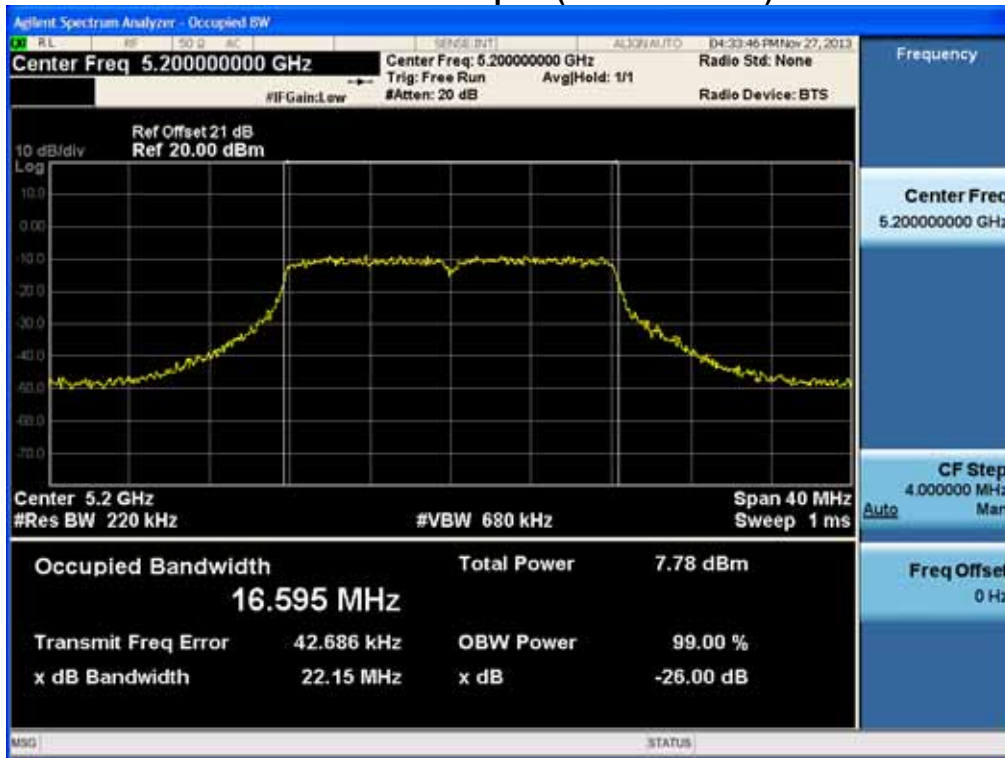
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.3

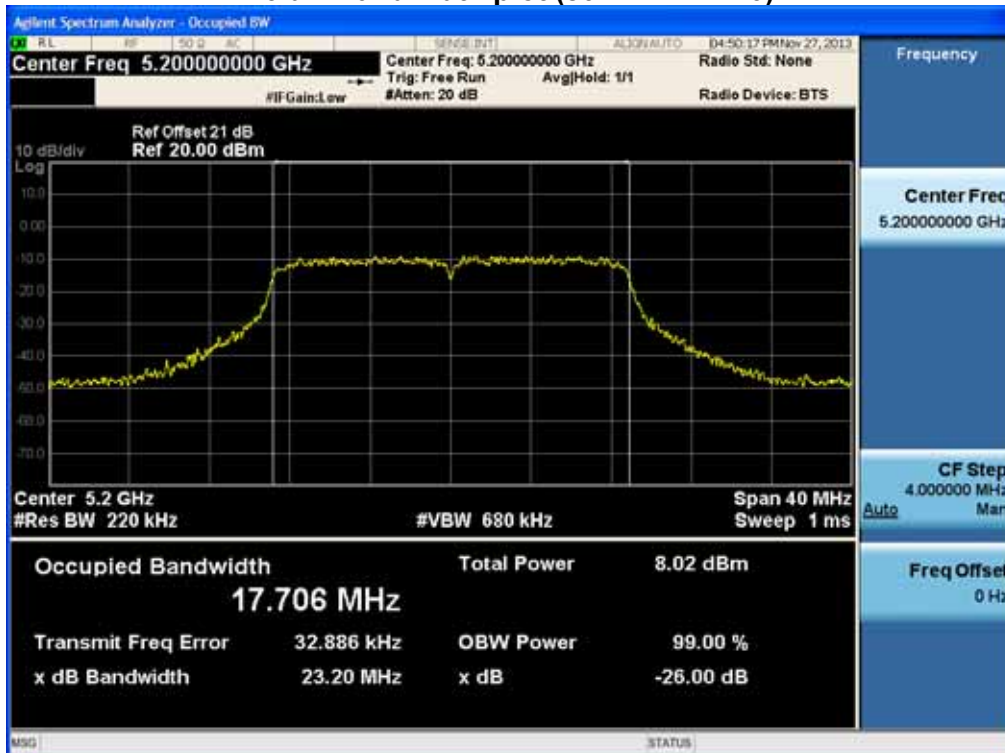
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

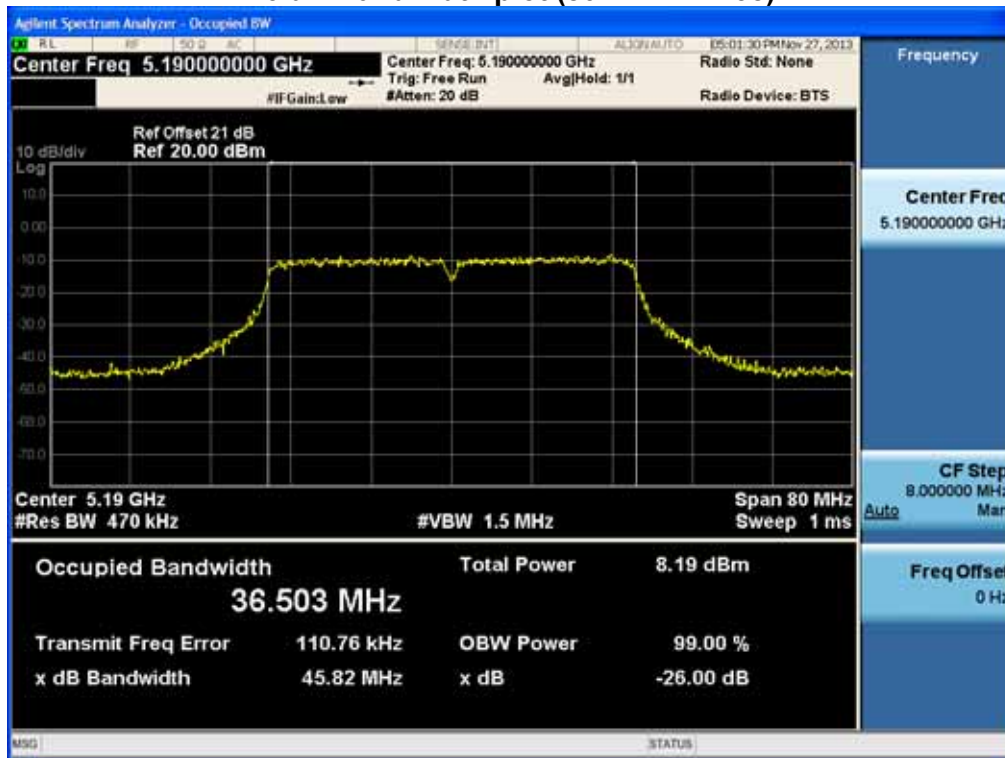


26 dB Bandwidth plot (802.11n-CH 40)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 38)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### 8.3 OUTPUT POWER MEASUREMENT

#### Test Requirements and limit, §15.407(a)(1)

The transmitter output is connected to the input of a RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

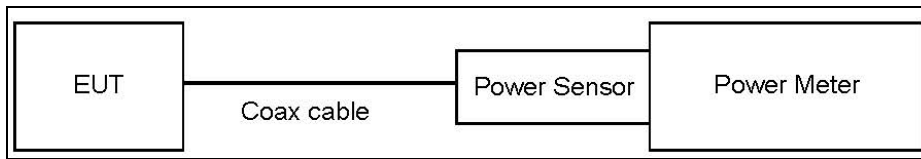
In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 50 mW ((16.99 dBm) and  $4 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$

Limit :

| Operating Mode             | Band   | Mode              | Ant. Gain(dBi) | Limit(dBm) |
|----------------------------|--------|-------------------|----------------|------------|
| SISO :<br>Monitoring       | UNII 1 | 802.11a           | 8              | 14.99      |
|                            |        | 802.11n_20 MHz BW |                |            |
|                            |        | 802.11n_40 MHz BW |                |            |
| SISO :<br>Service          | UNII 1 | 802.11a           | 8              | 14.99      |
|                            |        | 802.11n_20 MHz BW |                |            |
|                            |        | 802.11n_40 MHz BW |                |            |
| MIMO(2 TX) :<br>Monitoring | UNII 1 | 802.11a           | 11.01          | 11.98      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |
| MIMO(2 TX) :<br>Service    | UNII 1 | 802.11a           | 11.01          | 11.98      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |
| MIMO(3 TX) :<br>Service    | UNII 1 | 802.11a           | 12.77          | 10.22      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

## ■ TEST CONFIGURATION



## ■ TEST PROCEDURE

We tested according to Method E)3)a) in KDB 789033(issued 04/08/2013).

### ▪ Average Power

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add  $10 \log (1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

1. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

(Actual value of loss for the attenuator and cable combination)

## Monitoring Port

### ▣ TEST RESULTS\_Ant.1

#### Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 5.78                | 0.106             | 5.89                                    | 14.99       |
|                 |             | 9           | 5.71                | 0.151             | 5.86                                    | 14.99       |
|                 |             | 12          | 5.66                | 0.200             | 5.86                                    | 14.99       |
|                 |             | 18          | 5.60                | 0.282             | 5.88                                    | 14.99       |
|                 |             | 24          | 5.49                | 0.366             | 5.86                                    | 14.99       |
|                 |             | 36          | 4.47                | 0.531             | 5.00                                    | 14.99       |
|                 |             | 48          | 4.41                | 0.667             | 5.08                                    | 14.99       |
|                 |             | 54          | 3.50                | 0.738             | 4.24                                    | 14.99       |
| 5200            | 40          | 6           | 5.34                | 0.106             | 5.45                                    | 14.99       |
|                 |             | 9           | 5.31                | 0.151             | 5.46                                    | 14.99       |
|                 |             | 12          | 5.29                | 0.200             | 5.49                                    | 14.99       |
|                 |             | 18          | 5.18                | 0.282             | 5.47                                    | 14.99       |
|                 |             | 24          | 5.20                | 0.366             | 5.56                                    | 14.99       |
|                 |             | 36          | 4.23                | 0.531             | 4.76                                    | 14.99       |
|                 |             | 48          | 4.16                | 0.667             | 4.83                                    | 14.99       |
|                 |             | 54          | 3.16                | 0.738             | 3.89                                    | 14.99       |
| 5240            | 48          | 6           | 5.19                | 0.106             | 5.30                                    | 14.99       |
|                 |             | 9           | 5.18                | 0.151             | 5.33                                    | 14.99       |
|                 |             | 12          | 5.04                | 0.200             | 5.24                                    | 14.99       |
|                 |             | 18          | 5.06                | 0.282             | 5.34                                    | 14.99       |
|                 |             | 24          | 5.14                | 0.366             | 5.51                                    | 14.99       |
|                 |             | 36          | 3.85                | 0.531             | 4.38                                    | 14.99       |
|                 |             | 48          | 3.54                | 0.667             | 4.21                                    | 14.99       |
|                 |             | 54          | 2.27                | 0.738             | 3.00                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 5.75                | 0.106             | 5.85                                    | 14.99       |
|                 |             | 9           | 5.51                | 0.151             | 5.67                                    | 14.99       |
|                 |             | 12          | 5.77                | 0.200             | 5.97                                    | 14.99       |
|                 |             | 18          | 5.73                | 0.282             | 6.01                                    | 14.99       |
|                 |             | 24          | 5.58                | 0.366             | 5.94                                    | 14.99       |
|                 |             | 36          | 4.44                | 0.531             | 4.97                                    | 14.99       |
|                 |             | 48          | 4.23                | 0.667             | 4.89                                    | 14.99       |
|                 |             | 54          | 3.52                | 0.738             | 4.26                                    | 14.99       |
| 5200            | 40          | 6           | 5.46                | 0.106             | 5.57                                    | 14.99       |
|                 |             | 9           | 5.25                | 0.151             | 5.40                                    | 14.99       |
|                 |             | 12          | 5.23                | 0.200             | 5.43                                    | 14.99       |
|                 |             | 18          | 5.20                | 0.282             | 5.48                                    | 14.99       |
|                 |             | 24          | 5.10                | 0.366             | 5.47                                    | 14.99       |
|                 |             | 36          | 4.12                | 0.531             | 4.65                                    | 14.99       |
|                 |             | 48          | 4.01                | 0.667             | 4.67                                    | 14.99       |
|                 |             | 54          | 3.33                | 0.738             | 4.07                                    | 14.99       |
| 5240            | 48          | 6           | 5.06                | 0.106             | 5.17                                    | 14.99       |
|                 |             | 9           | 5.26                | 0.151             | 5.41                                    | 14.99       |
|                 |             | 12          | 5.21                | 0.200             | 5.41                                    | 14.99       |
|                 |             | 18          | 5.13                | 0.282             | 5.41                                    | 14.99       |
|                 |             | 24          | 5.09                | 0.366             | 5.46                                    | 14.99       |
|                 |             | 36          | 3.99                | 0.531             | 4.52                                    | 14.99       |
|                 |             | 48          | 3.68                | 0.667             | 4.35                                    | 14.99       |
|                 |             | 54          | 2.70                | 0.738             | 3.44                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 8.88                   | 11.98          |
|                |             | 9              | 8.77                   | 11.98          |
|                |             | 12             | 8.93                   | 11.98          |
|                |             | 18             | 8.95                   | 11.98          |
|                |             | 24             | 8.91                   | 11.98          |
|                |             | 36             | 7.99                   | 11.98          |
|                |             | 48             | 8.00                   | 11.98          |
|                |             | 54             | 7.26                   | 11.98          |
| 5200           | 40          | 6              | 8.52                   | 11.98          |
|                |             | 9              | 8.44                   | 11.98          |
|                |             | 12             | 8.47                   | 11.98          |
|                |             | 18             | 8.48                   | 11.98          |
|                |             | 24             | 8.53                   | 11.98          |
|                |             | 36             | 7.71                   | 11.98          |
|                |             | 48             | 7.76                   | 11.98          |
|                |             | 54             | 6.99                   | 11.98          |
| 5240           | 48          | 6              | 8.24                   | 11.98          |
|                |             | 9              | 8.38                   | 11.98          |
|                |             | 12             | 8.34                   | 11.98          |
|                |             | 18             | 8.39                   | 11.98          |
|                |             | 24             | 8.49                   | 11.98          |
|                |             | 36             | 7.46                   | 11.98          |
|                |             | 48             | 7.29                   | 11.98          |
|                |             | 54             | 6.24                   | 11.98          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 5.49                | 0.102             | 5.59                                    | 14.99       |
|                 |             | 13          | 5.36                | 0.203             | 5.56                                    | 14.99       |
|                 |             | 19.5        | 5.35                | 0.295             | 5.65                                    | 14.99       |
|                 |             | 26          | 5.27                | 0.384             | 5.66                                    | 14.99       |
|                 |             | 39          | 5.20                | 0.530             | 5.73                                    | 14.99       |
|                 |             | 52          | 4.13                | 0.676             | 4.80                                    | 14.99       |
|                 |             | 58.5        | 3.27                | 0.753             | 4.02                                    | 14.99       |
|                 |             | 65          | 3.24                | 0.779             | 4.02                                    | 14.99       |
| 5200            | 40          | 6.5         | 5.28                | 0.102             | 5.38                                    | 14.99       |
|                 |             | 13          | 5.25                | 0.203             | 5.45                                    | 14.99       |
|                 |             | 19.5        | 5.14                | 0.295             | 5.44                                    | 14.99       |
|                 |             | 26          | 5.14                | 0.384             | 5.53                                    | 14.99       |
|                 |             | 39          | 4.72                | 0.530             | 5.25                                    | 14.99       |
|                 |             | 52          | 3.69                | 0.676             | 4.36                                    | 14.99       |
|                 |             | 58.5        | 2.69                | 0.753             | 3.45                                    | 14.99       |
|                 |             | 65          | 2.66                | 0.779             | 3.44                                    | 14.99       |
| 5240            | 48          | 6.5         | 5.04                | 0.102             | 5.14                                    | 14.99       |
|                 |             | 13          | 4.94                | 0.203             | 5.14                                    | 14.99       |
|                 |             | 19.5        | 4.78                | 0.295             | 5.07                                    | 14.99       |
|                 |             | 26          | 4.65                | 0.384             | 5.03                                    | 14.99       |
|                 |             | 39          | 4.53                | 0.530             | 5.06                                    | 14.99       |
|                 |             | 52          | 3.58                | 0.676             | 4.26                                    | 14.99       |
|                 |             | 58.5        | 2.56                | 0.753             | 3.31                                    | 14.99       |
|                 |             | 65          | 2.56                | 0.779             | 3.34                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 5.80                | 0.102             | 5.90                                    | 14.99       |
|                 |             | 13          | 5.57                | 0.203             | 5.77                                    | 14.99       |
|                 |             | 19.5        | 5.46                | 0.295             | 5.75                                    | 14.99       |
|                 |             | 26          | 5.39                | 0.384             | 5.78                                    | 14.99       |
|                 |             | 39          | 5.34                | 0.530             | 5.87                                    | 14.99       |
|                 |             | 52          | 4.31                | 0.676             | 4.99                                    | 14.99       |
|                 |             | 58.5        | 3.31                | 0.753             | 4.06                                    | 14.99       |
|                 |             | 65          | 3.32                | 0.779             | 4.10                                    | 14.99       |
| 5200            | 40          | 6.5         | 5.27                | 0.102             | 5.37                                    | 14.99       |
|                 |             | 13          | 5.31                | 0.203             | 5.52                                    | 14.99       |
|                 |             | 19.5        | 5.22                | 0.295             | 5.52                                    | 14.99       |
|                 |             | 26          | 5.20                | 0.384             | 5.58                                    | 14.99       |
|                 |             | 39          | 5.15                | 0.530             | 5.68                                    | 14.99       |
|                 |             | 52          | 4.07                | 0.676             | 4.74                                    | 14.99       |
|                 |             | 58.5        | 3.23                | 0.753             | 3.98                                    | 14.99       |
|                 |             | 65          | 2.31                | 0.779             | 3.09                                    | 14.99       |
| 5240            | 48          | 6.5         | 5.14                | 0.102             | 5.25                                    | 14.99       |
|                 |             | 13          | 5.02                | 0.203             | 5.23                                    | 14.99       |
|                 |             | 19.5        | 4.87                | 0.295             | 5.17                                    | 14.99       |
|                 |             | 26          | 4.76                | 0.384             | 5.15                                    | 14.99       |
|                 |             | 39          | 4.66                | 0.530             | 5.19                                    | 14.99       |
|                 |             | 52          | 3.75                | 0.676             | 4.43                                    | 14.99       |
|                 |             | 58.5        | 2.82                | 0.753             | 3.57                                    | 14.99       |
|                 |             | 65          | 2.76                | 0.779             | 3.54                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 8.76                   | 14.99          |
|                |             | 13             | 8.68                   | 14.99          |
|                |             | 19.5           | 8.71                   | 14.99          |
|                |             | 26             | 8.73                   | 14.99          |
|                |             | 39             | 8.81                   | 14.99          |
|                |             | 52             | 7.91                   | 14.99          |
|                |             | 58.5           | 7.05                   | 14.99          |
|                |             | 65             | 7.07                   | 14.99          |
| 5200           | 40          | 6.5            | 8.39                   | 14.99          |
|                |             | 13             | 8.49                   | 14.99          |
|                |             | 19.5           | 8.49                   | 14.99          |
|                |             | 26             | 8.56                   | 14.99          |
|                |             | 39             | 8.48                   | 14.99          |
|                |             | 52             | 7.57                   | 14.99          |
|                |             | 58.5           | 6.73                   | 14.99          |
|                |             | 65             | 6.28                   | 14.99          |
| 5240           | 48          | 6.5            | 8.20                   | 14.99          |
|                |             | 13             | 8.20                   | 14.99          |
|                |             | 19.5           | 8.13                   | 14.99          |
|                |             | 26             | 8.10                   | 14.99          |
|                |             | 39             | 8.13                   | 14.99          |
|                |             | 52             | 7.35                   | 14.99          |
|                |             | 58.5           | 6.45                   | 14.99          |
|                |             | 65             | 6.45                   | 14.99          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 2.83                | 0.157             | 2.99                                    | 14.99       |
|                 |             | 27          | 2.77                | 0.296             | 3.06                                    | 14.99       |
|                 |             | 40.5        | 2.65                | 0.408             | 3.06                                    | 14.99       |
|                 |             | 54          | 2.67                | 0.504             | 3.17                                    | 14.99       |
|                 |             | 81          | 2.48                | 0.706             | 3.19                                    | 14.99       |
|                 |             | 108         | 2.42                | 0.880             | 3.30                                    | 14.99       |
|                 |             | 121.5       | 2.45                | 0.918             | 3.37                                    | 14.99       |
|                 |             | 135         | 2.36                | 0.969             | 3.33                                    | 14.99       |
| 5230            | 46          | 13.5        | 2.62                | 0.157             | 2.78                                    | 14.99       |
|                 |             | 27          | 2.50                | 0.296             | 2.79                                    | 14.99       |
|                 |             | 40.5        | 2.45                | 0.408             | 2.86                                    | 14.99       |
|                 |             | 54          | 2.37                | 0.504             | 2.87                                    | 14.99       |
|                 |             | 81          | 2.29                | 0.706             | 3.00                                    | 14.99       |
|                 |             | 108         | 2.25                | 0.880             | 3.13                                    | 14.99       |
|                 |             | 121.5       | 1.03                | 0.918             | 1.94                                    | 14.99       |
|                 |             | 135         | 0.07                | 0.969             | 1.04                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | -0.11               | 0.157             | 0.05                                    | 14.99       |
|                 |             | 27          | -0.22               | 0.296             | 0.08                                    | 14.99       |
|                 |             | 40.5        | -0.24               | 0.408             | 0.17                                    | 14.99       |
|                 |             | 54          | -0.21               | 0.504             | 0.29                                    | 14.99       |
|                 |             | 81          | -0.28               | 0.706             | 0.43                                    | 14.99       |
|                 |             | 108         | -0.36               | 0.880             | 0.52                                    | 14.99       |
|                 |             | 121.5       | -0.36               | 0.918             | 0.55                                    | 14.99       |
|                 |             | 135         | -0.44               | 0.969             | 0.53                                    | 14.99       |
| 5230            | 46          | 13.5        | 3.02                | 0.157             | 3.18                                    | 14.99       |
|                 |             | 27          | 2.80                | 0.296             | 3.10                                    | 14.99       |
|                 |             | 40.5        | 2.72                | 0.408             | 3.13                                    | 14.99       |
|                 |             | 54          | 2.69                | 0.504             | 3.20                                    | 14.99       |
|                 |             | 81          | 2.68                | 0.706             | 3.38                                    | 14.99       |
|                 |             | 108         | 2.64                | 0.880             | 3.52                                    | 14.99       |
|                 |             | 121.5       | 1.64                | 0.918             | 2.56                                    | 14.99       |
|                 |             | 135         | 0.12                | 0.969             | 1.09                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 4.77                   | 14.99          |
|                |             | 27             | 4.83                   | 14.99          |
|                |             | 40.5           | 4.86                   | 14.99          |
|                |             | 54             | 4.97                   | 14.99          |
|                |             | 81             | 5.03                   | 14.99          |
|                |             | 108            | 5.14                   | 14.99          |
|                |             | 121.5          | 5.20                   | 14.99          |
|                |             | 135            | 5.16                   | 14.99          |
| 5230           | 46          | 13.5           | 5.99                   | 14.99          |
|                |             | 27             | 5.96                   | 14.99          |
|                |             | 40.5           | 6.01                   | 14.99          |
|                |             | 54             | 6.05                   | 14.99          |
|                |             | 81             | 6.20                   | 14.99          |
|                |             | 108            | 6.34                   | 14.99          |
|                |             | 121.5          | 5.27                   | 14.99          |
|                |             | 135            | 4.08                   | 14.99          |

# Service Port

## TEST RESULTS\_Ant.1

### Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 1.56                | 0.222             | 1.78                                    | 14.99       |
|                 |             | 9           | 1.59                | 0.223             | 1.82                                    | 14.99       |
|                 |             | 12          | 1.53                | 0.274             | 1.81                                    | 14.99       |
|                 |             | 18          | 1.36                | 0.409             | 1.77                                    | 14.99       |
|                 |             | 24          | 1.29                | 0.531             | 1.82                                    | 14.99       |
|                 |             | 36          | 1.14                | 0.738             | 1.88                                    | 14.99       |
|                 |             | 48          | 0.94                | 0.936             | 1.88                                    | 14.99       |
|                 |             | 54          | 0.86                | 1.015             | 1.87                                    | 14.99       |
| 5200            | 40          | 6           | 1.80                | 0.222             | 2.02                                    | 14.99       |
|                 |             | 9           | 1.71                | 0.223             | 1.93                                    | 14.99       |
|                 |             | 12          | 1.70                | 0.274             | 1.97                                    | 14.99       |
|                 |             | 18          | 1.52                | 0.409             | 1.93                                    | 14.99       |
|                 |             | 24          | 1.44                | 0.531             | 1.97                                    | 14.99       |
|                 |             | 36          | 1.25                | 0.738             | 1.99                                    | 14.99       |
|                 |             | 48          | 1.11                | 0.936             | 2.05                                    | 14.99       |
|                 |             | 54          | 1.00                | 1.015             | 2.01                                    | 14.99       |
| 5240            | 48          | 6           | 2.15                | 0.222             | 2.37                                    | 14.99       |
|                 |             | 9           | 2.10                | 0.223             | 2.32                                    | 14.99       |
|                 |             | 12          | 2.05                | 0.274             | 2.32                                    | 14.99       |
|                 |             | 18          | 1.97                | 0.409             | 2.38                                    | 14.99       |
|                 |             | 24          | 1.84                | 0.531             | 2.37                                    | 14.99       |
|                 |             | 36          | 1.65                | 0.738             | 2.39                                    | 14.99       |
|                 |             | 48          | 1.51                | 0.936             | 2.44                                    | 14.99       |
|                 |             | 54          | 1.38                | 1.015             | 2.40                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 1.27                | 0.222             | 1.49                                    | 14.99       |
|                 |             | 9           | 1.19                | 0.223             | 1.41                                    | 14.99       |
|                 |             | 12          | 1.05                | 0.274             | 1.33                                    | 14.99       |
|                 |             | 18          | 0.88                | 0.409             | 1.29                                    | 14.99       |
|                 |             | 24          | 0.83                | 0.531             | 1.36                                    | 14.99       |
|                 |             | 36          | 0.68                | 0.738             | 1.42                                    | 14.99       |
|                 |             | 48          | 0.52                | 0.936             | 1.45                                    | 14.99       |
|                 |             | 54          | 0.46                | 1.015             | 1.48                                    | 14.99       |
| 5200            | 40          | 6           | 1.53                | 0.222             | 1.75                                    | 14.99       |
|                 |             | 9           | 1.50                | 0.223             | 1.72                                    | 14.99       |
|                 |             | 12          | 1.33                | 0.274             | 1.61                                    | 14.99       |
|                 |             | 18          | 1.29                | 0.409             | 1.70                                    | 14.99       |
|                 |             | 24          | 1.15                | 0.531             | 1.68                                    | 14.99       |
|                 |             | 36          | 0.96                | 0.738             | 1.70                                    | 14.99       |
|                 |             | 48          | 0.64                | 0.936             | 1.58                                    | 14.99       |
|                 |             | 54          | 0.54                | 1.015             | 1.56                                    | 14.99       |
| 5240            | 48          | 6           | 3.14                | 0.222             | 3.36                                    | 14.99       |
|                 |             | 9           | 3.08                | 0.223             | 3.30                                    | 14.99       |
|                 |             | 12          | 3.06                | 0.274             | 3.34                                    | 14.99       |
|                 |             | 18          | 2.94                | 0.409             | 3.35                                    | 14.99       |
|                 |             | 24          | 2.79                | 0.531             | 3.32                                    | 14.99       |
|                 |             | 36          | 2.62                | 0.738             | 3.36                                    | 14.99       |
|                 |             | 48          | 2.41                | 0.936             | 3.34                                    | 14.99       |
|                 |             | 54          | 2.24                | 1.015             | 3.26                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 1.36                | 0.222             | 1.58                                    | 14.99       |
|                 |             | 9           | 1.50                | 0.223             | 1.72                                    | 14.99       |
|                 |             | 12          | 1.36                | 0.274             | 1.64                                    | 14.99       |
|                 |             | 18          | 1.35                | 0.409             | 1.76                                    | 14.99       |
|                 |             | 24          | 1.23                | 0.531             | 1.76                                    | 14.99       |
|                 |             | 36          | 1.09                | 0.738             | 1.82                                    | 14.99       |
|                 |             | 48          | 0.76                | 0.936             | 1.70                                    | 14.99       |
|                 |             | 54          | 0.76                | 1.015             | 1.77                                    | 14.99       |
| 5200            | 40          | 6           | 1.95                | 0.222             | 2.17                                    | 14.99       |
|                 |             | 9           | 1.88                | 0.223             | 2.10                                    | 14.99       |
|                 |             | 12          | 1.79                | 0.274             | 2.07                                    | 14.99       |
|                 |             | 18          | 1.61                | 0.409             | 2.01                                    | 14.99       |
|                 |             | 24          | 1.52                | 0.531             | 2.05                                    | 14.99       |
|                 |             | 36          | 1.33                | 0.738             | 2.07                                    | 14.99       |
|                 |             | 48          | 1.21                | 0.936             | 2.14                                    | 14.99       |
|                 |             | 54          | 1.11                | 1.015             | 2.13                                    | 14.99       |
| 5240            | 48          | 6           | 3.09                | 0.222             | 3.31                                    | 14.99       |
|                 |             | 9           | 2.98                | 0.223             | 3.20                                    | 14.99       |
|                 |             | 12          | 2.81                | 0.274             | 3.09                                    | 14.99       |
|                 |             | 18          | 2.88                | 0.409             | 3.29                                    | 14.99       |
|                 |             | 24          | 2.64                | 0.531             | 3.17                                    | 14.99       |
|                 |             | 36          | 2.47                | 0.738             | 3.21                                    | 14.99       |
|                 |             | 48          | 2.20                | 0.936             | 3.14                                    | 14.99       |
|                 |             | 54          | 2.22                | 1.015             | 3.24                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 4.65                   | 11.98          |
|                |             | 9              | 4.63                   | 11.98          |
|                |             | 12             | 4.58                   | 11.98          |
|                |             | 18             | 4.54                   | 11.98          |
|                |             | 24             | 4.60                   | 11.98          |
|                |             | 36             | 4.67                   | 11.98          |
|                |             | 48             | 4.68                   | 11.98          |
|                |             | 54             | 4.69                   | 11.98          |
| 5200           | 40          | 6              | 4.90                   | 11.98          |
|                |             | 9              | 4.84                   | 11.98          |
|                |             | 12             | 4.81                   | 11.98          |
|                |             | 18             | 4.83                   | 11.98          |
|                |             | 24             | 4.84                   | 11.98          |
|                |             | 36             | 4.86                   | 11.98          |
|                |             | 48             | 4.83                   | 11.98          |
|                |             | 54             | 4.80                   | 11.98          |
| 5240           | 48          | 6              | 5.90                   | 11.98          |
|                |             | 9              | 5.85                   | 11.98          |
|                |             | 12             | 5.87                   | 11.98          |
|                |             | 18             | 5.90                   | 11.98          |
|                |             | 24             | 5.88                   | 11.98          |
|                |             | 36             | 5.91                   | 11.98          |
|                |             | 48             | 5.93                   | 11.98          |
|                |             | 54             | 5.86                   | 11.98          |

▣ TEST RESULTS\_Sum Data of Ant.1, Ant.2 and Ant 3

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 6.39                   | 10.22          |
|                |             | 9              | 6.43                   | 10.22          |
|                |             | 12             | 6.37                   | 10.22          |
|                |             | 18             | 6.38                   | 10.22          |
|                |             | 24             | 6.42                   | 10.22          |
|                |             | 36             | 6.48                   | 10.22          |
|                |             | 48             | 6.45                   | 10.22          |
|                |             | 54             | 6.48                   | 10.22          |
| 5200           | 40          | 6              | 6.76                   | 10.22          |
|                |             | 9              | 6.69                   | 10.22          |
|                |             | 12             | 6.66                   | 10.22          |
|                |             | 18             | 6.65                   | 10.22          |
|                |             | 24             | 6.68                   | 10.22          |
|                |             | 36             | 6.69                   | 10.22          |
|                |             | 48             | 6.70                   | 10.22          |
|                |             | 54             | 6.68                   | 10.22          |
| 5240           | 48          | 6              | 7.81                   | 10.22          |
|                |             | 9              | 7.74                   | 10.22          |
|                |             | 12             | 7.71                   | 10.22          |
|                |             | 18             | 7.80                   | 10.22          |
|                |             | 24             | 7.75                   | 10.22          |
|                |             | 36             | 7.78                   | 10.22          |
|                |             | 48             | 7.76                   | 10.22          |
|                |             | 54             | 7.75                   | 10.22          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 1.05                | 0.161             | 1.21                                    | 14.99       |
|                 |             | 13          | 0.93                | 0.295             | 1.23                                    | 14.99       |
|                 |             | 19.5        | 0.83                | 0.426             | 1.26                                    | 14.99       |
|                 |             | 26          | 0.65                | 0.528             | 1.18                                    | 14.99       |
|                 |             | 39          | 0.48                | 0.735             | 1.21                                    | 14.99       |
|                 |             | 52          | 0.29                | 0.896             | 1.19                                    | 14.99       |
|                 |             | 58.5        | 0.24                | 0.969             | 1.21                                    | 14.99       |
|                 |             | 65          | 0.21                | 1.082             | 1.29                                    | 14.99       |
| 5200            | 40          | 6.5         | 1.73                | 0.161             | 1.89                                    | 14.99       |
|                 |             | 13          | 1.64                | 0.295             | 1.94                                    | 14.99       |
|                 |             | 19.5        | 1.49                | 0.426             | 1.92                                    | 14.99       |
|                 |             | 26          | 1.19                | 0.528             | 1.72                                    | 14.99       |
|                 |             | 39          | 1.07                | 0.735             | 1.80                                    | 14.99       |
|                 |             | 52          | 0.92                | 0.896             | 1.82                                    | 14.99       |
|                 |             | 58.5        | 0.86                | 0.969             | 1.82                                    | 14.99       |
|                 |             | 65          | 0.78                | 1.082             | 1.86                                    | 14.99       |
| 5240            | 48          | 6.5         | 2.29                | 0.161             | 2.45                                    | 14.99       |
|                 |             | 13          | 2.18                | 0.295             | 2.48                                    | 14.99       |
|                 |             | 19.5        | 1.99                | 0.426             | 2.41                                    | 14.99       |
|                 |             | 26          | 1.89                | 0.528             | 2.42                                    | 14.99       |
|                 |             | 39          | 1.60                | 0.735             | 2.34                                    | 14.99       |
|                 |             | 52          | 1.42                | 0.896             | 2.31                                    | 14.99       |
|                 |             | 58.5        | 1.32                | 0.969             | 2.29                                    | 14.99       |
|                 |             | 65          | 1.27                | 1.082             | 2.35                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 0.62                | 0.161             | 0.78                                    | 14.99       |
|                 |             | 13          | 0.40                | 0.295             | 0.69                                    | 14.99       |
|                 |             | 19.5        | 0.32                | 0.426             | 0.74                                    | 14.99       |
|                 |             | 26          | 0.22                | 0.528             | 0.75                                    | 14.99       |
|                 |             | 39          | 0.02                | 0.735             | 0.76                                    | 14.99       |
|                 |             | 52          | -0.18               | 0.896             | 0.72                                    | 14.99       |
|                 |             | 58.5        | -0.23               | 0.969             | 0.74                                    | 14.99       |
|                 |             | 65          | -0.29               | 1.082             | 0.79                                    | 14.99       |
| 5200            | 40          | 6.5         | 0.95                | 0.161             | 1.11                                    | 14.99       |
|                 |             | 13          | 0.77                | 0.295             | 1.07                                    | 14.99       |
|                 |             | 19.5        | 0.67                | 0.426             | 1.09                                    | 14.99       |
|                 |             | 26          | 0.66                | 0.528             | 1.19                                    | 14.99       |
|                 |             | 39          | 0.36                | 0.735             | 1.09                                    | 14.99       |
|                 |             | 52          | 0.27                | 0.896             | 1.16                                    | 14.99       |
|                 |             | 58.5        | 0.18                | 0.969             | 1.15                                    | 14.99       |
|                 |             | 65          | 0.14                | 1.082             | 1.22                                    | 14.99       |
| 5240            | 48          | 6.5         | 2.40                | 0.161             | 2.56                                    | 14.99       |
|                 |             | 13          | 2.35                | 0.295             | 2.65                                    | 14.99       |
|                 |             | 19.5        | 2.06                | 0.426             | 2.49                                    | 14.99       |
|                 |             | 26          | 1.96                | 0.528             | 2.49                                    | 14.99       |
|                 |             | 39          | 1.84                | 0.735             | 2.57                                    | 14.99       |
|                 |             | 52          | 1.69                | 0.896             | 2.59                                    | 14.99       |
|                 |             | 58.5        | 1.67                | 0.969             | 2.64                                    | 14.99       |
|                 |             | 65          | 1.50                | 1.082             | 2.58                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 1.19                | 0.161             | 1.35                                    | 14.99       |
|                 |             | 13          | 1.04                | 0.295             | 1.34                                    | 14.99       |
|                 |             | 19.5        | 1.06                | 0.426             | 1.49                                    | 14.99       |
|                 |             | 26          | 0.98                | 0.528             | 1.50                                    | 14.99       |
|                 |             | 39          | 0.82                | 0.735             | 1.55                                    | 14.99       |
|                 |             | 52          | 0.51                | 0.896             | 1.41                                    | 14.99       |
|                 |             | 58.5        | 0.54                | 0.969             | 1.51                                    | 14.99       |
|                 |             | 65          | 0.44                | 1.082             | 1.52                                    | 14.99       |
| 5200            | 40          | 6.5         | 1.95                | 0.161             | 2.11                                    | 14.99       |
|                 |             | 13          | 1.75                | 0.295             | 2.04                                    | 14.99       |
|                 |             | 19.5        | 1.67                | 0.426             | 2.10                                    | 14.99       |
|                 |             | 26          | 1.65                | 0.528             | 2.18                                    | 14.99       |
|                 |             | 39          | 1.45                | 0.735             | 2.19                                    | 14.99       |
|                 |             | 52          | 1.34                | 0.896             | 2.23                                    | 14.99       |
|                 |             | 58.5        | 1.14                | 0.969             | 2.11                                    | 14.99       |
|                 |             | 65          | 1.09                | 1.082             | 2.17                                    | 14.99       |
| 5240            | 48          | 6.5         | 3.03                | 0.161             | 3.20                                    | 14.99       |
|                 |             | 13          | 2.94                | 0.295             | 3.24                                    | 14.99       |
|                 |             | 19.5        | 2.80                | 0.426             | 3.22                                    | 14.99       |
|                 |             | 26          | 2.69                | 0.528             | 3.22                                    | 14.99       |
|                 |             | 39          | 2.59                | 0.735             | 3.32                                    | 14.99       |
|                 |             | 52          | 2.49                | 0.896             | 3.39                                    | 14.99       |
|                 |             | 58.5        | 2.37                | 0.969             | 3.34                                    | 14.99       |
|                 |             | 65          | 2.33                | 1.082             | 3.41                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 4.01                   | 14.99          |
|                |             | 13             | 3.98                   | 14.99          |
|                |             | 19.5           | 4.02                   | 14.99          |
|                |             | 26             | 3.98                   | 14.99          |
|                |             | 39             | 4.00                   | 14.99          |
|                |             | 52             | 3.97                   | 14.99          |
|                |             | 58.5           | 3.99                   | 14.99          |
|                |             | 65             | 4.06                   | 14.99          |
| 5200           | 40          | 6.5            | 4.53                   | 14.99          |
|                |             | 13             | 4.54                   | 14.99          |
|                |             | 19.5           | 4.54                   | 14.99          |
|                |             | 26             | 4.47                   | 14.99          |
|                |             | 39             | 4.47                   | 14.99          |
|                |             | 52             | 4.51                   | 14.99          |
|                |             | 58.5           | 4.51                   | 14.99          |
|                |             | 65             | 4.57                   | 14.99          |
| 5240           | 48          | 6.5            | 5.52                   | 14.99          |
|                |             | 13             | 5.57                   | 14.99          |
|                |             | 19.5           | 5.46                   | 14.99          |
|                |             | 26             | 5.47                   | 14.99          |
|                |             | 39             | 5.47                   | 14.99          |
|                |             | 52             | 5.46                   | 14.99          |
|                |             | 58.5           | 5.47                   | 14.99          |
|                |             | 65             | 5.48                   | 14.99          |

■ TEST RESULTS\_Sum Data of Ant.1, Ant.2 and Ant 3

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 5.89                   | 14.99          |
|                |             | 13             | 5.87                   | 14.99          |
|                |             | 19.5           | 5.94                   | 14.99          |
|                |             | 26             | 5.93                   | 14.99          |
|                |             | 39             | 5.96                   | 14.99          |
|                |             | 52             | 5.89                   | 14.99          |
|                |             | 58.5           | 5.94                   | 14.99          |
|                |             | 65             | 5.98                   | 14.99          |
| 5200           | 40          | 6.5            | 6.49                   | 14.99          |
|                |             | 13             | 6.48                   | 14.99          |
|                |             | 19.5           | 6.50                   | 14.99          |
|                |             | 26             | 6.49                   | 14.99          |
|                |             | 39             | 6.49                   | 14.99          |
|                |             | 52             | 6.53                   | 14.99          |
|                |             | 58.5           | 6.48                   | 14.99          |
|                |             | 65             | 6.54                   | 14.99          |
| 5240           | 48          | 6.5            | 7.52                   | 14.99          |
|                |             | 13             | 7.57                   | 14.99          |
|                |             | 19.5           | 7.50                   | 14.99          |
|                |             | 26             | 7.50                   | 14.99          |
|                |             | 39             | 7.54                   | 14.99          |
|                |             | 52             | 7.56                   | 14.99          |
|                |             | 58.5           | 7.55                   | 14.99          |
|                |             | 65             | 7.58                   | 14.99          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 1.29                | 0.228             | 1.52                                    | 14.99       |
|                 |             | 27          | 1.11                | 0.421             | 1.53                                    | 14.99       |
|                 |             | 40.5        | 0.91                | 0.552             | 1.46                                    | 14.99       |
|                 |             | 54          | 0.79                | 0.683             | 1.47                                    | 14.99       |
|                 |             | 81          | 0.50                | 0.950             | 1.45                                    | 14.99       |
|                 |             | 108         | 0.41                | 1.091             | 1.50                                    | 14.99       |
|                 |             | 121.5       | 0.34                | 1.165             | 1.50                                    | 14.99       |
|                 |             | 135         | 0.24                | 1.249             | 1.49                                    | 14.99       |
| 5230            | 46          | 13.5        | 1.39                | 0.228             | 1.62                                    | 14.99       |
|                 |             | 27          | 1.19                | 0.421             | 1.61                                    | 14.99       |
|                 |             | 40.5        | 1.03                | 0.552             | 1.58                                    | 14.99       |
|                 |             | 54          | 0.93                | 0.683             | 1.61                                    | 14.99       |
|                 |             | 81          | 0.66                | 0.950             | 1.61                                    | 14.99       |
|                 |             | 108         | 0.59                | 1.091             | 1.68                                    | 14.99       |
|                 |             | 121.5       | 0.57                | 1.165             | 1.73                                    | 14.99       |
|                 |             | 135         | 0.30                | 1.249             | 1.55                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 0.78                | 0.228             | 1.00                                    | 14.99       |
|                 |             | 27          | 0.55                | 0.421             | 0.97                                    | 14.99       |
|                 |             | 40.5        | 0.45                | 0.552             | 1.01                                    | 14.99       |
|                 |             | 54          | 0.29                | 0.683             | 0.97                                    | 14.99       |
|                 |             | 81          | 0.05                | 0.950             | 1.00                                    | 14.99       |
|                 |             | 108         | -0.07               | 1.091             | 1.02                                    | 14.99       |
|                 |             | 121.5       | -0.19               | 1.165             | 0.98                                    | 14.99       |
|                 |             | 135         | -0.21               | 1.249             | 1.04                                    | 14.99       |
| 5230            | 46          | 13.5        | 1.74                | 0.228             | 1.97                                    | 14.99       |
|                 |             | 27          | 1.40                | 0.421             | 1.82                                    | 14.99       |
|                 |             | 40.5        | 1.37                | 0.552             | 1.92                                    | 14.99       |
|                 |             | 54          | 1.22                | 0.683             | 1.90                                    | 14.99       |
|                 |             | 81          | 1.04                | 0.950             | 1.99                                    | 14.99       |
|                 |             | 108         | 0.75                | 1.091             | 1.84                                    | 14.99       |
|                 |             | 121.5       | 0.75                | 1.165             | 1.91                                    | 14.99       |
|                 |             | 135         | 0.55                | 1.249             | 1.80                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 1.73                | 0.228             | 1.96                                    | 14.99       |
|                 |             | 27          | 1.54                | 0.421             | 1.97                                    | 14.99       |
|                 |             | 40.5        | 1.36                | 0.552             | 1.92                                    | 14.99       |
|                 |             | 54          | 1.22                | 0.683             | 1.91                                    | 14.99       |
|                 |             | 81          | 1.02                | 0.950             | 1.97                                    | 14.99       |
|                 |             | 108         | 0.94                | 1.091             | 2.04                                    | 14.99       |
|                 |             | 121.5       | 0.83                | 1.165             | 1.99                                    | 14.99       |
|                 |             | 135         | 0.73                | 1.249             | 1.98                                    | 14.99       |
| 5230            | 46          | 13.5        | 1.86                | 0.228             | 2.09                                    | 14.99       |
|                 |             | 27          | 1.67                | 0.421             | 2.09                                    | 14.99       |
|                 |             | 40.5        | 1.59                | 0.552             | 2.14                                    | 14.99       |
|                 |             | 54          | 1.42                | 0.683             | 2.10                                    | 14.99       |
|                 |             | 81          | 1.24                | 0.950             | 2.19                                    | 14.99       |
|                 |             | 108         | 1.10                | 1.091             | 2.19                                    | 14.99       |
|                 |             | 121.5       | 1.08                | 1.165             | 2.24                                    | 14.99       |
|                 |             | 135         | 0.90                | 1.249             | 2.15                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 4.28                   | 14.99          |
|                |             | 27             | 4.27                   | 14.99          |
|                |             | 40.5           | 4.25                   | 14.99          |
|                |             | 54             | 4.24                   | 14.99          |
|                |             | 81             | 4.24                   | 14.99          |
|                |             | 108            | 4.28                   | 14.99          |
|                |             | 121.5          | 4.26                   | 14.99          |
|                |             | 135            | 4.28                   | 14.99          |
| 5230           | 46          | 13.5           | 4.81                   | 14.99          |
|                |             | 27             | 4.73                   | 14.99          |
|                |             | 40.5           | 4.76                   | 14.99          |
|                |             | 54             | 4.77                   | 14.99          |
|                |             | 81             | 4.82                   | 14.99          |
|                |             | 108            | 4.77                   | 14.99          |
|                |             | 121.5          | 4.83                   | 14.99          |
|                |             | 135            | 4.69                   | 14.99          |

■ TEST RESULTS\_Sum Data of Ant.1, Ant.2 Ant 3

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 6.28                   | 14.99          |
|                |             | 27             | 6.28                   | 14.99          |
|                |             | 40.5           | 6.25                   | 14.99          |
|                |             | 54             | 6.24                   | 14.99          |
|                |             | 81             | 6.26                   | 14.99          |
|                |             | 108            | 6.31                   | 14.99          |
|                |             | 121.5          | 6.28                   | 14.99          |
|                |             | 135            | 6.29                   | 14.99          |
| 5230           | 46          | 13.5           | 6.67                   | 14.99          |
|                |             | 27             | 6.62                   | 14.99          |
|                |             | 40.5           | 6.66                   | 14.99          |
|                |             | 54             | 6.65                   | 14.99          |
|                |             | 81             | 6.71                   | 14.99          |
|                |             | 108            | 6.68                   | 14.99          |
|                |             | 121.5          | 6.74                   | 14.99          |
|                |             | 135            | 6.61                   | 14.99          |

## 8.4 POWER SPECTRAL DENSITY

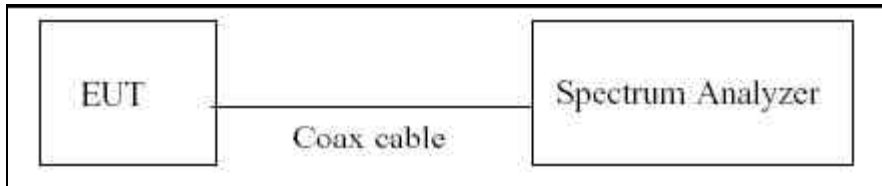
The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 4 dBm/ MHz in the 5.15 GHz – 5.25 GHz band.

Limit :

| Operating Mode             | Band   | Mode              | Ant. Gain(dBi) | Limt(dBm) |
|----------------------------|--------|-------------------|----------------|-----------|
| SISO :<br>Monitoring       | UNII 1 | 802.11a           | 8              | 2         |
|                            |        | 802.11n_20 MHz BW |                |           |
|                            |        | 802.11n_40 MHz BW |                |           |
| SISO :<br>Service          | UNII 1 | 802.11a           | 8              | 2         |
|                            |        | 802.11n_20 MHz BW |                |           |
|                            |        | 802.11n_40 MHz BW |                |           |
| MIMO(2 TX) :<br>Monitoring | UNII 1 | 802.11a           | 11.01          | -1.01     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |
| MIMO(2 TX) :<br>Service    | UNII 1 | 802.11a           | 11.01          | -1.01     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |
| MIMO(3 TX) :<br>Service    | UNII 1 | 802.11a           | 12.77          | -2.77     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

## ■ TEST CONFIGURATION



## ■ TEST PROCEDURE

We tested according to Method in KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz.
3. VBW  $\geq$  3 MHz.
4. Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add  $10 \log(1/x)$ , where x is the duty cycle, to the peak of the spectrum.

## ■ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = -5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

(Actual value of loss for the attenuator and cable combination)

# Monitoring Port Ant.1

## TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode                   | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                        | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a                | -7.034                       | 0.10619                | -6.928                                          | 2           | Pass      |
| 5200            | 40          |                        | -7.364                       | 0.366106               | -6.998                                          |             | Pass      |
| 5240            | 48          |                        | -7.118                       | 0.366106               | -6.752                                          |             | Pass      |
| 5180            | 36          | 802.11n<br>20MHz<br>BW | -7.201                       | 0.529566               | -6.671                                          |             | Pass      |
| 5200            | 40          |                        | -7.853                       | 0.383696               | -7.469                                          |             | Pass      |
| 5240            | 48          |                        | -7.452                       | 0.202855               | -7.249                                          |             | Pass      |
| 5190            | 38          | 802.11n<br>40MHz<br>BW | -12.513                      | 0.917704               | -11.595                                         |             | Pass      |
| 5230            | 46          |                        | -12.569                      | 0.879552               | -11.689                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Monitoring Port Ant.2

## TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode                   | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                        | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a                | -6.842                       | 0.28187                | -6.560                                          | 2           | Pass      |
| 5200            | 40          |                        | -7.179                       | 0.10619                | -7.073                                          |             | Pass      |
| 5240            | 48          |                        | -7.332                       | 0.366106               | -6.966                                          |             | Pass      |
| 5180            | 36          | 802.11n<br>20MHz<br>BW | -7.094                       | 0.10246                | -6.992                                          |             | Pass      |
| 5200            | 40          |                        | -7.666                       | 0.529566               | -7.136                                          |             | Pass      |
| 5240            | 48          |                        | -7.328                       | 0.10246                | -7.226                                          |             | Pass      |
| 5190            | 38          | 802.11n<br>40MHz<br>BW | -15.496                      | 0.917704               | -14.578                                         |             | Pass      |
| 5230            | 46          |                        | -12.527                      | 0.879552               | -11.647                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Sum Data of Monitoring Port Ant.1 and Ant.2

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -3.73                           | -1.01          | Pass      |
| 5200               | 40             |             | -4.02                           |                | Pass      |
| 5240               | 48             |             | -3.85                           |                | Pass      |
| 5180               | 36             | 802.11n     | -3.82                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -4.29                           |                | Pass      |
| 5240               | 48             | BW          | -4.23                           |                | Pass      |
| 5190               | 38             | 802.11n     | -9.83                           |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -8.66                           |                | Pass      |

#### Note :

1. Limit is -1.01 dBm for 802.11a. Because directional antenna gain is 11.01 dBi for 802.11a.
2. Sample Calculation  

$$4 \text{ dBm} - (11.01 \text{ dB} - 6 \text{ dB}) = -1.01 \text{ dBm}$$

# Service Port Ant.1

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode                   | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                        | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a                | -10.619                      | 0.737862               | -9.881                                          | 2           | Pass      |
| 5200            | 40          |                        | -10.494                      | 0.936464               | -9.558                                          |             | Pass      |
| 5240            | 48          |                        | -9.855                       | 0.936464               | -8.919                                          |             | Pass      |
| 5180            | 36          | 802.11n<br>20MHz<br>BW | -11.045                      | 1.08233                | -9.963                                          |             | Pass      |
| 5200            | 40          |                        | -10.524                      | 0.294767               | -10.229                                         |             | Pass      |
| 5240            | 48          |                        | -9.710                       | 0.294767               | -9.415                                          |             | Pass      |
| 5190            | 38          | 802.11n<br>40MHz<br>BW | -13.434                      | 0.421014               | -13.013                                         |             | Pass      |
| 5230            | 46          |                        | -13.957                      | 1.165056               | -12.792                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Service Port Ant.2

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode                   | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                        | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a                | -10.674                      | 0.221951               | -10.452                                         | 2           | Pass      |
| 5200            | 40          |                        | -10.445                      | 0.221951               | -10.223                                         |             | Pass      |
| 5240            | 48          |                        | -9.375                       | 0.737862               | -8.637                                          |             | Pass      |
| 5180            | 36          | 802.11n<br>20MHz<br>BW | -12.072                      | 1.08233                | -10.990                                         |             | Pass      |
| 5200            | 40          |                        | -11.567                      | 1.08233                | -10.485                                         |             | Pass      |
| 5240            | 48          |                        | -9.695                       | 0.294767               | -9.400                                          |             | Pass      |
| 5190            | 38          | 802.11n<br>40MHz<br>BW | -14.607                      | 1.249387               | -13.358                                         |             | Pass      |
| 5230            | 46          |                        | -13.701                      | 0.949755               | -12.751                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Service Port Ant.3

## TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode     | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|----------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |          | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a  | -10.449                      | 0.737862               | -9.711                                          | 2           | Pass      |
| 5200            | 40          |          | -9.653                       | 0.221951               | -9.431                                          |             | Pass      |
| 5240            | 48          |          | -8.161                       | 0.221951               | -7.939                                          |             | Pass      |
| 5180            | 36          | 802.11n  | -11.290                      | 0.73508                | -10.555                                         |             | Pass      |
| 5200            | 40          | 20MHz    | -9.691                       | 0.896108               | -8.795                                          |             | Pass      |
| 5240            | 48          | BW       | -9.218                       | 1.08233                | -8.136                                          |             | Pass      |
| 5190            | 38          | 802.11n  | -13.172                      | 1.091445               | -12.081                                         |             | Pass      |
| 5230            | 46          | 40MHz BW | -12.589                      | 1.165056               | -11.424                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

## Sum Data of Service Port Ant.1 and Ant.2

### ■ TEST RESULTS

#### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -7.15                           | -1.01          | Pass      |
| 5200               | 40             |             | -6.87                           |                | Pass      |
| 5240               | 48             |             | -5.77                           |                | Pass      |
| 5180               | 36             | 802.11n     | -7.44                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -7.34                           |                | Pass      |
| 5240               | 48             | BW          | -6.40                           |                | Pass      |
| 5190               | 38             | 802.11n     | -10.17                          |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -9.76                           |                | Pass      |

Note :

1. Limit is -1.01 dBm for 802.11a. Because directional antenna gain is 11.01 dBi for 802.11a.

2. Sample Calculation

$$4 \text{ dBm} - (11.01 \text{ dB} - 6 \text{ dB}) = -1.01 \text{ dBm}$$

## Sum Data of Service Port Ant.1, Ant.2 and Ant.3

### ■ TEST RESULTS

#### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -5.23                           | -2.77          | Pass      |
| 5200               | 40             |             | -4.95                           |                | Pass      |
| 5240               | 48             |             | -3.71                           |                | Pass      |
| 5180               | 36             | 802.11n     | -5.71                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -5.00                           |                | Pass      |
| 5240               | 48             | BW          | -4.17                           |                | Pass      |
| 5190               | 38             | 802.11n     | -8.01                           |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -7.50                           |                | Pass      |

Note :

1. Limit is -2.77 dBm. Because directional antenna gain is 12.77 dBi for 802.11a.

2. Sample Calculation

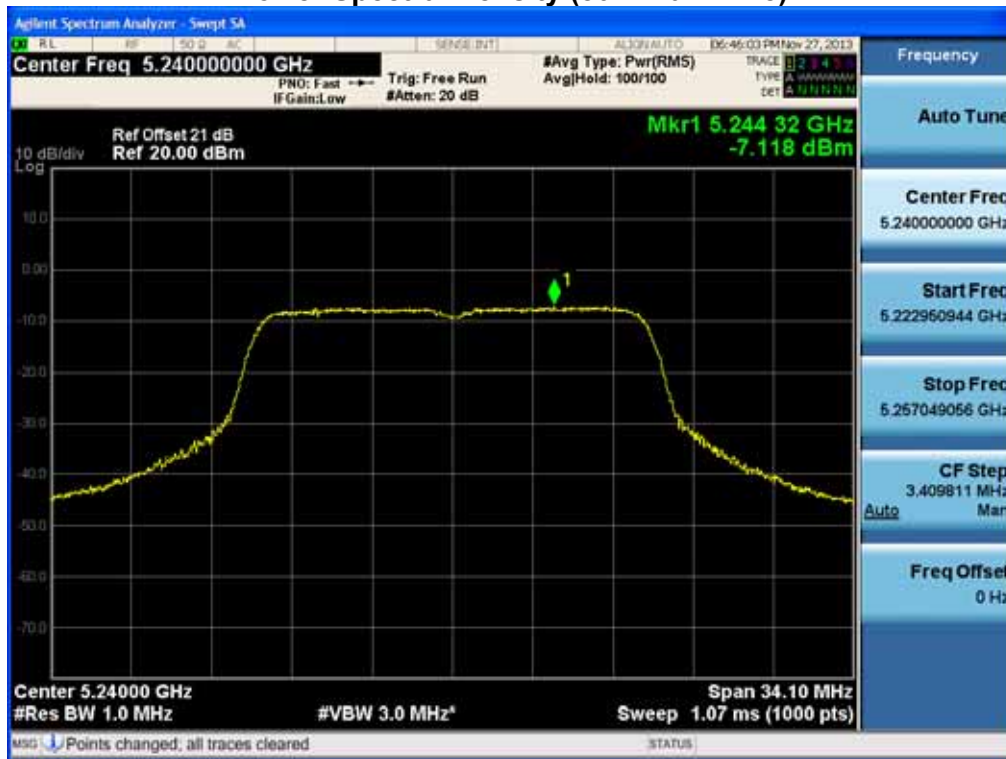
$$4 \text{ dBm} - (12.77 \text{ dB} - 6 \text{ dB}) = -2.77 \text{ dBm}$$

## Monitoring Port Ant.1

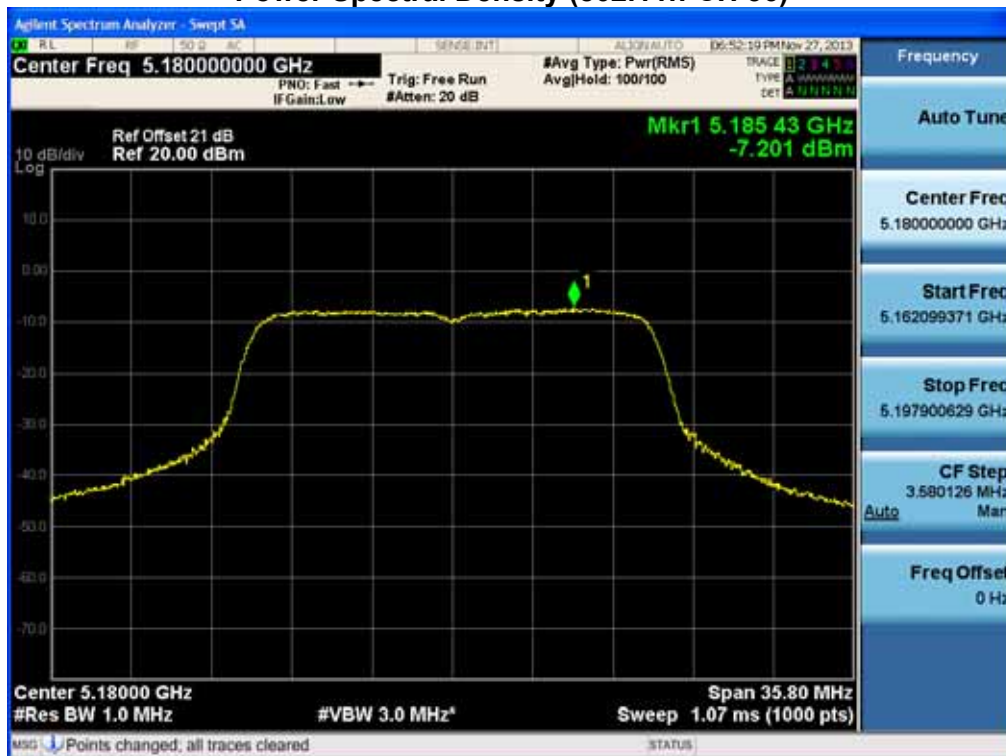
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)

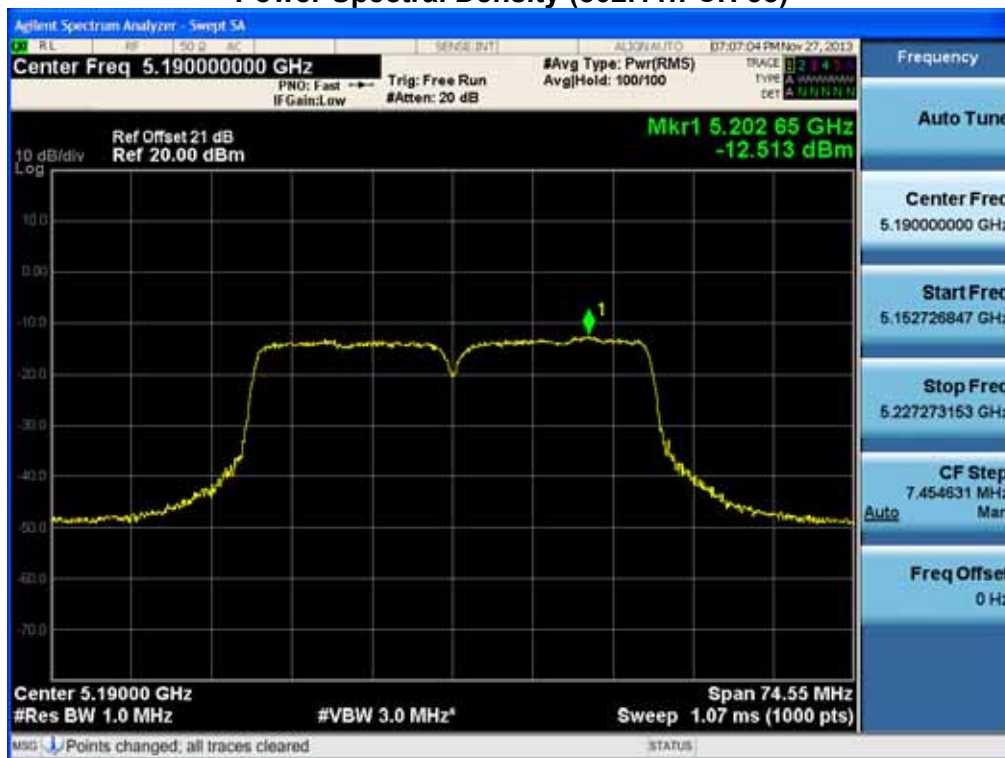


#### Power Spectral Density (802.11n-CH 36)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 38)



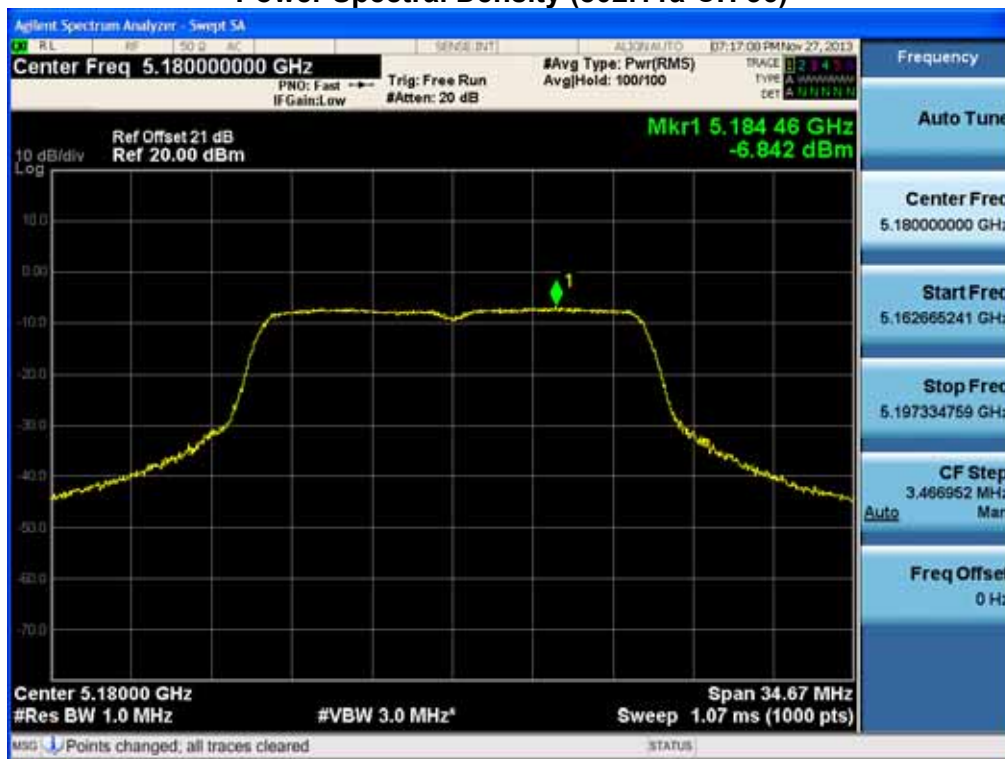
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.2

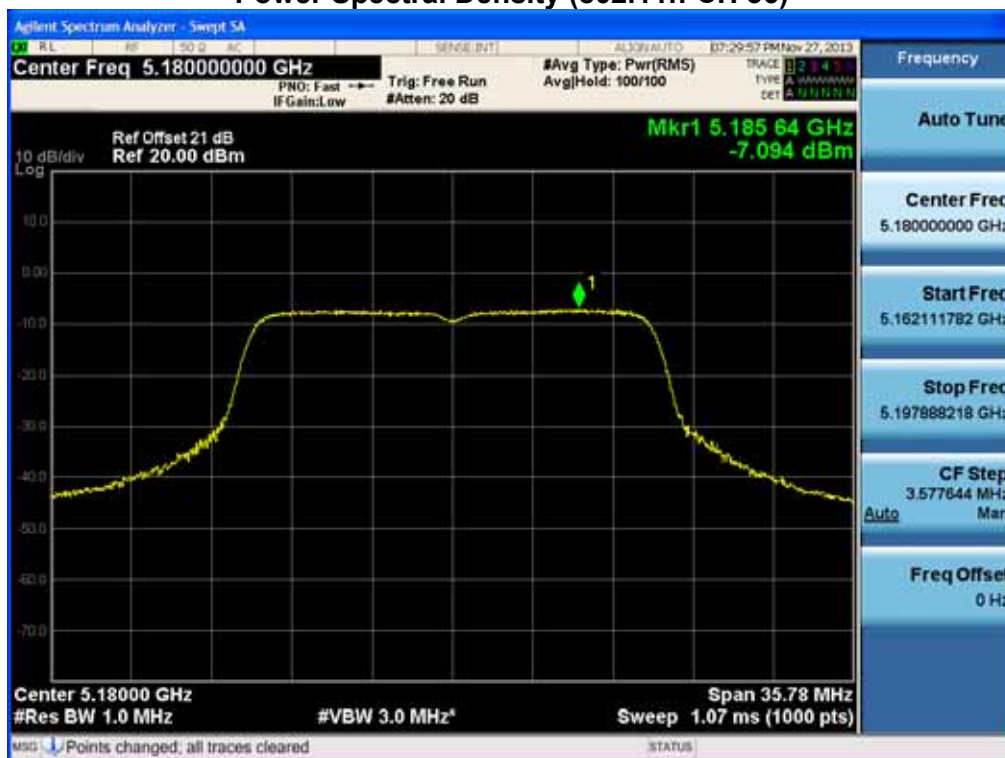
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 36)

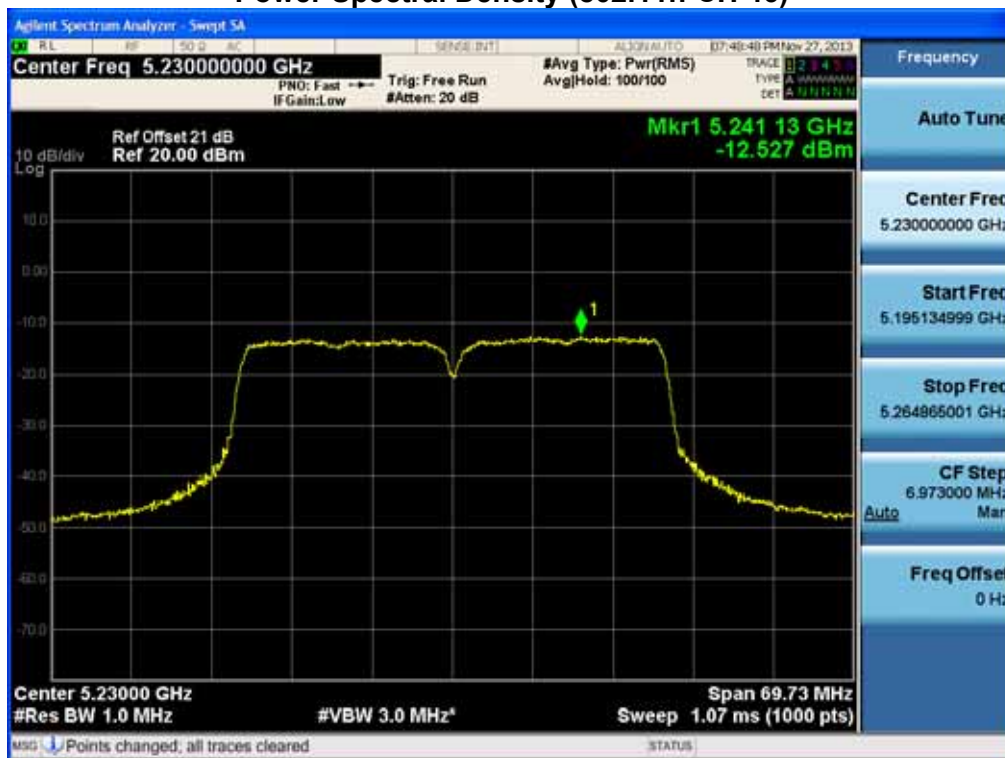


#### Power Spectral Density (802.11n-CH 36)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 46)



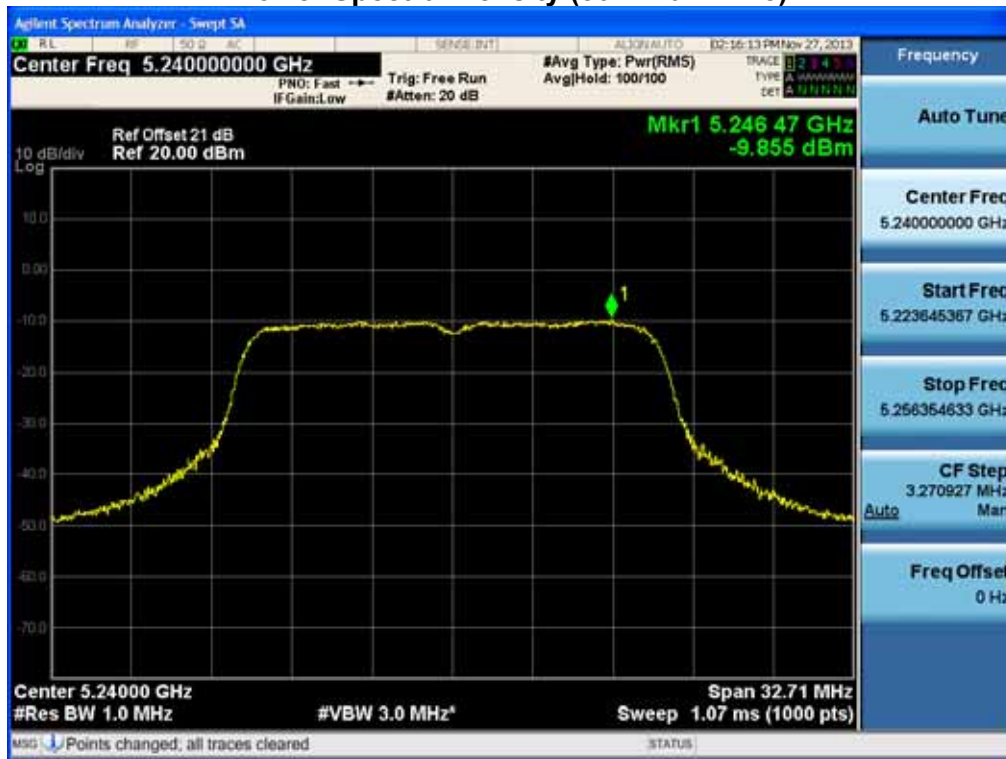
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.1

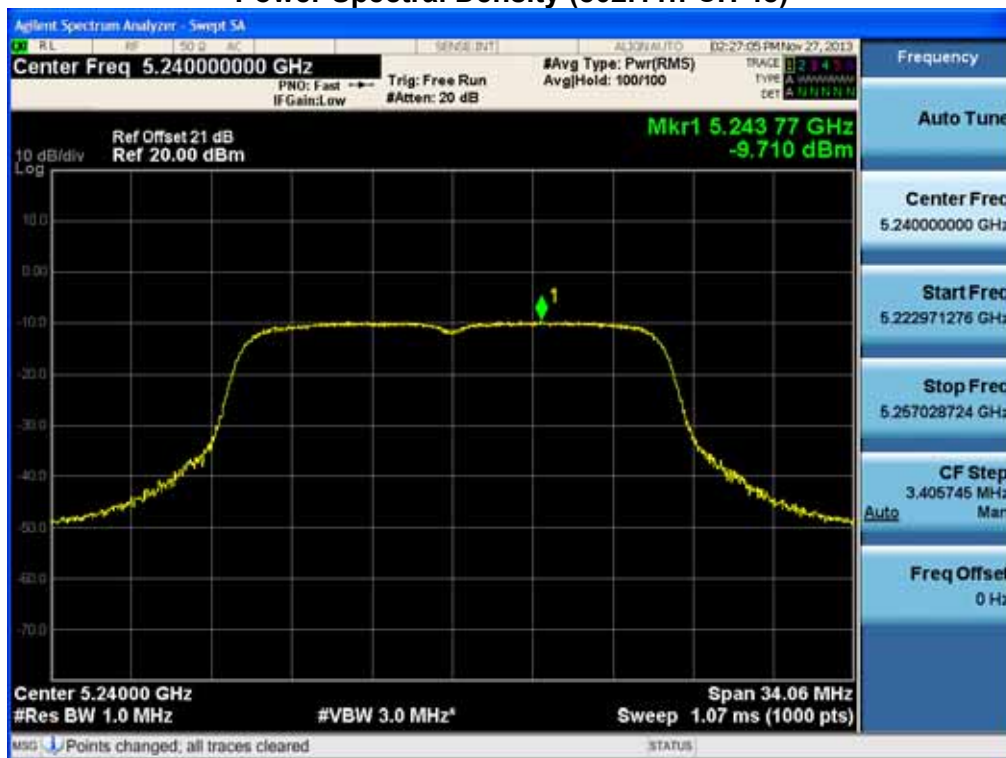
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)



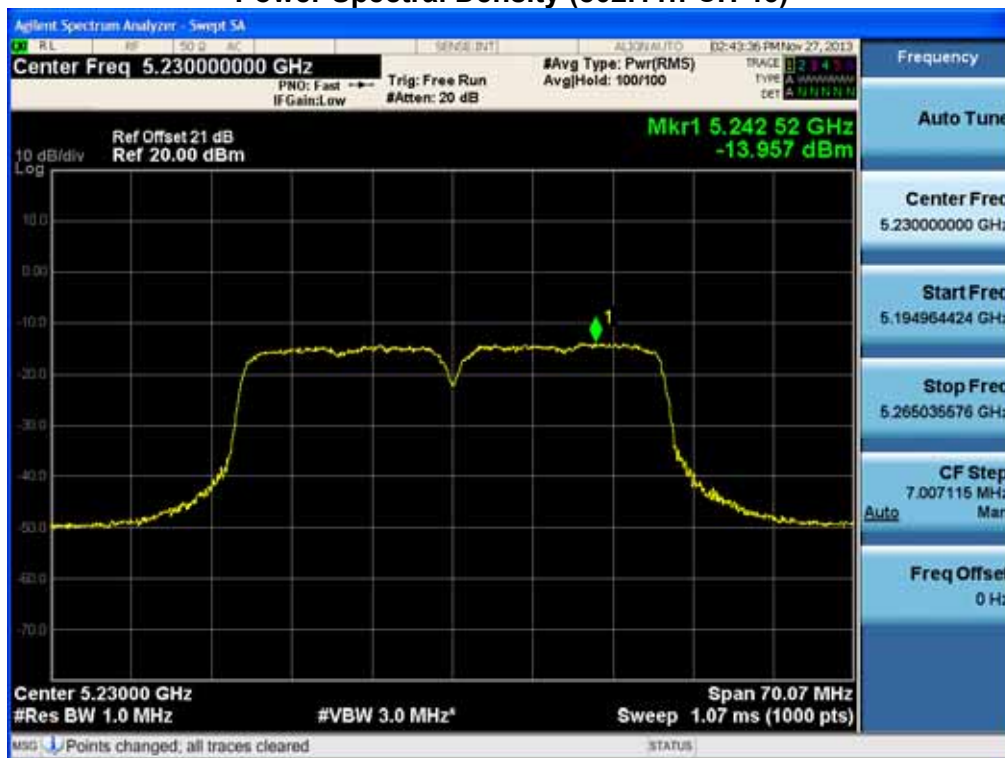
#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

40 MHz BW

### Power Spectral Density (802.11n-CH 46)



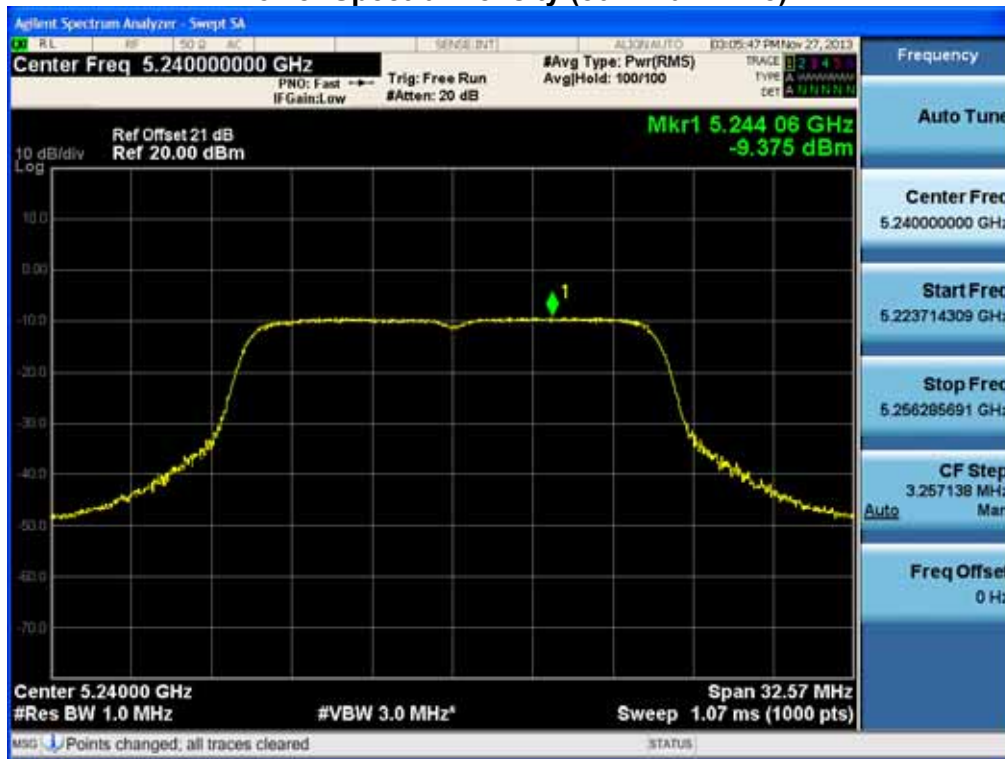
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.2

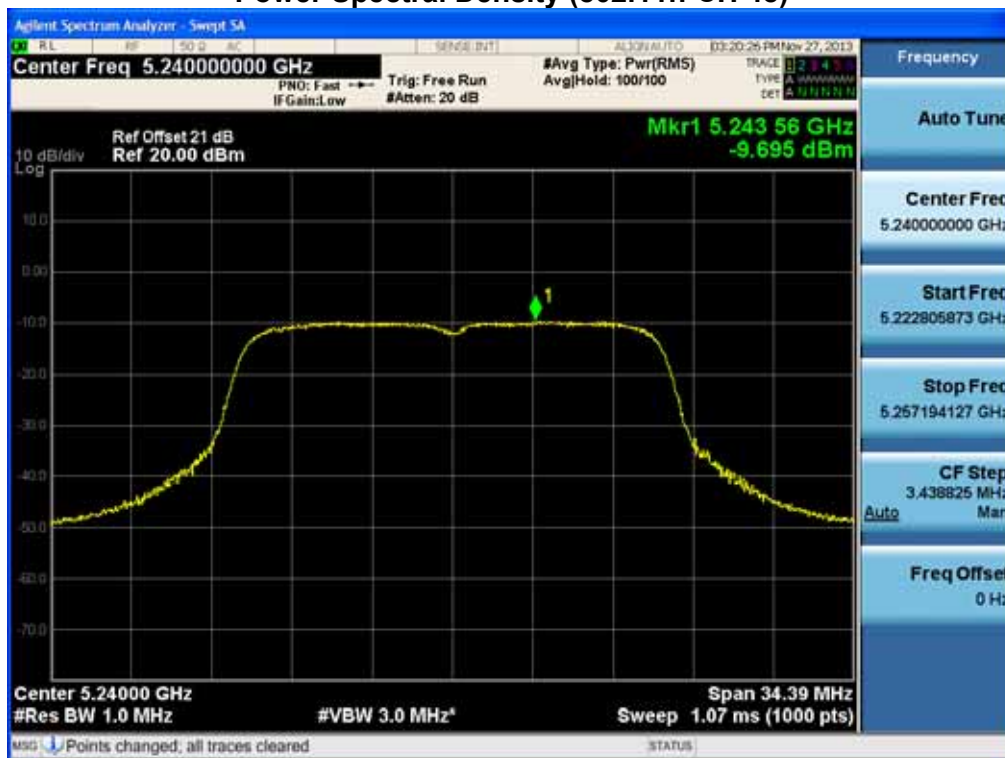
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)



#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

40 MHz BW

### Power Spectral Density (802.11n-CH 46)



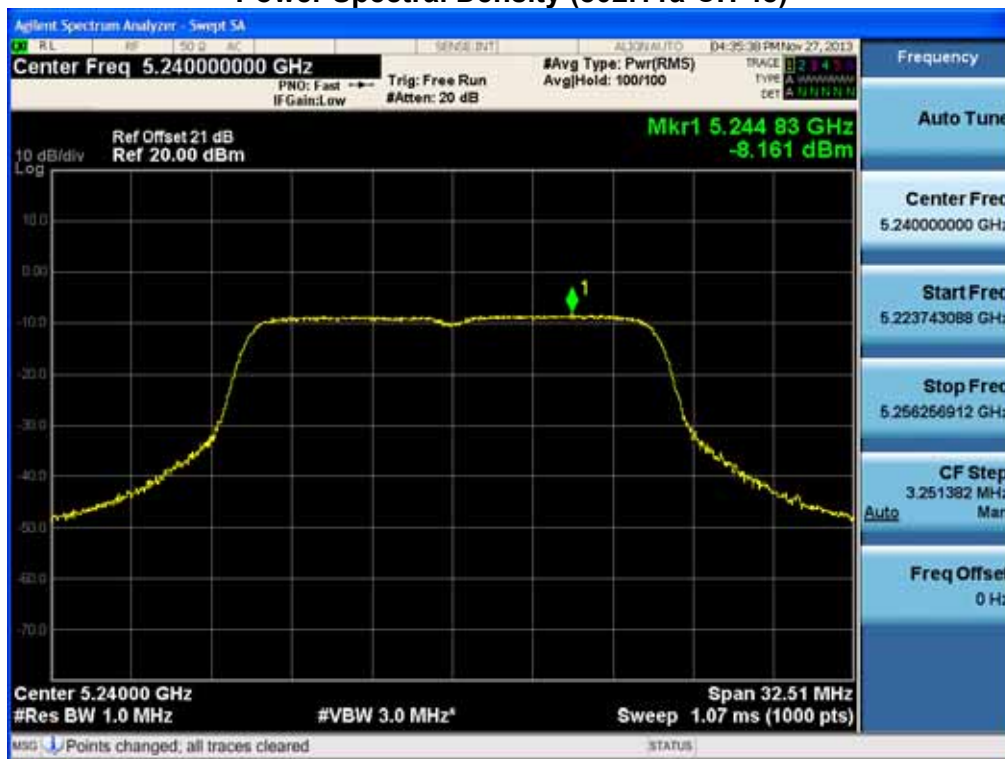
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.3

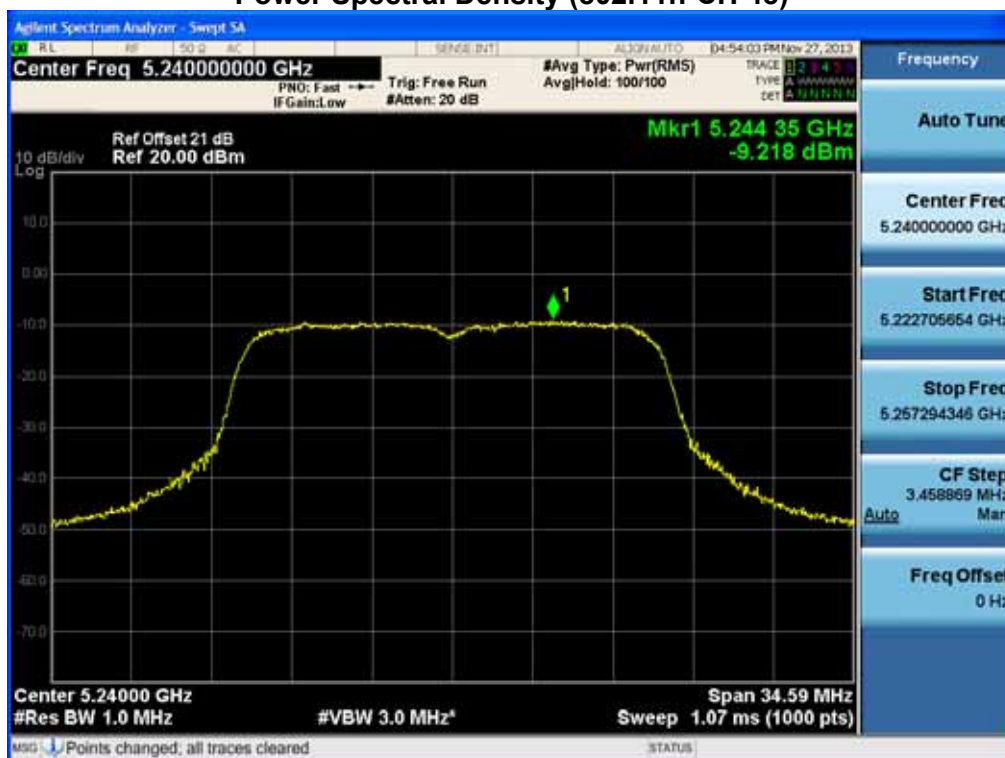
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)

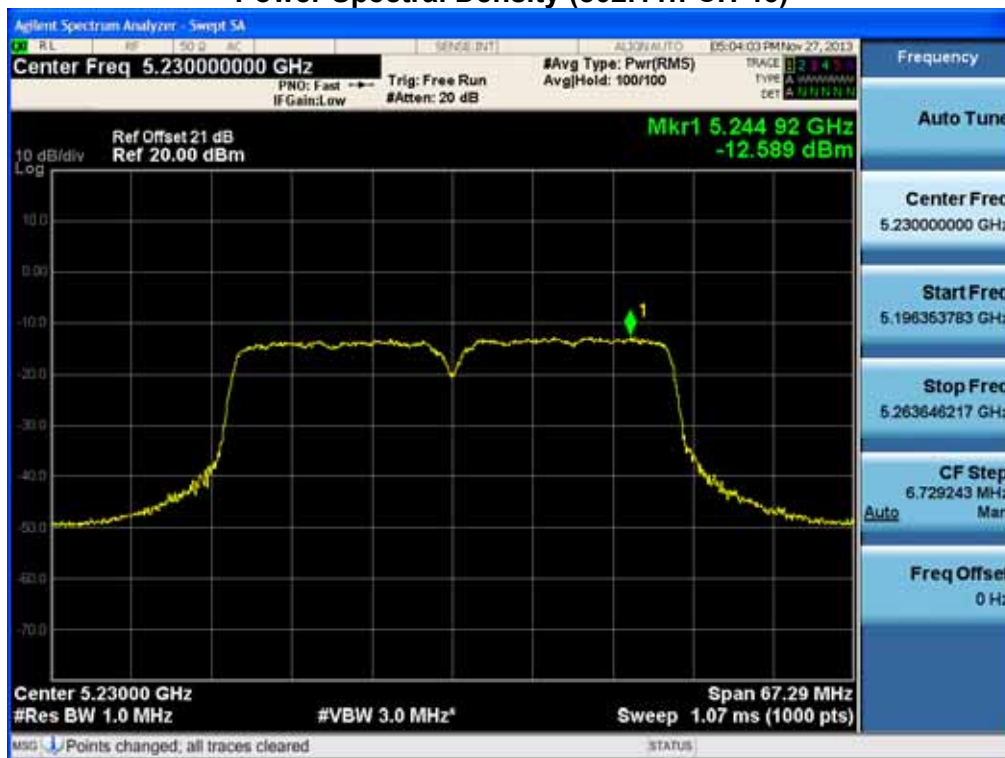


#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 46)

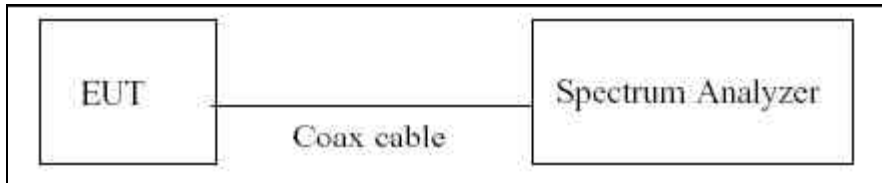


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## 8.5 PEAK EXCURSION RATIO

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. The largest permissible difference between the modulation envelope(measured using a peak hold function) and the maximum conducted output power 13 dB/MHz.

### ▣ TEST CONFIGURATION



### ▣ TEST PROCEDURE

We tested according to KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Span = Set the span to view the entire emission bandwidth.
2. RBW = 1 MHz
3. VBW  $\geq$  3 MHz
4. Detector Mode = Peak
5. Trace Mode = Max hold
6. Allow the sweeps to continue until the trace stabilizes.
7. Use the peak search function to find the peak of the spectrum.
8. Use the procedure to measure the PPSP
9. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSP.

Note :

1. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

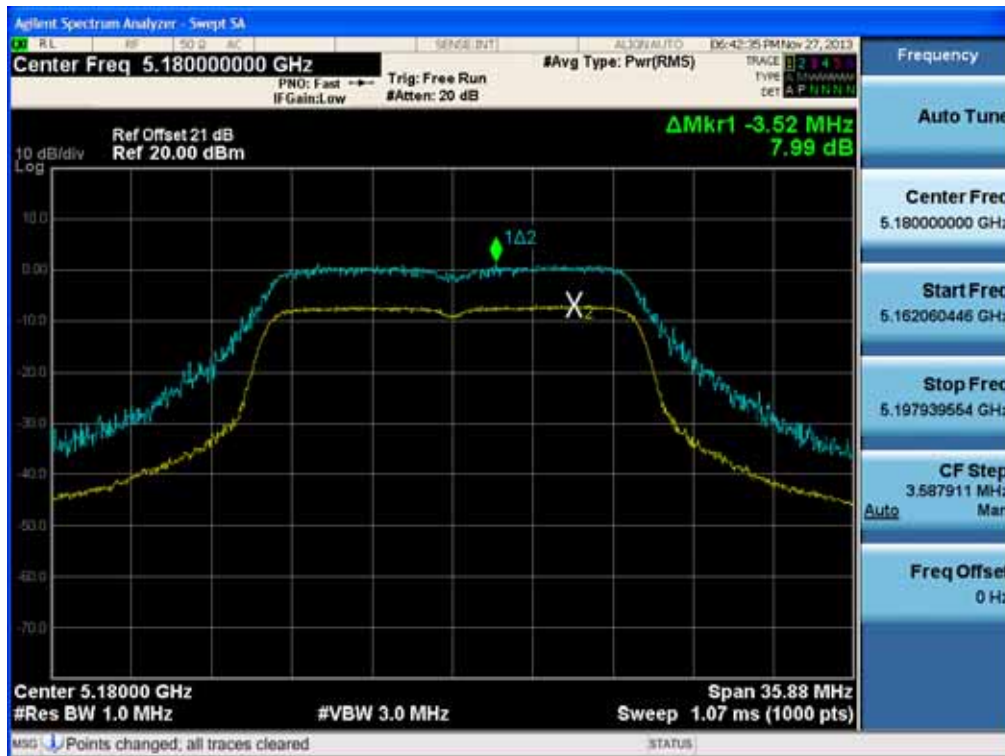
(Actual value of loss for the attenuator and cable combination)

## Monitoring Port Ant.1

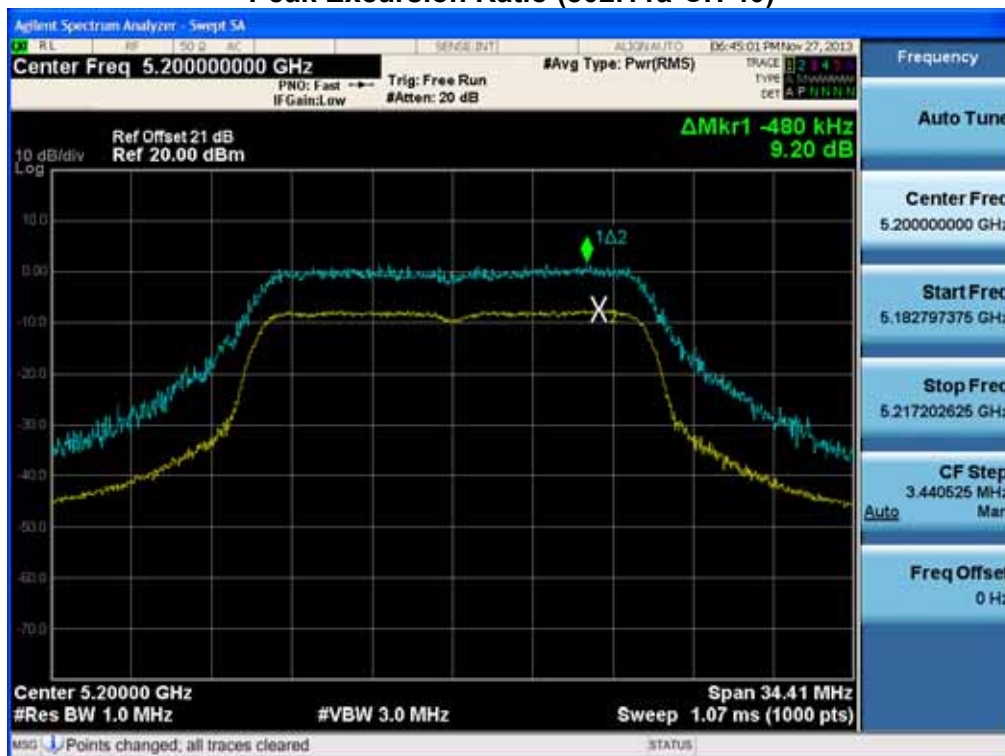
### RESULT PLOTS

20 MHz BW

#### Peak Excursion Ratio (802.11a-CH 36)

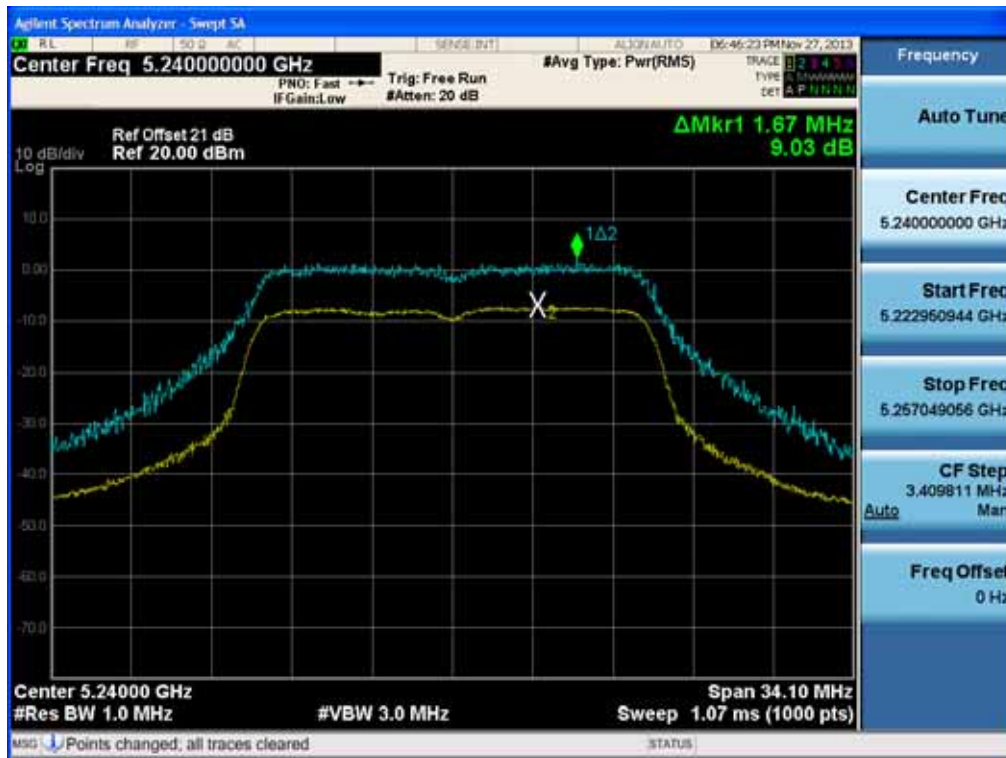


#### Peak Excursion Ratio (802.11a-CH 40)

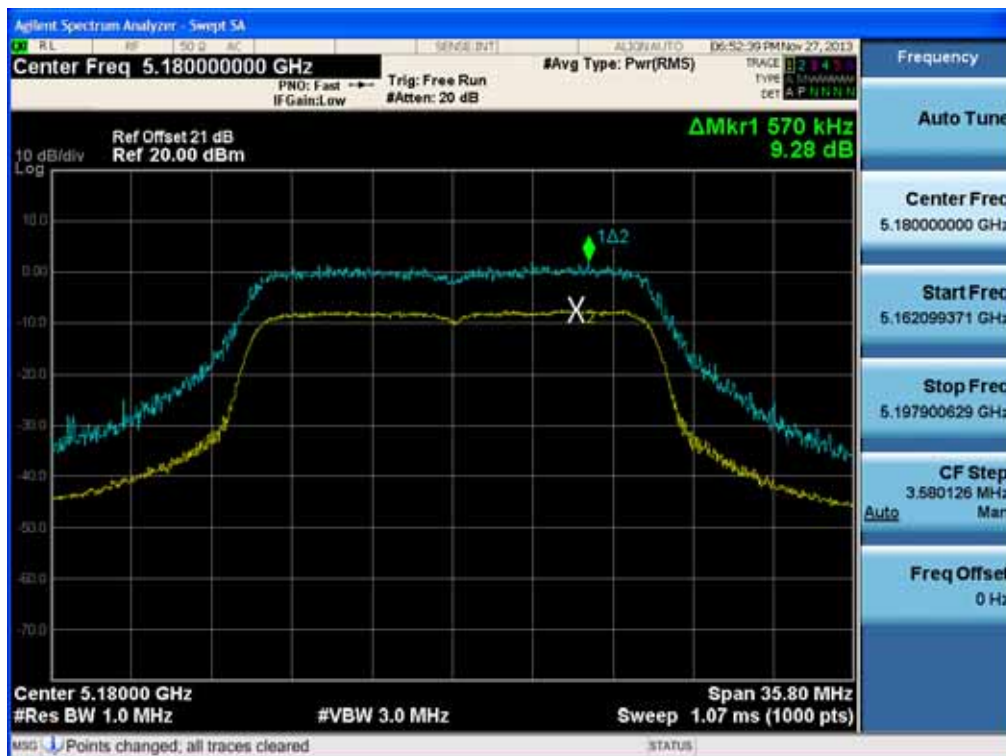


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11a-CH 48)



### Peak Excursion Ratio (802.11n-CH 36)

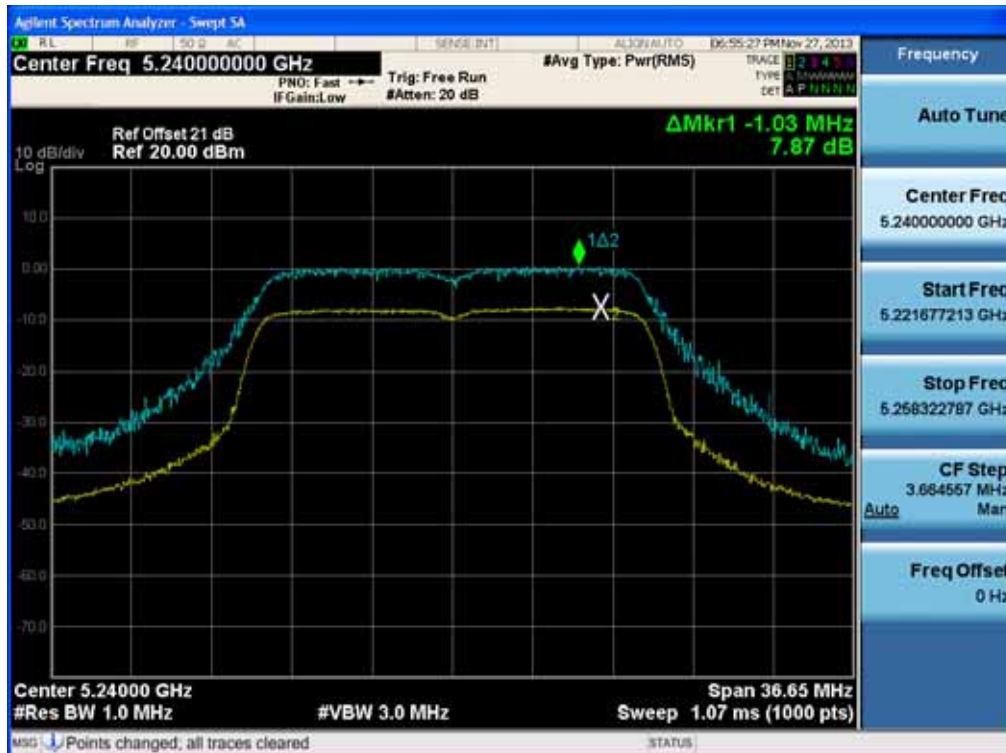


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11n-CH 40)



### Peak Excursion Ratio (802.11n-CH 48)

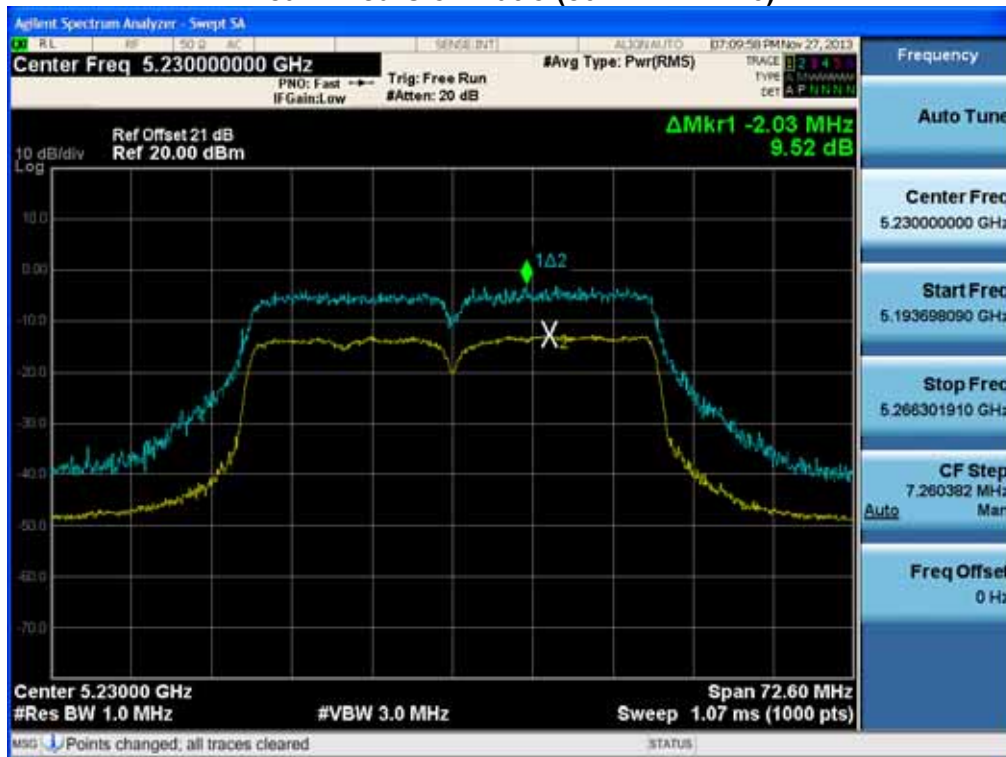


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



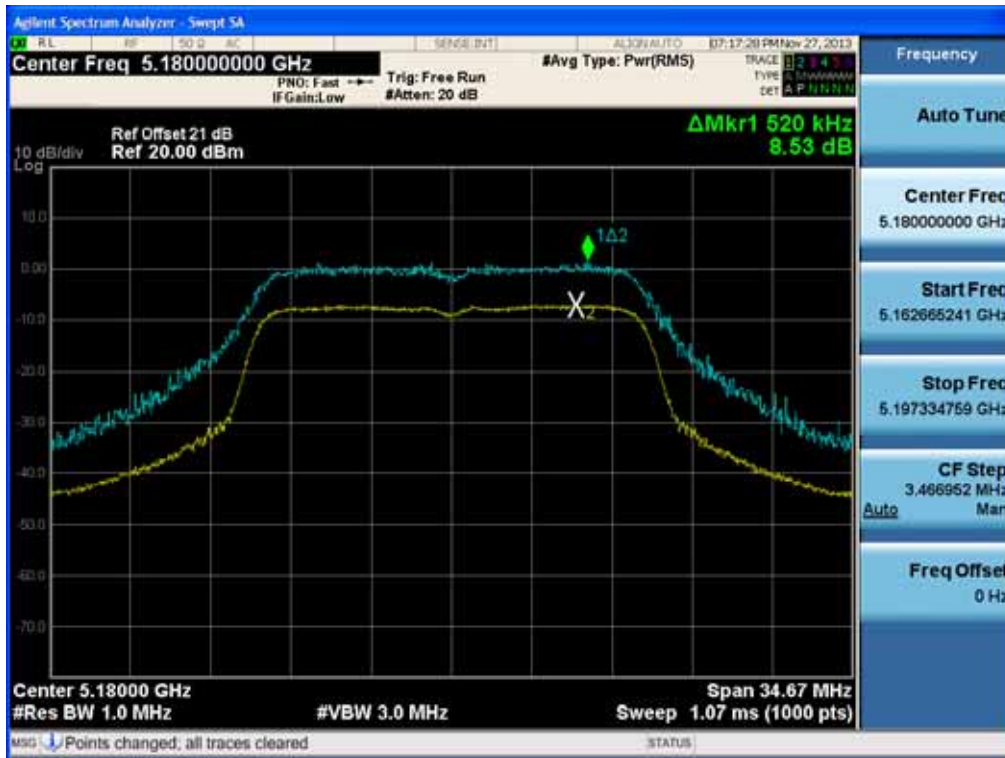
### Peak Excursion Ratio (802.11n-CH 46)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.2

### Peak Excursion Ratio (802.11a-CH 36)



### Peak Excursion Ratio (802.11a-CH 40)

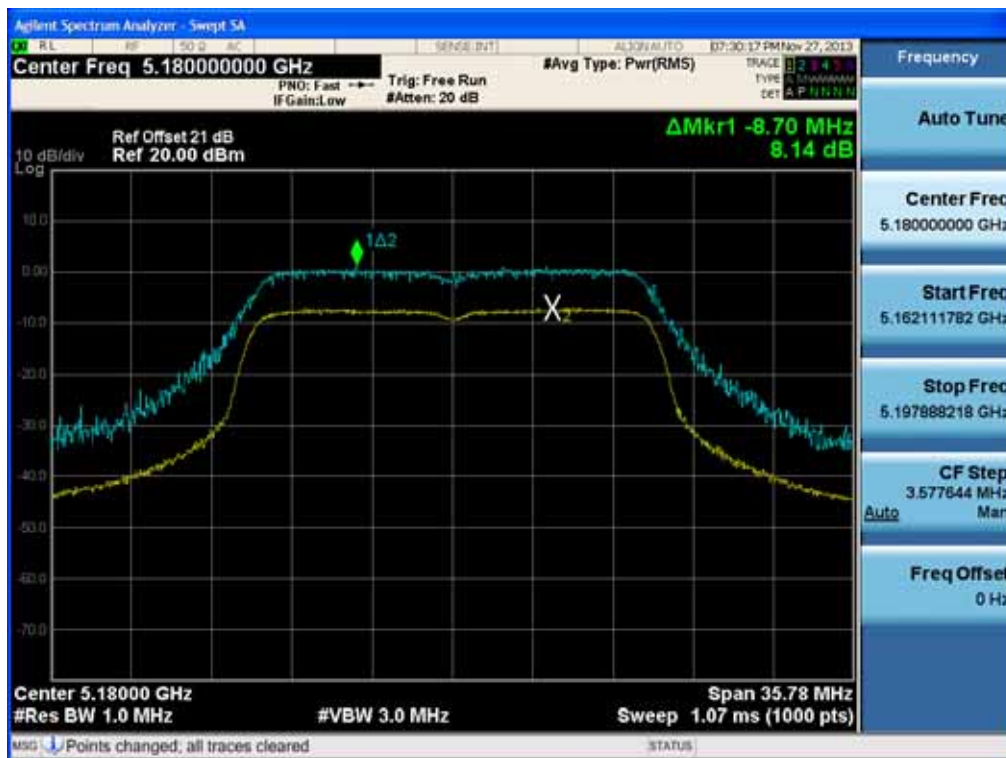


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

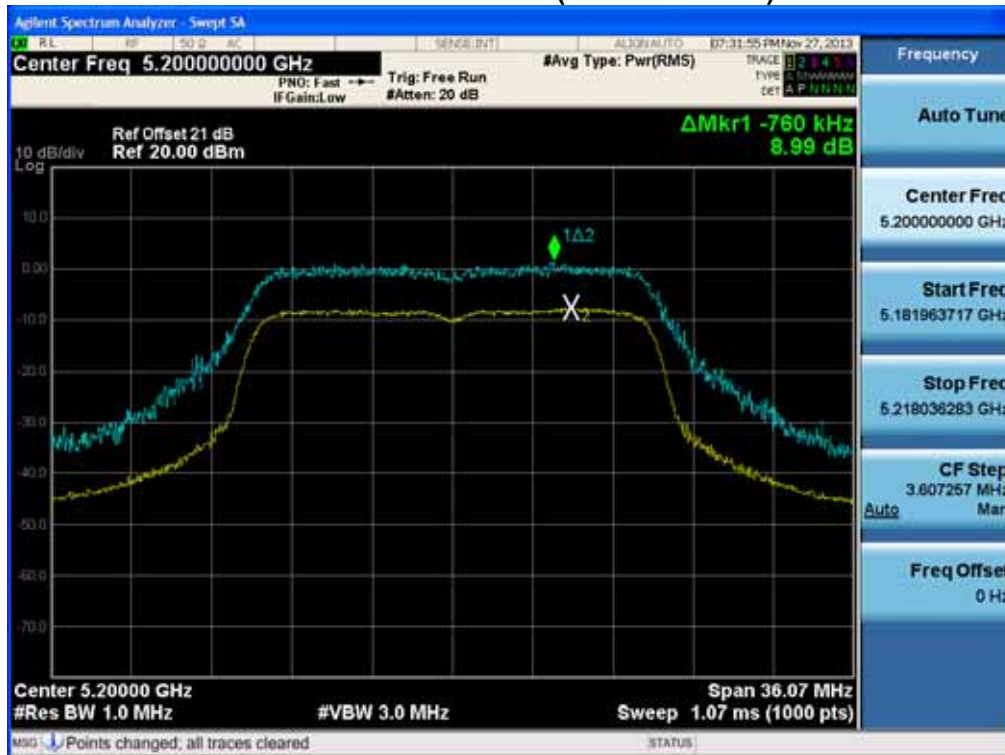
### Peak Excursion Ratio (802.11a-CH 48)



### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

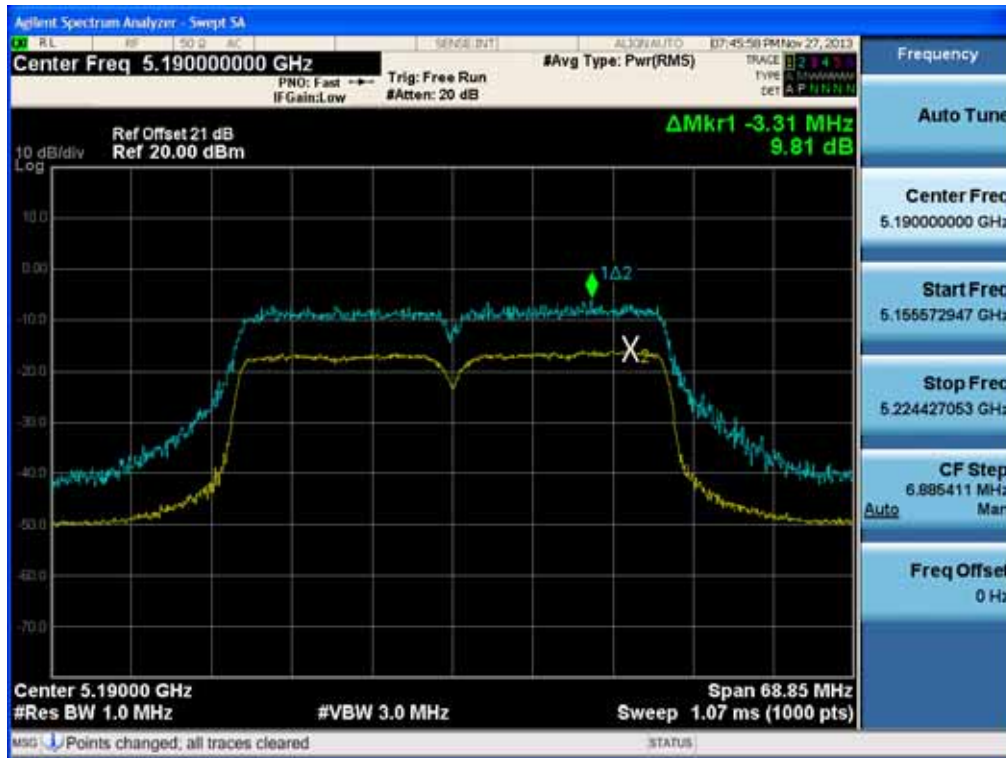


### Peak Excursion Ratio (802.11n-CH 48)

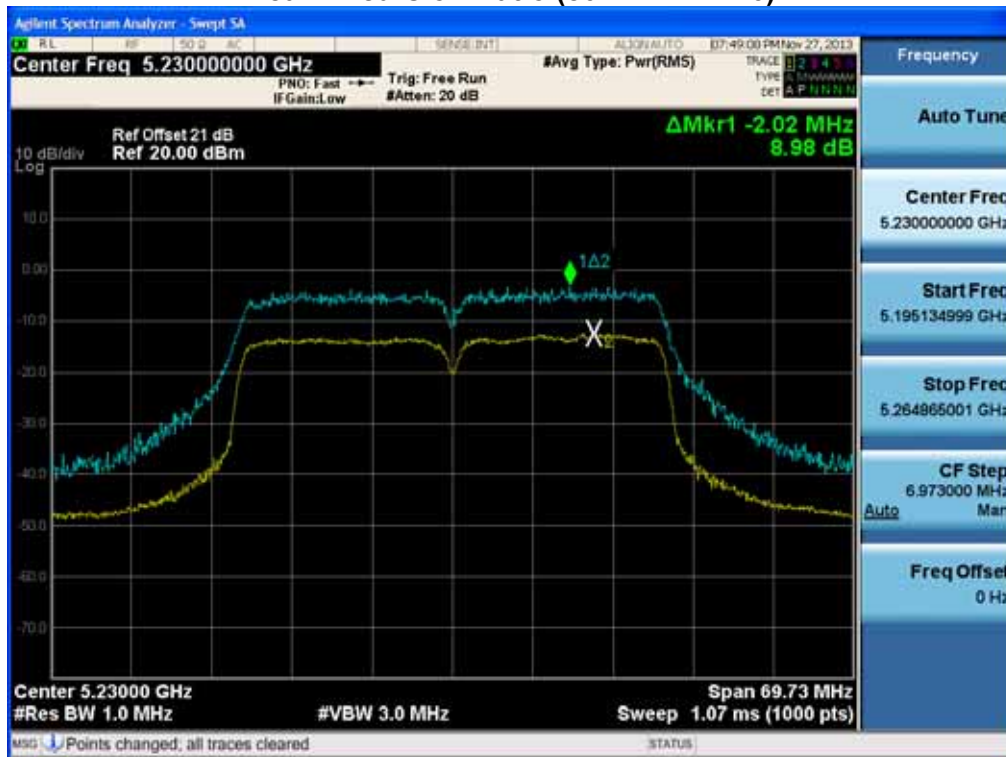


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)

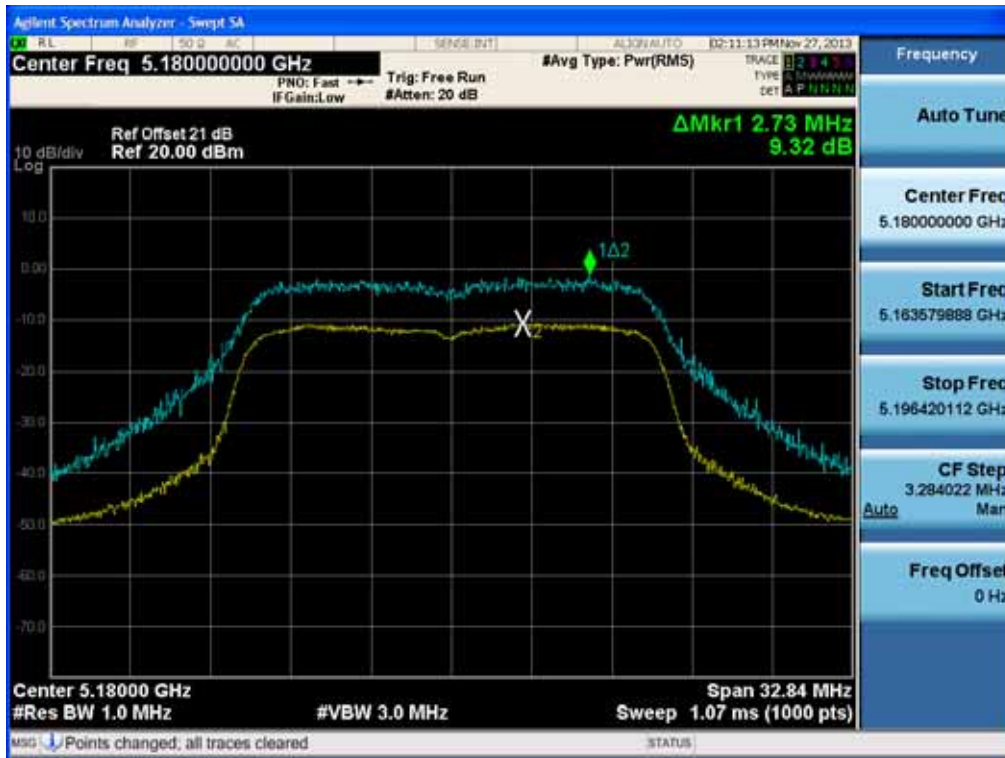


### Peak Excursion Ratio (802.11n-CH 46)



## Service Port Ant.1

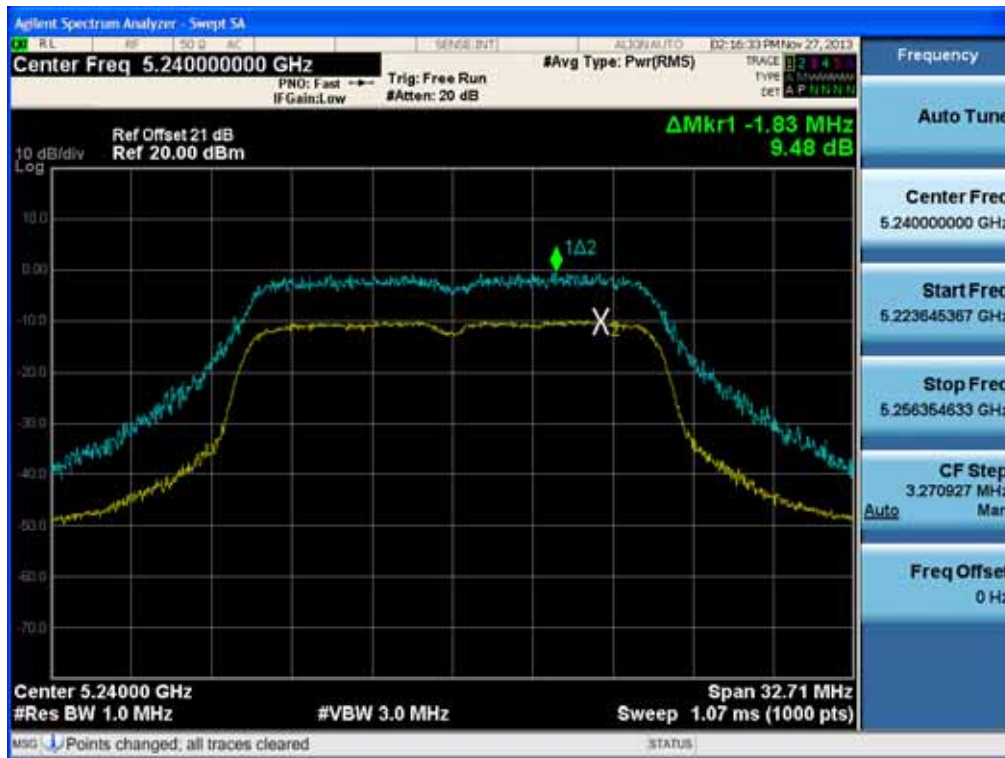
### Peak Excursion Ratio (802.11a-CH 36)



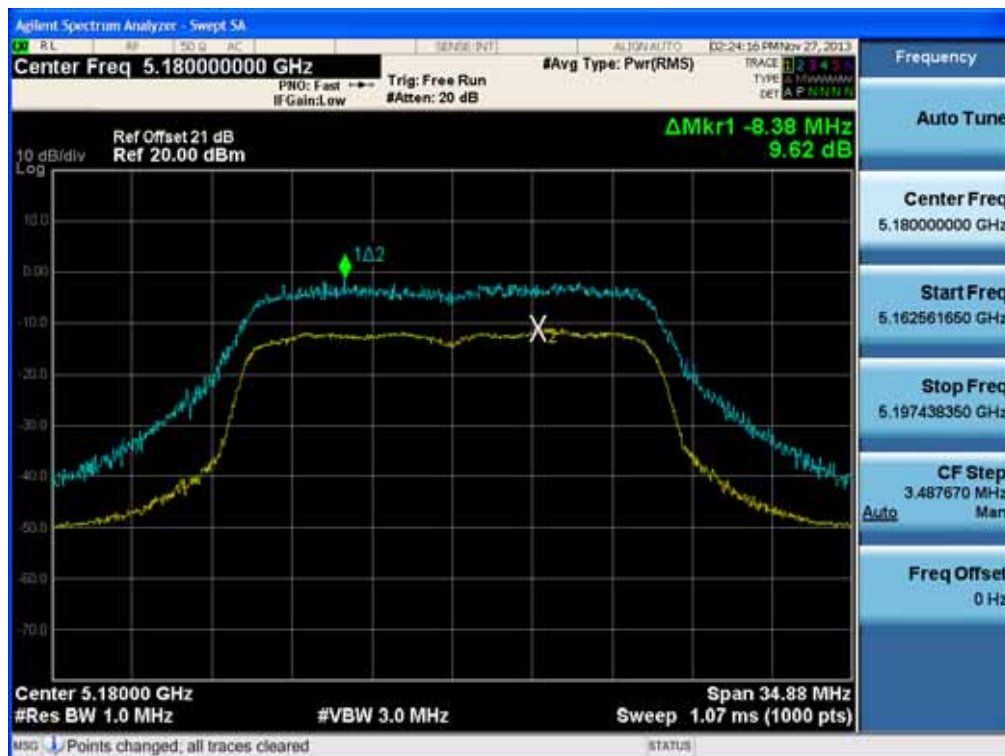
### Peak Excursion Ratio (802.11a-CH 40)



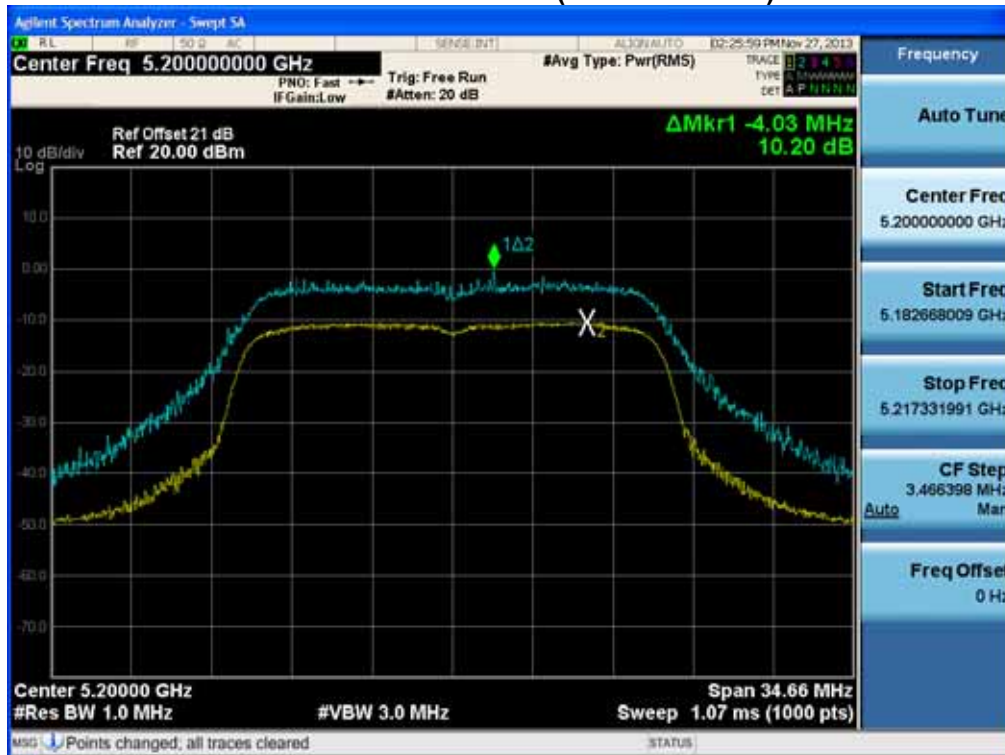
### Peak Excursion Ratio (802.11a-CH 48)



### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)



### Peak Excursion Ratio (802.11n-CH 48)



40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)

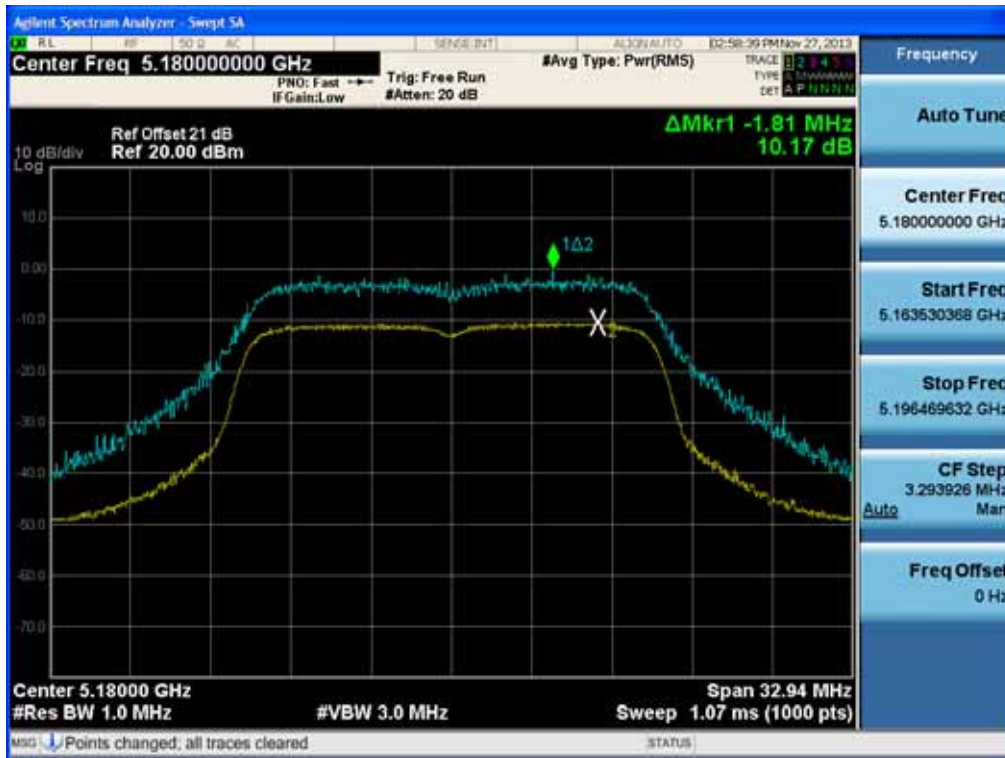


### Peak Excursion Ratio (802.11n-CH 46)

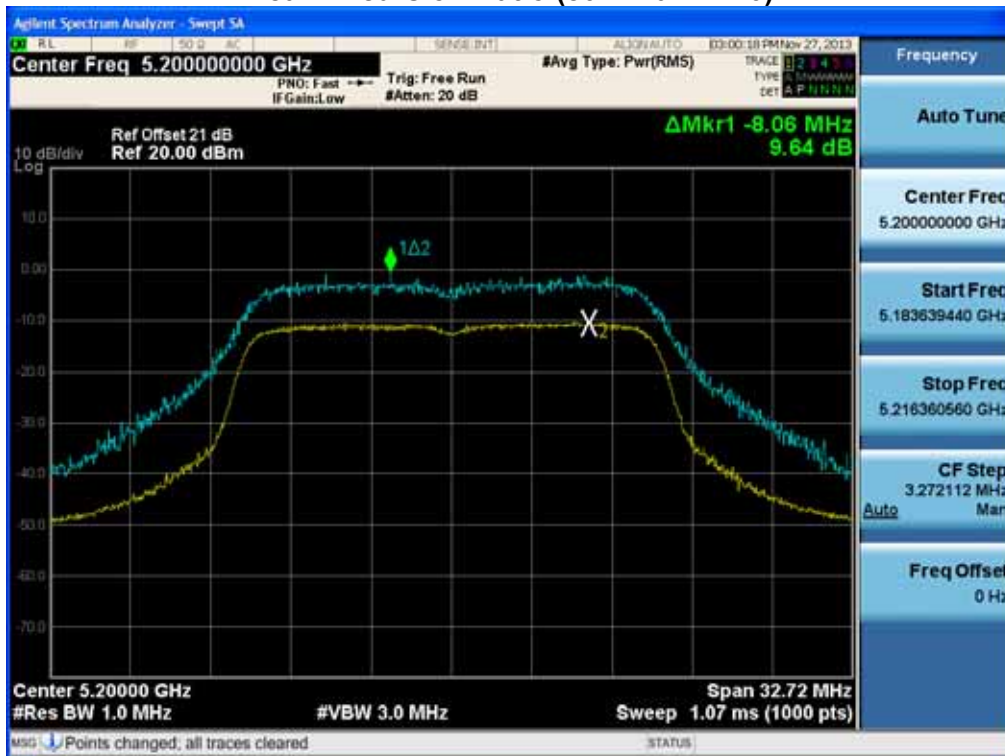


## Service Port Ant.2

### Peak Excursion Ratio (802.11a-CH 36)



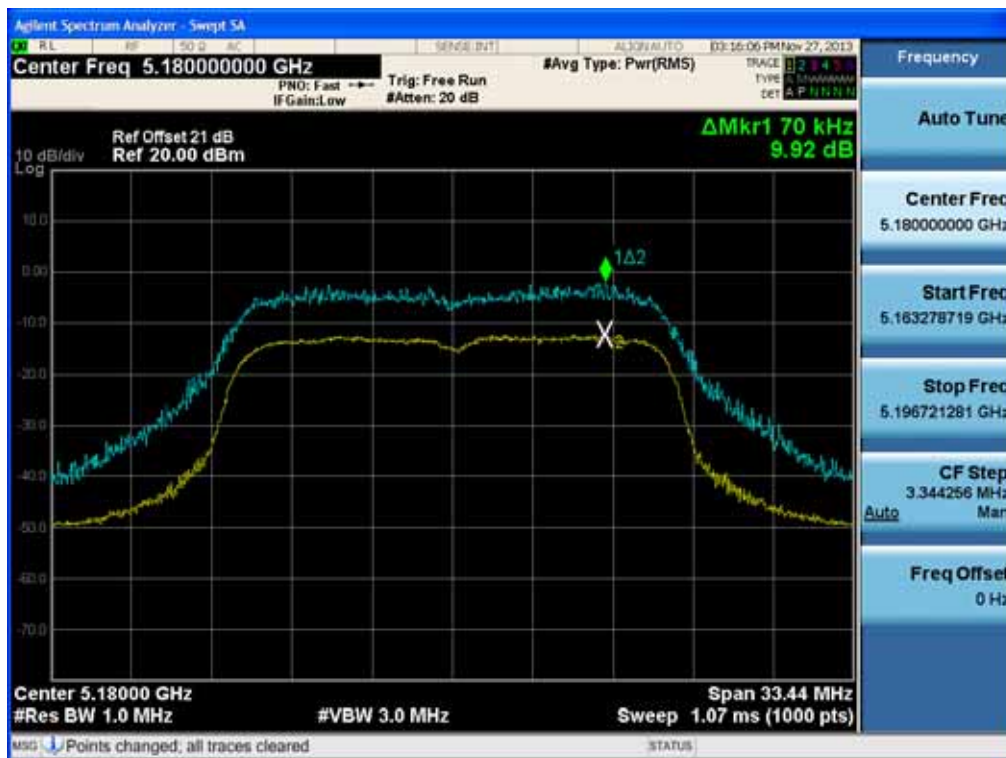
### Peak Excursion Ratio (802.11a-CH 40)



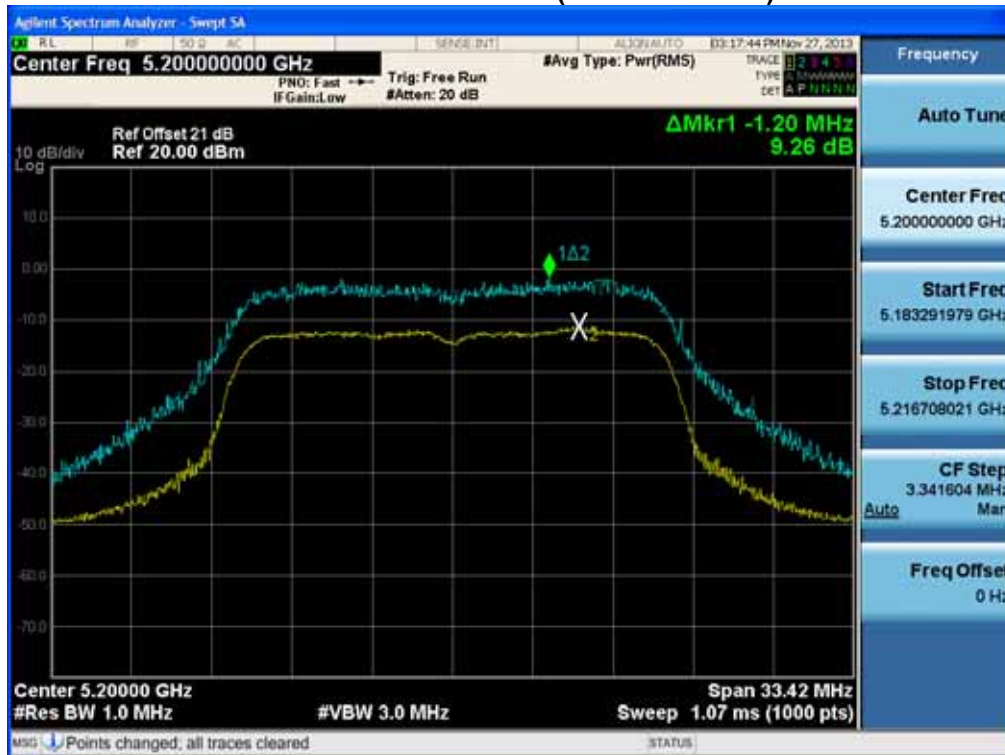
### Peak Excursion Ratio (802.11a-CH 48)



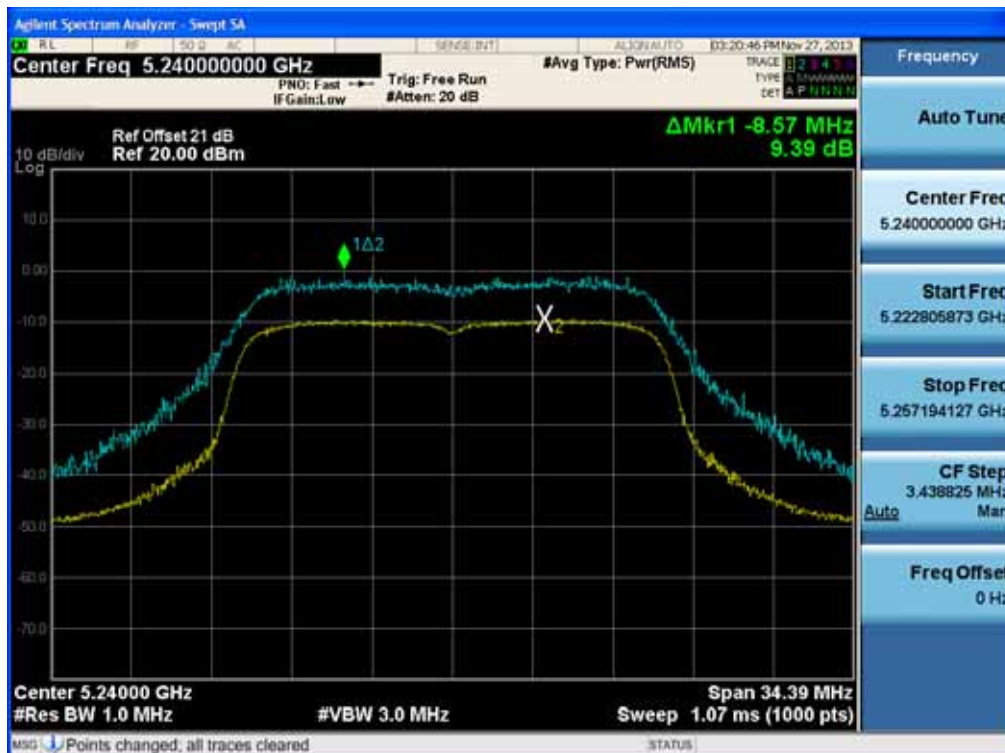
### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

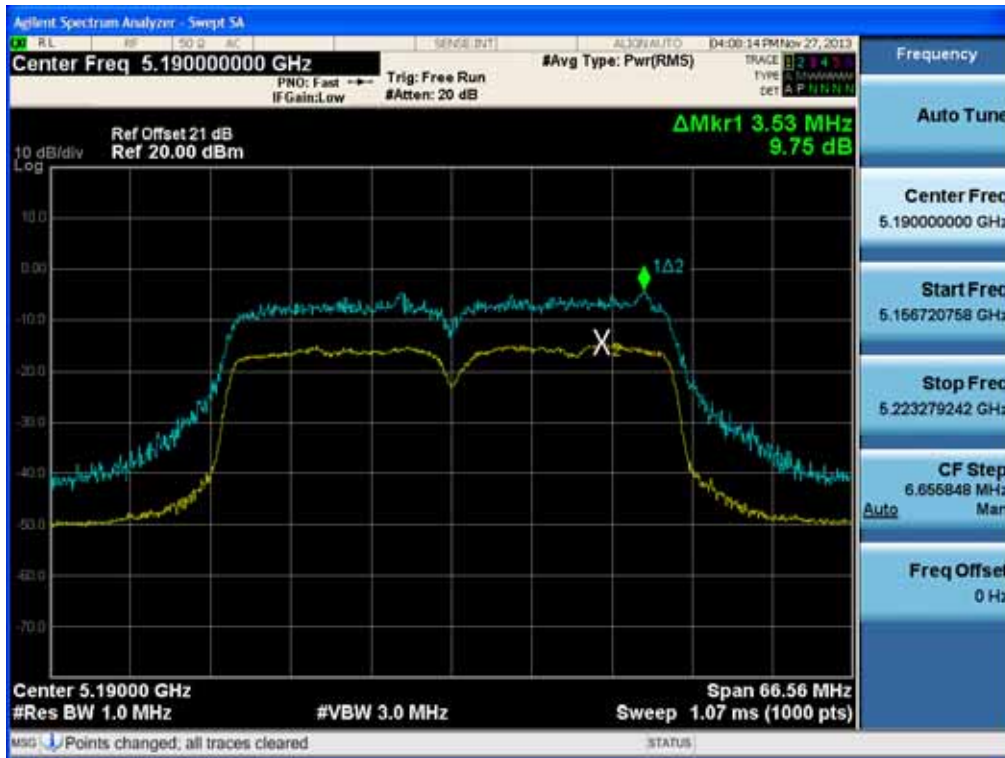


### Peak Excursion Ratio (802.11n-CH 48)

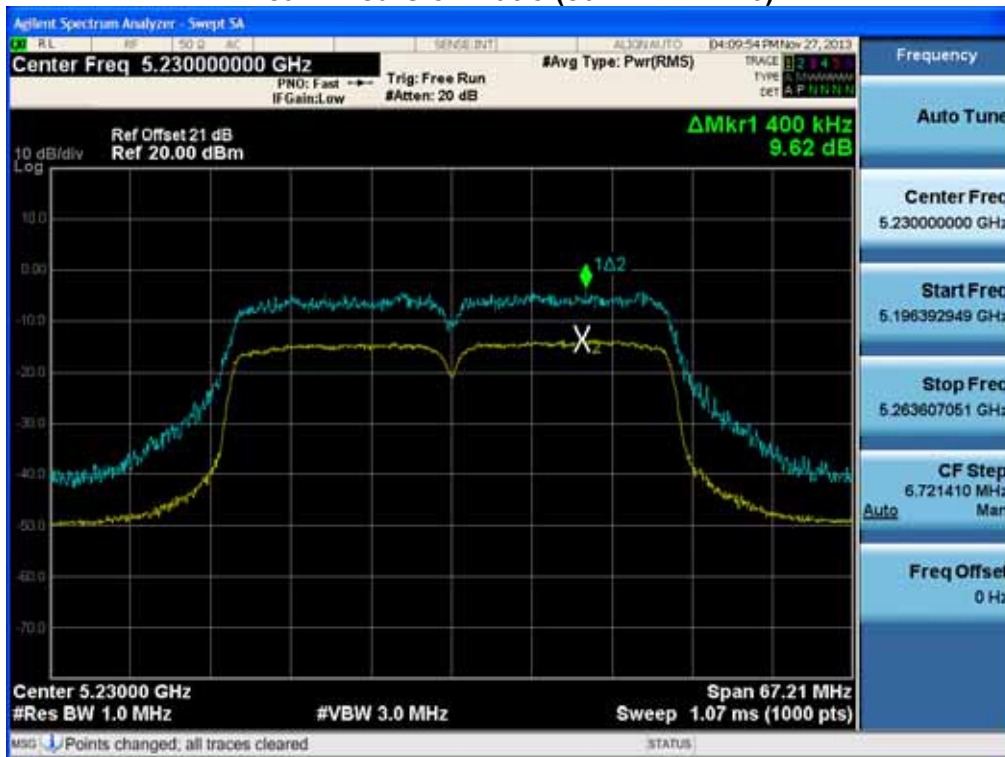


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)

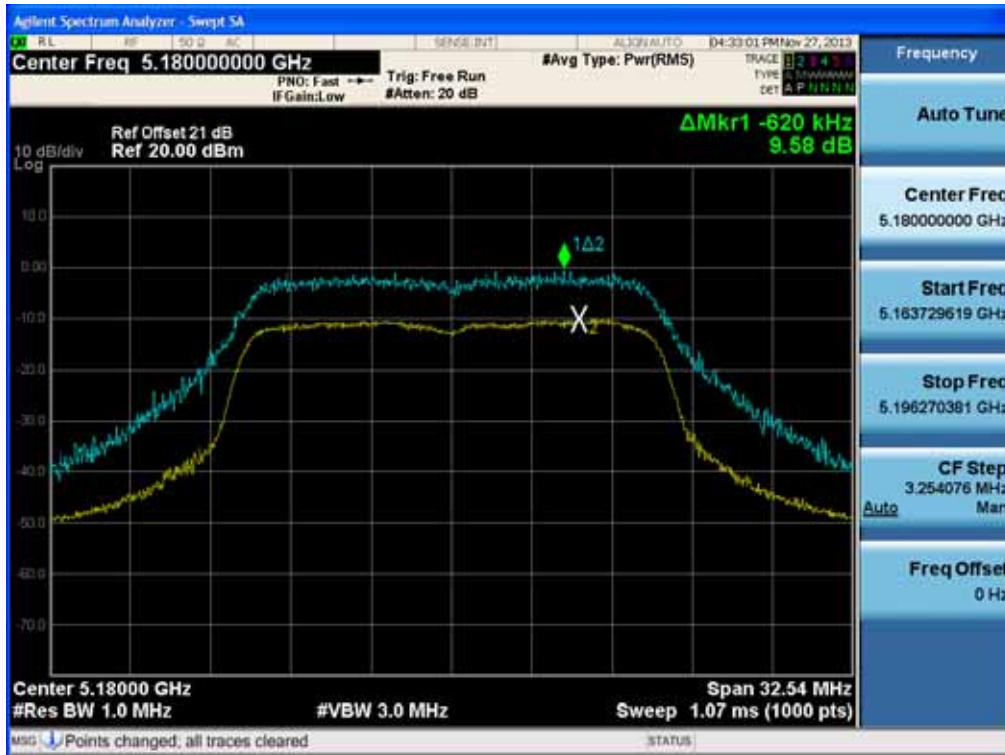


### Peak Excursion Ratio (802.11n-CH 46)

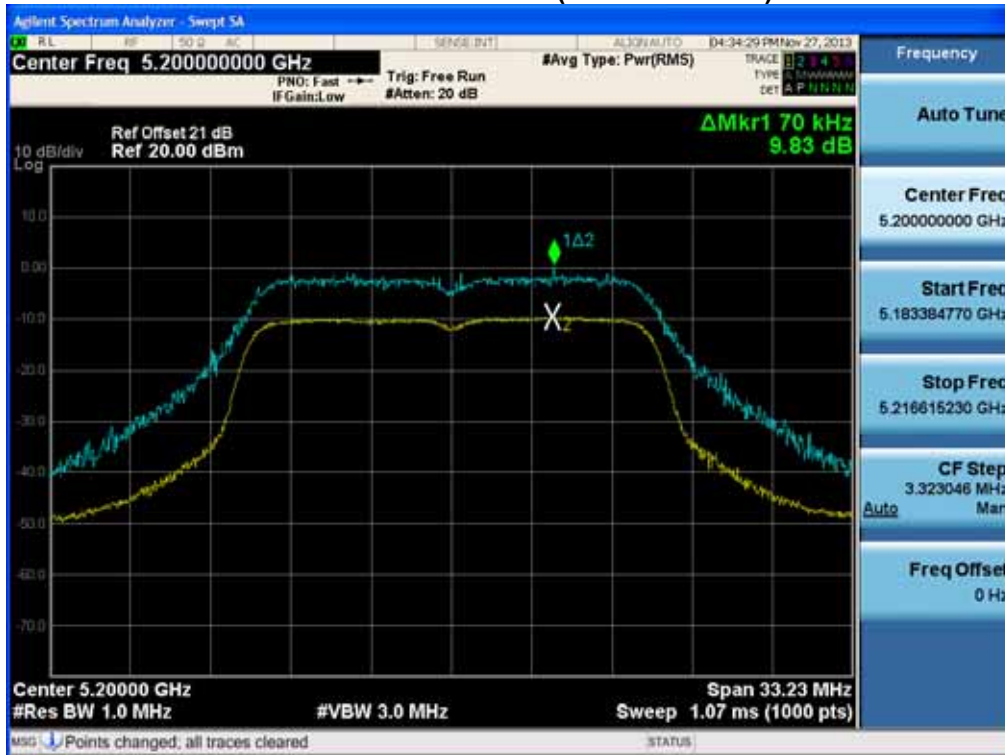


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11a-CH 36)



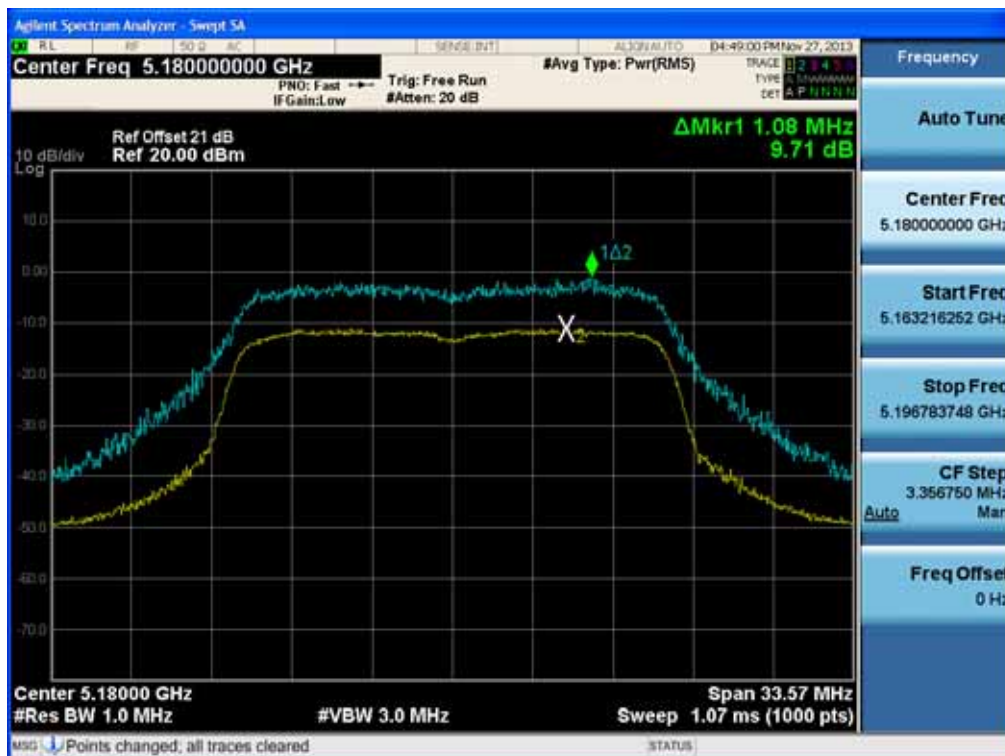
### Peak Excursion Ratio (802.11a-CH 40)



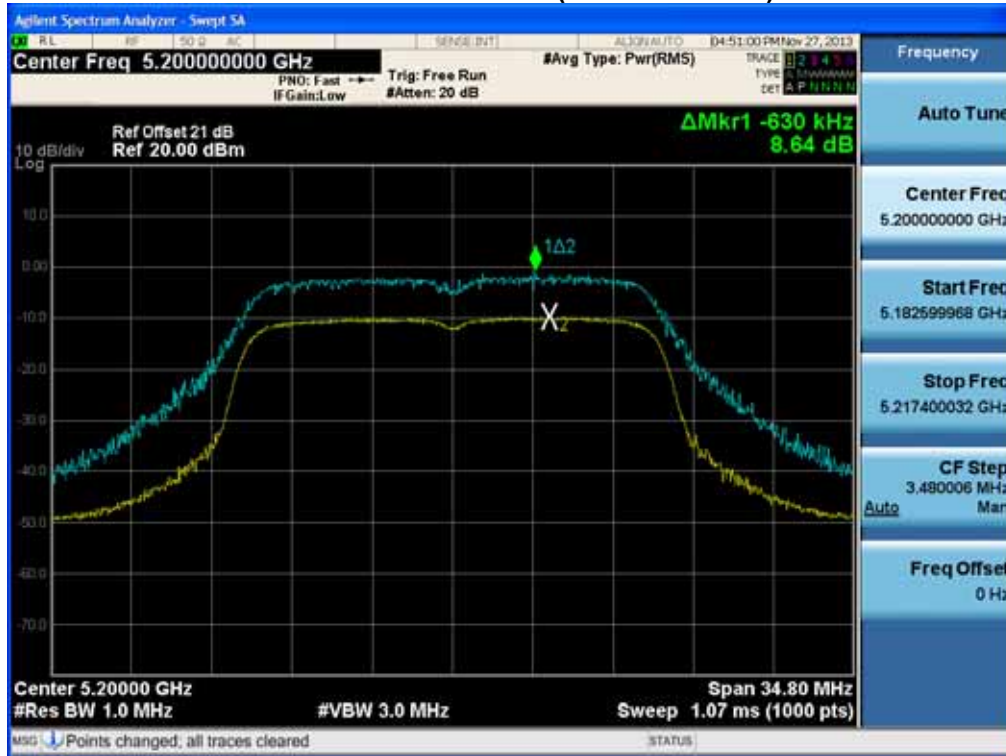
### Peak Excursion Ratio (802.11a-CH 48)



### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

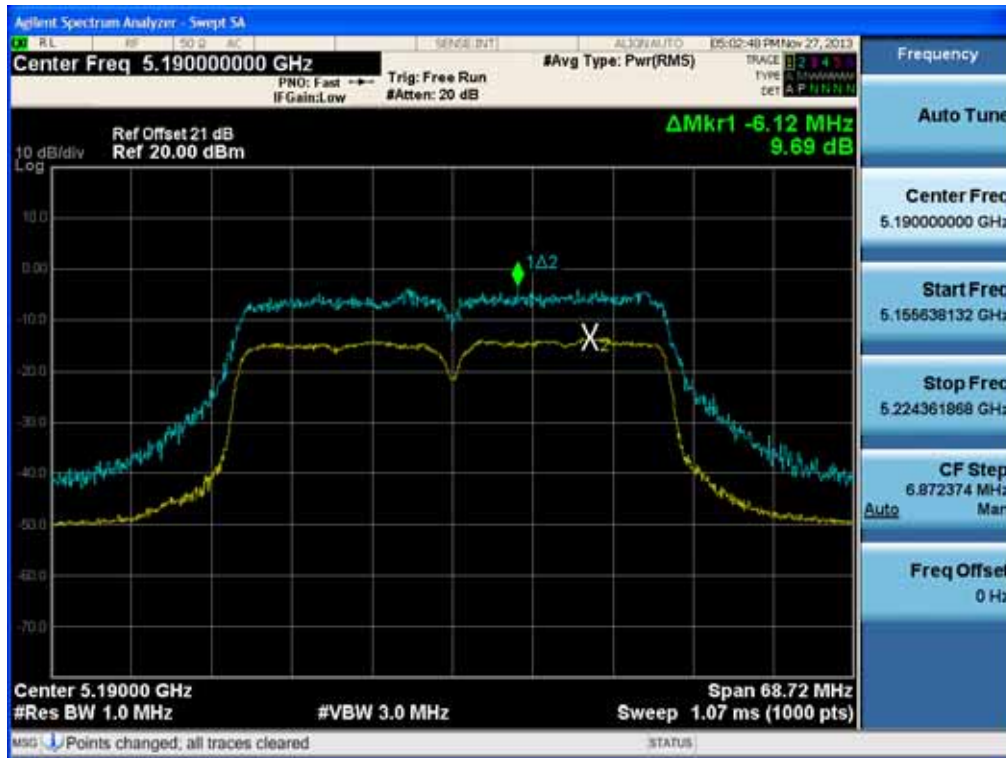


### Peak Excursion Ratio (802.11n-CH 48)

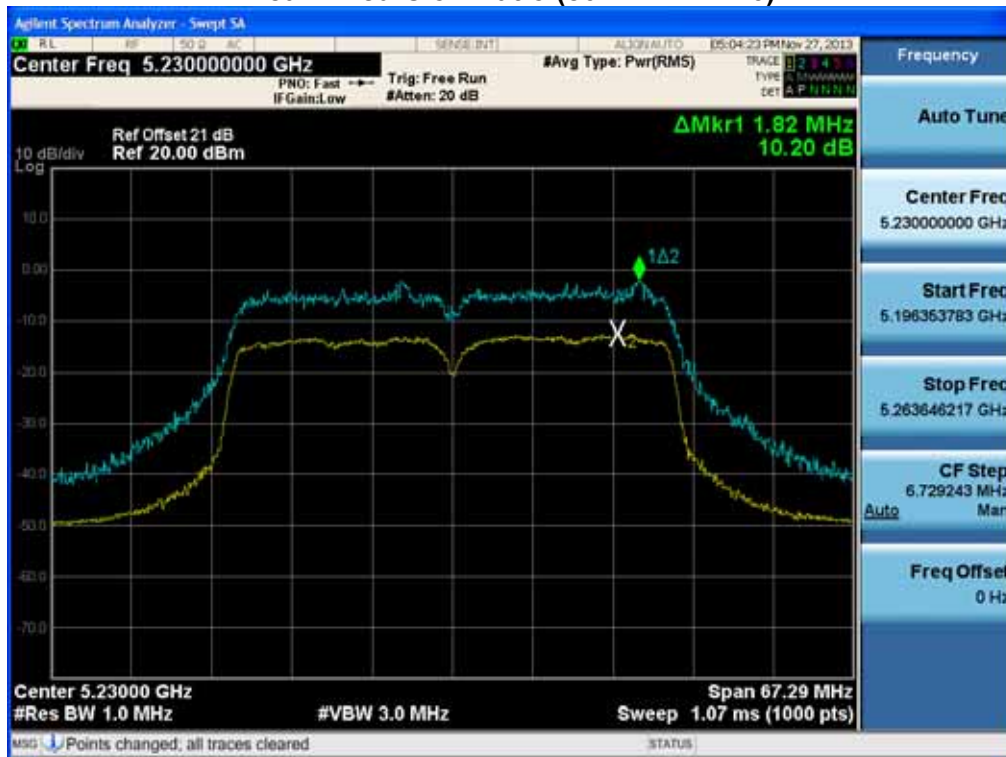


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



### Peak Excursion Ratio (802.11n-CH 46)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## 8.6 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

### Service Port

|                      |                  |
|----------------------|------------------|
| OPERATING BAND:      | UNII Band 1      |
| OPERATING FREQUENCY: | 5,180,000,000 Hz |
| CHANNEL:             | 36               |
| REFERENCE VOLTAGE:   | 220 VAC          |

| Voltage (%) | Power (VAC) | Temp. (°C) | Frequency (kHz) | Frequency Error (kHz) |
|-------------|-------------|------------|-----------------|-----------------------|
| 100         | 220         | +20(Ref)   | 5 180 022.95    | 23.0                  |
| 100         |             | -30        | 5 180 009.60    | 9.6                   |
| 100         |             | -20        | 5 180 008.70    | 8.7                   |
| 100         |             | -10        | 5 180 006.90    | 6.9                   |
| 100         |             | 0          | 5 180 005.50    | 5.5                   |
| 100         |             | +10        | 5 180 015.60    | 15.6                  |
| 100         |             | +30        | 5 180 013.20    | 13.2                  |
| 100         |             | +40        | 5 180 016.60    | 16.6                  |
| 100         |             | +50        | 5 180 012.10    | 12.1                  |
| 115         | 253         | +20        | 5 180 018.70    | 18.7                  |
| 85          | 187         | +20        | 5 180 019.50    | 19.5                  |

### Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

# Monitoring Port

OPERATING BAND: UNII Band 1  
 OPERATING FREQUENCY: 5,180,000,000 Hz  
 CHANNEL: 36  
 REFERENCE VOLTAGE: 220 VAC

| Voltage (%) | Power (VAC) | Temp. (°C) | Frequency (kHz) | Frequency Error (kHz) |
|-------------|-------------|------------|-----------------|-----------------------|
| 100         | 220         | +20(Ref)   | 5 180 011.10    | 11.1                  |
| 100         |             | -30        | 5 180 021.60    | 21.6                  |
| 100         |             | -20        | 5 180 013.60    | 13.6                  |
| 100         |             | -10        | 5 180 015.40    | 15.4                  |
| 100         |             | 0          | 5 180 009.61    | 9.6                   |
| 100         |             | +10        | 5 180 010.50    | 10.5                  |
| 100         |             | +30        | 5 180 012.10    | 12.1                  |
| 100         |             | +40        | 5 180 016.50    | 16.5                  |
| 100         |             | +50        | 5 180 010.30    | 10.3                  |
| 115         | 253         | +20        | 5 180 016.40    | 16.4                  |
| 85          | 187         | +20        | 5 180 017.10    | 17.1                  |

## Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

## 8.7 RADIATED MEASUREMENT.

### 8.7.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

| Frequency (MHz) | Field Strength (uV/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                        |

#### ■ §15.407, KDB 789033

All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBµV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBµV/m.

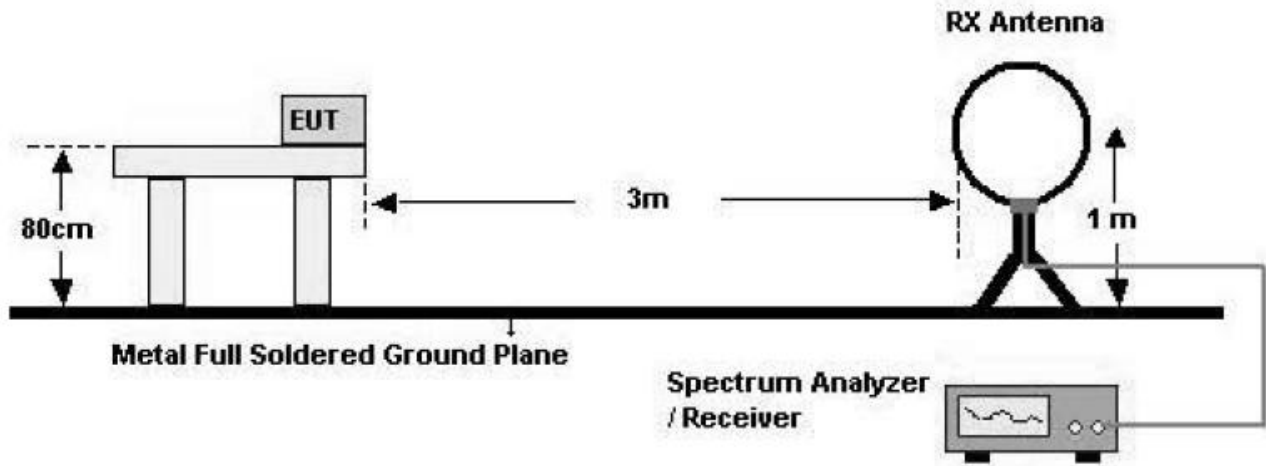
#### ■ Test case

|            |      |               |
|------------|------|---------------|
| Monitoring | SISO | Ant 1         |
|            |      | Ant 2         |
|            | MIMO | Ant 1 & 2     |
| Service    | SISO | Ant 1         |
|            |      | Ant 2         |
|            |      | Ant 3         |
|            | MIMO | Ant 1 & 2     |
|            |      | Ant 1 & 2 & 3 |

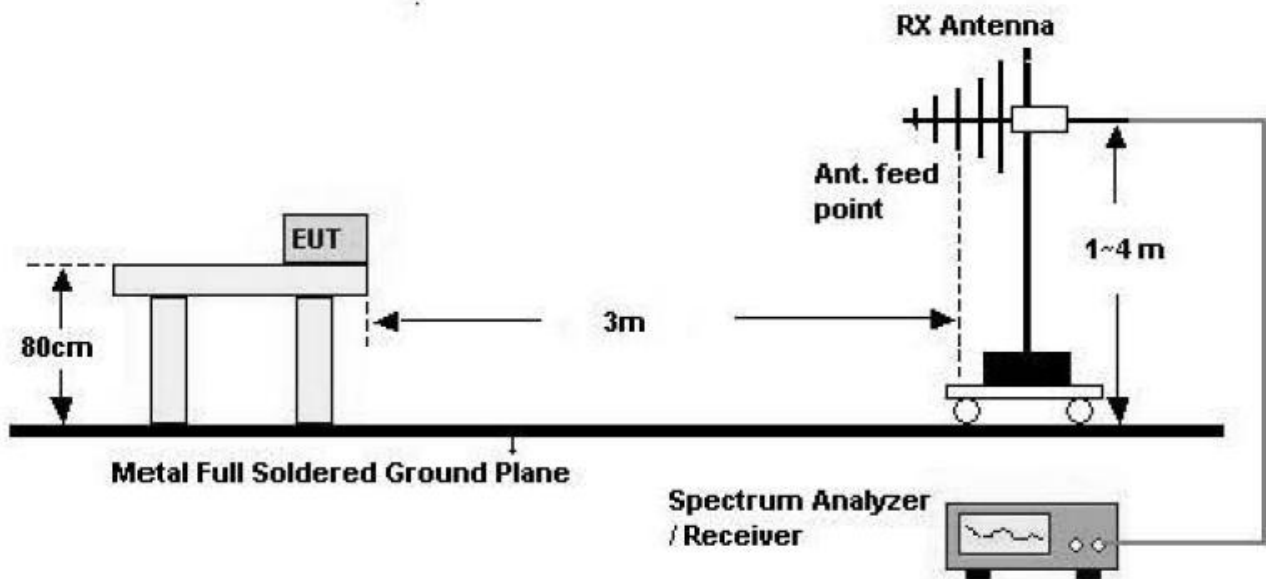
Note : We have done all test case. Worst case is Ant 1 & 2 for monitoring and Ant 1 & 2 & 3 for service. So, we attached the results of only worst case.

## Test Configuration

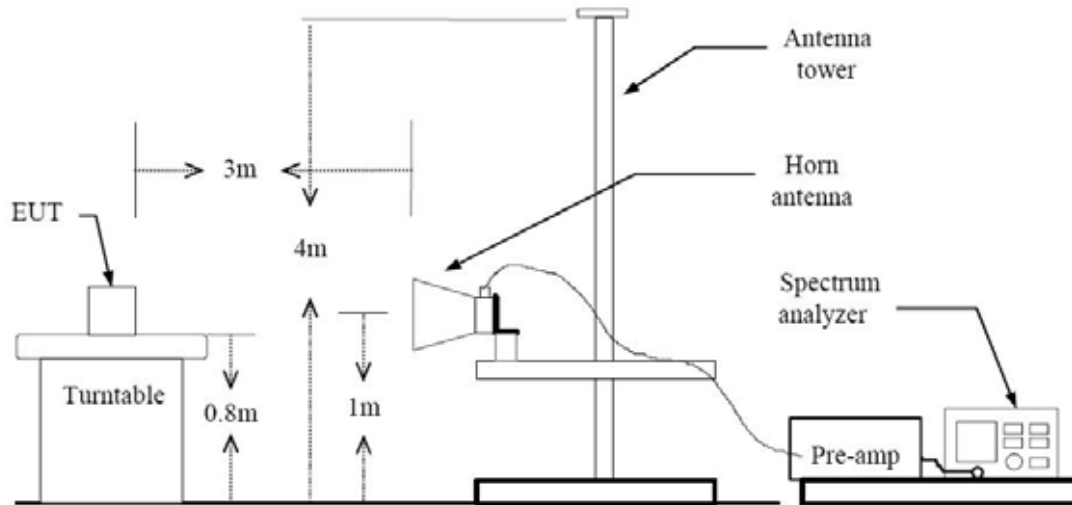
### Below 30 MHz



### 30 MHz - 1 GHz



## Above 1 GHz



### TEST PROCEDURE USED

ANSI C63.4(2003)

Method H)5) in KDB 789033, issued 04/08/2013 (Peak)

Method H)6)d) in KDB 789033, issued 04/08/2013 (Average)

#### . Spectrum setting:

- Peak.

1. RBW = 1 MHz

2. VBW  $\geq$  3 MHz

3. Detector = Peak

4. Sweep Time = auto

5. Trace mode = max hold

6. Allow sweeps to continue until the trace stabilizes.

7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where  $x$  is the duty cycle.

- Average ( Method VB :Averaging using reduced video bandwidth)

1. RBW = 1 MHz

2. VBW

2.1. If the EUT is configured to transmit with duty cycle  $\geq$  98 percent, set  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.

2.2. If the EUT duty cycle is  $<$  98 percent, set  $VBW \geq 1/T$ , where  $T$  is the minimum transmission duration.

3. The analyzer is set to linear detector mode.

4. Detector = Peak.

| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

5. Sweep time = auto.
6. Trace mode = max hold.
7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where  $x$  is the duty cycle.

**Note :**

1. We used the case 2 for 802.11a/n\_20/n\_40 to perform the average field strength measurements for RSE and radiated band edge test.
2. The actual setting value of VBW for 802.11a/n\_20/n\_40.

**Monitoring**

| Mode | Worst Data rate (Mbps) | T <sub>on</sub> (ms) | T <sub>total</sub> (ms) | Duty Cycle (%) | VBW(1/T) (Hz) | The actual setting value of VBW (Hz) |
|------|------------------------|----------------------|-------------------------|----------------|---------------|--------------------------------------|
| a    | 6                      | 2.020                | 2.070                   | 97.6           | 495.0         | 1000                                 |
| n_20 | 6.5                    | 1.885                | 1.930                   | 97.7           | 530.5         | 1000                                 |
| n_40 | 13.5                   | 0.926                | 0.960                   | 96.5           | 1079.9        | 3000                                 |

**Service**

| Mode | Worst Data rate (Mbps) | T <sub>on</sub> (ms) | T <sub>total</sub> (ms) | Duty Cycle (%) | VBW(1/T) (Hz) | The actual setting value of VBW (Hz) |
|------|------------------------|----------------------|-------------------------|----------------|---------------|--------------------------------------|
| a    | 6                      | 1.335                | 1.405                   | 95.0           | 749.1         | 1000                                 |
| n_20 | 6.5                    | 1.269                | 1.317                   | 96.4           | 788.0         | 1000                                 |
| n_40 | 13.5                   | 0.630                | 0.664                   | 94.9           | 1587.3        | 3000                                 |

## TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

| Frequency               | Reading    | Ant. factor | Cable loss | Ant. POL | Total        | Limit        | Margin |
|-------------------------|------------|-------------|------------|----------|--------------|--------------|--------|
| MHz                     | dB $\mu$ V | dB /m       | dB         | (H/V)    | dB $\mu$ V/m | dB $\mu$ V/m | dB     |
| No Critical peaks found |            |             |            |          |              |              |        |

### Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dB $\mu$ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

| Frequency               | Reading    | Ant. factor | Cable loss | Ant. POL | Total        | Limit        | Margin |
|-------------------------|------------|-------------|------------|----------|--------------|--------------|--------|
| MHz                     | dB $\mu$ V | dB /m       | dB         | (H/V)    | dB $\mu$ V/m | dB $\mu$ V/m | dB     |
| No Critical peaks found |            |             |            |          |              |              |        |

### Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## Above 1 GHz

### Monitoring MIMO (Ant 1 & 2)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10360              | 64.05           | -6.51                 | V                 | 57.54             | 68.20             | 10.66          | PK     |
| 15540              | 63.36           | -6.42                 | V                 | 56.94             | 73.98             | 17.04          | PK     |
| 15540              | 50.15           | -6.42                 | V                 | 43.73             | 53.98             | 10.25          | AV     |
| 10360              | 63.33           | -6.51                 | H                 | 56.82             | 68.20             | 11.38          | PK     |
| 15540              | 63.87           | -6.42                 | H                 | 57.45             | 73.98             | 16.53          | PK     |
| 15540              | 50.25           | -6.42                 | H                 | 43.83             | 53.98             | 10.15          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5200 MHz |
| Channel No.         | 40 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10400              | 63.64           | -6.49                 | V                 | 57.15             | 68.20             | 11.05          | PK     |
| 15600              | 63.29           | -7.15                 | V                 | 56.14             | 73.98             | 17.84          | PK     |
| 15600              | 50.31           | -7.15                 | V                 | 43.16             | 53.98             | 10.82          | AV     |
| 10400              | 63.61           | -6.49                 | H                 | 57.12             | 68.20             | 11.08          | PK     |
| 15600              | 63.34           | -7.15                 | H                 | 56.19             | 73.98             | 17.79          | PK     |
| 15600              | 50.00           | -7.15                 | H                 | 42.85             | 53.98             | 11.13          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5240 MHz |
| Channel No.         | 48 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 62.96           | -6.96                 | V                 | 56.00             | 68.20             | 12.20          | PK     |
| 15720              | 63.29           | -6.62                 | V                 | 56.67             | 73.98             | 17.31          | PK     |
| 15720              | 50.25           | -6.62                 | V                 | 43.63             | 53.98             | 10.35          | AV     |
| 10480              | 63.45           | -6.96                 | H                 | 56.49             | 68.20             | 11.71          | PK     |
| 15720              | 63.64           | -6.96                 | H                 | 56.68             | 73.98             | 17.30          | PK     |
| 15720              | 50.14           | -6.62                 | H                 | 43.52             | 53.98             | 10.46          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5180 MHz

Channel No. 36 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10360           | 63.44        | -6.51              | V              | 56.93          | 68.20          | 11.27       | PK     |
| 15540           | 63.55        | -6.42              | V              | 57.13          | 73.98          | 16.85       | PK     |
| 15540           | 50.20        | -6.42              | V              | 43.78          | 53.98          | 10.20       | AV     |
| 10360           | 63.81        | -6.51              | H              | 57.30          | 68.20          | 10.90       | PK     |
| 15540           | 63.11        | -6.42              | H              | 56.69          | 73.98          | 17.29       | PK     |
| 15540           | 50.14        | -6.42              | H              | 43.72          | 53.98          | 10.26       | AV     |

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5200 MHz

Channel No. 40 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10400           | 63.44        | -6.49              | V              | 56.95          | 68.20          | 11.25       | PK     |
| 15600           | 63.66        | -7.15              | V              | 56.51          | 73.98          | 17.47       | PK     |
| 15600           | 50.29        | -7.15              | V              | 43.14          | 53.98          | 10.84       | AV     |
| 10400           | 63.59        | -6.49              | H              | 57.10          | 68.20          | 11.10       | PK     |
| 15600           | 63.44        | -7.15              | H              | 56.29          | 73.98          | 17.69       | PK     |
| 15600           | 50.04        | -7.15              | H              | 42.89          | 53.98          | 11.09       | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5240 MHz           |
| Channel No.         | 48 Ch              |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 63.00           | -6.96                 | V                 | 56.04             | 68.20             | 12.16          | PK     |
| 15720              | 63.44           | -6.62                 | V                 | 56.82             | 73.98             | 17.16          | PK     |
| 15720              | 50.19           | -6.62                 | V                 | 43.57             | 53.98             | 10.41          | AV     |
| 10480              | 63.97           | -6.96                 | H                 | 57.01             | 68.20             | 11.19          | PK     |
| 15720              | 63.47           | -6.96                 | H                 | 56.51             | 73.98             | 17.47          | PK     |
| 15720              | 50.17           | -6.62                 | H                 | 43.55             | 53.98             | 10.43          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_20 MHz BW. Worst case is 6.5 Mbps in 802.11n\_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10380              | 63.15           | -5.38                 | V                 | 57.77             | 68.20             | 10.43          | PK     |
| 15570              | 62.81           | -6.41                 | V                 | 56.40             | 73.98             | 17.58          | PK     |
| 15570              | 49.82           | -6.41                 | V                 | 43.41             | 53.98             | 10.57          | AV     |
| 10380              | 62.61           | -5.38                 | H                 | 57.23             | 68.20             | 10.97          | PK     |
| 15570              | 62.77           | -6.41                 | H                 | 56.36             | 73.98             | 17.62          | PK     |
| 15570              | 49.78           | -6.41                 | H                 | 43.37             | 53.98             | 10.61          | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5230 MHz          |
| Channel No.         | 46 Ch             |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10460              | 62.84           | -6.88                 | V                 | 55.96             | 68.20             | 12.24          | PK     |
| 15690              | 63.28           | -6.64                 | V                 | 56.64             | 73.98             | 17.34          | PK     |
| 15690              | 49.97           | -6.64                 | V                 | 43.33             | 53.98             | 10.65          | AV     |
| 10460              | 63.41           | -6.88                 | H                 | 56.53             | 68.20             | 11.67          | PK     |
| 15690              | 62.79           | -6.64                 | H                 | 56.15             | 73.98             | 17.83          | PK     |
| 15690              | 49.79           | -6.64                 | H                 | 43.15             | 53.98             | 10.83          | 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.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |



4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_40 MHz BW. Worst case is 13.5 Mbps in 802.11n\_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                                        |                                            |                                    |                                                  |
|----------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|
| <b>FCC PT.15.407<br/>TEST REPORT</b>   | <b>FCC CERTIFICATION REPORT</b>            |                                    | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1312FR19 | <b>Date of Issue:</b><br>December 23, 2013 | <b>EUT Type:</b> WLAN Access Point | <b>FCC ID:</b><br>A3LWEA303I                     |

## Service MIMO (Ant 1 & 2 & 3)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10360              | 62.52           | -6.51                 | V                 | 56.01             | 68.20             | 12.19          | PK     |
| 15540              | 65.17           | -6.42                 | V                 | 58.75             | 73.98             | 15.23          | PK     |
| 15540              | 50.43           | -6.42                 | V                 | 44.01             | 53.98             | 9.97           | AV     |
| 10360              | 62.29           | -6.51                 | H                 | 55.78             | 68.20             | 12.42          | PK     |
| 15540              | 63.23           | -6.42                 | H                 | 56.81             | 73.98             | 17.17          | PK     |
| 15540              | 49.98           | -6.42                 | H                 | 43.56             | 53.98             | 10.42          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5200 MHz |
| Channel No.         | 40 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10400              | 62.05           | -6.49                 | V                 | 55.56             | 68.20             | 12.64          | PK     |
| 15600              | 63.17           | -7.15                 | V                 | 56.02             | 73.98             | 17.96          | PK     |
| 15600              | 49.92           | -7.15                 | V                 | 42.77             | 53.98             | 11.21          | AV     |
| 10400              | 61.96           | -6.49                 | H                 | 55.47             | 68.20             | 12.73          | PK     |
| 15600              | 62.94           | -7.15                 | H                 | 55.79             | 73.98             | 18.19          | PK     |
| 15600              | 49.96           | -7.15                 | H                 | 42.81             | 53.98             | 11.17          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5240 MHz |
| Channel No.         | 48 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 63.15           | -6.96                 | V                 | 56.19             | 68.20             | 12.01          | PK     |
| 15720              | 62.61           | -6.62                 | V                 | 55.99             | 73.98             | 17.99          | PK     |
| 15720              | 49.08           | -6.62                 | V                 | 42.46             | 53.98             | 11.52          | AV     |
| 10480              | 63.06           | -6.96                 | H                 | 56.10             | 68.20             | 12.10          | PK     |
| 15720              | 62.39           | -6.96                 | H                 | 55.43             | 73.98             | 18.55          | PK     |
| 15720              | 49.17           | -6.62                 | H                 | 42.55             | 53.98             | 11.43          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5180 MHz

Channel No. 36 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10360           | 62.28        | -6.51              | V              | 55.77          | 68.20          | 12.43       | PK     |
| 15540           | 63.13        | -6.42              | V              | 56.71          | 73.98          | 17.27       | PK     |
| 15540           | 49.83        | -6.42              | V              | 43.41          | 53.98          | 10.57       | AV     |
| 10360           | 62.13        | -6.51              | H              | 55.62          | 68.20          | 12.58       | PK     |
| 15540           | 63.44        | -6.42              | H              | 57.02          | 73.98          | 16.96       | PK     |
| 15540           | 49.97        | -6.42              | H              | 43.55          | 53.98          | 10.43       | AV     |

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5200 MHz

Channel No. 40 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10400           | 62.32        | -6.49              | V              | 55.83          | 68.20          | 12.37       | PK     |
| 15600           | 63.05        | -7.15              | V              | 55.90          | 73.98          | 18.08       | PK     |
| 15600           | 49.70        | -7.15              | V              | 42.55          | 53.98          | 11.43       | AV     |
| 10400           | 62.18        | -6.49              | H              | 55.69          | 68.20          | 12.51       | PK     |
| 15600           | 62.93        | -7.15              | H              | 55.78          | 73.98          | 18.20       | PK     |
| 15600           | 49.53        | -7.15              | H              | 42.38          | 53.98          | 11.60       | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5240 MHz           |
| Channel No.         | 48 Ch              |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 62.72           | -6.96                 | V                 | 55.76             | 68.20             | 12.44          | PK     |
| 15720              | 63.53           | -6.62                 | V                 | 56.91             | 73.98             | 17.07          | PK     |
| 15720              | 50.02           | -6.62                 | V                 | 43.40             | 53.98             | 10.58          | AV     |
| 10480              | 62.37           | -6.96                 | H                 | 55.41             | 68.20             | 12.79          | PK     |
| 15720              | 63.23           | -6.96                 | H                 | 56.27             | 73.98             | 17.71          | PK     |
| 15720              | 49.96           | -6.62                 | H                 | 43.34             | 53.98             | 10.64          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_20 MHz BW. Worst case is 6.5 Mbps in 802.11n\_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10380           | 62.16        | -5.38              | V              | 56.78          | 68.20          | 11.42       | PK     |
| 15570           | 63.62        | -6.41              | V              | 57.21          | 73.98          | 16.77       | PK     |
| 15570           | 49.48        | -6.41              | V              | 43.07          | 53.98          | 10.91       | AV     |
| 10380           | 61.80        | -5.38              | H              | 56.42          | 68.20          | 11.78       | PK     |
| 15570           | 62.94        | -6.41              | H              | 56.53          | 73.98          | 17.45       | PK     |
| 15570           | 49.42        | -6.41              | H              | 43.01          | 53.98          | 10.97       | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5230 MHz          |
| Channel No.         | 46 Ch             |

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10460           | 62.06        | -6.88              | V              | 55.18          | 68.20          | 13.02       | PK     |
| 15690           | 63.48        | -6.64              | V              | 56.84          | 73.98          | 17.14       | PK     |
| 15690           | 49.66        | -6.64              | V              | 43.02          | 53.98          | 10.96       | AV     |
| 10460           | 63.11        | -6.88              | H              | 56.23          | 68.20          | 11.97       | PK     |
| 15690           | 63.34        | -6.64              | H              | 56.70          | 73.98          | 17.28       | PK     |
| 15690           | 49.59        | -6.64              | H              | 42.95          | 53.98          | 11.03       | 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.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |



4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_40 MHz BW. Worst case is 13.5 Mbps in 802.11n\_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## 8.7.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

### Test Requirements and limit, §15.407, §15.205, §15.209

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)).

### Monitoring MIMO (Ant 1 & 2)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 57.08           | 8.79                    | H                 | 65.87             | 73.98             | 8.11           | PK     |
| 5150               | 37.81           | 8.79                    | H                 | 46.60             | 53.98             | 7.38           | AV     |
| 5150               | 50.07           | 8.79                    | V                 | 58.86             | 73.98             | 15.12          | PK     |
| 5150               | 37.00           | 8.79                    | V                 | 45.79             | 53.98             | 8.19           | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5180 MHz           |
| Channel No.         | 36 Ch              |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 59.77           | 8.79                    | H                 | 68.56             | 73.98             | 5.42           | PK     |
| 5150               | 38.39           | 8.79                    | H                 | 47.18             | 53.98             | 6.80           | AV     |
| 5150               | 49.57           | 8.79                    | V                 | 58.36             | 73.98             | 15.62          | PK     |
| 5150               | 37.10           | 8.79                    | V                 | 45.89             | 53.98             | 8.09           | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 59.03           | 8.79                    | H                 | 67.82             | 73.98             | 6.16           | PK     |
| 5150               | 40.43           | 8.79                    | H                 | 49.22             | 53.98             | 4.76           | AV     |
| 5150               | 51.88           | 8.79                    | V                 | 60.67             | 73.98             | 13.31          | PK     |
| 5150               | 37.51           | 8.79                    | V                 | 46.30             | 53.98             | 7.68           | AV     |

#### Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a/n mode test. . Worst case of EUT is lowest data rate in 802.11a/n
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## Service MIMO (Ant 1 & 2 & 3)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 49.47           | 8.79                    | H                 | 58.26             | 73.98             | 15.72          | PK     |
| 5150               | 36.26           | 8.79                    | H                 | 45.05             | 53.98             | 8.93           | AV     |
| 5150               | 43.58           | 8.79                    | V                 | 52.37             | 73.98             | 21.61          | PK     |
| 5150               | 27.15           | 8.79                    | V                 | 35.94             | 53.98             | 18.04          | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5180 MHz           |
| Channel No.         | 36 Ch              |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 50.04           | 8.79                    | H                 | 58.83             | 73.98             | 15.15          | PK     |
| 5150               | 36.07           | 8.79                    | H                 | 44.86             | 53.98             | 9.12           | AV     |
| 5150               | 44.66           | 8.79                    | V                 | 53.45             | 73.98             | 20.53          | PK     |
| 5150               | 27.01           | 8.79                    | V                 | 35.8              | 53.98             | 18.18          | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 50.85           | 8.79                    | H                 | 59.64             | 73.98             | 14.34          | PK     |
| 5150               | 36.48           | 8.79                    | H                 | 45.27             | 53.98             | 8.71           | AV     |
| 5150               | 44.99           | 8.79                    | V                 | 53.78             | 73.98             | 20.2           | PK     |
| 5150               | 27.59           | 8.79                    | V                 | 36.38             | 53.98             | 17.6           | AV     |

#### Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a/n mode test. . Worst case of EUT is lowest data rate in 802.11a/n
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## 8.8 POWERLINE CONDUCTED EMISSIONS

### Test Requirements and limit, §15.207

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 (dBμV) |          |
|-----------------------|---------------|----------|
|                       | 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.
5. We are performed the AC Power Line Conducted Emission test for 121.5 Mbps, Ch.102 and 802.11n\_40 MHz BW mode in UNII 3\_3 TX MIMO. Because the mode in UNII 3 is worst case.

## RESULT PLOTS

### Conducted Emissions (Line 1)

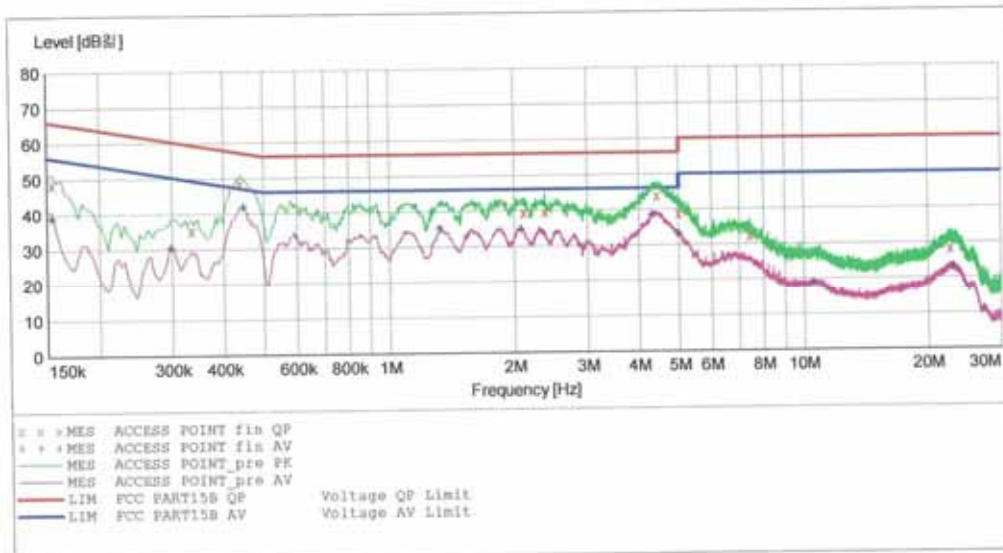
HCT

EMC

EUT: WEA303e  
 Manufacturer: SAMSUNG  
 Operating Condition: 5GHz WLAN MODE  
 Test Site: SHIELD ROOM  
 Operator: JS LEE  
 Test Specification: FCC PART15 C  
 Comment: H

#### SCAN TABLE: "FCC CLASS B(H)"

| Short Description: |           |         | KN22 CLASS B |            |           |            |
|--------------------|-----------|---------|--------------|------------|-----------|------------|
| Start              | Stop      | Step    | Detector     | Meas. Time | IF Bandw. | Transducer |
| Frequency          | Frequency | Width   |              |            |           |            |
| 150.0 kHz          | 500.0 kHz | 4.0 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: "ACCESS POINT\_fin QP"

2013-11-03 8:15오전

| Frequency MHz | Level dBμV | Transd dB | Limit dBμV | Margin dB | Line | PE  |
|---------------|------------|-----------|------------|-----------|------|-----|
| 0.154001      | 48.40      | 9.8       | 66         | 17.4      | ---  | --- |
| 0.334001      | 35.20      | 9.8       | 59         | 24.2      | ---  | --- |
| 0.438001      | 48.50      | 9.8       | 57         | 8.6       | ---  | --- |
| 2.112000      | 39.40      | 10.0      | 56         | 16.6      | ---  | --- |
| 2.380000      | 39.50      | 10.0      | 56         | 16.5      | ---  | --- |
| 4.436000      | 43.80      | 10.2      | 56         | 12.2      | ---  | --- |
| 5.000000      | 38.80      | 10.2      | 56         | 17.2      | ---  | --- |
| 7.404000      | 32.30      | 10.3      | 60         | 27.7      | ---  | --- |
| 22.528000     | 28.20      | 11.0      | 60         | 31.8      | ---  | --- |

**MEASUREMENT RESULT: "ACCESS POINT\_fin AV"**

2013-11-03 8:15 오후

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.154001         | 38.90         | 9.8          | 56            | 16.9         | ---  | --- |
| 0.298001         | 30.50         | 9.8          | 50            | 19.8         | ---  | --- |
| 0.446001         | 41.70         | 9.8          | 47            | 5.2          | ---  | --- |
| 1.324000         | 35.10         | 9.9          | 46            | 10.9         | ---  | --- |
| 2.080000         | 34.80         | 9.9          | 46            | 11.2         | ---  | --- |
| 4.316000         | 38.50         | 10.1         | 46            | 7.5          | ---  | --- |
| 5.000000         | 33.00         | 10.2         | 46            | 13.0         | ---  | --- |
| 10.584000        | 18.80         | 10.5         | 50            | 31.2         | ---  | --- |
| 22.960000        | 22.90         | 11.1         | 50            | 27.1         | ---  | --- |

## Conducted Emissions (Line 2)

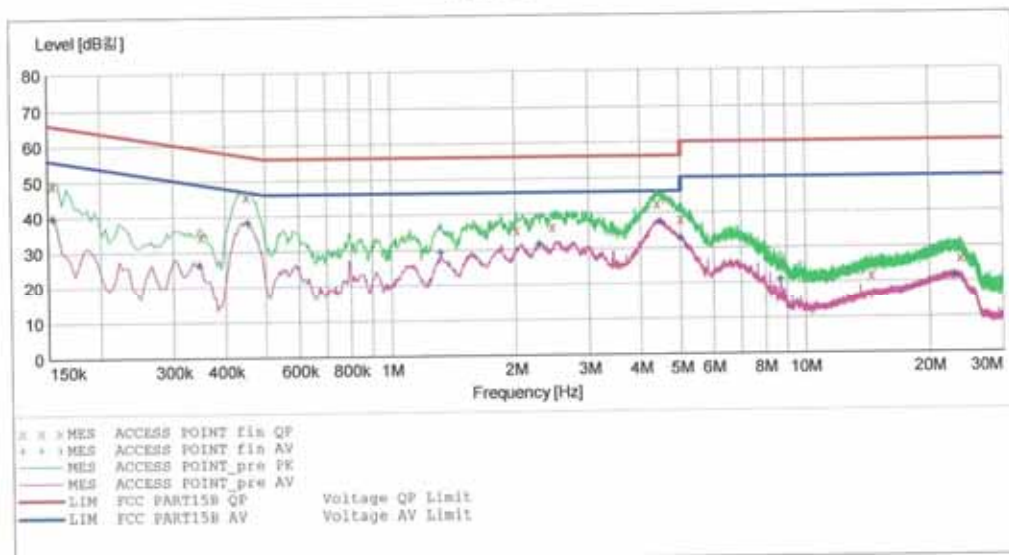
HCT

EMC

EUT: WEA303e  
 Manufacturer: SAMSUNG  
 Operating Condition: 5GHz WLAN MODE  
 Test Site: SHIELD ROOM  
 Operator: JS LEE  
 Test Specification: FCC PART15 B  
 Comment: N

### SCAN TABLE: "FCC CLASS B(N)"

| Short Description: |           |         | KN22 CLASS B | Meas.   | IF     | Transducer |
|--------------------|-----------|---------|--------------|---------|--------|------------|
| Start              | Stop      | Step    | Detector     | Time    | Bandw. |            |
| 150.0 kHz          | 500.0 kHz | 4.0 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: "ACCESS POINT\_fin QP"

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.154001         | 49.10         | 10.0         | 66            | 16.7         | ---  | --- |
| 0.350001         | 34.40         | 10.0         | 59            | 24.5         | ---  | --- |
| 0.450001         | 45.50         | 10.0         | 57            | 11.4         | ---  | --- |
| 2.016000         | 35.40         | 10.1         | 56            | 20.6         | ---  | --- |
| 2.460000         | 36.30         | 10.2         | 56            | 19.7         | ---  | --- |
| 4.404000         | 42.40         | 10.3         | 56            | 13.6         | ---  | --- |
| 5.000000         | 38.00         | 10.4         | 56            | 18.0         | ---  | --- |
| 14.444000        | 21.80         | 11.0         | 60            | 38.2         | ---  | --- |
| 23.736000        | 26.50         | 11.5         | 60            | 33.5         | ---  | --- |

**MEASUREMENT RESULT: "ACCESS POINT\_fin AV"**

2013-11-03 8:19 오후

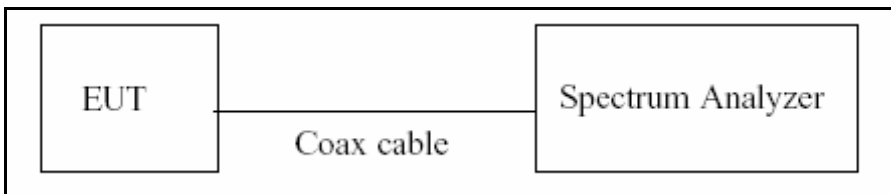
| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.154001         | 39.60         | 10.0         | 56            | 16.2         | ---  | --- |
| 0.346001         | 26.20         | 10.0         | 49            | 22.9         | ---  | --- |
| 0.454001         | 38.10         | 10.0         | 47            | 8.7          | ---  | --- |
| 1.320000         | 29.30         | 10.1         | 46            | 16.7         | ---  | --- |
| 2.288000         | 31.50         | 10.2         | 46            | 14.5         | ---  | --- |
| 4.480000         | 37.30         | 10.3         | 46            | 8.7          | ---  | --- |
| 5.000000         | 32.70         | 10.4         | 46            | 13.3         | ---  | --- |
| 8.728000         | 20.90         | 10.6         | 50            | 29.1         | ---  | --- |
| 22.964000        | 21.50         | 11.4         | 50            | 28.5         | ---  | --- |

## 9. TEST RESULT(POE)

### 9.1 DUTY CYCLE

The zero-span mode on a spectrum analyzer or EMI receiver ,if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW  $\geq$  EBW if possible; otherwise, set RBW to the largest available value. Set VBW  $\geq$  RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$ , where  $T$  is defined in section B)1)a), and the number of sweep points across duration  $T$  exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

#### ▣ TEST CONFIGURATION



#### ▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, B)2) in KDB 789033( issued 04/08/2013)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if  $T \leq 6.25$  microseconds. ( $50/6.25 = 8$ )

The zero-span method was used because all measured  $T$  data are  $> 6.25$  microseconds and both RBW and VBW are  $> 50/T$ .

1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep  $> 100$
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
9. Calculate Duty Cycle =  $T_{on}/T_{total}$  and Duty Cycle Factor =  $10 \cdot \log(1/\text{Duty Cycle})$

▣ Duty Cycle Factor

Monitoring Port

| Mode              | Data Rate | T <sub>on</sub><br>(ms) | T <sub>total</sub><br>(ms) | Duty Cycle | Duty Cycle Factor |
|-------------------|-----------|-------------------------|----------------------------|------------|-------------------|
| 802.11a           | 6         | 2.020                   | 2.070                      | 0.97584541 | 0.106             |
|                   | 9         | 1.353                   | 1.401                      | 0.96573876 | 0.151             |
|                   | 12        | 1.020                   | 1.068                      | 0.95505618 | 0.200             |
|                   | 18        | 0.686                   | 0.732                      | 0.93715847 | 0.282             |
|                   | 24        | 0.523                   | 0.569                      | 0.91915641 | 0.366             |
|                   | 36        | 0.354                   | 0.400                      | 0.88500000 | 0.531             |
|                   | 48        | 0.271                   | 0.316                      | 0.85759494 | 0.667             |
|                   | 54        | 0.243                   | 0.288                      | 0.84375000 | 0.738             |
| 802.11n_20 MHz BW | 6.5       | 1.885                   | 1.930                      | 0.97668394 | 0.102             |
|                   | 13        | 0.962                   | 1.008                      | 0.95436508 | 0.203             |
|                   | 19.5      | 0.654                   | 0.700                      | 0.93428571 | 0.295             |
|                   | 26        | 0.498                   | 0.544                      | 0.91544118 | 0.384             |
|                   | 39        | 0.347                   | 0.392                      | 0.88520408 | 0.530             |
|                   | 52        | 0.267                   | 0.312                      | 0.85576923 | 0.676             |
|                   | 58.5      | 0.243                   | 0.289                      | 0.84083045 | 0.753             |
|                   | 65        | 0.224                   | 0.268                      | 0.83582090 | 0.779             |
| 802.11n_40 MHz BW | 13.5      | 0.926                   | 0.960                      | 0.96458333 | 0.157             |
|                   | 27        | 0.482                   | 0.516                      | 0.93410853 | 0.296             |
|                   | 40.5      | 0.335                   | 0.368                      | 0.91032609 | 0.408             |
|                   | 54        | 0.260                   | 0.292                      | 0.89041096 | 0.504             |
|                   | 81        | 0.187                   | 0.220                      | 0.85000000 | 0.706             |
|                   | 108       | 0.147                   | 0.180                      | 0.81666667 | 0.880             |
|                   | 121.5     | 0.136                   | 0.168                      | 0.80952381 | 0.918             |
|                   | 135       | 0.128                   | 0.160                      | 0.80000000 | 0.969             |

# Service Port

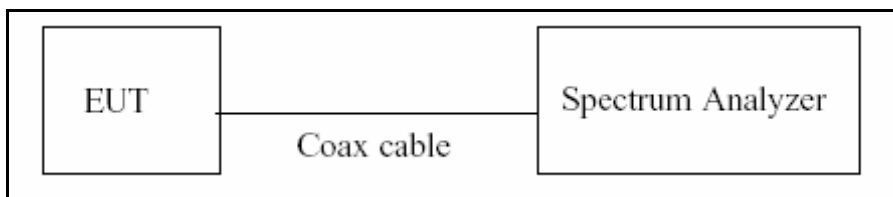
| Mode              | Data Rate | T <sub>on</sub><br>(ms) | T <sub>total</sub><br>(ms) | Duty Cycle | Duty Cycle Factor |
|-------------------|-----------|-------------------------|----------------------------|------------|-------------------|
| 802.11a           | 6         | 1.335                   | 1.405                      | 0.95017794 | 0.222             |
|                   | 9         | 0.909                   | 0.957                      | 0.94984326 | 0.223             |
|                   | 12        | 0.690                   | 0.735                      | 0.93877551 | 0.274             |
|                   | 18        | 0.466                   | 0.512                      | 0.91015625 | 0.409             |
|                   | 24        | 0.354                   | 0.400                      | 0.88500000 | 0.531             |
|                   | 36        | 0.243                   | 0.288                      | 0.84375000 | 0.738             |
|                   | 48        | 0.187                   | 0.232                      | 0.80603448 | 0.936             |
|                   | 54        | 0.171                   | 0.216                      | 0.79166667 | 1.015             |
| 802.11n_20 MHz BW | 6.5       | 1.269                   | 1.317                      | 0.96355353 | 0.161             |
|                   | 13        | 0.655                   | 0.701                      | 0.93437946 | 0.295             |
|                   | 19.5      | 0.446                   | 0.492                      | 0.90650407 | 0.426             |
|                   | 26        | 0.348                   | 0.393                      | 0.88549618 | 0.528             |
|                   | 39        | 0.244                   | 0.289                      | 0.84429066 | 0.735             |
|                   | 52        | 0.192                   | 0.236                      | 0.81355932 | 0.896             |
|                   | 58.5      | 0.176                   | 0.220                      | 0.80000000 | 0.969             |
|                   | 65        | 0.159                   | 0.204                      | 0.77941176 | 1.082             |
| 802.11n_40 MHz BW | 13.5      | 0.630                   | 0.664                      | 0.94879518 | 0.228             |
|                   | 27        | 0.334                   | 0.368                      | 0.90760870 | 0.421             |
|                   | 40.5      | 0.236                   | 0.268                      | 0.88059701 | 0.552             |
|                   | 54        | 0.188                   | 0.220                      | 0.85454545 | 0.683             |
|                   | 81        | 0.135                   | 0.168                      | 0.80357143 | 0.950             |
|                   | 108       | 0.112                   | 0.144                      | 0.77777778 | 1.091             |
|                   | 121.5     | 0.104                   | 0.136                      | 0.76470588 | 1.165             |
|                   | 135       | 0.096                   | 0.128                      | 0.75000000 | 1.249             |

## 9.2 26 dB BANDWIDTH MEASUREMENT

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033(issued 04/08/2013), at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

### ▣ TEST CONFIGURATION



### ▣ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to( Page 3 in KDB 789033, issued 04/08/2013)

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

# Monitoring Port Ant.1

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.88                       | N/A                        | Pass        |
| 5200            | 40          | 23.68                       | N/A                        | Pass        |
| 5240            | 48          | 23.23                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.58                       | N/A                        | Pass        |
| 5200            | 40          | 24.18                       | N/A                        | Pass        |
| 5240            | 48          | 24.03                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 49.26                       | N/A                        | Pass        |
| 5230            | 46          | 49.17                       | N/A                        | Pass        |

# Monitoring Port Ant.2

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 23.26                       | N/A                        | Pass        |
| 5200            | 40          | 22.95                       | N/A                        | Pass        |
| 5240            | 48          | 23.88                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 24.41                       | N/A                        | Pass        |
| 5200            | 40          | 24.51                       | N/A                        | Pass        |
| 5240            | 48          | 23.76                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 47.15                       | N/A                        | Pass        |
| 5230            | 46          | 47.77                       | N/A                        | Pass        |

Service Port Ant.1

■ TEST RESULTS

20 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.58                       | N/A                        | Pass        |
| 5200            | 40          | 22.41                       | N/A                        | Pass        |
| 5240            | 48          | 22.27                       | N/A                        | Pass        |

Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.95                       | N/A                        | Pass        |
| 5200            | 40          | 23.36                       | N/A                        | Pass        |
| 5240            | 48          | 22.75                       | N/A                        | Pass        |

40 MHz BW

Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 46.78                       | N/A                        | Pass        |
| 5230            | 46          | 48.29                       | N/A                        | Pass        |

# Service Port Ant.2

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.36                       | N/A                        | Pass        |
| 5200            | 40          | 21.63                       | N/A                        | Pass        |
| 5240            | 48          | 21.86                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.38                       | N/A                        | Pass        |
| 5200            | 40          | 22.39                       | N/A                        | Pass        |
| 5240            | 48          | 22.32                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 45.61                       | N/A                        | Pass        |
| 5230            | 46          | 47.17                       | N/A                        | Pass        |

# Service Port Ant.3

## TEST RESULTS

20 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11a

| 802.11a Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 21.75                       | N/A                        | Pass        |
| 5200            | 40          | 22.27                       | N/A                        | Pass        |
| 5240            | 48          | 21.28                       | N/A                        | Pass        |

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5180            | 36          | 22.70                       | N/A                        | Pass        |
| 5200            | 40          | 22.51                       | N/A                        | Pass        |
| 5240            | 48          | 23.24                       | N/A                        | Pass        |

40 MHz BW

### Conducted 26 dB Bandwidth Measurements for 802.11n

| 802.11n Mode    |             | Measured Bandwidth<br>[MHz] | Minimum Bandwidth<br>[MHz] | Pass / Fail |
|-----------------|-------------|-----------------------------|----------------------------|-------------|
| Frequency [MHz] | Channel No. |                             |                            |             |
| 5190            | 38          | 46.31                       | N/A                        | Pass        |
| 5230            | 46          | 45.05                       | N/A                        | Pass        |

Note :

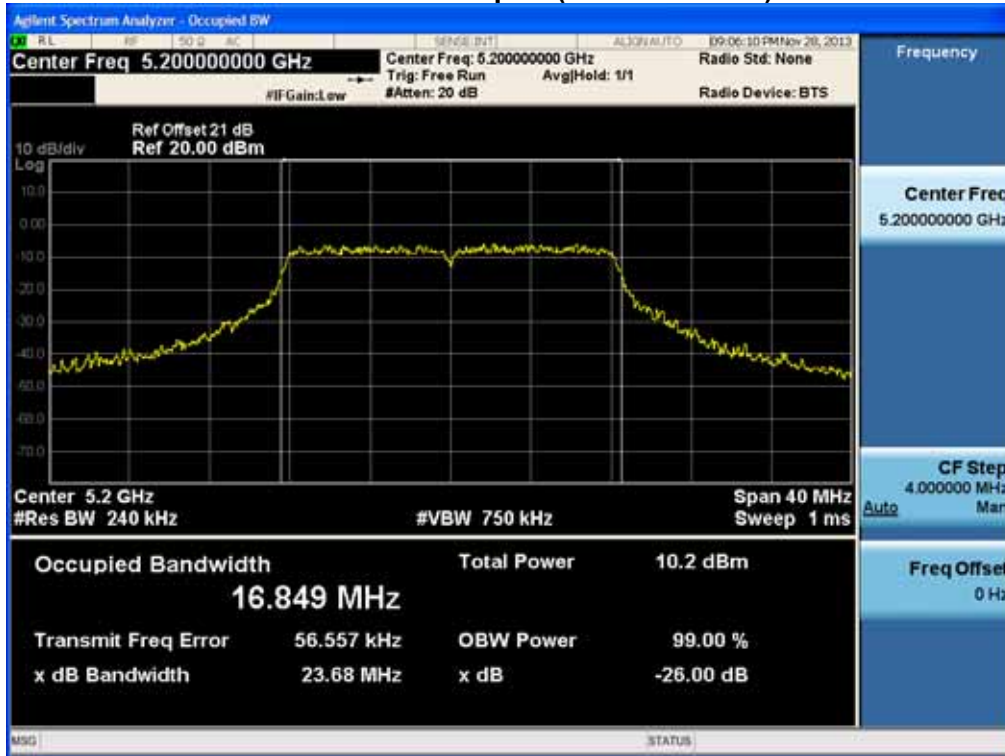
1. In order to simplify the report, attached plots were only the most wide channel.

## Monitoring Port Ant.1

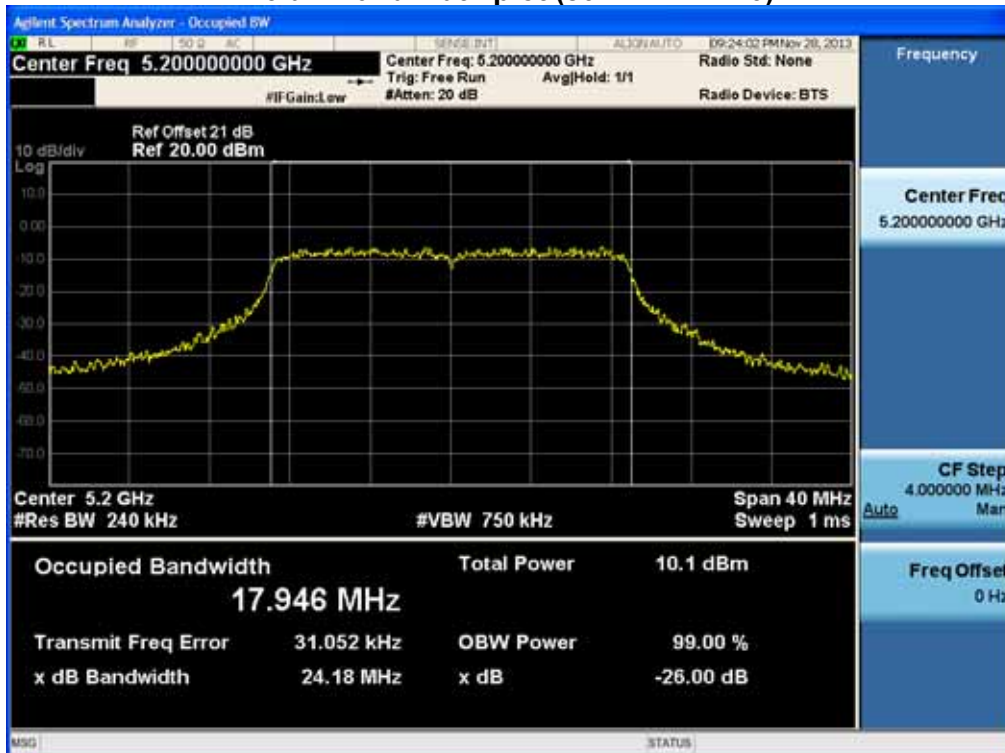
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)



26 dB Bandwidth plot (802.11n-CH 40)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 38)



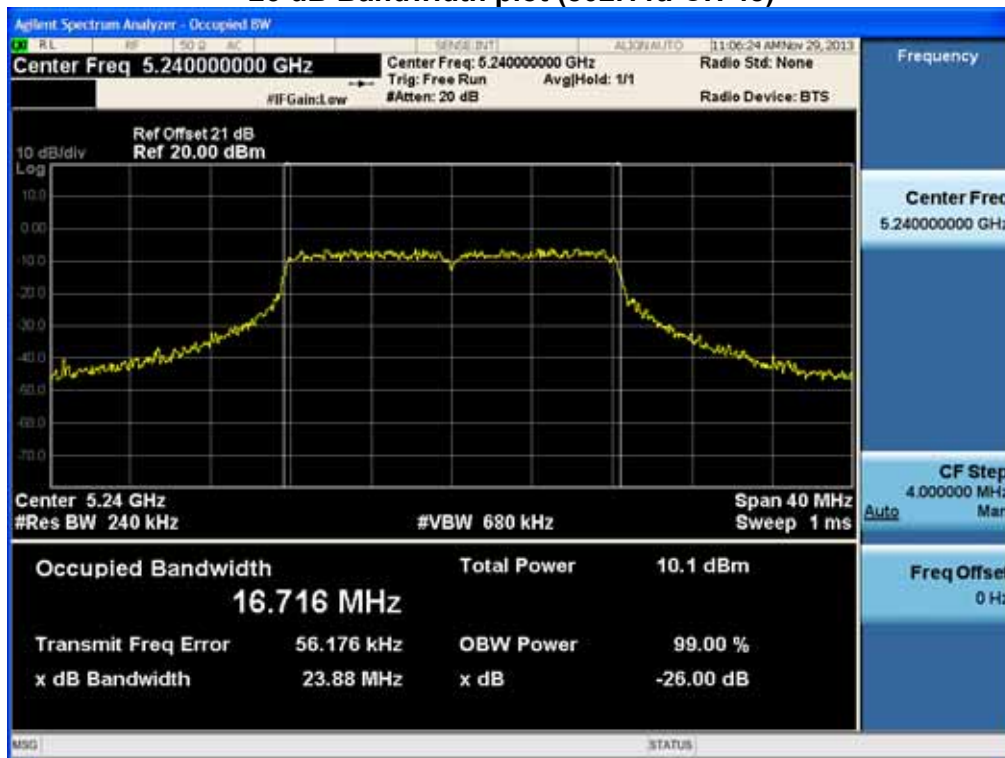
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.2

### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 48)

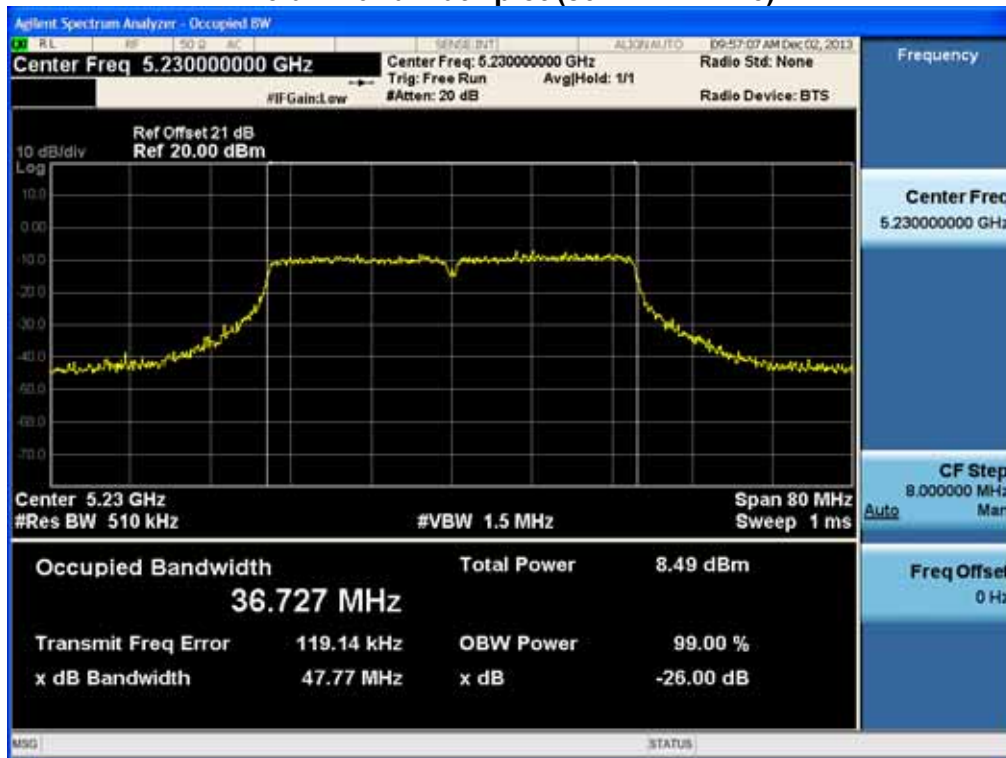


26 dB Bandwidth plot (802.11n-CH 40)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 46)



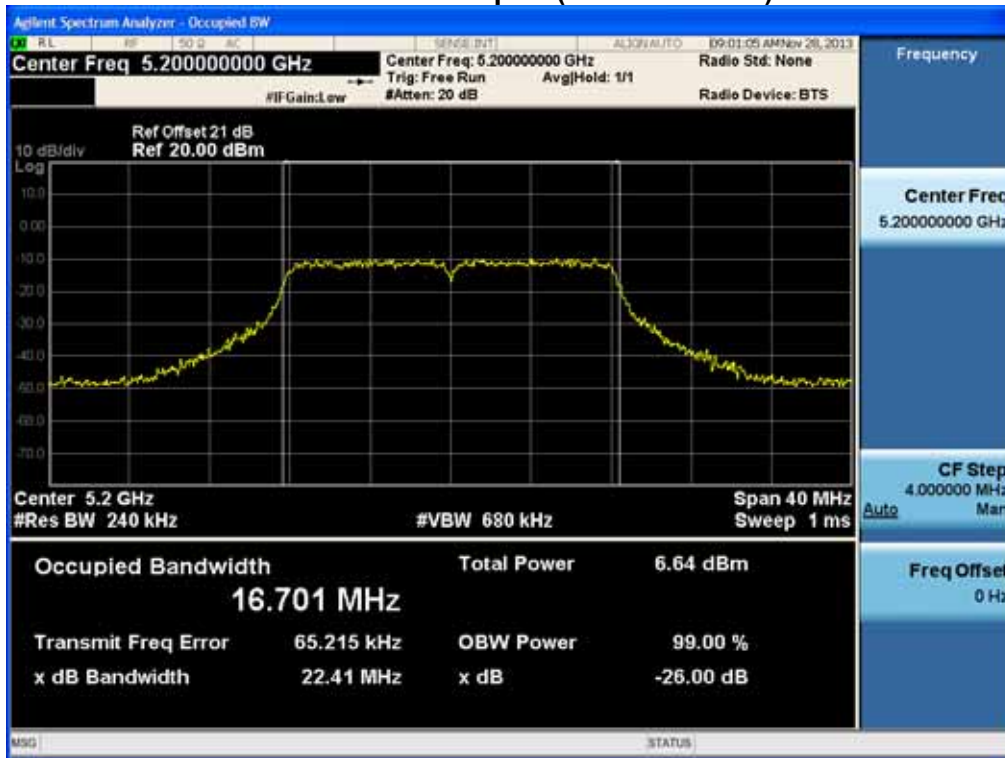
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.1

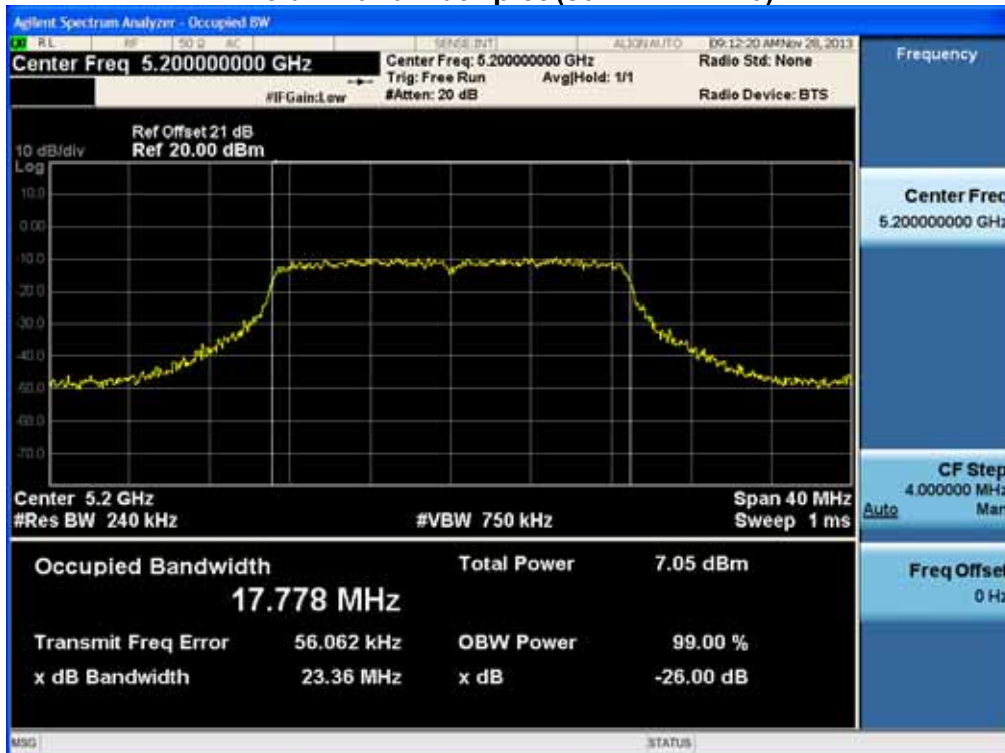
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

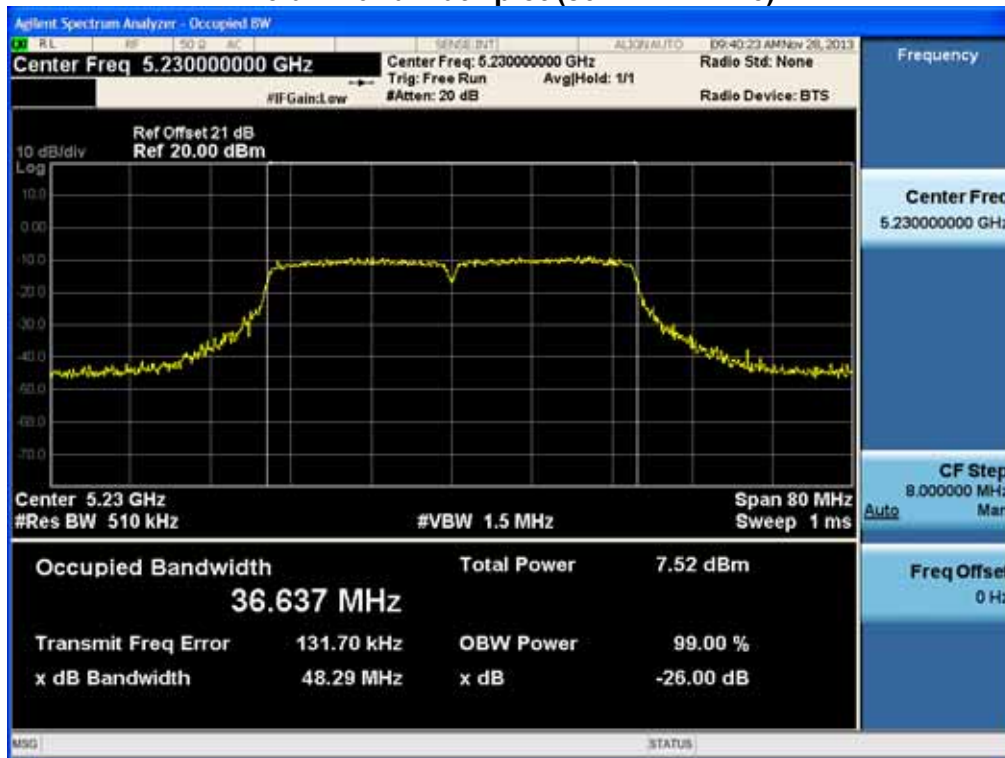


26 dB Bandwidth plot (802.11n-CH 40)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 46)



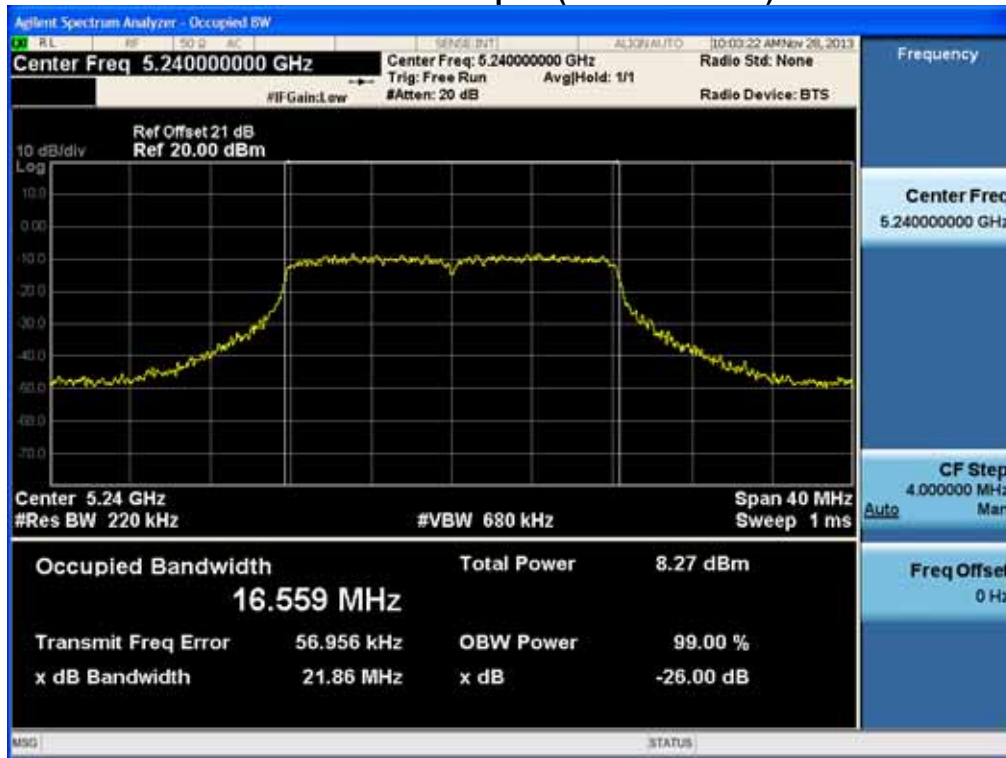
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.2

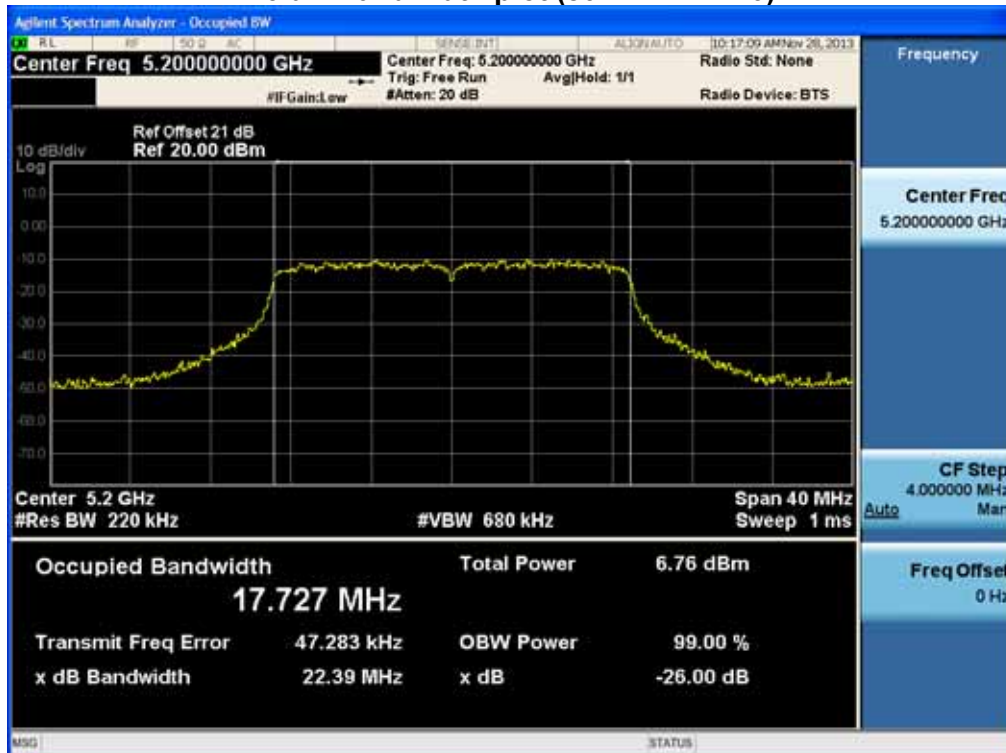
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 48)

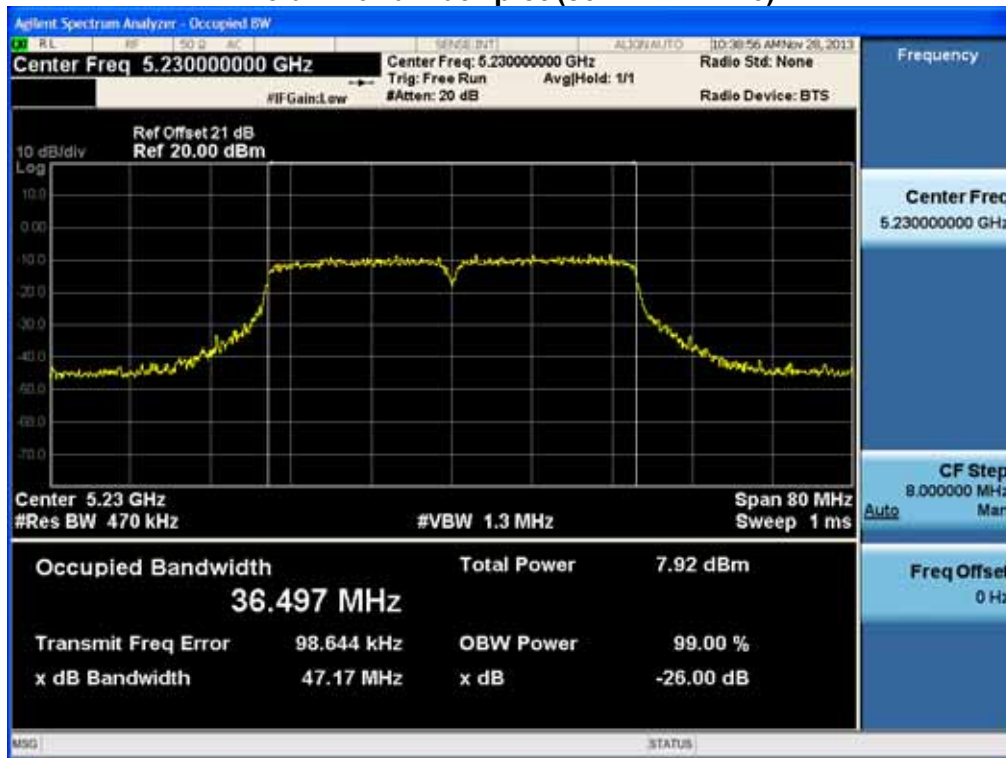


26 dB Bandwidth plot (802.11n-CH 40)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 46)



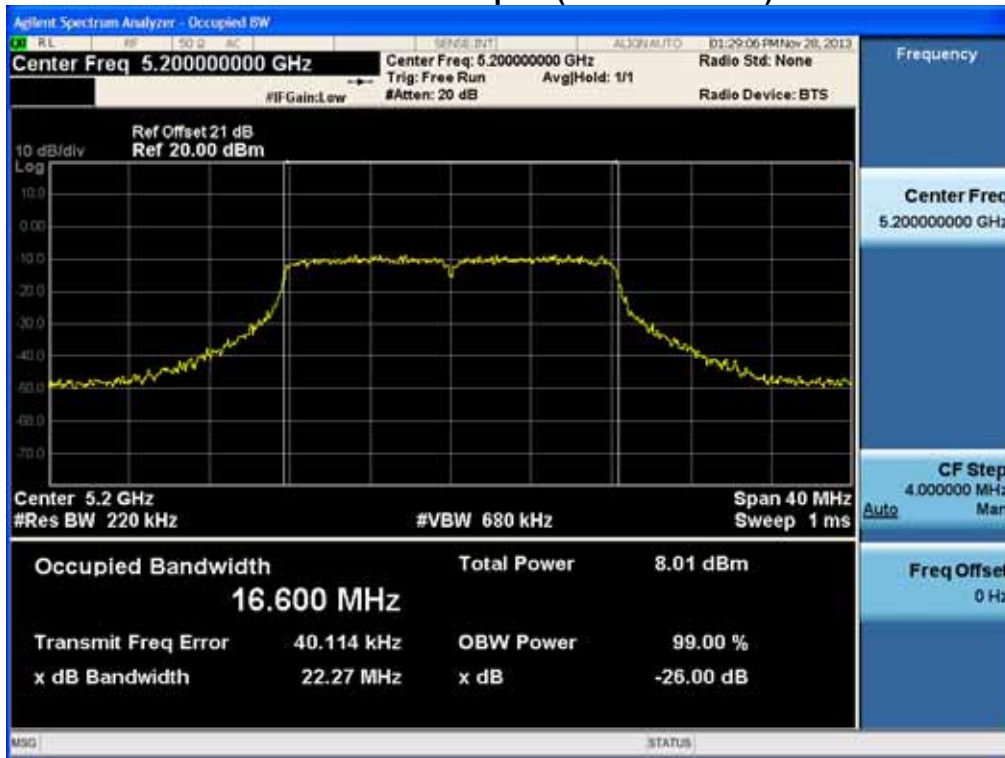
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.3

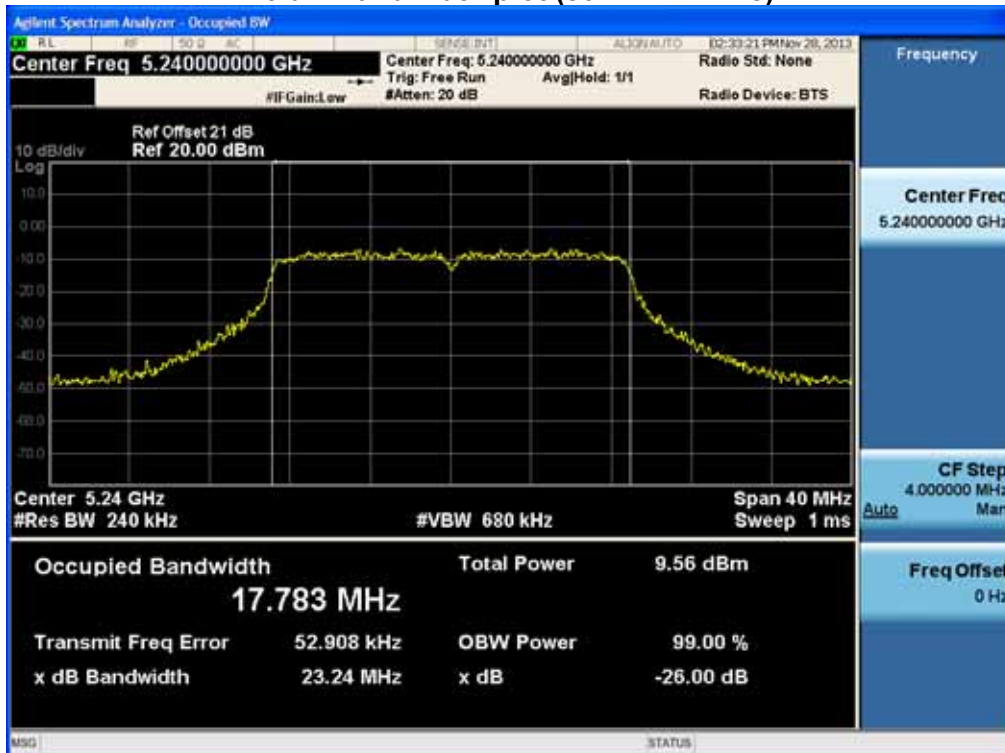
### RESULT PLOTS

20 MHz BW

26 dB Bandwidth plot (802.11a-CH 40)

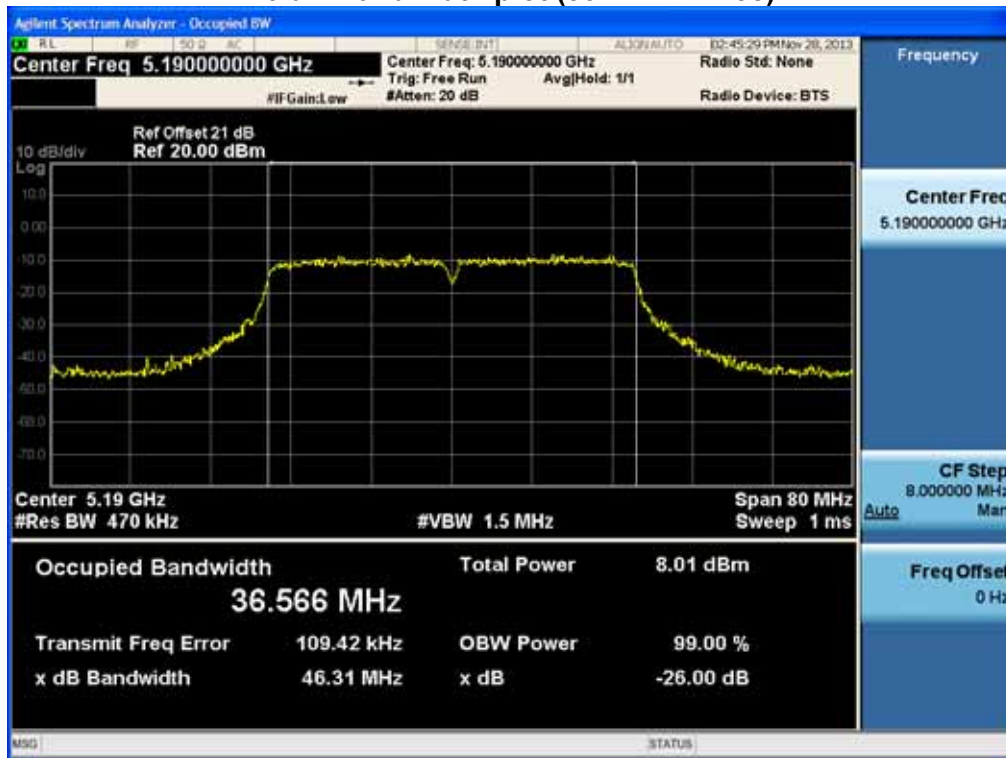


26 dB Bandwidth plot (802.11n-CH 48)



40 MHz BW

### 26 dB Bandwidth plot (802.11n-CH 38)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### 9.3 OUTPUT POWER MEASUREMENT

#### Test Requirements and limit, §15.407(a)(1)

The transmitter output is connected to the input of a RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

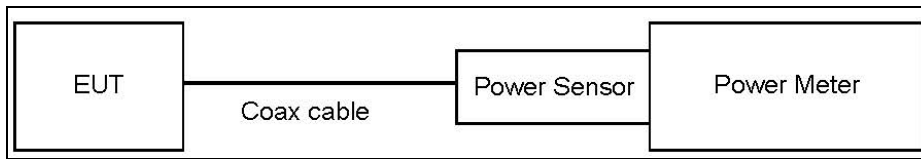
In the 5.15 – 5.25 GHz band, the maximum permissible conducted output power is the lesser of 50 mW ((16.99 dBm) and  $4 \text{ dBm} + 10 \log_{10} (26 \text{ dB BW})$

Limit :

| Operating Mode             | Band   | Mode              | Ant. Gain(dBi) | Limit(dBm) |
|----------------------------|--------|-------------------|----------------|------------|
| SISO :<br>Monitoring       | UNII 1 | 802.11a           | 8              | 14.99      |
|                            |        | 802.11n_20 MHz BW |                |            |
|                            |        | 802.11n_40 MHz BW |                |            |
| SISO :<br>Service          | UNII 1 | 802.11a           | 8              | 14.99      |
|                            |        | 802.11n_20 MHz BW |                |            |
|                            |        | 802.11n_40 MHz BW |                |            |
| MIMO(2 TX) :<br>Monitoring | UNII 1 | 802.11a           | 11.01          | 11.98      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |
| MIMO(2 TX) :<br>Service    | UNII 1 | 802.11a           | 11.01          | 11.98      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |
| MIMO(3 TX) :<br>Service    | UNII 1 | 802.11a           | 12.77          | 10.22      |
|                            |        | 802.11n_20 MHz BW | 8              | 14.99      |
|                            |        | 802.11n_40 MHz BW | 8              | 14.99      |

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

## ■ TEST CONFIGURATION



## ■ TEST PROCEDURE

We tested according to Method E)3)a) in KDB 789033(issued 04/08/2013).

### ▪ Average Power

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add  $10 \log (1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Note :

1. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

(Actual value of loss for the attenuator and cable combination)

## Monitoring Port

### ▣ TEST RESULTS\_Ant.1

#### Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 5.22                | 0.106             | 5.32                                    | 14.99       |
|                 |             | 9           | 5.38                | 0.151             | 5.53                                    | 14.99       |
|                 |             | 12          | 5.49                | 0.200             | 5.69                                    | 14.99       |
|                 |             | 18          | 5.46                | 0.282             | 5.75                                    | 14.99       |
|                 |             | 24          | 5.32                | 0.366             | 5.68                                    | 14.99       |
|                 |             | 36          | 4.11                | 0.531             | 4.64                                    | 14.99       |
|                 |             | 48          | 3.89                | 0.667             | 4.56                                    | 14.99       |
|                 |             | 54          | 2.86                | 0.738             | 3.60                                    | 14.99       |
| 5200            | 40          | 6           | 4.96                | 0.106             | 5.06                                    | 14.99       |
|                 |             | 9           | 4.91                | 0.151             | 5.06                                    | 14.99       |
|                 |             | 12          | 4.88                | 0.200             | 5.07                                    | 14.99       |
|                 |             | 18          | 4.85                | 0.282             | 5.14                                    | 14.99       |
|                 |             | 24          | 4.80                | 0.366             | 5.17                                    | 14.99       |
|                 |             | 36          | 3.78                | 0.531             | 4.31                                    | 14.99       |
|                 |             | 48          | 3.69                | 0.667             | 4.35                                    | 14.99       |
|                 |             | 54          | 2.70                | 0.738             | 3.44                                    | 14.99       |
| 5240            | 48          | 6           | 4.82                | 0.106             | 4.92                                    | 14.99       |
|                 |             | 9           | 4.80                | 0.151             | 4.96                                    | 14.99       |
|                 |             | 12          | 4.75                | 0.200             | 4.95                                    | 14.99       |
|                 |             | 18          | 4.64                | 0.282             | 4.92                                    | 14.99       |
|                 |             | 24          | 4.62                | 0.366             | 4.99                                    | 14.99       |
|                 |             | 36          | 3.58                | 0.531             | 4.11                                    | 14.99       |
|                 |             | 48          | 3.54                | 0.667             | 4.20                                    | 14.99       |
|                 |             | 54          | 2.41                | 0.738             | 3.15                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 5.50                | 0.106             | 5.61                                    | 14.99       |
|                 |             | 9           | 5.41                | 0.151             | 5.56                                    | 14.99       |
|                 |             | 12          | 5.31                | 0.200             | 5.51                                    | 14.99       |
|                 |             | 18          | 5.32                | 0.282             | 5.60                                    | 14.99       |
|                 |             | 24          | 5.17                | 0.366             | 5.54                                    | 14.99       |
|                 |             | 36          | 4.17                | 0.531             | 4.70                                    | 14.99       |
|                 |             | 48          | 4.03                | 0.667             | 4.70                                    | 14.99       |
|                 |             | 54          | 3.10                | 0.738             | 3.84                                    | 14.99       |
| 5200            | 40          | 6           | 5.19                | 0.106             | 5.30                                    | 14.99       |
|                 |             | 9           | 5.20                | 0.151             | 5.35                                    | 14.99       |
|                 |             | 12          | 5.10                | 0.200             | 5.30                                    | 14.99       |
|                 |             | 18          | 5.11                | 0.282             | 5.39                                    | 14.99       |
|                 |             | 24          | 5.04                | 0.366             | 5.40                                    | 14.99       |
|                 |             | 36          | 3.98                | 0.531             | 4.51                                    | 14.99       |
|                 |             | 48          | 3.93                | 0.667             | 4.60                                    | 14.99       |
|                 |             | 54          | 0.23                | 0.738             | 0.97                                    | 14.99       |
| 5240            | 48          | 6           | 4.90                | 0.106             | 5.00                                    | 14.99       |
|                 |             | 9           | 4.85                | 0.151             | 5.00                                    | 14.99       |
|                 |             | 12          | 4.84                | 0.200             | 5.04                                    | 14.99       |
|                 |             | 18          | 4.75                | 0.282             | 5.03                                    | 14.99       |
|                 |             | 24          | 4.84                | 0.366             | 5.20                                    | 14.99       |
|                 |             | 36          | 3.69                | 0.531             | 4.22                                    | 14.99       |
|                 |             | 48          | 3.16                | 0.667             | 3.83                                    | 14.99       |
|                 |             | 54          | 2.78                | 0.738             | 3.51                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 8.48                   | 11.98          |
|                |             | 9              | 8.55                   | 11.98          |
|                |             | 12             | 8.61                   | 11.98          |
|                |             | 18             | 8.68                   | 11.98          |
|                |             | 24             | 8.62                   | 11.98          |
|                |             | 36             | 7.68                   | 11.98          |
|                |             | 48             | 7.64                   | 11.98          |
|                |             | 54             | 6.73                   | 11.98          |
| 5200           | 40          | 6              | 8.19                   | 11.98          |
|                |             | 9              | 8.22                   | 11.98          |
|                |             | 12             | 8.20                   | 11.98          |
|                |             | 18             | 8.28                   | 11.98          |
|                |             | 24             | 8.30                   | 11.98          |
|                |             | 36             | 7.42                   | 11.98          |
|                |             | 48             | 7.49                   | 11.98          |
|                |             | 54             | 5.39                   | 11.98          |
| 5240           | 48          | 6              | 7.97                   | 11.98          |
|                |             | 9              | 7.99                   | 11.98          |
|                |             | 12             | 8.01                   | 11.98          |
|                |             | 18             | 7.98                   | 11.98          |
|                |             | 24             | 8.11                   | 11.98          |
|                |             | 36             | 7.18                   | 11.98          |
|                |             | 48             | 7.03                   | 11.98          |
|                |             | 54             | 6.35                   | 11.98          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 5.09                | 0.102             | 5.19                                    | 14.99       |
|                 |             | 13          | 5.05                | 0.203             | 5.26                                    | 14.99       |
|                 |             | 19.5        | 5.04                | 0.295             | 5.33                                    | 14.99       |
|                 |             | 26          | 5.00                | 0.384             | 5.38                                    | 14.99       |
|                 |             | 39          | 4.90                | 0.530             | 5.43                                    | 14.99       |
|                 |             | 52          | 3.92                | 0.676             | 4.59                                    | 14.99       |
|                 |             | 58.5        | 2.89                | 0.753             | 3.65                                    | 14.99       |
|                 |             | 65          | 2.86                | 0.779             | 3.64                                    | 14.99       |
| 5200            | 40          | 6.5         | 4.85                | 0.102             | 4.95                                    | 14.99       |
|                 |             | 13          | 4.72                | 0.203             | 4.92                                    | 14.99       |
|                 |             | 19.5        | 4.56                | 0.295             | 4.85                                    | 14.99       |
|                 |             | 26          | 4.45                | 0.384             | 4.84                                    | 14.99       |
|                 |             | 39          | 4.31                | 0.530             | 4.84                                    | 14.99       |
|                 |             | 52          | 3.36                | 0.676             | 4.04                                    | 14.99       |
|                 |             | 58.5        | 2.42                | 0.753             | 3.17                                    | 14.99       |
|                 |             | 65          | 2.39                | 0.779             | 3.17                                    | 14.99       |
| 5240            | 48          | 6.5         | 4.47                | 0.102             | 4.57                                    | 14.99       |
|                 |             | 13          | 4.42                | 0.203             | 4.62                                    | 14.99       |
|                 |             | 19.5        | 4.44                | 0.295             | 4.73                                    | 14.99       |
|                 |             | 26          | 4.37                | 0.384             | 4.75                                    | 14.99       |
|                 |             | 39          | 4.28                | 0.530             | 4.81                                    | 14.99       |
|                 |             | 52          | 3.26                | 0.676             | 3.94                                    | 14.99       |
|                 |             | 58.5        | 2.17                | 0.753             | 2.92                                    | 14.99       |
|                 |             | 65          | 2.26                | 0.779             | 3.04                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 5.67                | 0.102             | 5.77                                    | 14.99       |
|                 |             | 13          | 5.64                | 0.203             | 5.84                                    | 14.99       |
|                 |             | 19.5        | 5.55                | 0.295             | 5.84                                    | 14.99       |
|                 |             | 26          | 5.51                | 0.384             | 5.89                                    | 14.99       |
|                 |             | 39          | 5.52                | 0.530             | 6.05                                    | 14.99       |
|                 |             | 52          | 4.42                | 0.676             | 5.09                                    | 14.99       |
|                 |             | 58.5        | 3.11                | 0.753             | 3.86                                    | 14.99       |
|                 |             | 65          | 3.05                | 0.779             | 3.83                                    | 14.99       |
| 5200            | 40          | 6.5         | 4.80                | 0.102             | 4.90                                    | 14.99       |
|                 |             | 13          | 4.62                | 0.203             | 4.82                                    | 14.99       |
|                 |             | 19.5        | 4.48                | 0.295             | 4.78                                    | 14.99       |
|                 |             | 26          | 4.41                | 0.384             | 4.79                                    | 14.99       |
|                 |             | 39          | 4.32                | 0.530             | 4.85                                    | 14.99       |
|                 |             | 52          | 3.28                | 0.676             | 3.96                                    | 14.99       |
|                 |             | 58.5        | -0.02               | 0.753             | 0.73                                    | 14.99       |
|                 |             | 65          | -0.04               | 0.779             | 0.74                                    | 14.99       |
| 5240            | 48          | 6.5         | 4.20                | 0.102             | 4.30                                    | 14.99       |
|                 |             | 13          | 3.98                | 0.203             | 4.18                                    | 14.99       |
|                 |             | 19.5        | 3.97                | 0.295             | 4.27                                    | 14.99       |
|                 |             | 26          | 3.94                | 0.384             | 4.32                                    | 14.99       |
|                 |             | 39          | 3.85                | 0.530             | 4.38                                    | 14.99       |
|                 |             | 52          | 2.92                | 0.676             | 3.60                                    | 14.99       |
|                 |             | 58.5        | 1.91                | 0.753             | 2.66                                    | 14.99       |
|                 |             | 65          | 1.90                | 0.779             | 2.68                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 8.50                   | 14.99          |
|                |             | 13             | 8.57                   | 14.99          |
|                |             | 19.5           | 8.61                   | 14.99          |
|                |             | 26             | 8.65                   | 14.99          |
|                |             | 39             | 8.76                   | 14.99          |
|                |             | 52             | 7.86                   | 14.99          |
|                |             | 58.5           | 6.77                   | 14.99          |
|                |             | 65             | 6.74                   | 14.99          |
| 5200           | 40          | 6.5            | 7.94                   | 14.99          |
|                |             | 13             | 7.88                   | 14.99          |
|                |             | 19.5           | 7.82                   | 14.99          |
|                |             | 26             | 7.83                   | 14.99          |
|                |             | 39             | 7.85                   | 14.99          |
|                |             | 52             | 7.01                   | 14.99          |
|                |             | 58.5           | 5.13                   | 14.99          |
|                |             | 65             | 5.13                   | 14.99          |
| 5240           | 48          | 6.5            | 7.45                   | 14.99          |
|                |             | 13             | 7.42                   | 14.99          |
|                |             | 19.5           | 7.51                   | 14.99          |
|                |             | 26             | 7.55                   | 14.99          |
|                |             | 39             | 7.61                   | 14.99          |
|                |             | 52             | 6.78                   | 14.99          |
|                |             | 58.5           | 5.80                   | 14.99          |
|                |             | 65             | 5.87                   | 14.99          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 2.81                | 0.157             | 2.97                                    | 14.99       |
|                 |             | 27          | 2.58                | 0.296             | 2.87                                    | 14.99       |
|                 |             | 40.5        | 2.55                | 0.408             | 2.95                                    | 14.99       |
|                 |             | 54          | 2.44                | 0.504             | 2.94                                    | 14.99       |
|                 |             | 81          | 2.35                | 0.706             | 3.06                                    | 14.99       |
|                 |             | 108         | 2.33                | 0.880             | 3.21                                    | 14.99       |
|                 |             | 121.5       | 2.23                | 0.918             | 3.15                                    | 14.99       |
|                 |             | 135         | 2.23                | 0.969             | 3.20                                    | 14.99       |
| 5230            | 46          | 13.5        | 2.41                | 0.157             | 2.57                                    | 14.99       |
|                 |             | 27          | 2.34                | 0.296             | 2.64                                    | 14.99       |
|                 |             | 40.5        | 2.22                | 0.408             | 2.63                                    | 14.99       |
|                 |             | 54          | 2.31                | 0.504             | 2.82                                    | 14.99       |
|                 |             | 81          | 2.16                | 0.706             | 2.87                                    | 14.99       |
|                 |             | 108         | 2.05                | 0.880             | 2.93                                    | 14.99       |
|                 |             | 121.5       | 0.83                | 0.918             | 1.75                                    | 14.99       |
|                 |             | 135         | -0.23               | 0.969             | 0.74                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 3.05                | 0.157             | 3.21                                    | 14.99       |
|                 |             | 27          | 3.03                | 0.296             | 3.33                                    | 14.99       |
|                 |             | 40.5        | 2.93                | 0.408             | 3.34                                    | 14.99       |
|                 |             | 54          | 2.85                | 0.504             | 3.36                                    | 14.99       |
|                 |             | 81          | 2.79                | 0.706             | 3.50                                    | 14.99       |
|                 |             | 108         | 2.63                | 0.880             | 3.51                                    | 14.99       |
|                 |             | 121.5       | 2.69                | 0.918             | 3.61                                    | 14.99       |
|                 |             | 135         | 2.55                | 0.969             | 3.52                                    | 14.99       |
| 5230            | 46          | 13.5        | 2.98                | 0.157             | 3.13                                    | 14.99       |
|                 |             | 27          | 2.90                | 0.296             | 3.20                                    | 14.99       |
|                 |             | 40.5        | 2.75                | 0.408             | 3.15                                    | 14.99       |
|                 |             | 54          | 2.49                | 0.504             | 2.99                                    | 14.99       |
|                 |             | 81          | 2.21                | 0.706             | 2.91                                    | 14.99       |
|                 |             | 108         | 2.26                | 0.880             | 3.14                                    | 14.99       |
|                 |             | 121.5       | -2.39               | 0.918             | -1.47                                   | 14.99       |
|                 |             | 135         | -3.54               | 0.969             | -2.57                                   | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 6.10                   | 14.99          |
|                |             | 27             | 6.12                   | 14.99          |
|                |             | 40.5           | 6.16                   | 14.99          |
|                |             | 54             | 6.17                   | 14.99          |
|                |             | 81             | 6.29                   | 14.99          |
|                |             | 108            | 6.38                   | 14.99          |
|                |             | 121.5          | 6.40                   | 14.99          |
|                |             | 135            | 6.38                   | 14.99          |
| 5230           | 46          | 13.5           | 5.87                   | 14.99          |
|                |             | 27             | 5.94                   | 14.99          |
|                |             | 40.5           | 5.91                   | 14.99          |
|                |             | 54             | 5.92                   | 14.99          |
|                |             | 81             | 5.90                   | 14.99          |
|                |             | 108            | 6.05                   | 14.99          |
|                |             | 121.5          | 3.44                   | 14.99          |
|                |             | 135            | 2.40                   | 14.99          |

# Service Port

## TEST RESULTS\_Ant.1

### Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 1.16                | 0.222             | 1.38                                    | 14.99       |
|                 |             | 9           | 1.07                | 0.223             | 1.30                                    | 14.99       |
|                 |             | 12          | 1.03                | 0.274             | 1.30                                    | 14.99       |
|                 |             | 18          | 0.91                | 0.409             | 1.32                                    | 14.99       |
|                 |             | 24          | 0.80                | 0.531             | 1.33                                    | 14.99       |
|                 |             | 36          | 0.56                | 0.738             | 1.30                                    | 14.99       |
|                 |             | 48          | 0.39                | 0.936             | 1.33                                    | 14.99       |
|                 |             | 54          | 0.26                | 1.015             | 1.27                                    | 14.99       |
| 5200            | 40          | 6           | 1.46                | 0.222             | 1.68                                    | 14.99       |
|                 |             | 9           | 1.40                | 0.223             | 1.63                                    | 14.99       |
|                 |             | 12          | 1.33                | 0.274             | 1.61                                    | 14.99       |
|                 |             | 18          | 1.22                | 0.409             | 1.63                                    | 14.99       |
|                 |             | 24          | 1.07                | 0.531             | 1.60                                    | 14.99       |
|                 |             | 36          | 0.84                | 0.738             | 1.57                                    | 14.99       |
|                 |             | 48          | 0.67                | 0.936             | 1.61                                    | 14.99       |
|                 |             | 54          | 0.65                | 1.015             | 1.66                                    | 14.99       |
| 5240            | 48          | 6           | 2.29                | 0.222             | 2.51                                    | 14.99       |
|                 |             | 9           | 2.15                | 0.223             | 2.38                                    | 14.99       |
|                 |             | 12          | 2.16                | 0.274             | 2.43                                    | 14.99       |
|                 |             | 18          | 2.12                | 0.409             | 2.53                                    | 14.99       |
|                 |             | 24          | 1.97                | 0.531             | 2.50                                    | 14.99       |
|                 |             | 36          | 1.67                | 0.738             | 2.41                                    | 14.99       |
|                 |             | 48          | 1.35                | 0.936             | 2.28                                    | 14.99       |
|                 |             | 54          | 1.23                | 1.015             | 2.24                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 0.88                | 0.222             | 1.10                                    | 14.99       |
|                 |             | 9           | 0.62                | 0.223             | 0.85                                    | 14.99       |
|                 |             | 12          | 0.50                | 0.274             | 0.78                                    | 14.99       |
|                 |             | 18          | 0.57                | 0.409             | 0.97                                    | 14.99       |
|                 |             | 24          | 0.44                | 0.531             | 0.97                                    | 14.99       |
|                 |             | 36          | 0.10                | 0.738             | 0.83                                    | 14.99       |
|                 |             | 48          | 0.02                | 0.936             | 0.96                                    | 14.99       |
|                 |             | 54          | -0.12               | 1.015             | 0.90                                    | 14.99       |
| 5200            | 40          | 6           | 0.87                | 0.222             | 1.09                                    | 14.99       |
|                 |             | 9           | 0.76                | 0.223             | 0.98                                    | 14.99       |
|                 |             | 12          | 0.59                | 0.274             | 0.87                                    | 14.99       |
|                 |             | 18          | 0.50                | 0.409             | 0.91                                    | 14.99       |
|                 |             | 24          | 0.47                | 0.531             | 1.00                                    | 14.99       |
|                 |             | 36          | 0.34                | 0.738             | 1.07                                    | 14.99       |
|                 |             | 48          | 0.07                | 0.936             | 1.00                                    | 14.99       |
|                 |             | 54          | 0.08                | 1.015             | 1.09                                    | 14.99       |
| 5240            | 48          | 6           | 2.06                | 0.222             | 2.28                                    | 14.99       |
|                 |             | 9           | 1.90                | 0.223             | 2.12                                    | 14.99       |
|                 |             | 12          | 1.84                | 0.274             | 2.11                                    | 14.99       |
|                 |             | 18          | 1.84                | 0.409             | 2.25                                    | 14.99       |
|                 |             | 24          | 1.63                | 0.531             | 2.16                                    | 14.99       |
|                 |             | 36          | 1.47                | 0.738             | 2.21                                    | 14.99       |
|                 |             | 48          | 1.35                | 0.936             | 2.29                                    | 14.99       |
|                 |             | 54          | 1.27                | 1.015             | 2.29                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6           | 1.59                | 0.222             | 1.81                                    | 14.99       |
|                 |             | 9           | 1.49                | 0.223             | 1.72                                    | 14.99       |
|                 |             | 12          | 1.37                | 0.274             | 1.65                                    | 14.99       |
|                 |             | 18          | 1.20                | 0.409             | 1.60                                    | 14.99       |
|                 |             | 24          | 1.09                | 0.531             | 1.62                                    | 14.99       |
|                 |             | 36          | 0.95                | 0.738             | 1.69                                    | 14.99       |
|                 |             | 48          | 0.75                | 0.936             | 1.69                                    | 14.99       |
|                 |             | 54          | 0.63                | 1.015             | 1.65                                    | 14.99       |
| 5200            | 40          | 6           | 1.84                | 0.222             | 2.07                                    | 14.99       |
|                 |             | 9           | 1.71                | 0.223             | 1.94                                    | 14.99       |
|                 |             | 12          | 1.70                | 0.274             | 1.97                                    | 14.99       |
|                 |             | 18          | 1.62                | 0.409             | 2.03                                    | 14.99       |
|                 |             | 24          | 1.47                | 0.531             | 2.00                                    | 14.99       |
|                 |             | 36          | 1.27                | 0.738             | 2.01                                    | 14.99       |
|                 |             | 48          | 1.08                | 0.936             | 2.01                                    | 14.99       |
|                 |             | 54          | 1.01                | 1.015             | 2.03                                    | 14.99       |
| 5240            | 48          | 6           | 2.84                | 0.222             | 3.06                                    | 14.99       |
|                 |             | 9           | 2.74                | 0.223             | 2.97                                    | 14.99       |
|                 |             | 12          | 2.69                | 0.274             | 2.97                                    | 14.99       |
|                 |             | 18          | 2.58                | 0.409             | 2.99                                    | 14.99       |
|                 |             | 24          | 2.52                | 0.531             | 3.05                                    | 14.99       |
|                 |             | 36          | 2.29                | 0.738             | 3.03                                    | 14.99       |
|                 |             | 48          | 2.08                | 0.936             | 3.02                                    | 14.99       |
|                 |             | 54          | 2.07                | 1.015             | 3.08                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 4.25                   | 11.98          |
|                |             | 9              | 4.09                   | 11.98          |
|                |             | 12             | 4.06                   | 11.98          |
|                |             | 18             | 4.16                   | 11.98          |
|                |             | 24             | 4.16                   | 11.98          |
|                |             | 36             | 4.08                   | 11.98          |
|                |             | 48             | 4.16                   | 11.98          |
|                |             | 54             | 4.10                   | 11.98          |
| 5200           | 40          | 6              | 4.41                   | 11.98          |
|                |             | 9              | 4.33                   | 11.98          |
|                |             | 12             | 4.26                   | 11.98          |
|                |             | 18             | 4.30                   | 11.98          |
|                |             | 24             | 4.32                   | 11.98          |
|                |             | 36             | 4.34                   | 11.98          |
|                |             | 48             | 4.33                   | 11.98          |
|                |             | 54             | 4.40                   | 11.98          |
| 5240           | 48          | 6              | 5.41                   | 11.98          |
|                |             | 9              | 5.26                   | 11.98          |
|                |             | 12             | 5.29                   | 11.98          |
|                |             | 18             | 5.40                   | 11.98          |
|                |             | 24             | 5.34                   | 11.98          |
|                |             | 36             | 5.32                   | 11.98          |
|                |             | 48             | 5.30                   | 11.98          |
|                |             | 54             | 5.28                   | 11.98          |

■ TEST RESULTS\_Sum Data of Ant.1, Ant.2 and Ant 3

Conducted Output Power Measurements (802.11a Mode: 5180~5240)

| 802.11a Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6              | 6.21                   | 10.22          |
|                |             | 9              | 6.07                   | 10.22          |
|                |             | 12             | 6.03                   | 10.22          |
|                |             | 18             | 6.08                   | 10.22          |
|                |             | 24             | 6.08                   | 10.22          |
|                |             | 36             | 6.06                   | 10.22          |
|                |             | 48             | 6.11                   | 10.22          |
|                |             | 54             | 6.05                   | 10.22          |
| 5200           | 40          | 6              | 6.40                   | 10.22          |
|                |             | 9              | 6.31                   | 10.22          |
|                |             | 12             | 6.28                   | 10.22          |
|                |             | 18             | 6.32                   | 10.22          |
|                |             | 24             | 6.33                   | 10.22          |
|                |             | 36             | 6.34                   | 10.22          |
|                |             | 48             | 6.33                   | 10.22          |
|                |             | 54             | 6.38                   | 10.22          |
| 5240           | 48          | 6              | 7.40                   | 10.22          |
|                |             | 9              | 7.27                   | 10.22          |
|                |             | 12             | 7.29                   | 10.22          |
|                |             | 18             | 7.37                   | 10.22          |
|                |             | 24             | 7.36                   | 10.22          |
|                |             | 36             | 7.33                   | 10.22          |
|                |             | 48             | 7.31                   | 10.22          |
|                |             | 54             | 7.33                   | 10.22          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 1.05                | 0.161             | 1.22                                    | 14.99       |
|                 |             | 13          | 0.97                | 0.295             | 1.26                                    | 14.99       |
|                 |             | 19.5        | 0.90                | 0.426             | 1.33                                    | 14.99       |
|                 |             | 26          | 0.86                | 0.528             | 1.39                                    | 14.99       |
|                 |             | 39          | 0.66                | 0.735             | 1.39                                    | 14.99       |
|                 |             | 52          | 0.35                | 0.896             | 1.25                                    | 14.99       |
|                 |             | 58.5        | 0.45                | 0.969             | 1.42                                    | 14.99       |
|                 |             | 65          | 0.23                | 1.082             | 1.31                                    | 14.99       |
| 5200            | 40          | 6.5         | 1.64                | 0.161             | 1.81                                    | 14.99       |
|                 |             | 13          | 1.55                | 0.295             | 1.84                                    | 14.99       |
|                 |             | 19.5        | 1.39                | 0.426             | 1.82                                    | 14.99       |
|                 |             | 26          | 1.33                | 0.528             | 1.86                                    | 14.99       |
|                 |             | 39          | 1.17                | 0.735             | 1.90                                    | 14.99       |
|                 |             | 52          | 1.02                | 0.896             | 1.92                                    | 14.99       |
|                 |             | 58.5        | 0.95                | 0.969             | 1.92                                    | 14.99       |
|                 |             | 65          | 0.91                | 1.082             | 1.99                                    | 14.99       |
| 5240            | 48          | 6.5         | 2.17                | 0.161             | 2.34                                    | 14.99       |
|                 |             | 13          | 2.04                | 0.295             | 2.34                                    | 14.99       |
|                 |             | 19.5        | 1.84                | 0.426             | 2.27                                    | 14.99       |
|                 |             | 26          | 1.79                | 0.528             | 2.32                                    | 14.99       |
|                 |             | 39          | 1.61                | 0.735             | 2.35                                    | 14.99       |
|                 |             | 52          | 1.45                | 0.896             | 2.35                                    | 14.99       |
|                 |             | 58.5        | 1.39                | 0.969             | 2.36                                    | 14.99       |
|                 |             | 65          | 1.30                | 1.082             | 2.38                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 0.003               | 0.161             | 0.16                                    | 14.99       |
|                 |             | 13          | 0.194               | 0.295             | 0.49                                    | 14.99       |
|                 |             | 19.5        | -0.021              | 0.426             | 0.40                                    | 14.99       |
|                 |             | 26          | -0.086              | 0.528             | 0.44                                    | 14.99       |
|                 |             | 39          | -0.374              | 0.735             | 0.36                                    | 14.99       |
|                 |             | 52          | -0.511              | 0.896             | 0.39                                    | 14.99       |
|                 |             | 58.5        | -0.526              | 0.969             | 0.44                                    | 14.99       |
|                 |             | 65          | -0.617              | 1.082             | 0.47                                    | 14.99       |
| 5200            | 40          | 6.5         | 0.852               | 0.161             | 1.01                                    | 14.99       |
|                 |             | 13          | 0.690               | 0.295             | 0.99                                    | 14.99       |
|                 |             | 19.5        | 0.633               | 0.426             | 1.06                                    | 14.99       |
|                 |             | 26          | 0.599               | 0.528             | 1.13                                    | 14.99       |
|                 |             | 39          | 0.350               | 0.735             | 1.09                                    | 14.99       |
|                 |             | 52          | 0.276               | 0.896             | 1.17                                    | 14.99       |
|                 |             | 58.5        | 0.233               | 0.969             | 1.20                                    | 14.99       |
|                 |             | 65          | 0.132               | 1.082             | 1.21                                    | 14.99       |
| 5240            | 48          | 6.5         | 2.065               | 0.161             | 2.23                                    | 14.99       |
|                 |             | 13          | 1.915               | 0.295             | 2.21                                    | 14.99       |
|                 |             | 19.5        | 1.822               | 0.426             | 2.25                                    | 14.99       |
|                 |             | 26          | 1.724               | 0.528             | 2.25                                    | 14.99       |
|                 |             | 39          | 1.531               | 0.735             | 2.27                                    | 14.99       |
|                 |             | 52          | 1.409               | 0.896             | 2.30                                    | 14.99       |
|                 |             | 58.5        | 1.399               | 0.969             | 2.37                                    | 14.99       |
|                 |             | 65          | 1.304               | 1.082             | 2.39                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5180            | 36          | 6.5         | 1.46                | 0.161             | 1.62                                    | 14.99       |
|                 |             | 13          | 1.24                | 0.295             | 1.53                                    | 14.99       |
|                 |             | 19.5        | 1.18                | 0.426             | 1.61                                    | 14.99       |
|                 |             | 26          | 1.06                | 0.528             | 1.59                                    | 14.99       |
|                 |             | 39          | 0.83                | 0.735             | 1.56                                    | 14.99       |
|                 |             | 52          | 0.69                | 0.896             | 1.58                                    | 14.99       |
|                 |             | 58.5        | 0.66                | 0.969             | 1.63                                    | 14.99       |
|                 |             | 65          | 0.50                | 1.082             | 1.59                                    | 14.99       |
| 5200            | 40          | 6.5         | 1.82                | 0.161             | 1.98                                    | 14.99       |
|                 |             | 13          | 1.75                | 0.295             | 2.05                                    | 14.99       |
|                 |             | 19.5        | 1.58                | 0.426             | 2.00                                    | 14.99       |
|                 |             | 26          | 1.55                | 0.528             | 2.08                                    | 14.99       |
|                 |             | 39          | 1.42                | 0.735             | 2.16                                    | 14.99       |
|                 |             | 52          | 1.27                | 0.896             | 2.17                                    | 14.99       |
|                 |             | 58.5        | 1.12                | 0.969             | 2.09                                    | 14.99       |
|                 |             | 65          | 1.08                | 1.082             | 2.17                                    | 14.99       |
| 5240            | 48          | 6.5         | 2.98                | 0.161             | 3.14                                    | 14.99       |
|                 |             | 13          | 2.86                | 0.295             | 3.16                                    | 14.99       |
|                 |             | 19.5        | 2.80                | 0.426             | 3.23                                    | 14.99       |
|                 |             | 26          | 2.65                | 0.528             | 3.18                                    | 14.99       |
|                 |             | 39          | 2.52                | 0.735             | 3.25                                    | 14.99       |
|                 |             | 52          | 2.33                | 0.896             | 3.23                                    | 14.99       |
|                 |             | 58.5        | 2.27                | 0.969             | 3.24                                    | 14.99       |
|                 |             | 65          | 2.21                | 1.082             | 3.29                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 3.73                   | 14.99          |
|                |             | 13             | 3.90                   | 14.99          |
|                |             | 19.5           | 3.90                   | 14.99          |
|                |             | 26             | 3.95                   | 14.99          |
|                |             | 39             | 3.92                   | 14.99          |
|                |             | 52             | 3.85                   | 14.99          |
|                |             | 58.5           | 3.97                   | 14.99          |
|                |             | 65             | 3.92                   | 14.99          |
| 5200           | 40          | 6.5            | 4.44                   | 14.99          |
|                |             | 13             | 4.44                   | 14.99          |
|                |             | 19.5           | 4.47                   | 14.99          |
|                |             | 26             | 4.52                   | 14.99          |
|                |             | 39             | 4.52                   | 14.99          |
|                |             | 52             | 4.57                   | 14.99          |
|                |             | 58.5           | 4.58                   | 14.99          |
|                |             | 65             | 4.63                   | 14.99          |
| 5240           | 48          | 6.5            | 5.29                   | 14.99          |
|                |             | 13             | 5.28                   | 14.99          |
|                |             | 19.5           | 5.27                   | 14.99          |
|                |             | 26             | 5.30                   | 14.99          |
|                |             | 39             | 5.32                   | 14.99          |
|                |             | 52             | 5.34                   | 14.99          |
|                |             | 58.5           | 5.37                   | 14.99          |
|                |             | 65             | 5.39                   | 14.99          |

■ TEST RESULTS\_Sum Data of Ant.1, Ant.2 and Ant 3

Conducted Output Power Measurements (802.11n\_20 MHz BW Mode: 5180~5240)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5180           | 36          | 6.5            | 5.81                   | 14.99          |
|                |             | 13             | 5.89                   | 14.99          |
|                |             | 19.5           | 5.91                   | 14.99          |
|                |             | 26             | 5.94                   | 14.99          |
|                |             | 39             | 5.91                   | 14.99          |
|                |             | 52             | 5.87                   | 14.99          |
|                |             | 58.5           | 5.96                   | 14.99          |
|                |             | 65             | 5.92                   | 14.99          |
| 5200           | 40          | 6.5            | 6.39                   | 14.99          |
|                |             | 13             | 6.42                   | 14.99          |
|                |             | 19.5           | 6.42                   | 14.99          |
|                |             | 26             | 6.48                   | 14.99          |
|                |             | 39             | 6.51                   | 14.99          |
|                |             | 52             | 6.54                   | 14.99          |
|                |             | 58.5           | 6.52                   | 14.99          |
|                |             | 65             | 6.58                   | 14.99          |
| 5240           | 48          | 6.5            | 7.36                   | 14.99          |
|                |             | 13             | 7.36                   | 14.99          |
|                |             | 19.5           | 7.38                   | 14.99          |
|                |             | 26             | 7.38                   | 14.99          |
|                |             | 39             | 7.42                   | 14.99          |
|                |             | 52             | 7.42                   | 14.99          |
|                |             | 58.5           | 7.45                   | 14.99          |
|                |             | 65             | 7.48                   | 14.99          |

■ TEST RESULTS\_Ant.1

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 1.38                | 0.228             | 1.61                                    | 14.99       |
|                 |             | 27          | 1.26                | 0.421             | 1.68                                    | 14.99       |
|                 |             | 40.5        | 1.03                | 0.552             | 1.58                                    | 14.99       |
|                 |             | 54          | 0.95                | 0.683             | 1.64                                    | 14.99       |
|                 |             | 81          | 0.77                | 0.950             | 1.72                                    | 14.99       |
|                 |             | 108         | 0.59                | 1.091             | 1.68                                    | 14.99       |
|                 |             | 121.5       | 0.57                | 1.165             | 1.74                                    | 14.99       |
|                 |             | 135         | 0.43                | 1.249             | 1.68                                    | 14.99       |
| 5230            | 46          | 13.5        | 1.75                | 0.228             | 1.98                                    | 14.99       |
|                 |             | 27          | 1.58                | 0.421             | 2.01                                    | 14.99       |
|                 |             | 40.5        | 1.37                | 0.552             | 1.92                                    | 14.99       |
|                 |             | 54          | 1.34                | 0.683             | 2.02                                    | 14.99       |
|                 |             | 81          | 0.86                | 0.950             | 1.81                                    | 14.99       |
|                 |             | 108         | 0.61                | 1.091             | 1.70                                    | 14.99       |
|                 |             | 121.5       | 0.53                | 1.165             | 1.70                                    | 14.99       |
|                 |             | 135         | 0.37                | 1.249             | 1.62                                    | 14.99       |

■ TEST RESULTS\_Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 0.50                | 0.228             | 0.73                                    | 14.99       |
|                 |             | 27          | 0.59                | 0.421             | 1.01                                    | 14.99       |
|                 |             | 40.5        | 0.28                | 0.552             | 0.83                                    | 14.99       |
|                 |             | 54          | 0.21                | 0.683             | 0.89                                    | 14.99       |
|                 |             | 81          | -0.05               | 0.950             | 0.90                                    | 14.99       |
|                 |             | 108         | -0.16               | 1.091             | 0.94                                    | 14.99       |
|                 |             | 121.5       | -0.34               | 1.165             | 0.83                                    | 14.99       |
|                 |             | 135         | -0.52               | 1.249             | 0.73                                    | 14.99       |
| 5230            | 46          | 13.5        | 0.91                | 0.228             | 1.14                                    | 14.99       |
|                 |             | 27          | 0.77                | 0.421             | 1.19                                    | 14.99       |
|                 |             | 40.5        | 0.62                | 0.552             | 1.17                                    | 14.99       |
|                 |             | 54          | 0.43                | 0.683             | 1.11                                    | 14.99       |
|                 |             | 81          | 0.36                | 0.950             | 1.31                                    | 14.99       |
|                 |             | 108         | 0.23                | 1.091             | 1.32                                    | 14.99       |
|                 |             | 121.5       | 0.09                | 1.165             | 1.26                                    | 14.99       |
|                 |             | 135         | 0.04                | 1.249             | 1.29                                    | 14.99       |

■ TEST RESULTS\_Ant.3

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode    |             | Rate (Mbps) | Measured Power(dBm) | Duty Cycle Factor | Measured Power(dBm) + Duty Cycle Factor | Limit (dBm) |
|-----------------|-------------|-------------|---------------------|-------------------|-----------------------------------------|-------------|
| Frequency [MHz] | Channel No. |             |                     |                   |                                         |             |
| 5190            | 38          | 13.5        | 1.64                | 0.228             | 1.87                                    | 14.99       |
|                 |             | 27          | 1.40                | 0.421             | 1.82                                    | 14.99       |
|                 |             | 40.5        | 1.15                | 0.552             | 1.70                                    | 14.99       |
|                 |             | 54          | 1.03                | 0.683             | 1.71                                    | 14.99       |
|                 |             | 81          | 0.85                | 0.950             | 1.80                                    | 14.99       |
|                 |             | 108         | 0.67                | 1.091             | 1.76                                    | 14.99       |
|                 |             | 121.5       | 0.60                | 1.165             | 1.76                                    | 14.99       |
|                 |             | 135         | 0.54                | 1.249             | 1.79                                    | 14.99       |
| 5230            | 46          | 13.5        | 2.15                | 0.228             | 2.37                                    | 14.99       |
|                 |             | 27          | 2.05                | 0.421             | 2.47                                    | 14.99       |
|                 |             | 40.5        | 1.77                | 0.552             | 2.33                                    | 14.99       |
|                 |             | 54          | 1.60                | 0.683             | 2.28                                    | 14.99       |
|                 |             | 81          | 1.47                | 0.950             | 2.42                                    | 14.99       |
|                 |             | 108         | 1.27                | 1.091             | 2.36                                    | 14.99       |
|                 |             | 121.5       | 1.27                | 1.165             | 2.44                                    | 14.99       |
|                 |             | 135         | 1.07                | 1.249             | 2.32                                    | 14.99       |

■ TEST RESULTS\_Sum Data of Ant.1 and Ant.2

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 4.20                   | 14.99          |
|                |             | 27             | 4.37                   | 14.99          |
|                |             | 40.5           | 4.23                   | 14.99          |
|                |             | 54             | 4.29                   | 14.99          |
|                |             | 81             | 4.34                   | 14.99          |
|                |             | 108            | 4.33                   | 14.99          |
|                |             | 121.5          | 4.32                   | 14.99          |
|                |             | 135            | 4.24                   | 14.99          |
| 5230           | 46          | 13.5           | 4.59                   | 14.99          |
|                |             | 27             | 4.63                   | 14.99          |
|                |             | 40.5           | 4.57                   | 14.99          |
|                |             | 54             | 4.60                   | 14.99          |
|                |             | 81             | 4.58                   | 14.99          |
|                |             | 108            | 4.53                   | 14.99          |
|                |             | 121.5          | 4.49                   | 14.99          |
|                |             | 135            | 4.47                   | 14.99          |

■ TEST RESULTS\_Sum Data of Ant.1, Ant.2 Ant 3

Conducted Output Power Measurements (802.11n\_40 MHz BW Mode: 5190~5230)

| 802.11n Mode   |             | Rate<br>(Mbps) | Measured<br>Power(dBm) | Limit<br>(dBm) |
|----------------|-------------|----------------|------------------------|----------------|
| Frequency[MHz] | Channel No. |                |                        |                |
| 5190           | 38          | 13.5           | 6.20                   | 14.99          |
|                |             | 27             | 6.29                   | 14.99          |
|                |             | 40.5           | 6.16                   | 14.99          |
|                |             | 54             | 6.20                   | 14.99          |
|                |             | 81             | 6.26                   | 14.99          |
|                |             | 108            | 6.25                   | 14.99          |
|                |             | 121.5          | 6.24                   | 14.99          |
|                |             | 135            | 6.20                   | 14.99          |
| 5230           | 46          | 13.5           | 6.63                   | 14.99          |
|                |             | 27             | 6.69                   | 14.99          |
|                |             | 40.5           | 6.61                   | 14.99          |
|                |             | 54             | 6.60                   | 14.99          |
|                |             | 81             | 6.65                   | 14.99          |
|                |             | 108            | 6.59                   | 14.99          |
|                |             | 121.5          | 6.59                   | 14.99          |
|                |             | 135            | 6.53                   | 14.99          |

## 9.4 POWER SPECTRAL DENSITY

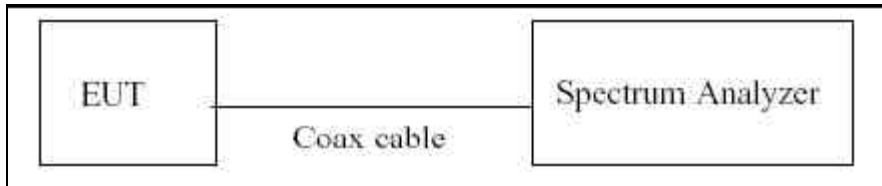
The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. The maximum permissible peak power spectral density is 4 dBm/ MHz in the 5.15 GHz – 5.25 GHz band.

Limit :

| Operating Mode             | Band   | Mode              | Ant. Gain(dBi) | Limt(dBm) |
|----------------------------|--------|-------------------|----------------|-----------|
| SISO :<br>Monitoring       | UNII 1 | 802.11a           | 8              | 2         |
|                            |        | 802.11n_20 MHz BW |                |           |
|                            |        | 802.11n_40 MHz BW |                |           |
| SISO :<br>Service          | UNII 1 | 802.11a           | 8              | 2         |
|                            |        | 802.11n_20 MHz BW |                |           |
|                            |        | 802.11n_40 MHz BW |                |           |
| MIMO(2 TX) :<br>Monitoring | UNII 1 | 802.11a           | 11.01          | -1.01     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |
| MIMO(2 TX) :<br>Service    | UNII 1 | 802.11a           | 11.01          | -1.01     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |
| MIMO(3 TX) :<br>Service    | UNII 1 | 802.11a           | 12.77          | -2.77     |
|                            |        | 802.11n_20 MHz BW | 8              | 2         |
|                            |        | 802.11n_40 MHz BW | 8              | 2         |

Note : Above the limits is calculated according to antenna gain. Because antenna gain is higher than 6 dBi.

## ■ TEST CONFIGURATION



## ■ TEST PROCEDURE

We tested according to Method in KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz.
3. VBW  $\geq$  3 MHz.
4. Number of points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to "free run".
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add  $10 \log(1/x)$ , where x is the duty cycle, to the peak of the spectrum.

## ■ Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Output Power = -5 dBm + 10 dB + 0.8 dB + 0.21 dB = 16.01 dBm

Note :

1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

(Actual value of loss for the attenuator and cable combination)

# Monitoring Port Ant.1

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode     | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|----------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |          | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a  | -7.060                       | 0.28187                | -6.778                                          | 2           | Pass      |
| 5200            | 40          |          | -7.356                       | 0.366106               | -6.990                                          |             | Pass      |
| 5240            | 48          |          | -6.898                       | 0.366106               | -6.532                                          |             | Pass      |
| 5180            | 36          | 802.11n  | -7.221                       | 0.529566               | -6.691                                          |             | Pass      |
| 5200            | 40          | 20MHz    | -7.436                       | 0.10246                | -7.334                                          |             | Pass      |
| 5240            | 48          | BW       | -7.736                       | 0.529566               | -7.206                                          |             | Pass      |
| 5190            | 38          | 802.11n  | -12.686                      | 0.879552               | -11.806                                         |             | Pass      |
| 5230            | 46          | 40MHz BW | -12.708                      | 0.879552               | -11.828                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Monitoring Port Ant.2

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode     | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|----------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |          | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a  | -6.850                       | 0.10619                | -6.744                                          | 2           | Pass      |
| 5200            | 40          |          | -7.237                       | 0.366106               | -6.871                                          |             | Pass      |
| 5240            | 48          |          | -7.433                       | 0.366106               | -7.067                                          |             | Pass      |
| 5180            | 36          | 802.11n  | -7.196                       | 0.529566               | -6.666                                          |             | Pass      |
| 5200            | 40          | 20MHz    | -7.454                       | 0.10246                | -7.352                                          |             | Pass      |
| 5240            | 48          | BW       | -7.674                       | 0.529566               | -7.144                                          |             | Pass      |
| 5190            | 38          | 802.11n  | -13.141                      | 0.917704               | -12.223                                         |             | Pass      |
| 5230            | 46          | 40MHz BW | -12.721                      | 0.296027               | -12.425                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

## Sum Data of Monitoring Port Ant.1 and Ant.2

### ■ TEST RESULTS

#### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -3.75                           | -1.01          | Pass      |
| 5200               | 40             |             | -3.92                           |                | Pass      |
| 5240               | 48             |             | -3.78                           |                | Pass      |
| 5180               | 36             | 802.11n     | -3.67                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -4.33                           |                | Pass      |
| 5240               | 48             | BW          | -4.17                           |                | Pass      |
| 5190               | 38             | 802.11n     | -9.00                           |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -9.11                           |                | Pass      |

#### Note :

1. Limit is -1.01 dBm for 802.11a. Because directional antenna gain is 11.01 dBi for 802.11a.
2. Sample Calculation  

$$4 \text{ dBm} - (11.01 \text{ dB} - 6 \text{ dB}) = -1.01 \text{ dBm}$$

# Service Port Ant.1

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode             | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                  | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a          | -11.024                      | 0.221951               | -10.802                                         | 2           | Pass      |
| 5200            | 40          |                  | -11.046                      | 0.221951               | -10.824                                         |             | Pass      |
| 5240            | 48          |                  | -10.107                      | 0.40884                | -9.698                                          |             | Pass      |
| 5180            | 36          | 802.11n 20MHz BW | -11.832                      | 0.9691                 | -10.863                                         |             | Pass      |
| 5200            | 40          |                  | -11.404                      | 1.08233                | -10.322                                         |             | Pass      |
| 5240            | 48          |                  | -10.698                      | 1.08233                | -9.616                                          |             | Pass      |
| 5190            | 38          | 802.11n 40MHz BW | -14.288                      | 1.165056               | -13.123                                         |             | Pass      |
| 5230            | 46          |                  | -13.665                      | 0.682648               | -12.982                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Service Port Ant.2

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency (MHz) | Channel No. | Mode             | Test Result                  |                        |                                                 |             |           |
|-----------------|-------------|------------------|------------------------------|------------------------|-------------------------------------------------|-------------|-----------|
|                 |             |                  | Measured Power Density (dBm) | Duty Cycle Factor (dB) | Measured Power Density(dBm) + Duty Cycle Factor | Limit (dBm) | Pass/Fail |
| 5180            | 36          | 802.11a          | -10.728                      | 0.221951               | -10.506                                         | 2           | Pass      |
| 5200            | 40          |                  | -10.641                      | 0.221951               | -10.419                                         |             | Pass      |
| 5240            | 48          |                  | -9.830                       | 1.014576               | -8.815                                          |             | Pass      |
| 5180            | 36          | 802.11n 20MHz BW | -11.717                      | 0.294767               | -11.422                                         |             | Pass      |
| 5200            | 40          |                  | -11.559                      | 1.08233                | -10.477                                         |             | Pass      |
| 5240            | 48          |                  | -9.781                       | 1.08233                | -8.699                                          |             | Pass      |
| 5190            | 38          | 802.11n 40MHz BW | -14.315                      | 0.421014               | -13.894                                         |             | Pass      |
| 5230            | 46          |                  | -13.811                      | 1.091445               | -12.720                                         |             | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

# Service Port Ant.3

## ■ TEST RESULTS

### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode                   | Test Result                           |                              |                                                                |                |           |
|--------------------|----------------|------------------------|---------------------------------------|------------------------------|----------------------------------------------------------------|----------------|-----------|
|                    |                |                        | Measured<br>Power<br>Density<br>(dBm) | Duty Cycle<br>Factor<br>(dB) | Measured<br>Power<br>Density(dBm)<br>+<br>Duty Cycle<br>Factor | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a                | -9.462                                | 0.221951                     | -9.240                                                         | 2              | Pass      |
| 5200               | 40             |                        | -9.386                                | 0.221951                     | -9.164                                                         |                | Pass      |
| 5240               | 48             |                        | -8.868                                | 1.014576                     | -7.853                                                         |                | Pass      |
| 5180               | 36             | 802.11n<br>20MHz<br>BW | -10.764                               | 0.9691                       | -9.795                                                         |                | Pass      |
| 5200               | 40             |                        | -10.406                               | 0.896108                     | -9.510                                                         |                | Pass      |
| 5240               | 48             |                        | -8.936                                | 1.08233                      | -7.854                                                         |                | Pass      |
| 5190               | 38             | 802.11n<br>40MHz<br>BW | -13.107                               | 0.228275                     | -12.879                                                        |                | Pass      |
| 5230               | 46             |                        | -12.239                               | 0.421014                     | -11.818                                                        |                | Pass      |

Note : In order to simplify the report, attached plots were only the highest PSD channel.

## Sum Data of Service Port Ant.1 and Ant.2

### ■ TEST RESULTS

#### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -7.64                           | -1.01          | Pass      |
| 5200               | 40             |             | -7.61                           |                | Pass      |
| 5240               | 48             |             | -6.22                           |                | Pass      |
| 5180               | 36             | 802.11n     | -8.12                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -7.39                           |                | Pass      |
| 5240               | 48             | BW          | -6.12                           |                | Pass      |
| 5190               | 38             | 802.11n     | -10.48                          |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -9.84                           |                | Pass      |

Note :

1. Limit is -1.01 dBm for 802.11a. Because directional antenna gain is 11.01 dBi for 802.11a.

2. Sample Calculation

$$4 \text{ dBm} - (11.01 \text{ dB} - 6 \text{ dB}) = -1.01 \text{ dBm}$$

## Sum Data of Service Port Ant.1, Ant.2 and Ant.3

### ■ TEST RESULTS

#### Conducted Power Density Measurements

| Frequency<br>(MHz) | Channel<br>No. | Mode        | Test Result                     |                |           |
|--------------------|----------------|-------------|---------------------------------|----------------|-----------|
|                    |                |             | Measured Power<br>Density (dBm) | Limit<br>(dBm) | Pass/Fail |
| 5180               | 36             | 802.11a     | -5.36                           | -2.77          | Pass      |
| 5200               | 40             |             | -5.31                           |                | Pass      |
| 5240               | 48             |             | -3.95                           |                | Pass      |
| 5180               | 36             | 802.11n     | -5.87                           | 2              | Pass      |
| 5200               | 40             | 20MHz       | -5.31                           |                | Pass      |
| 5240               | 48             | BW          | -3.89                           |                | Pass      |
| 5190               | 38             | 802.11n     | -8.51                           |                | Pass      |
| 5230               | 46             | 40MHz<br>BW | -7.71                           |                | Pass      |

Note :

1. Limit is -2.77 dBm. Because directional antenna gain is 12.77 dBi for 802.11a.

2. Sample Calculation

$$4 \text{ dBm} - (12.77 \text{ dB} - 6 \text{ dB}) = -2.77 \text{ dBm}$$

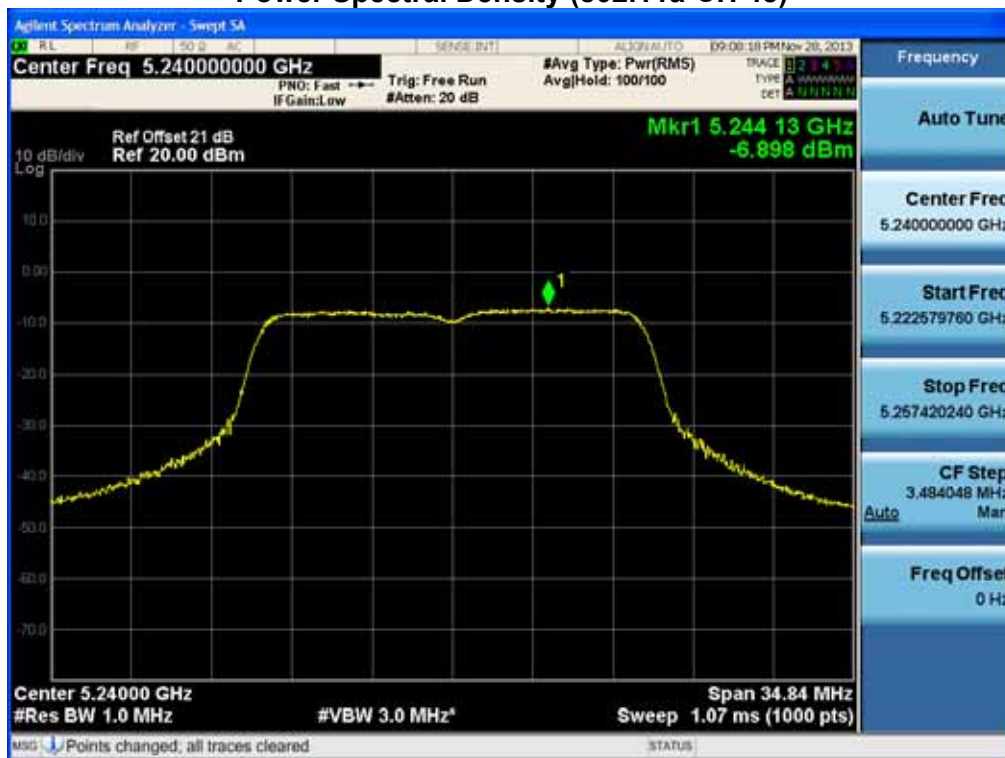
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.1

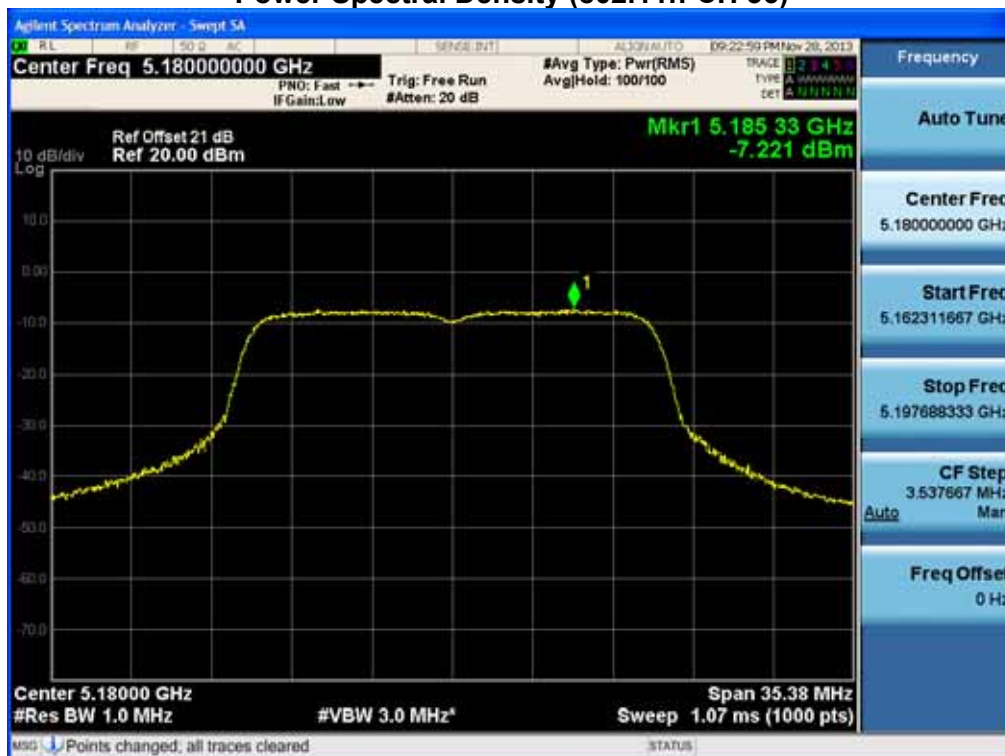
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)



#### Power Spectral Density (802.11n-CH 36)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 38)



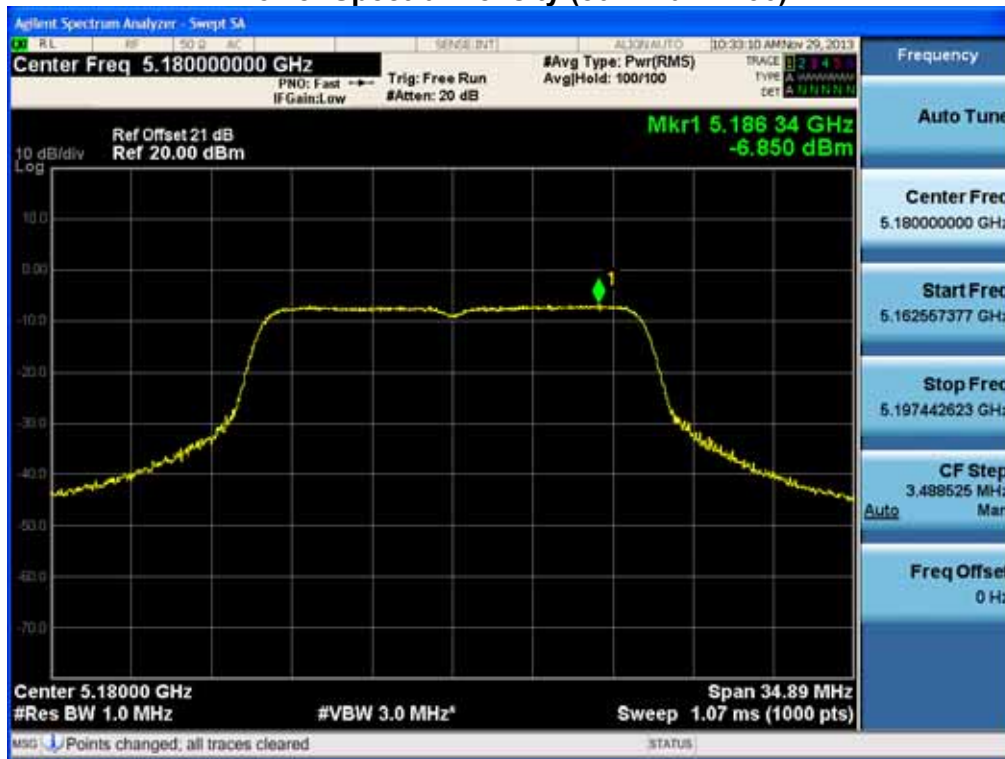
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Monitoring Port Ant.2

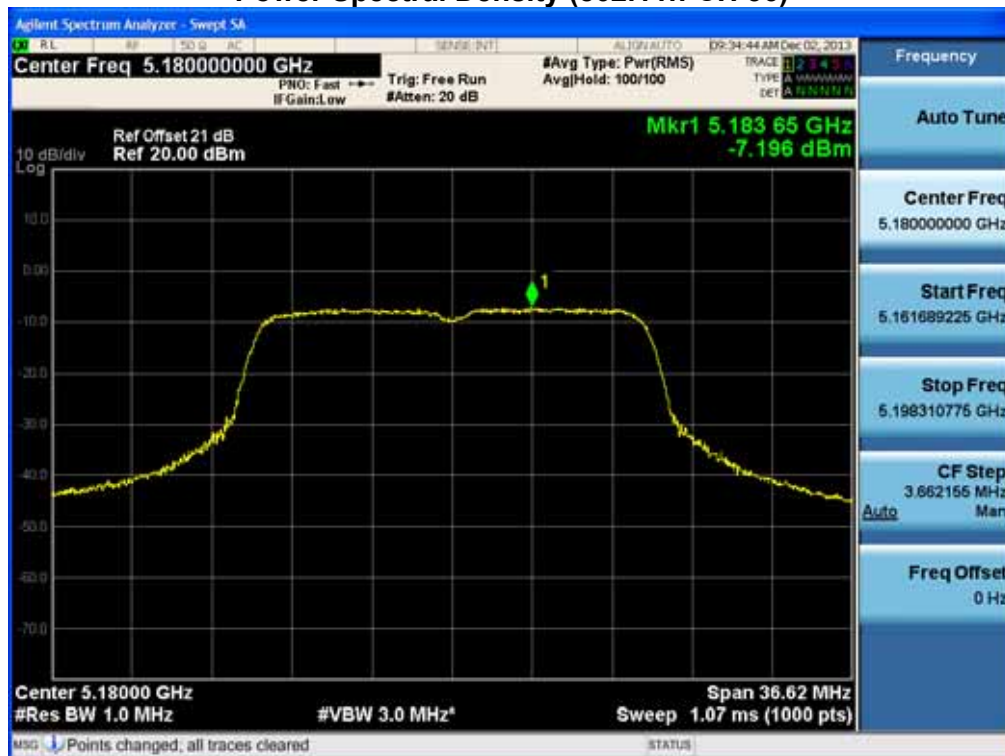
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 36)



#### Power Spectral Density (802.11n-CH 36)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 38)



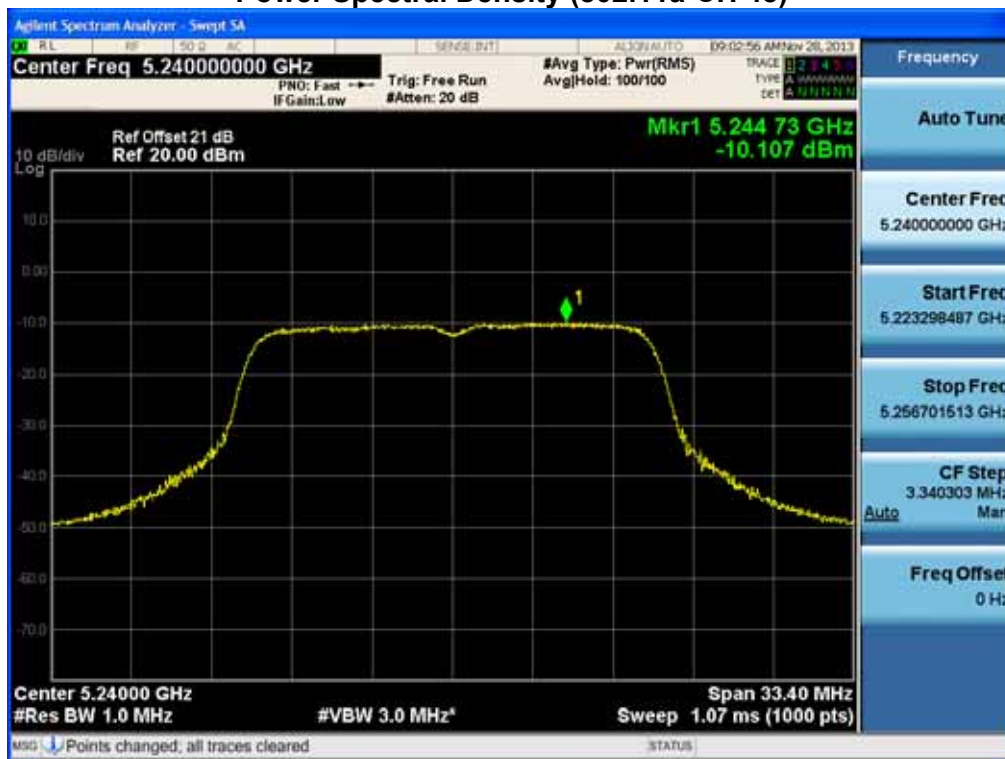
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.1

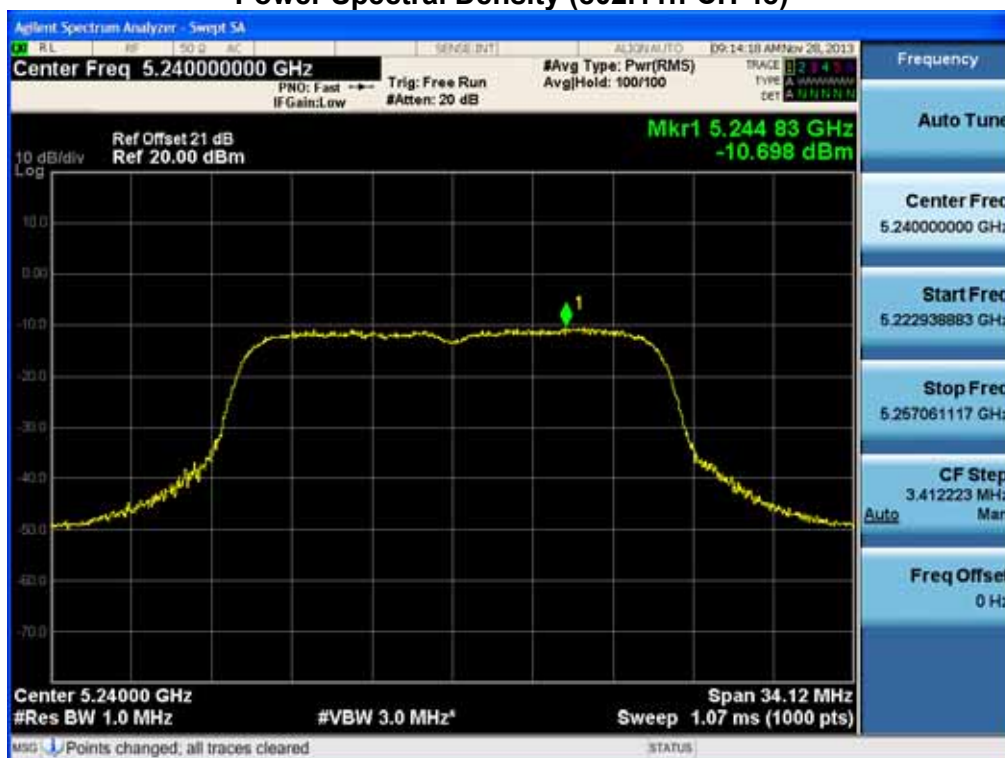
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)



#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 46)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.2

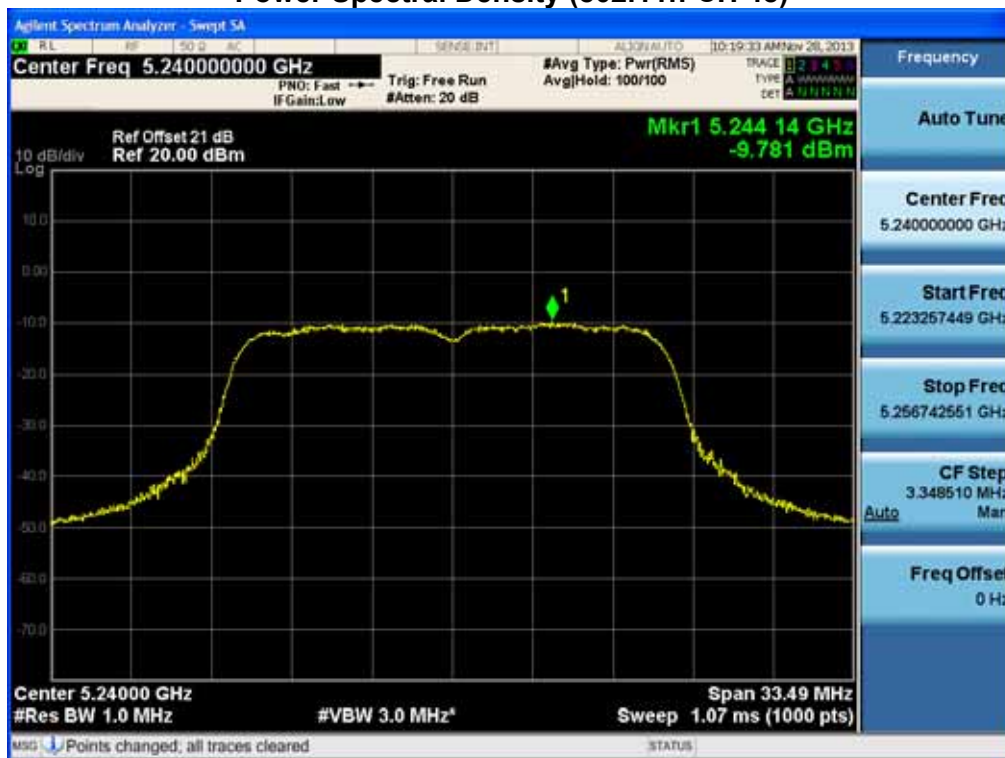
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)

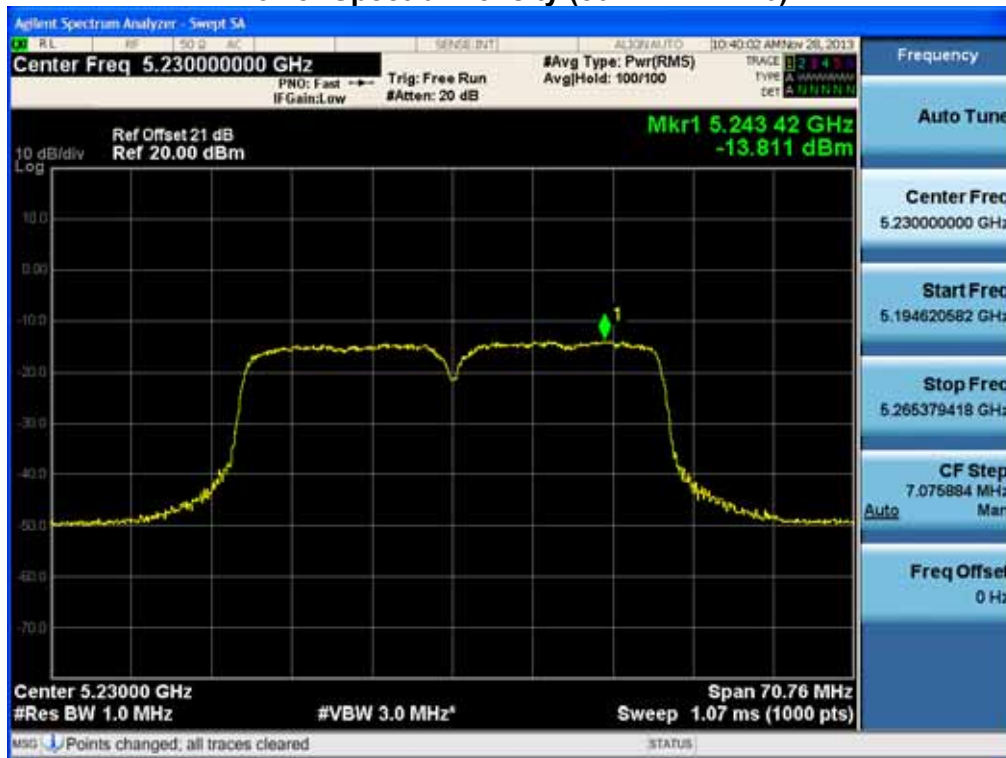


#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Power Spectral Density (802.11n-CH 46)



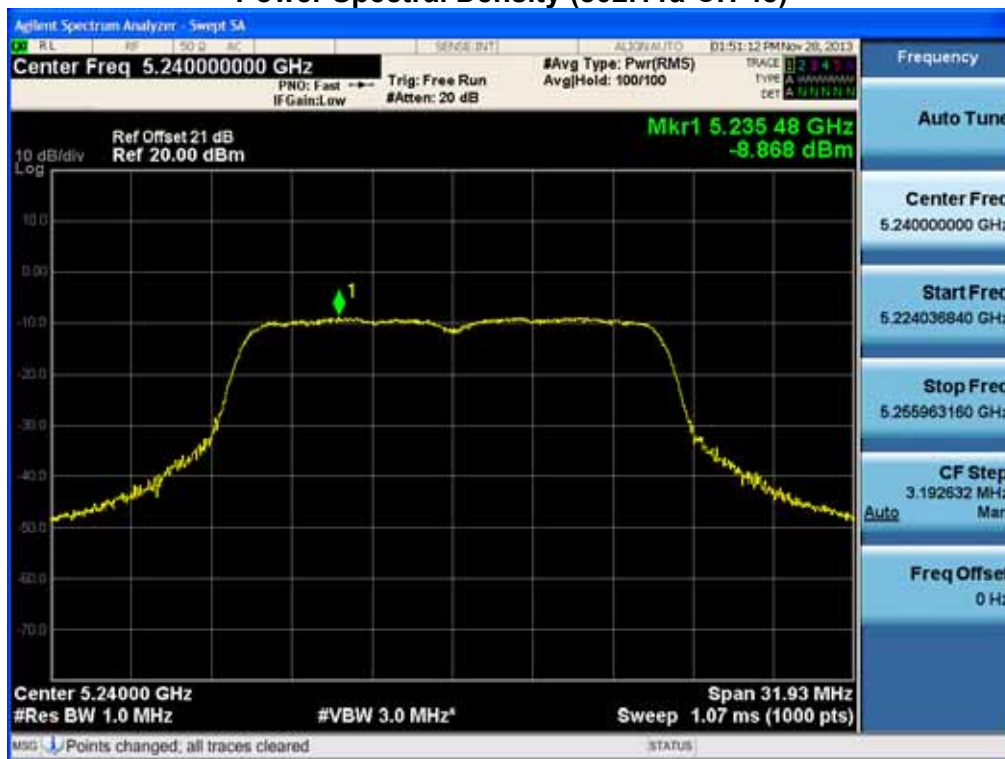
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.3

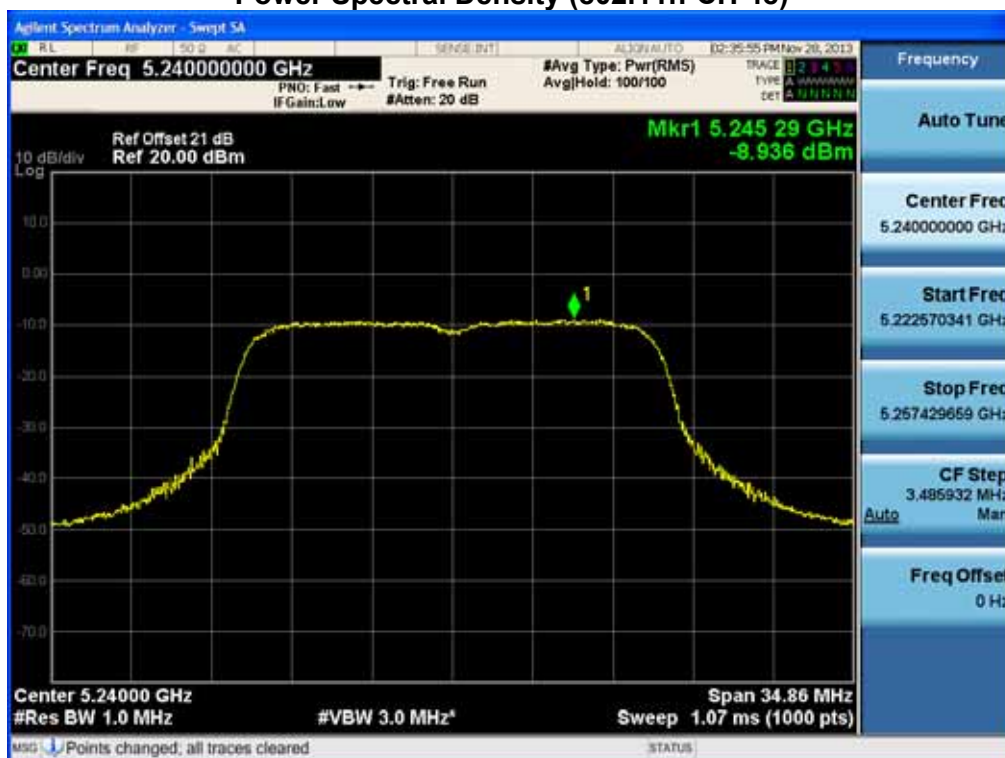
### RESULT PLOTS

20 MHz BW

#### Power Spectral Density (802.11a-CH 48)

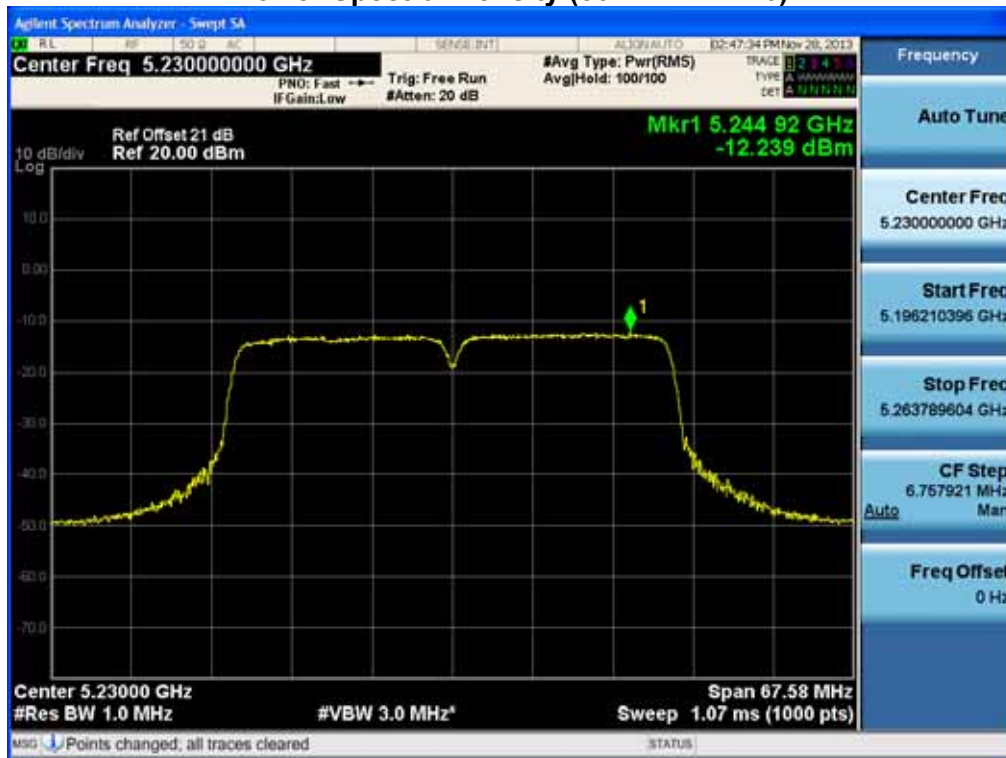


#### Power Spectral Density (802.11n-CH 48)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Power Spectral Density (802.11n-CH 46)

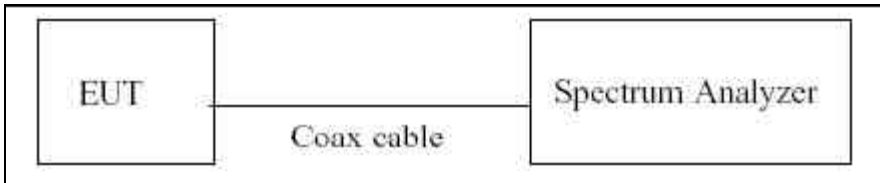


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## 9.5 PEAK EXCURSION RATIO

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. The largest permissible difference between the modulation envelope(measured using a peak hold function) and the maximum conducted output power 13 dB/MHz.

### ▣ TEST CONFIGURATION



### ▣ TEST PROCEDURE

We tested according to KDB 789033(issued 04/08/2013).

The spectrum analyzer is set to :

1. Span = Set the span to view the entire emission bandwidth.
2. RBW = 1 MHz
3. VBW  $\geq$  3 MHz
4. Detector Mode = Peak
5. Trace Mode = Max hold
6. Allow the sweeps to continue until the trace stabilizes.
7. Use the peak search function to find the peak of the spectrum.
8. Use the procedure to measure the PPSP
9. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSP.

Note :

1. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. We apply to the offset in the UNII 1 band that was rounded off to the closest tenth dB. Actual value of loss for the attenuator and cable combination is below table. We used the particular cable type that is supported by manufacture.

| Band   | Loss(dB) |
|--------|----------|
| UNII 1 | 21.0     |

(Actual value of loss for the attenuator and cable combination)

## Monitoring Port Ant.1

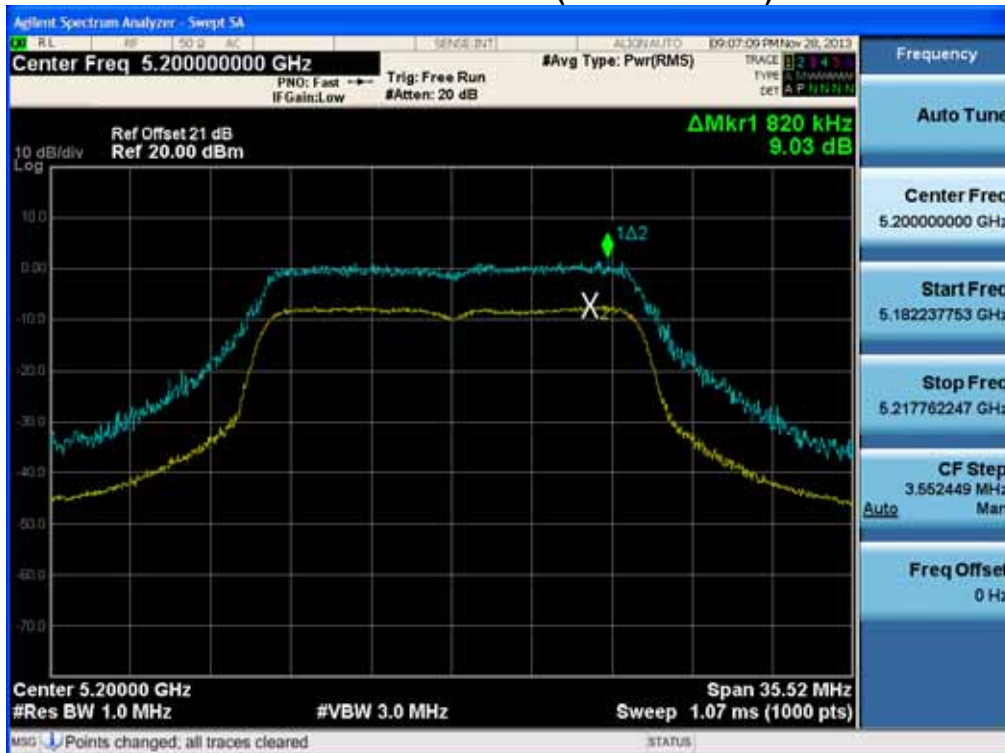
### RESULT PLOTS

20 MHz BW

#### Peak Excursion Ratio (802.11a-CH 36)

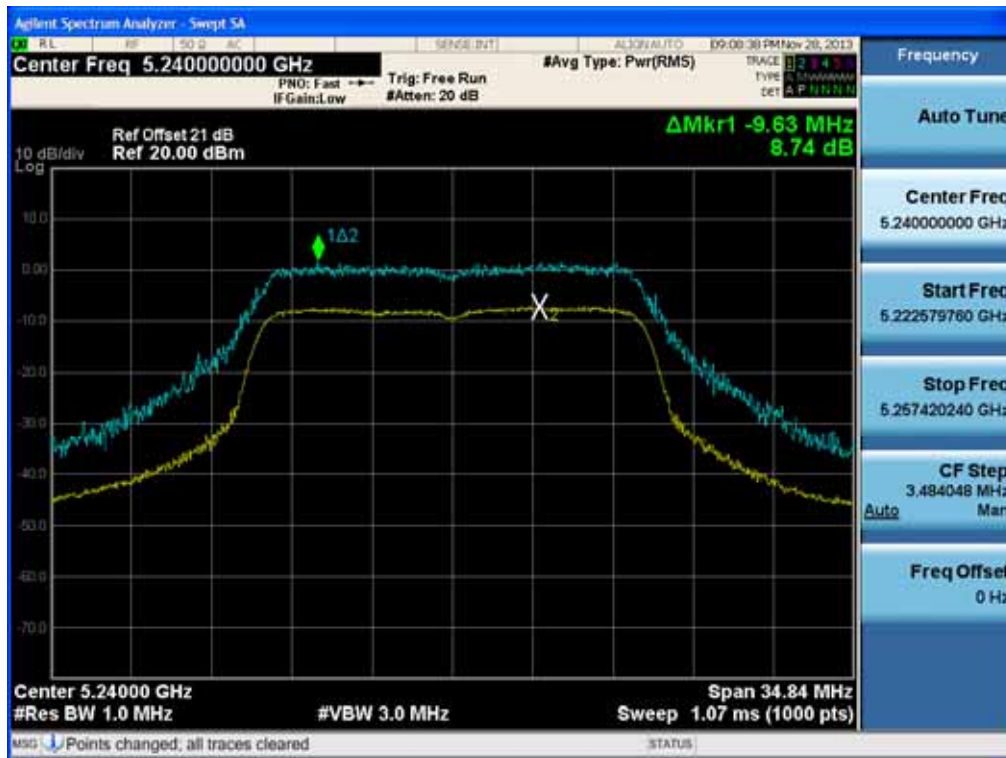


#### Peak Excursion Ratio (802.11a-CH 40)

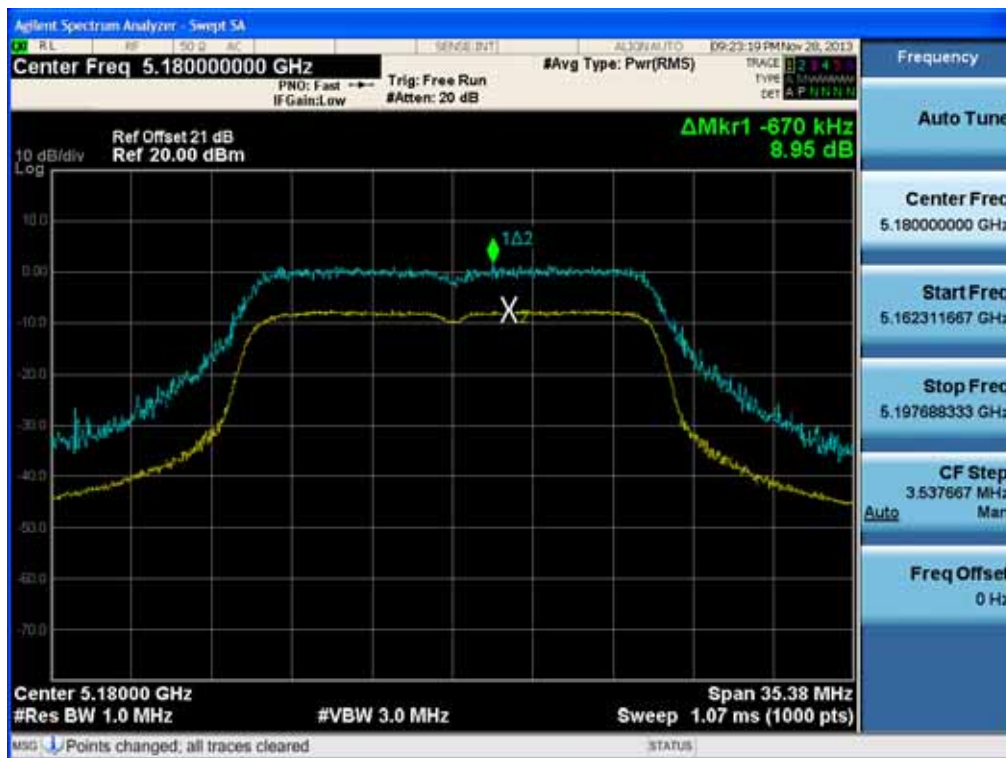


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11a-CH 48)

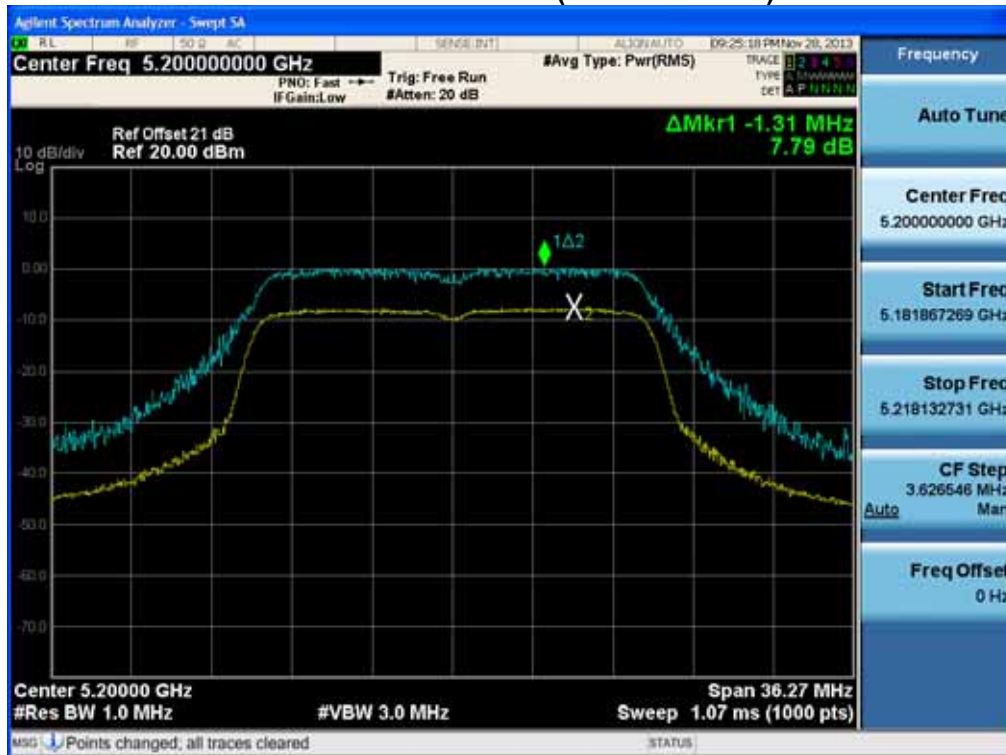


### Peak Excursion Ratio (802.11n-CH 36)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11n-CH 40)

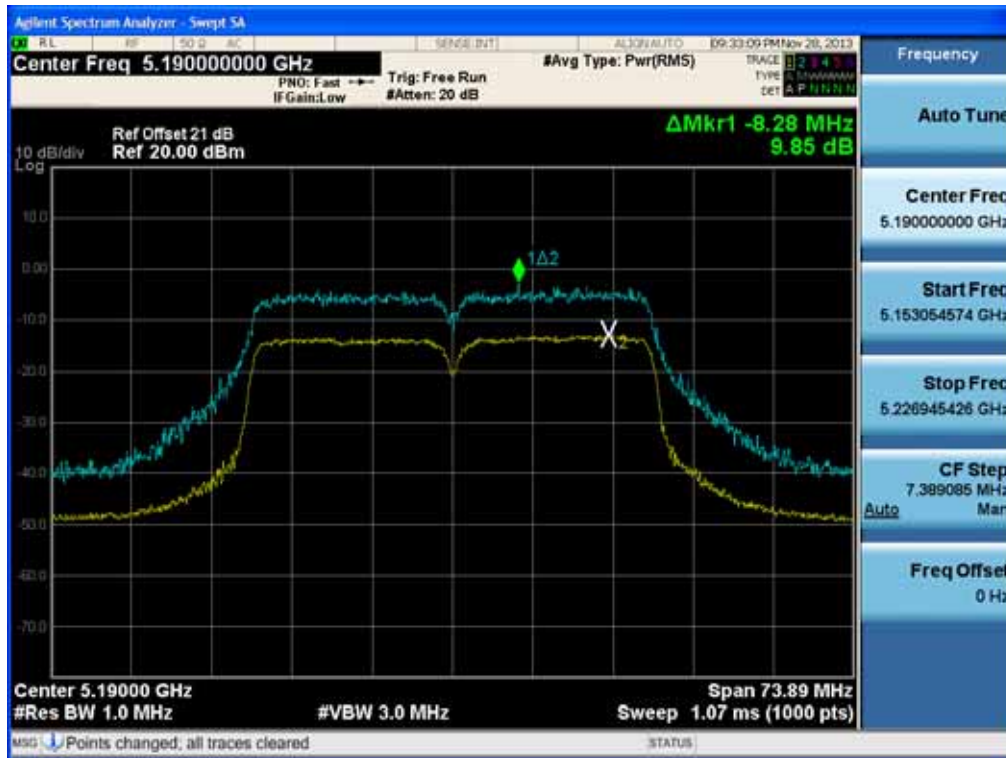


### Peak Excursion Ratio (802.11n-CH 48)

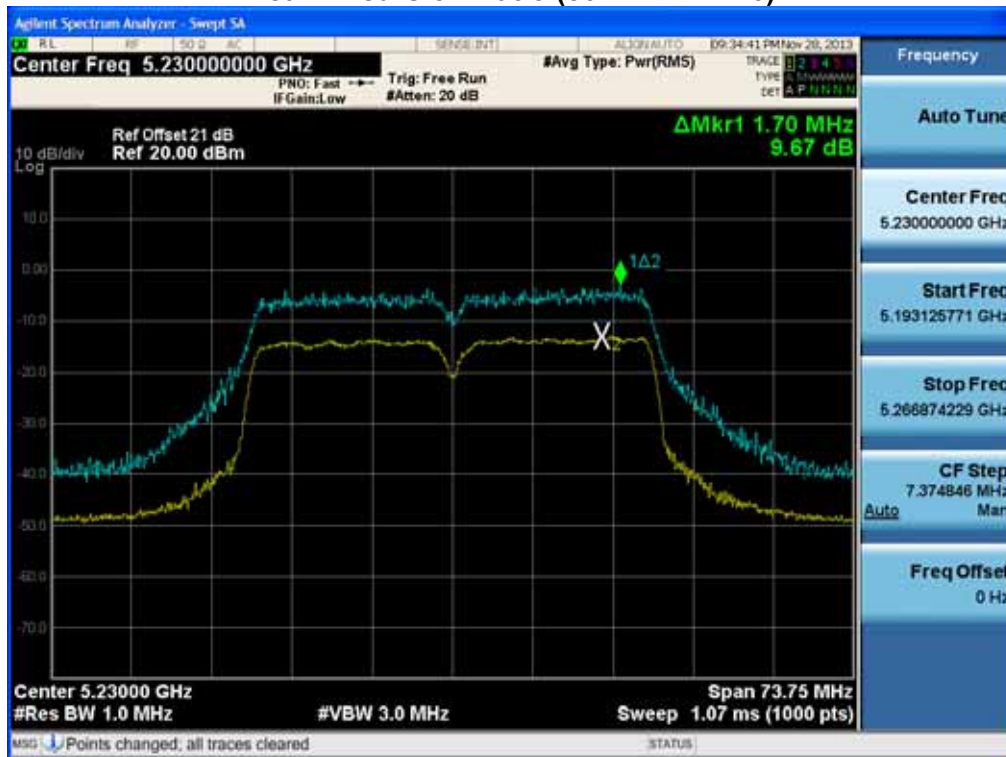


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



### Peak Excursion Ratio (802.11n-CH 46)



## Monitoring Port Ant.2

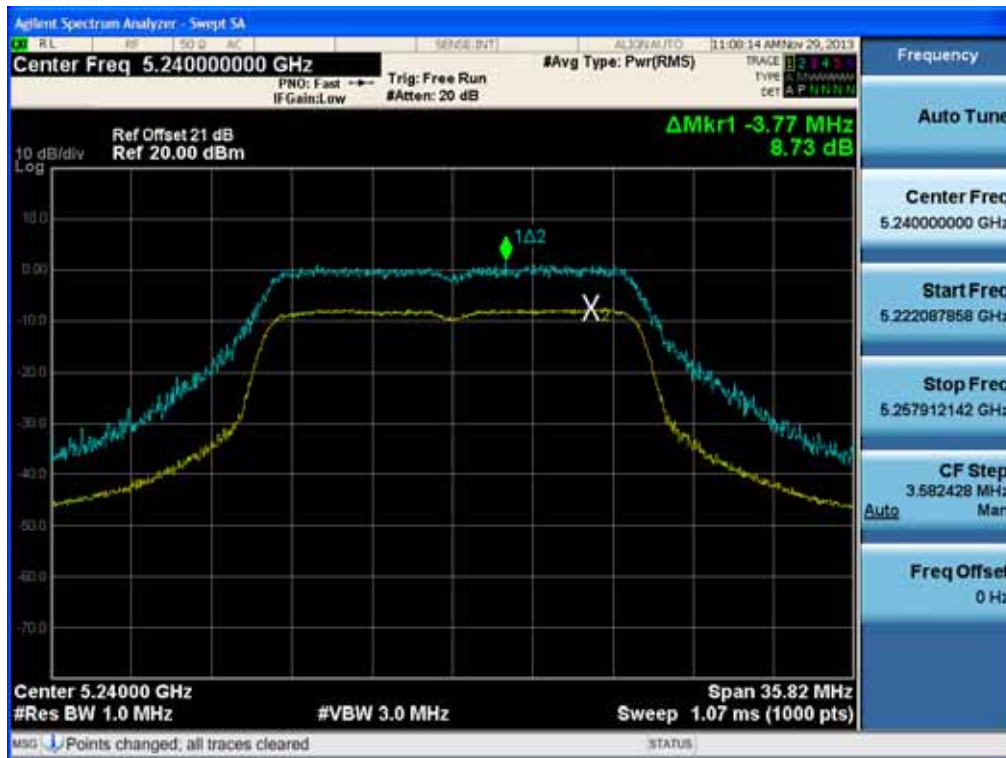
### Peak Excursion Ratio (802.11a-CH 36)



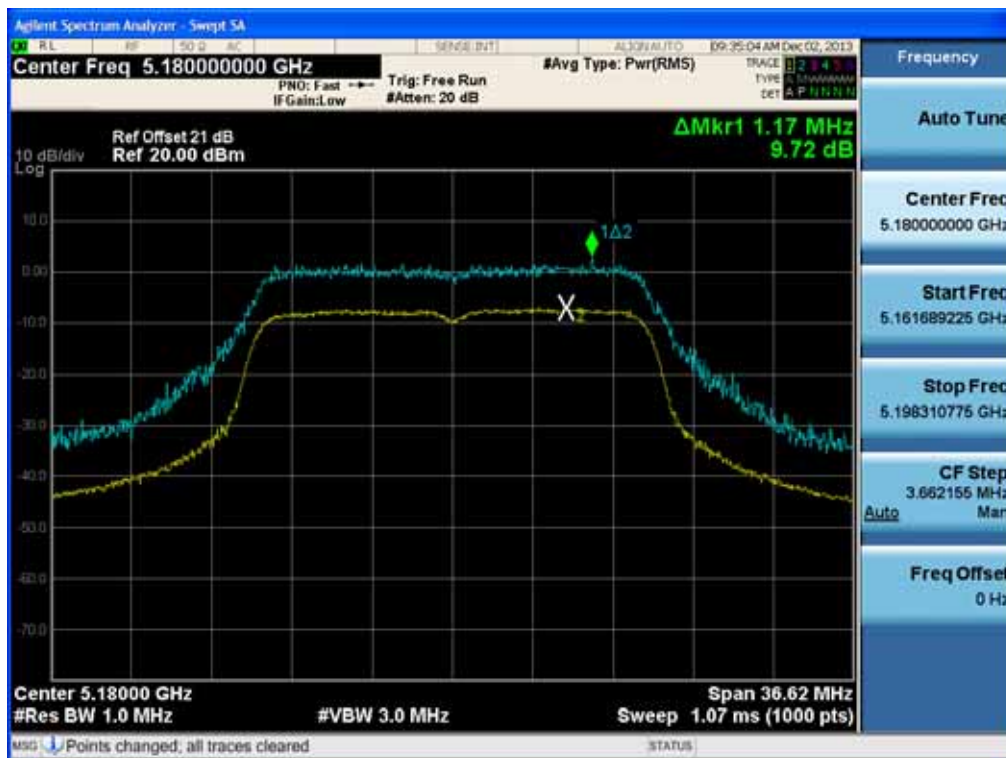
### Peak Excursion Ratio (802.11a-CH 40)



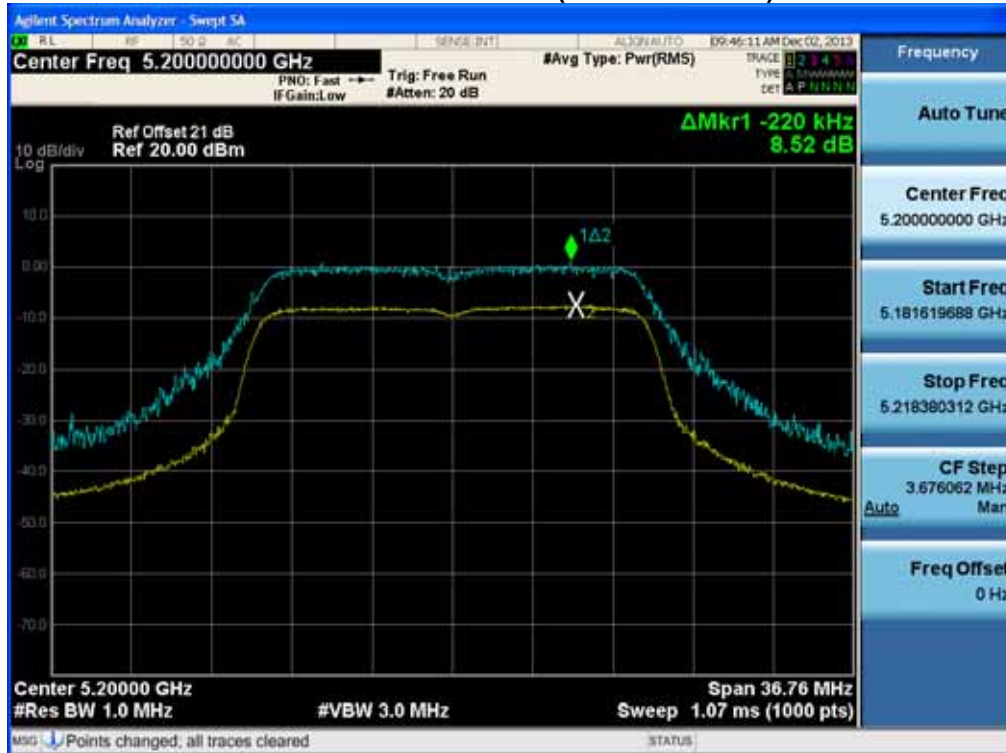
### Peak Excursion Ratio (802.11a-CH 48)



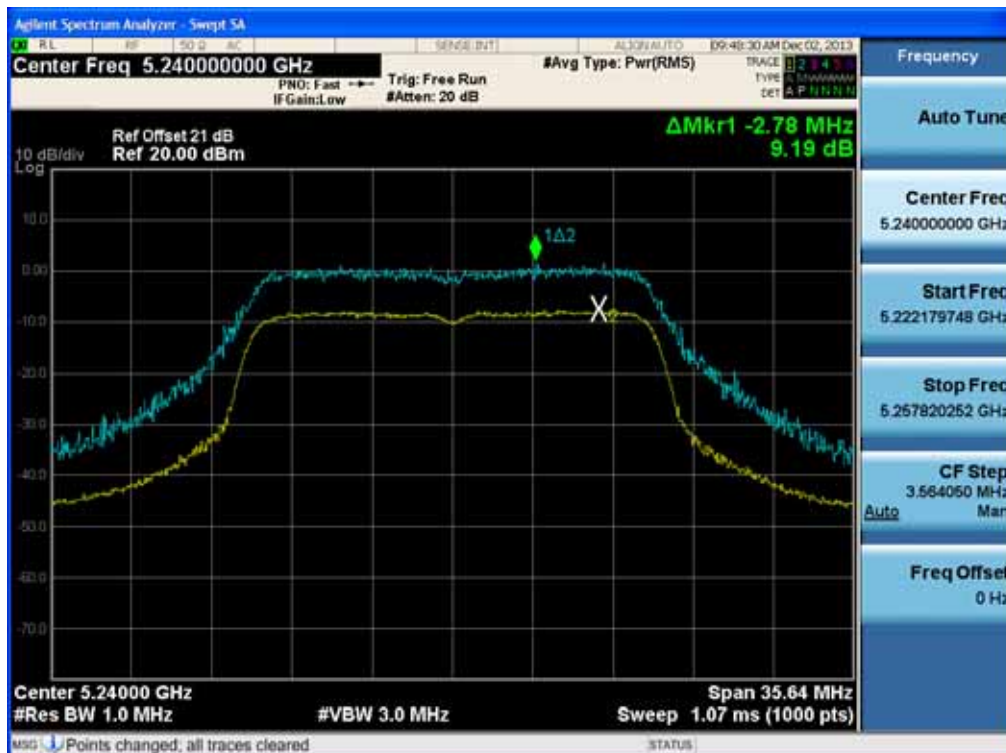
### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

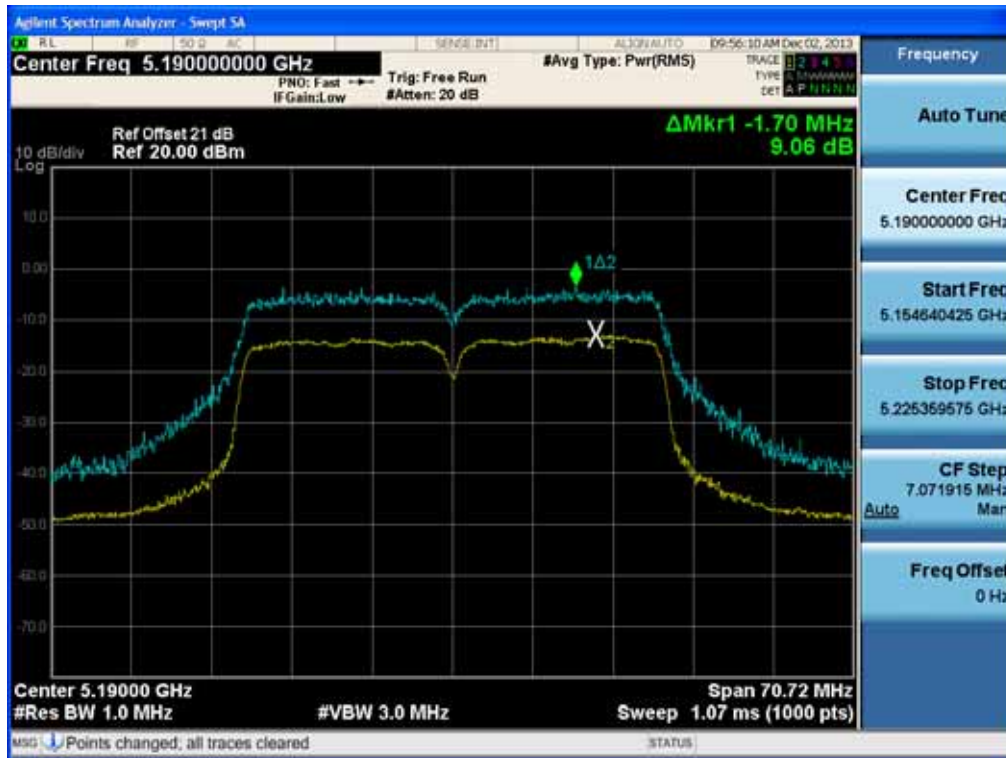


### Peak Excursion Ratio (802.11n-CH 48)

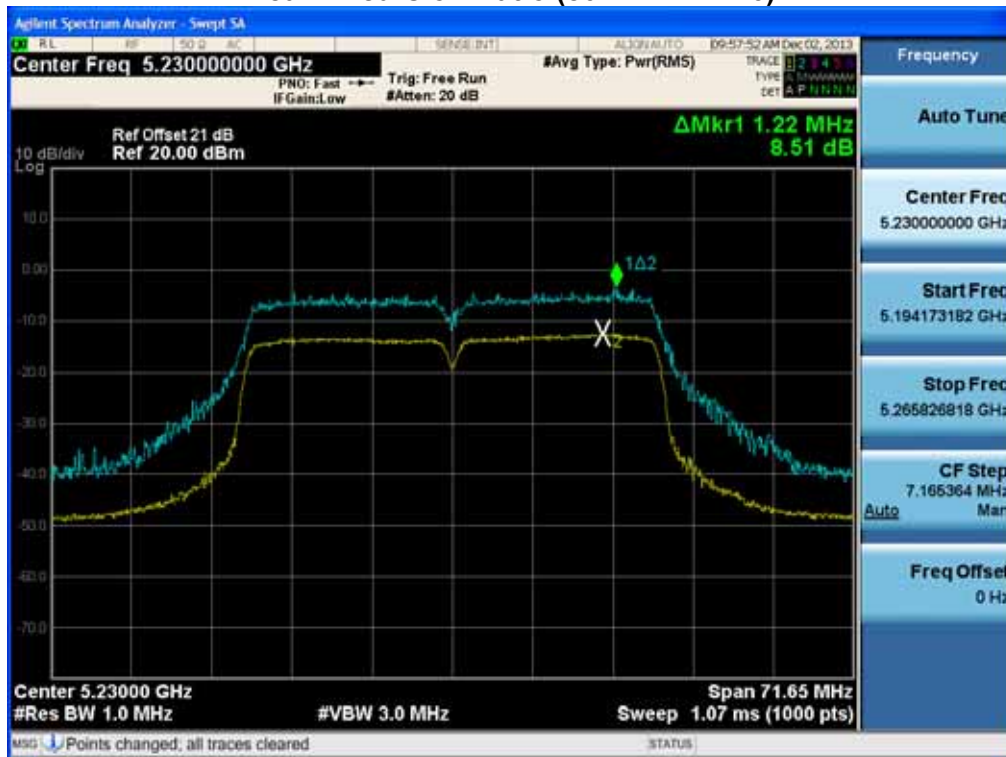


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



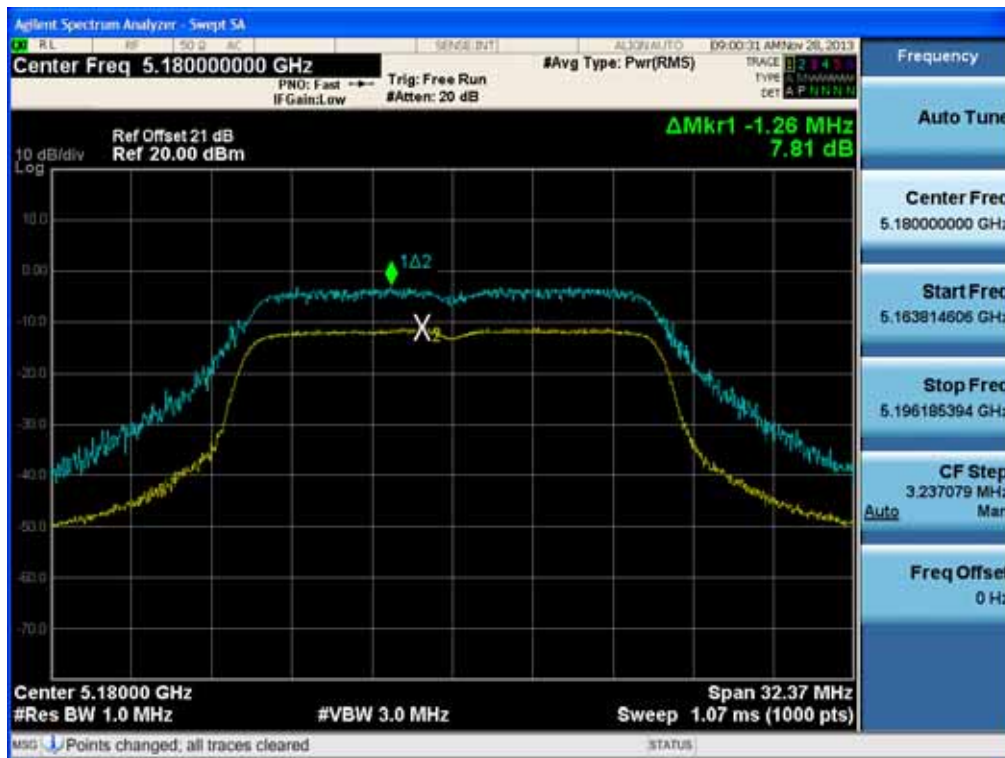
### Peak Excursion Ratio (802.11n-CH 46)



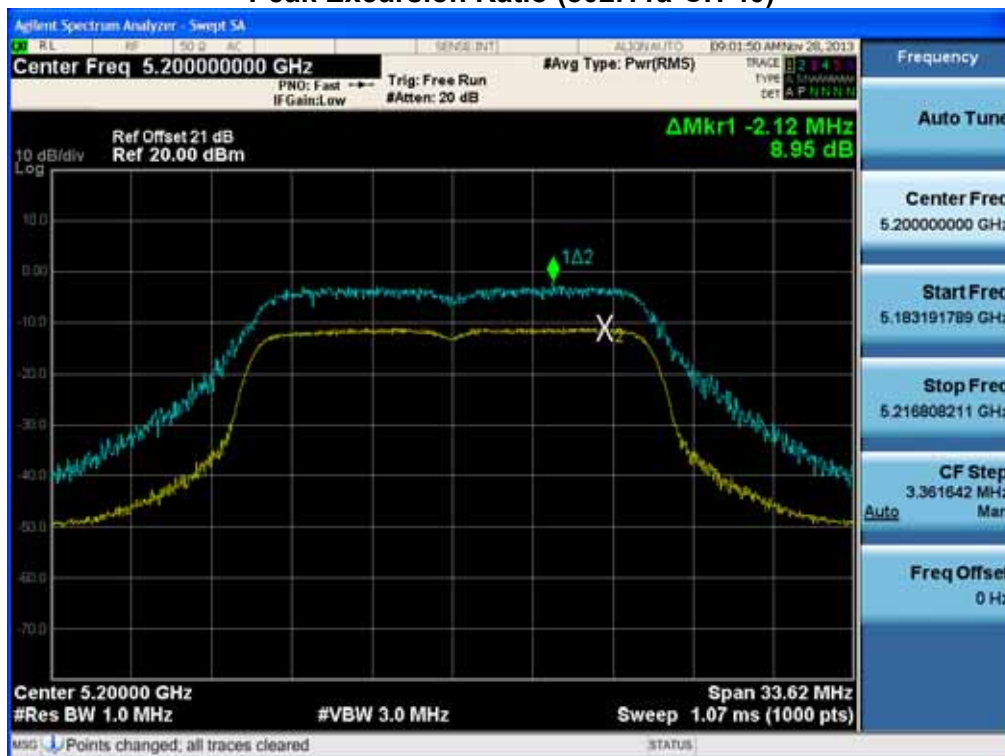
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.1

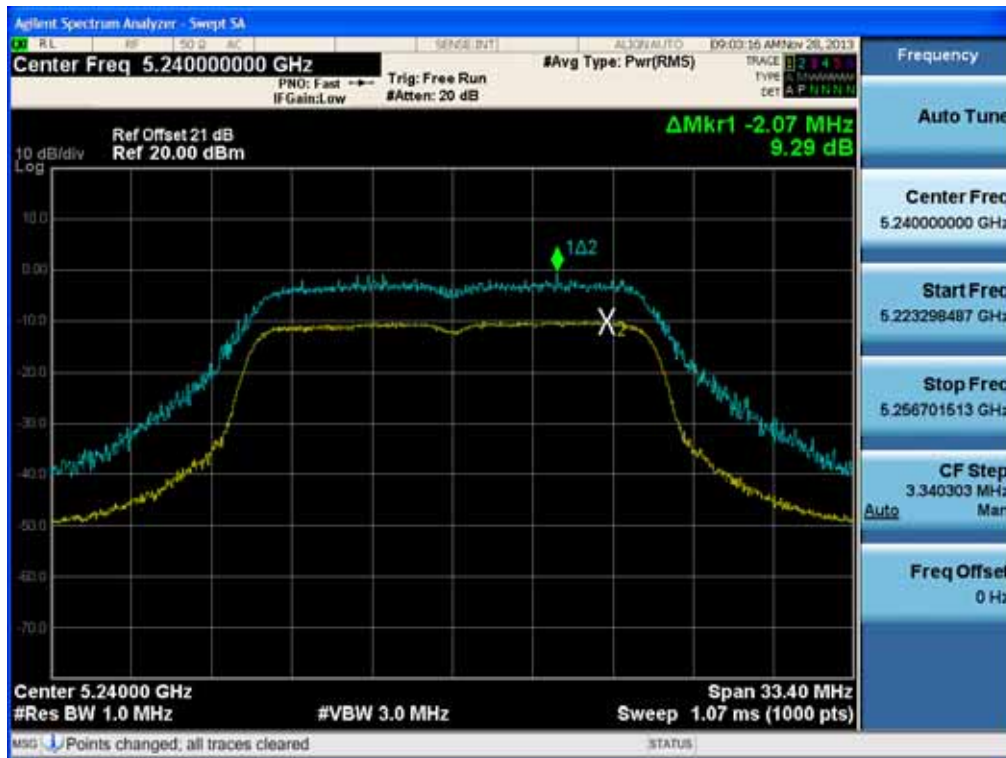
### Peak Excursion Ratio (802.11a-CH 36)



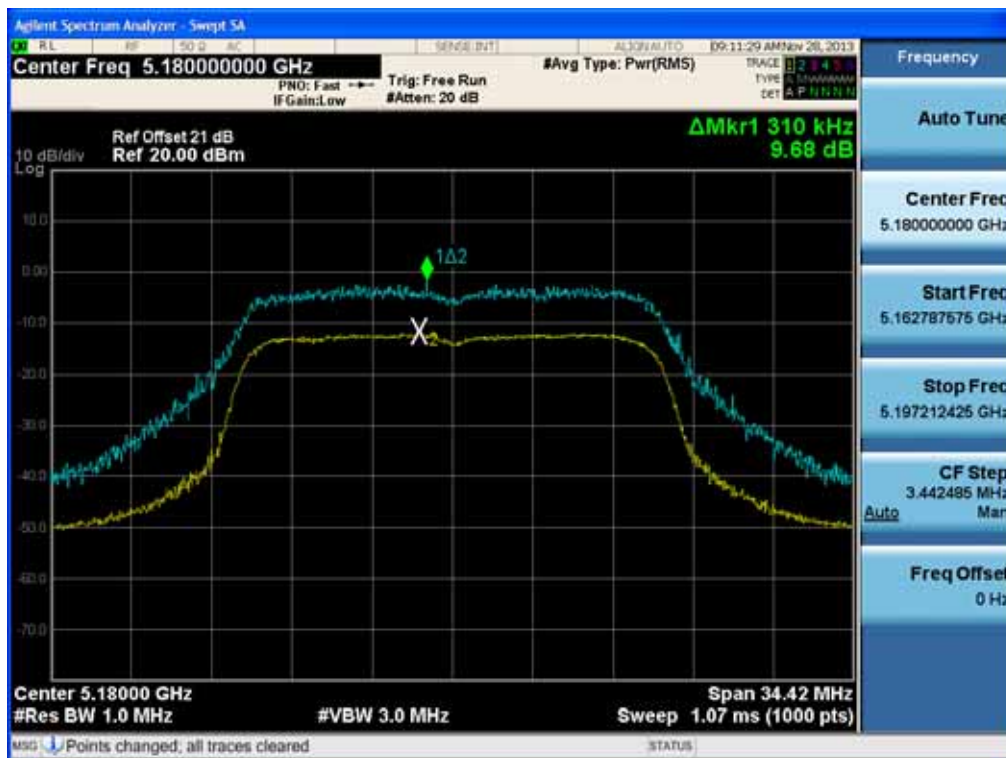
### Peak Excursion Ratio (802.11a-CH 40)



### Peak Excursion Ratio (802.11a-CH 48)

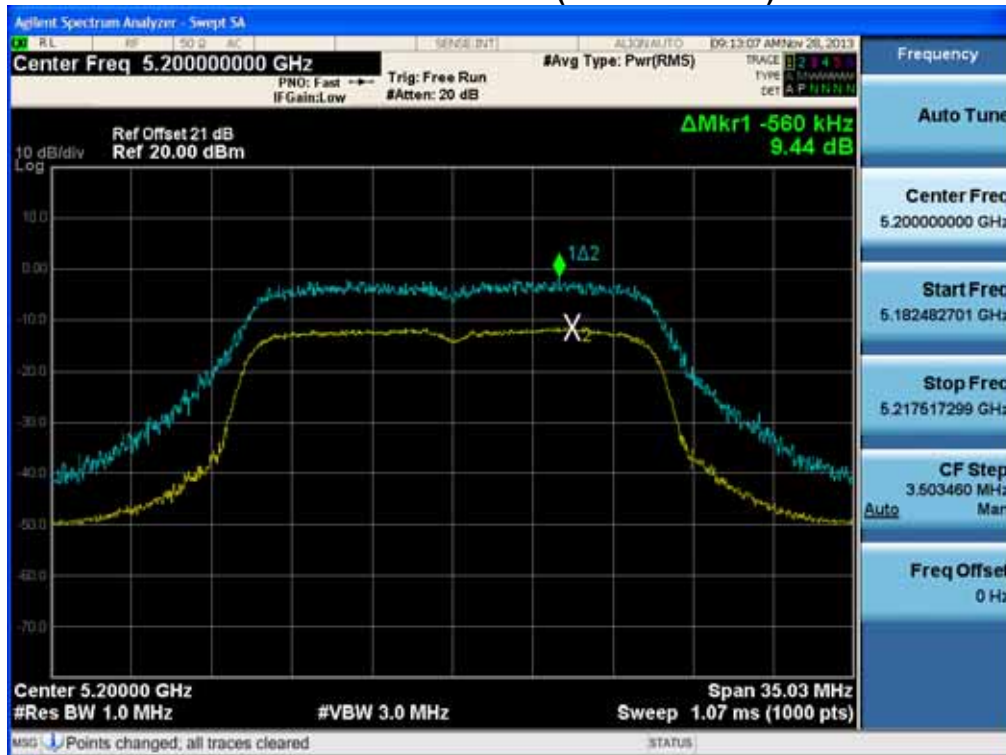


### Peak Excursion Ratio (802.11n-CH 36)

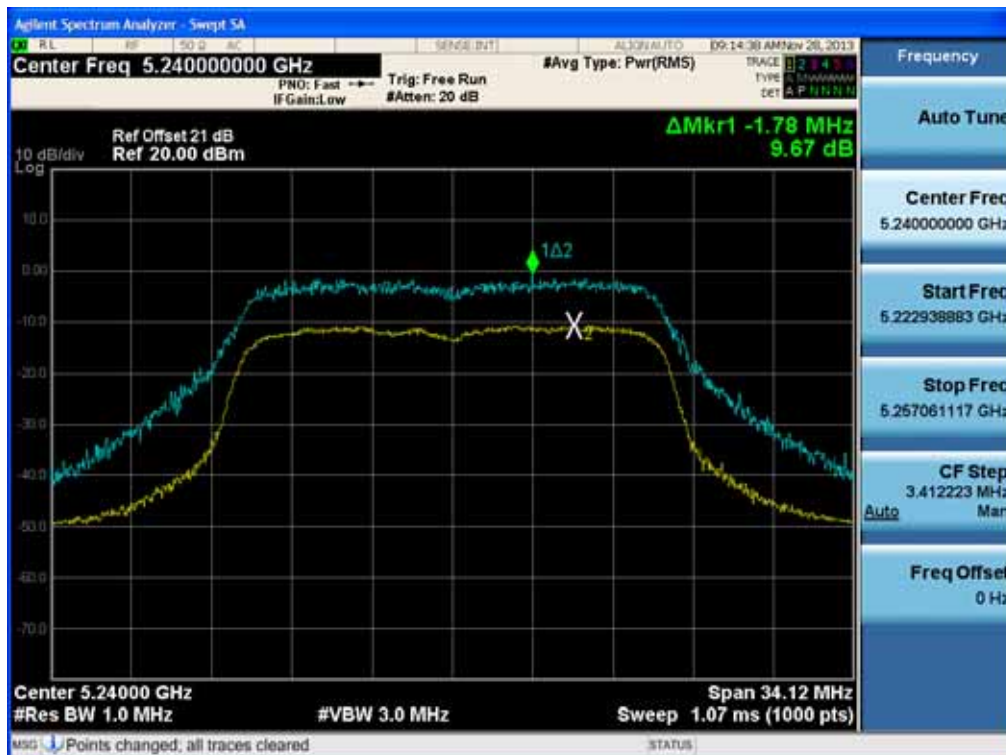


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11n-CH 40)

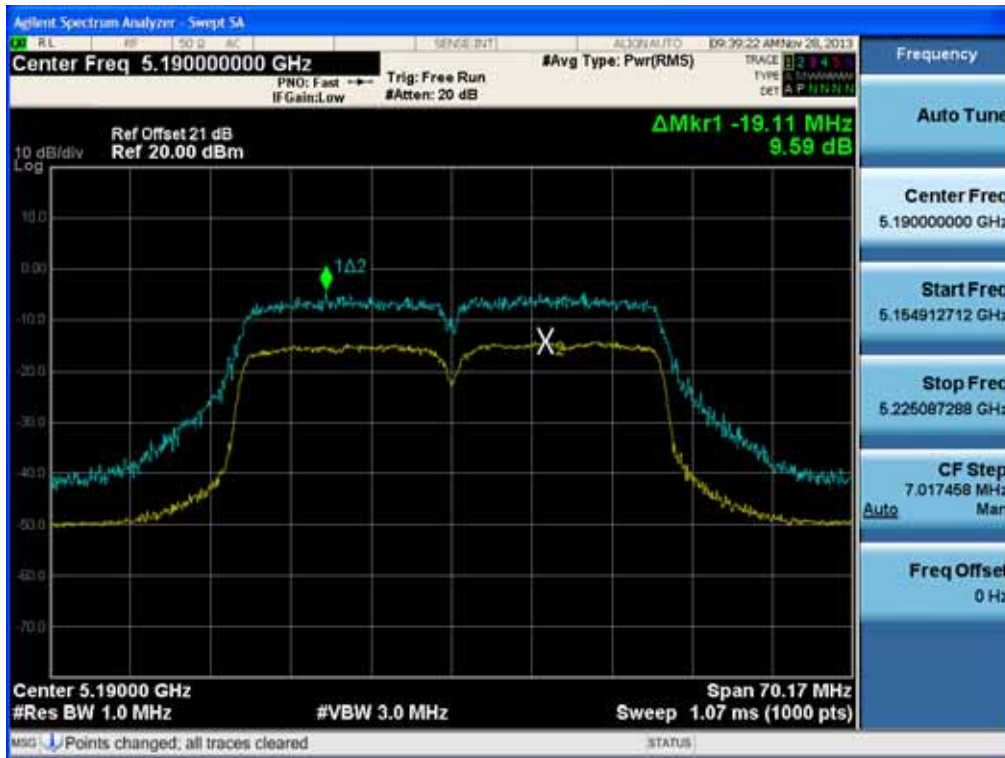


### Peak Excursion Ratio (802.11n-CH 48)



40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



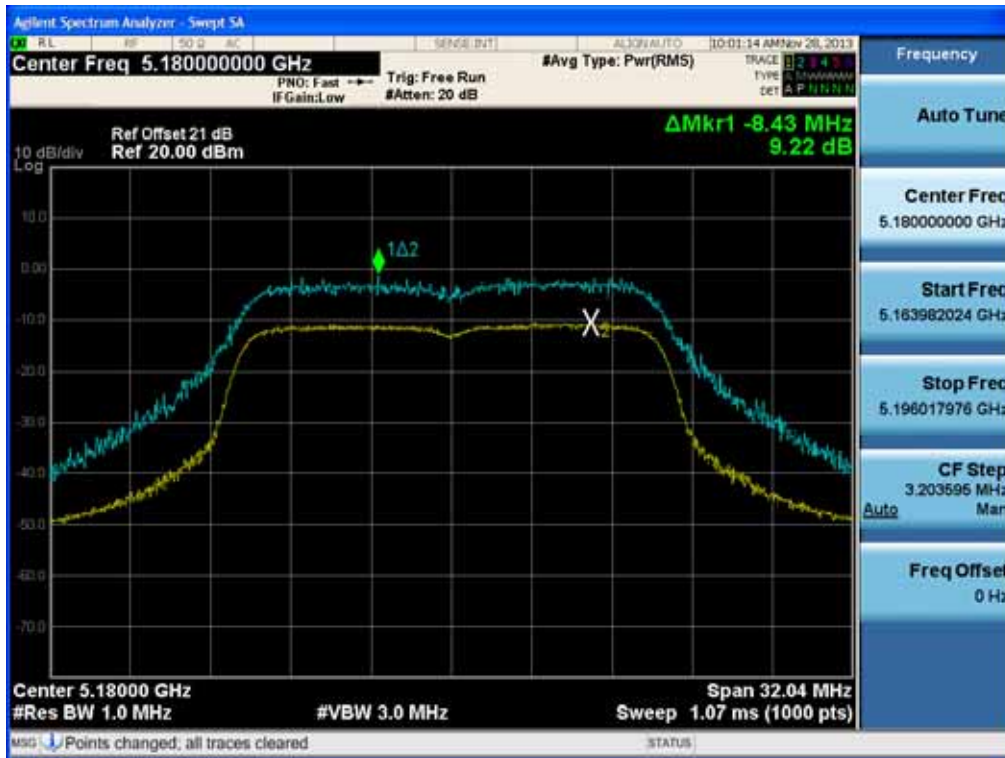
### Peak Excursion Ratio (802.11n-CH 46)



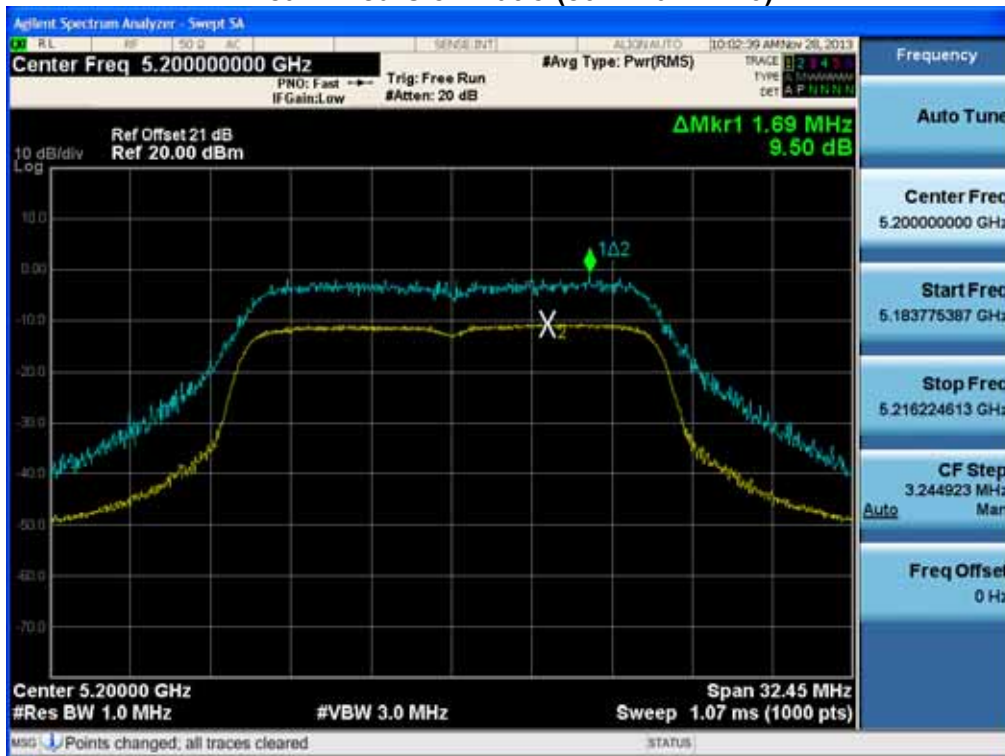
|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service Port Ant.2

### Peak Excursion Ratio (802.11a-CH 36)



### Peak Excursion Ratio (802.11a-CH 40)

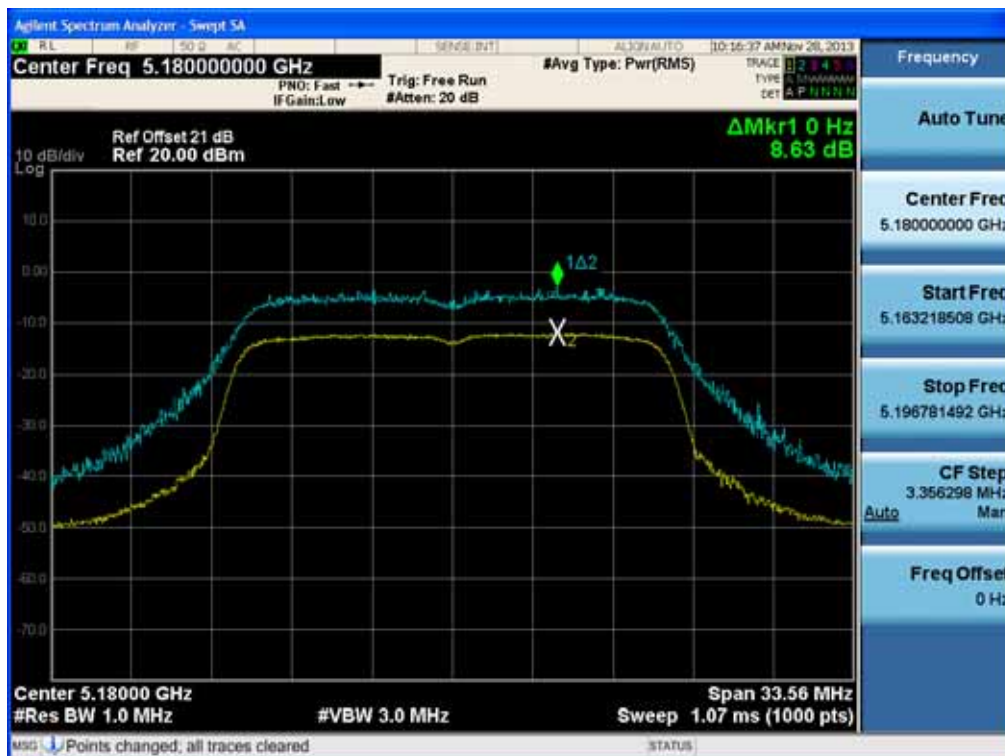


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

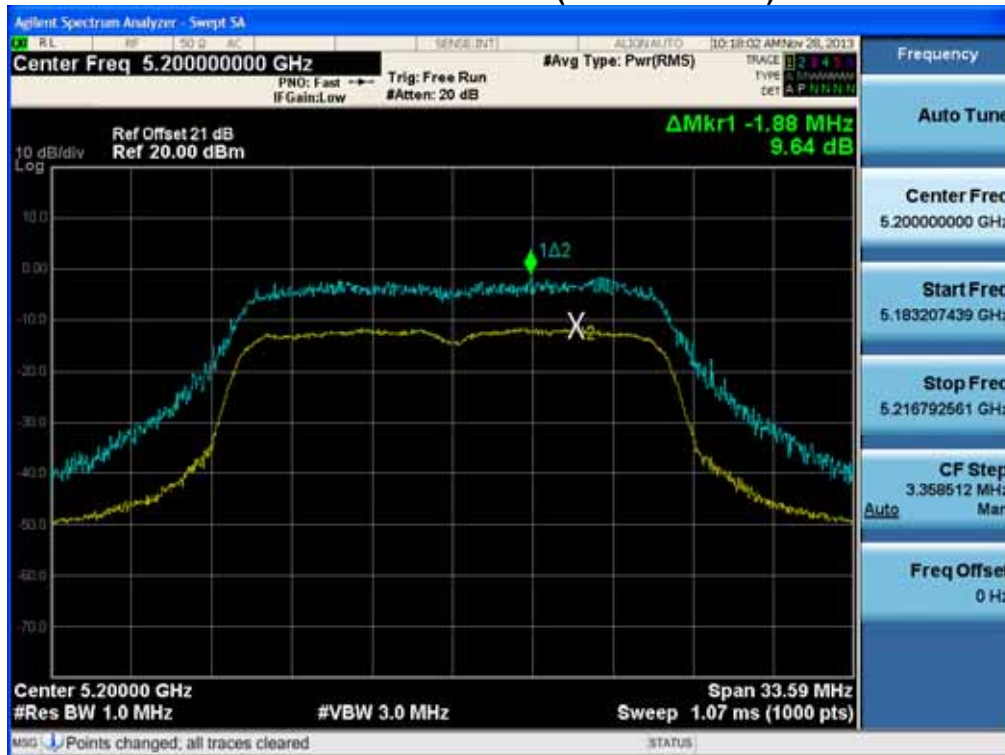
### Peak Excursion Ratio (802.11a-CH 48)



### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

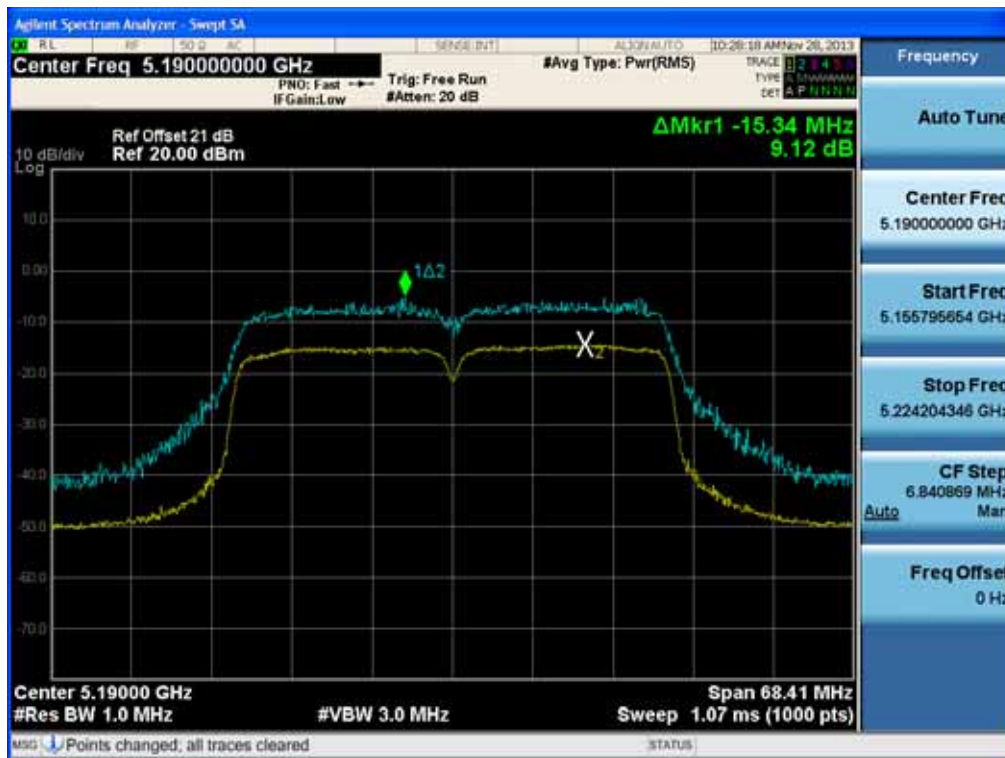


### Peak Excursion Ratio (802.11n-CH 48)

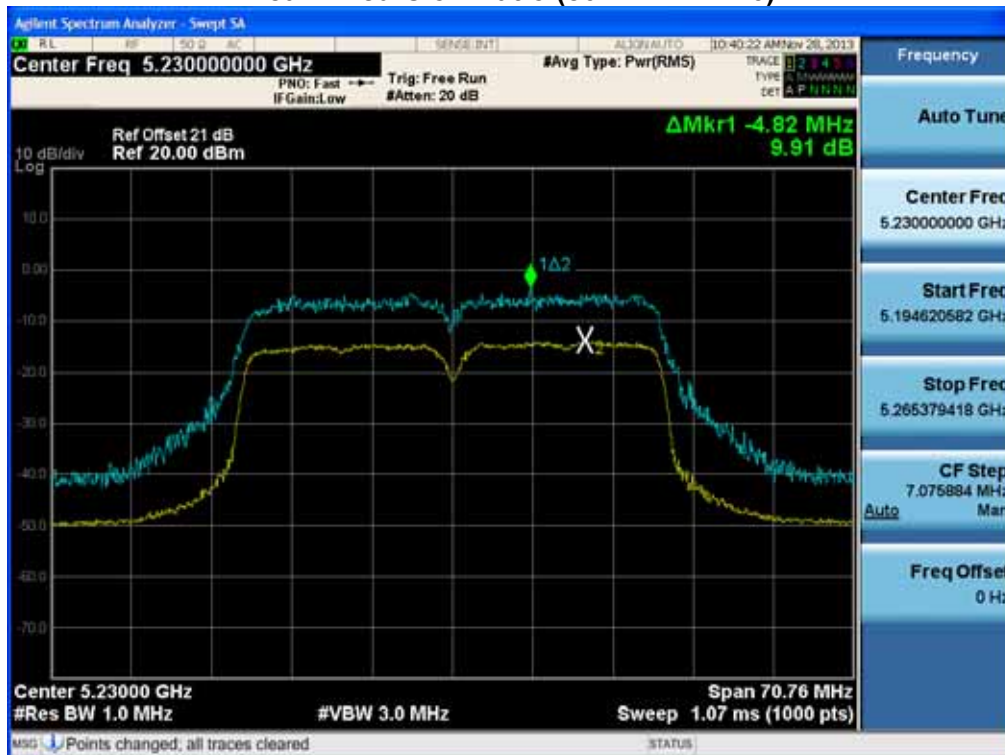


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)

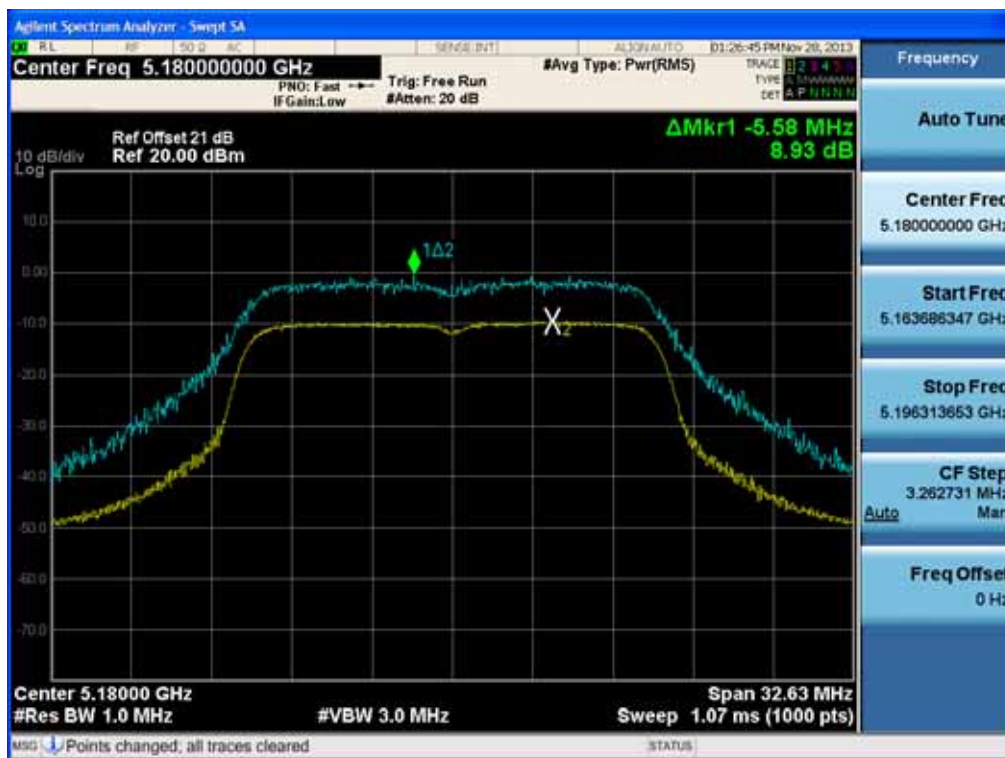


### Peak Excursion Ratio (802.11n-CH 46)



|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

### Peak Excursion Ratio (802.11a-CH 36)



### Peak Excursion Ratio (802.11a-CH 40)

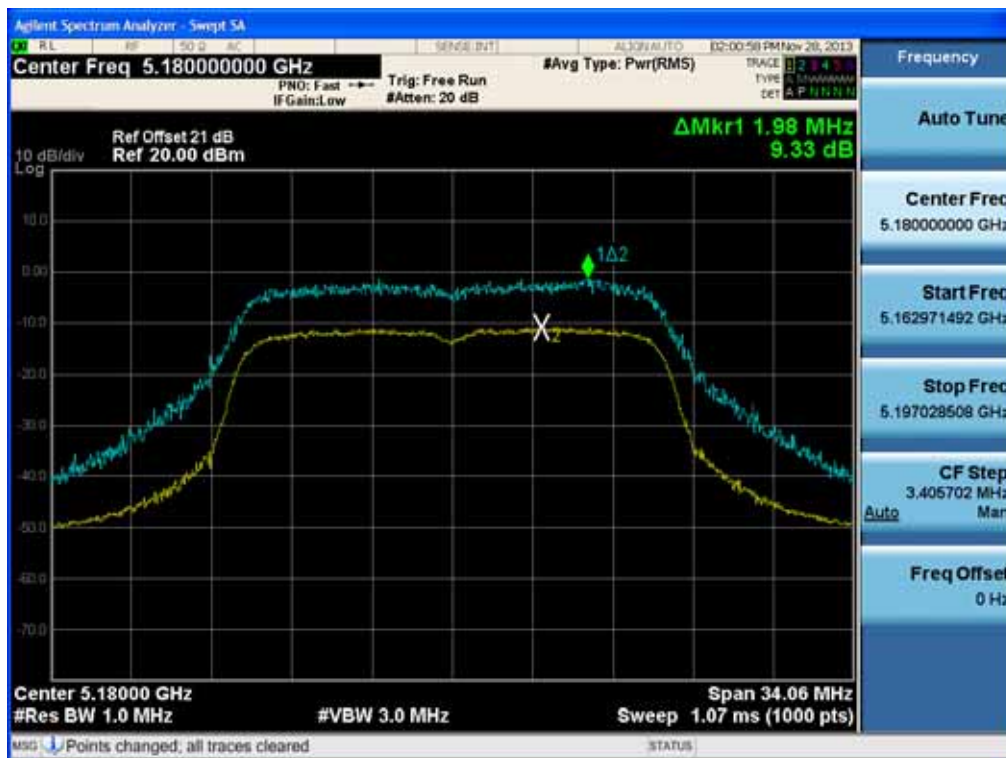


|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

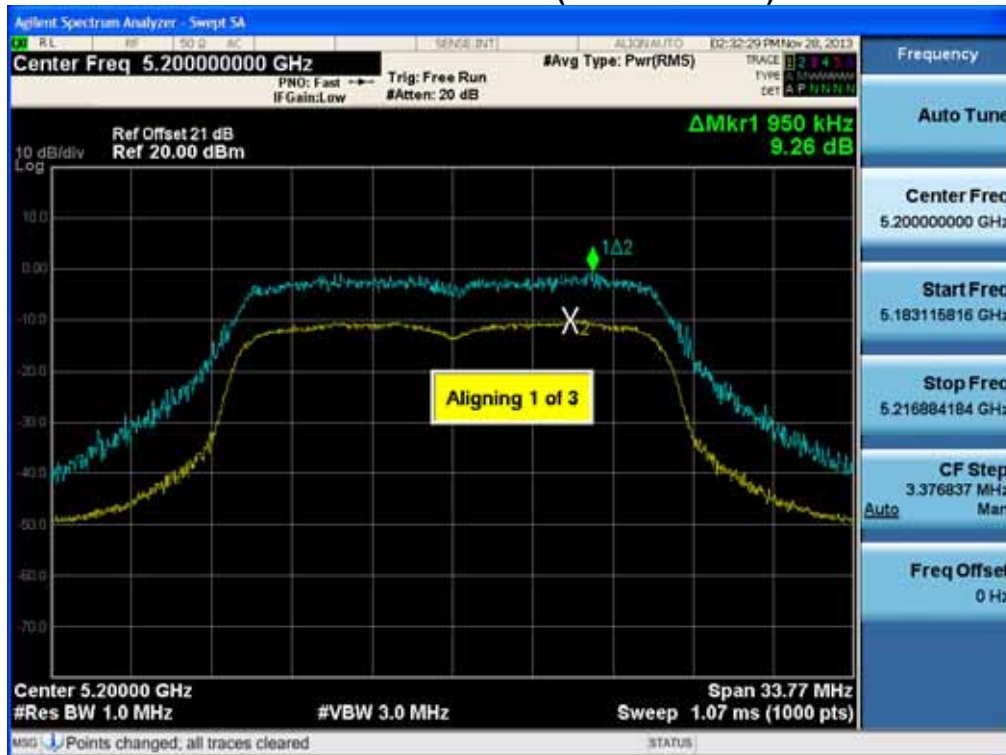
### Peak Excursion Ratio (802.11a-CH 48)



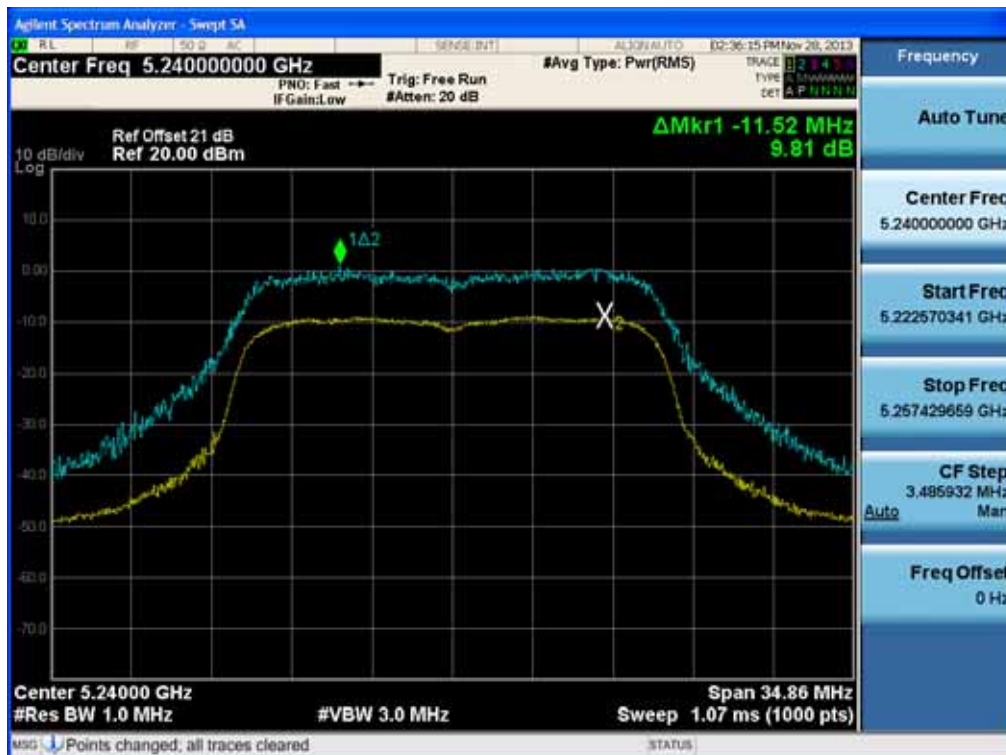
### Peak Excursion Ratio (802.11n-CH 36)



### Peak Excursion Ratio (802.11n-CH 40)

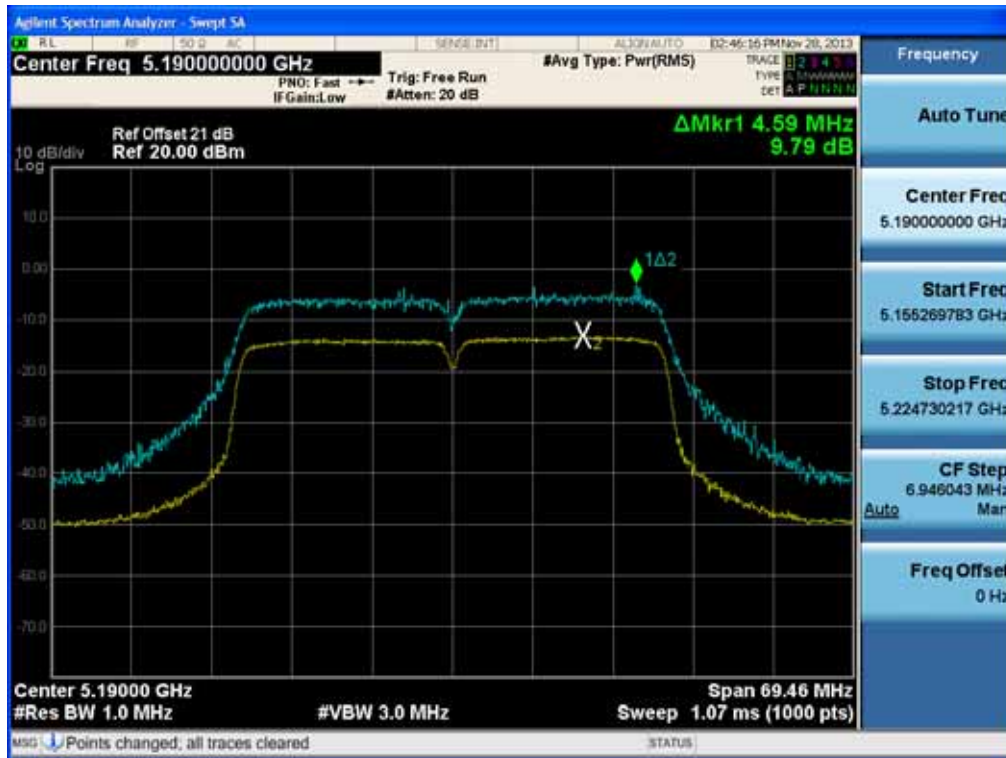


### Peak Excursion Ratio (802.11n-CH 48)

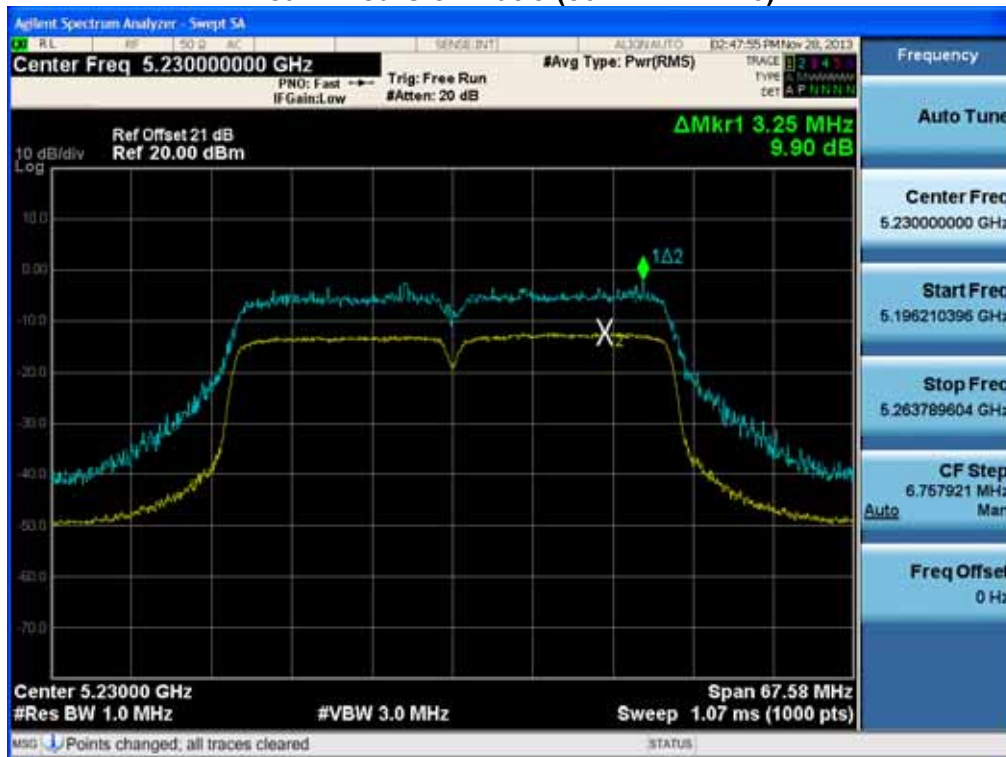


40MHz BW

### Peak Excursion Ratio (802.11n-CH 38)



### Peak Excursion Ratio (802.11n-CH 46)



## 9.6 FREQUENCY STABILITY.

The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

### Service Port

|                      |                  |
|----------------------|------------------|
| OPERATING BAND:      | UNII Band 1      |
| OPERATING FREQUENCY: | 5,180,000,000 Hz |
| CHANNEL:             | 36               |
| REFERENCE VOLTAGE:   | 220 VAC          |

| Voltage (%) | Power (VAC) | Temp. (°C) | Frequency (kHz) | Frequency Error (kHz) |
|-------------|-------------|------------|-----------------|-----------------------|
| 100         | 220         | +20(Ref)   | 5 180 022. 72   | 22.7                  |
| 100         |             | -30        | 5 180 009. 42   | 9.4                   |
| 100         |             | -20        | 5 180 008. 64   | 8.6                   |
| 100         |             | -10        | 5 180 006. 49   | 6.5                   |
| 100         |             | 0          | 5 180 005. 47   | 5.5                   |
| 100         |             | +10        | 5 180 014. 54   | 14.5                  |
| 100         |             | +30        | 5 180 013. 72   | 13.7                  |
| 100         |             | +40        | 5 180 015. 48   | 15.5                  |
| 100         |             | +50        | 5 180 011. 09   | 11.1                  |
| 115         | 253         | +20        | 5 180 017. 64   | 17.6                  |
| 85          | 187         | +20        | 5 180 018. 75   | 18.8                  |

### Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

# Monitoring Port

OPERATING BAND: UNII Band 1  
 OPERATING FREQUENCY: 5,180,000,000 Hz  
 CHANNEL: 36  
 REFERENCE VOLTAGE: 220 VAC

| Voltage (%) | Power (VAC) | Temp. (°C) | Frequency (kHz) | Frequency Error (kHz) |
|-------------|-------------|------------|-----------------|-----------------------|
| 100         | 220         | +20(Ref)   | 5 180 010. 08   | 10.1                  |
| 100         |             | -30        | 5 180 020. 04   | 20.0                  |
| 100         |             | -20        | 5 180 013. 45   | 13.5                  |
| 100         |             | -10        | 5 180 015. 32   | 15.3                  |
| 100         |             | 0          | 5 180 009. 40   | 9.4                   |
| 100         |             | +10        | 5 180 011. 00   | 11.0                  |
| 100         |             | +30        | 5 180 012. 01   | 12.0                  |
| 100         |             | +40        | 5 180 015. 42   | 15.4                  |
| 100         |             | +50        | 5 180 010. 75   | 10.8                  |
| 115         | 253         | +20        | 5 180 015. 49   | 15.5                  |
| 85          | 187         | +20        | 5 180 016. 74   | 16.7                  |

## Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

## 9.7 RADIATED MEASUREMENT.

### 9.7.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209, §15.407

| Frequency (MHz) | Field Strength (uV/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                        |

#### ■ §15.407, KDB 789033

All harmonics that do not lie in a restricted band are subject to a peak limit of -27 dBm/MHz. At a distance of 3 meters the field strength limit in dBµV/m can be determined by adding a “conversion” factor of 95.2 dB to the EIRP limit of -27 dBm/MHz to obtain the limit for out of band spurious emissions of 68.2 dBµV/m.

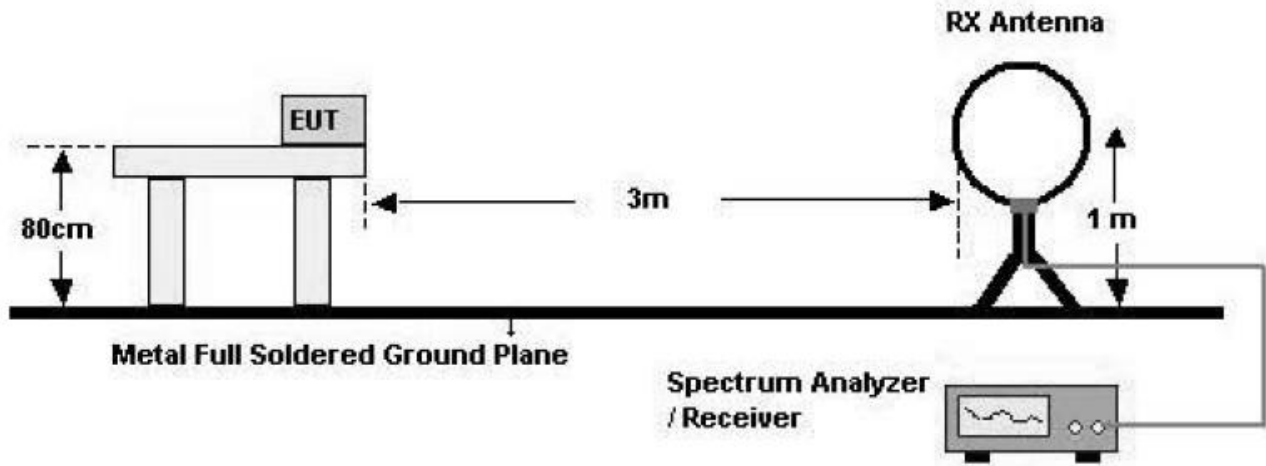
#### ■ Test case

|            |      |               |
|------------|------|---------------|
| Monitoring | SISO | Ant 1         |
|            |      | Ant 2         |
|            | MIMO | Ant 1 & 2     |
| Service    | SISO | Ant 1         |
|            |      | Ant 2         |
|            |      | Ant 3         |
|            | MIMO | Ant 1 & 2     |
|            |      | Ant 1 & 2 & 3 |

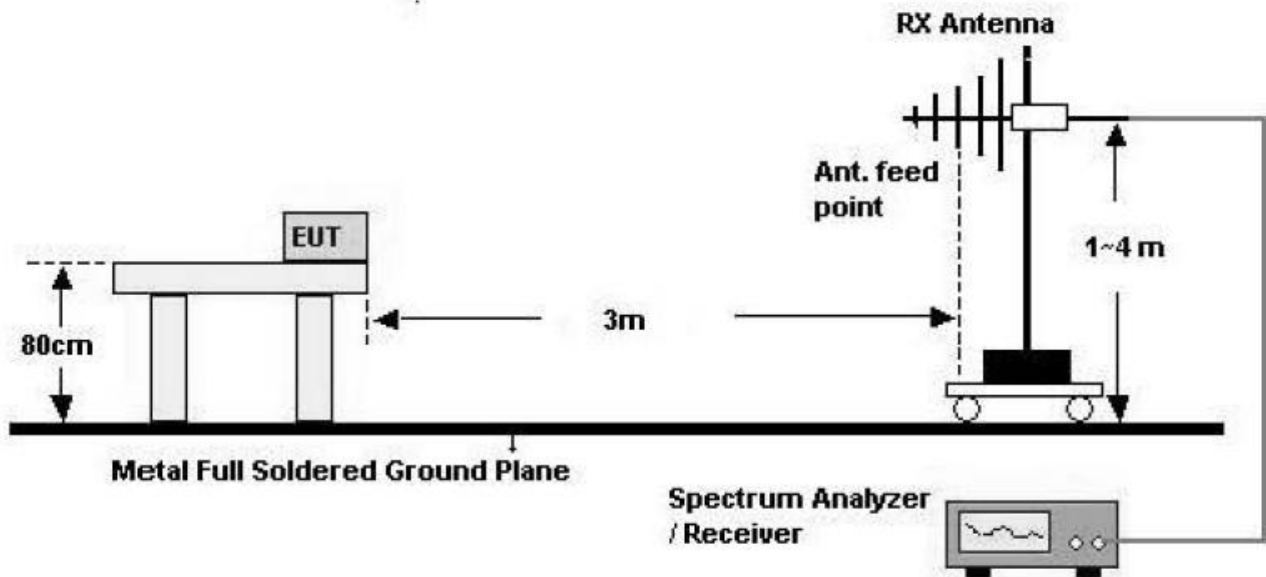
Note : We have done all test case. Worst case is Ant 1 & 2 for monitoring and Ant 1 & 2 & 3 for service. So, we attached the results of only worst case.

## Test Configuration

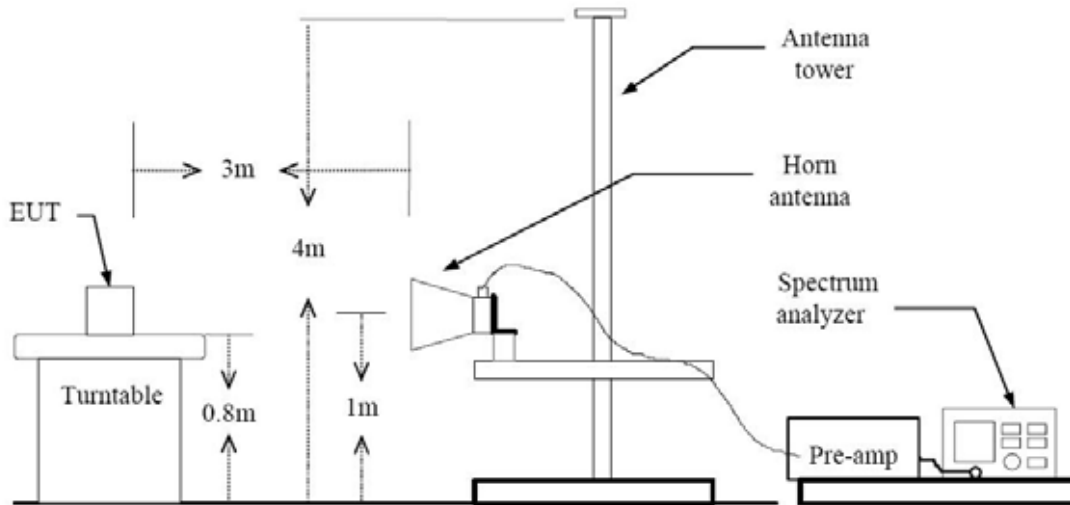
Below 30 MHz



30 MHz - 1 GHz



## Above 1 GHz



### TEST PROCEDURE USED

ANSI C63.4(2003)

Method H)5) in KDB 789033, issued 04/08/2013 (Peak)

Method H)6)d) in KDB 789033, issued 04/08/2013 (Average)

#### . Spectrum setting:

- Peak.

1. RBW = 1 MHz

2. VBW  $\geq$  3 MHz

3. Detector = Peak

4. Sweep Time = auto

5. Trace mode = max hold

6. Allow sweeps to continue until the trace stabilizes.

7. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where  $x$  is the duty cycle.

- Average ( Method VB :Averaging using reduced video bandwidth)

1. RBW = 1 MHz

2. VBW

2.1. If the EUT is configured to transmit with duty cycle  $\geq$  98 percent, set  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.

2.2. If the EUT duty cycle is  $<$  98 percent, set  $VBW \geq 1/T$ , where  $T$  is the minimum transmission duration.

3. The analyzer is set to linear detector mode.

4. Detector = Peak.

|                                        |                                            |                                    |                                                  |
|----------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|
| <b>FCC PT.15.407<br/>TEST REPORT</b>   | <b>FCC CERTIFICATION REPORT</b>            |                                    | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1312FR19 | <b>Date of Issue:</b><br>December 23, 2013 | <b>EUT Type:</b> WLAN Access Point | <b>FCC ID:</b><br>A3LWEA303I                     |

5. Sweep time = auto.
6. Trace mode = max hold.
7. Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where  $x$  is the duty cycle.

**Note :**

1. We used the case 2 for 802.11a/n\_20/n\_40 to perform the average field strength measurements for RSE and radiated band edge test.
2. The actual setting value of VBW for 802.11a/n\_20/n\_40.

**Monitoring**

| Mode | Worst Data rate (Mbps) | T <sub>on</sub> (ms) | T <sub>total</sub> (ms) | Duty Cycle (%) | VBW(1/T) (Hz) | The actual setting value of VBW (Hz) |
|------|------------------------|----------------------|-------------------------|----------------|---------------|--------------------------------------|
| a    | 6                      | 2.020                | 2.070                   | 97.6           | 495.0         | 1000                                 |
| n_20 | 6.5                    | 1.885                | 1.930                   | 97.7           | 530.5         | 1000                                 |
| n_40 | 13.5                   | 0.926                | 0.960                   | 96.5           | 1079.9        | 3000                                 |

**Service**

| Mode | Worst Data rate (Mbps) | T <sub>on</sub> (ms) | T <sub>total</sub> (ms) | Duty Cycle (%) | VBW(1/T) (Hz) | The actual setting value of VBW (Hz) |
|------|------------------------|----------------------|-------------------------|----------------|---------------|--------------------------------------|
| a    | 6                      | 1.335                | 1.405                   | 95.0           | 749.1         | 1000                                 |
| n_20 | 6.5                    | 1.269                | 1.317                   | 96.4           | 788.0         | 1000                                 |
| n_40 | 13.5                   | 0.630                | 0.664                   | 94.9           | 1587.3        | 3000                                 |

## TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

| Frequency               | Reading    | Ant. factor | Cable loss | Ant. POL | Total        | Limit        | Margin |
|-------------------------|------------|-------------|------------|----------|--------------|--------------|--------|
| MHz                     | dB $\mu$ V | dB /m       | dB         | (H/V)    | dB $\mu$ V/m | dB $\mu$ V/m | dB     |
| No Critical peaks found |            |             |            |          |              |              |        |

### Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
4. Limit line = specific Limits (dB $\mu$ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

| Frequency               | Reading    | Ant. factor | Cable loss | Ant. POL | Total        | Limit        | Margin |
|-------------------------|------------|-------------|------------|----------|--------------|--------------|--------|
| MHz                     | dB $\mu$ V | dB /m       | dB         | (H/V)    | dB $\mu$ V/m | dB $\mu$ V/m | dB     |
| No Critical peaks found |            |             |            |          |              |              |        |

### Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

## Above 1 GHz

### Monitoring MIMO (Ant 1 & 2)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10360              | 64.12           | -6.51                 | V                 | 57.61             | 68.20             | 10.59          | PK     |
| 15540              | 62.72           | -6.42                 | V                 | 56.30             | 73.98             | 17.68          | PK     |
| 15540              | 51.04           | -6.42                 | V                 | 44.62             | 53.98             | 9.36           | AV     |
| 10360              | 62.00           | -6.51                 | H                 | 55.49             | 68.20             | 12.71          | PK     |
| 15540              | 64.00           | -6.42                 | H                 | 57.58             | 73.98             | 16.40          | PK     |
| 15540              | 51.39           | -6.42                 | H                 | 44.97             | 53.98             | 9.01           | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5200 MHz |
| Channel No.         | 40 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10400              | 62.04           | -6.49                 | V                 | 55.55             | 68.20             | 12.65          | PK     |
| 15600              | 62.25           | -7.15                 | V                 | 55.10             | 73.98             | 18.88          | PK     |
| 15600              | 50.14           | -7.15                 | V                 | 42.99             | 53.98             | 10.99          | AV     |
| 10400              | 63.72           | -6.49                 | H                 | 57.23             | 68.20             | 10.97          | PK     |
| 15600              | 62.12           | -7.15                 | H                 | 54.97             | 73.98             | 19.01          | PK     |
| 15600              | 51.02           | -7.15                 | H                 | 43.87             | 53.98             | 10.11          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5240 MHz |
| Channel No.         | 48 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 61.72           | -6.96                 | V                 | 54.76             | 68.20             | 13.44          | PK     |
| 15720              | 62.89           | -6.62                 | V                 | 56.27             | 73.98             | 17.71          | PK     |
| 15720              | 50.78           | -6.62                 | V                 | 44.16             | 53.98             | 9.82           | AV     |
| 10480              | 62.49           | -6.96                 | H                 | 55.53             | 68.20             | 12.67          | PK     |
| 15720              | 62.00           | -6.96                 | H                 | 55.04             | 73.98             | 18.94          | PK     |
| 15720              | 50.16           | -6.62                 | H                 | 43.54             | 53.98             | 10.44          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5180 MHz

Channel No. 36 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10360           | 64.10        | -6.51              | V              | 57.59          | 68.20          | 10.61       | PK     |
| 15540           | 64.00        | -6.42              | V              | 57.58          | 73.98          | 16.40       | PK     |
| 15540           | 49.72        | -6.42              | V              | 43.30          | 53.98          | 10.68       | AV     |
| 10360           | 63.02        | -6.51              | H              | 56.51          | 68.20          | 11.69       | PK     |
| 15540           | 62.78        | -6.42              | H              | 56.36          | 73.98          | 17.62       | PK     |
| 15540           | 50.68        | -6.42              | H              | 44.26          | 53.98          | 9.72        | AV     |

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5200 MHz

Channel No. 40 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10400           | 64.04        | -6.49              | V              | 57.55          | 68.20          | 10.65       | PK     |
| 15600           | 62.72        | -7.15              | V              | 55.57          | 73.98          | 18.41       | PK     |
| 15600           | 51.48        | -7.15              | V              | 44.33          | 53.98          | 9.65        | AV     |
| 10400           | 62.78        | -6.49              | H              | 56.29          | 68.20          | 11.91       | PK     |
| 15600           | 63.05        | -7.15              | H              | 55.90          | 73.98          | 18.08       | PK     |
| 15600           | 50.11        | -7.15              | H              | 42.96          | 53.98          | 11.02       | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5240 MHz           |
| Channel No.         | 48 Ch              |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 62.79           | -6.96                 | V                 | 55.83             | 68.20             | 12.37          | PK     |
| 15720              | 63.02           | -6.62                 | V                 | 56.40             | 73.98             | 17.58          | PK     |
| 15720              | 50.04           | -6.62                 | V                 | 43.42             | 53.98             | 10.56          | AV     |
| 10480              | 63.42           | -6.96                 | H                 | 56.46             | 68.20             | 11.74          | PK     |
| 15720              | 63.30           | -6.96                 | H                 | 56.34             | 73.98             | 17.64          | PK     |
| 15720              | 50.43           | -6.62                 | H                 | 43.81             | 53.98             | 10.17          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_20 MHz BW. Worst case is 6.5 Mbps in 802.11n\_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10380              | 63.00           | -5.38                 | V                 | 57.62             | 68.20             | 10.58          | PK     |
| 15570              | 61.54           | -6.41                 | V                 | 55.13             | 73.98             | 18.85          | PK     |
| 15570              | 48.72           | -6.41                 | V                 | 42.31             | 53.98             | 11.67          | AV     |
| 10380              | 61.47           | -5.38                 | H                 | 56.09             | 68.20             | 12.11          | PK     |
| 15570              | 61.84           | -6.41                 | H                 | 55.43             | 73.98             | 18.55          | PK     |
| 15570              | 48.92           | -6.41                 | H                 | 42.51             | 53.98             | 11.47          | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5230 MHz          |
| Channel No.         | 46 Ch             |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10460              | 61.72           | -6.88                 | V                 | 54.84             | 68.20             | 13.36          | PK     |
| 15690              | 62.84           | -6.64                 | V                 | 56.20             | 73.98             | 17.78          | PK     |
| 15690              | 48.45           | -6.64                 | V                 | 41.81             | 53.98             | 12.17          | AV     |
| 10460              | 64.03           | -6.88                 | H                 | 57.15             | 68.20             | 11.05          | PK     |
| 15690              | 63.00           | -6.64                 | H                 | 56.36             | 73.98             | 17.62          | PK     |
| 15690              | 48.84           | -6.64                 | H                 | 42.20             | 53.98             | 11.78          | 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.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |



4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_40 MHz BW. Worst case is 13.5 Mbps in 802.11n\_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## Service MIMO (Ant 1 & 2 & 3)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10360              | 62.00           | -6.51                 | V                 | 55.49             | 68.20             | 12.71          | PK     |
| 15540              | 65.00           | -6.42                 | V                 | 58.58             | 73.98             | 15.40          | PK     |
| 15540              | 51.42           | -6.42                 | V                 | 45.00             | 53.98             | 8.98           | AV     |
| 10360              | 63.01           | -6.51                 | H                 | 56.50             | 68.20             | 11.70          | PK     |
| 15540              | 64.52           | -6.42                 | H                 | 58.10             | 73.98             | 15.88          | PK     |
| 15540              | 48.72           | -6.42                 | H                 | 42.30             | 53.98             | 11.68          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5200 MHz |
| Channel No.         | 40 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10400              | 63.05           | -6.49                 | V                 | 56.56             | 68.20             | 11.64          | PK     |
| 15600              | 62.71           | -7.15                 | V                 | 55.56             | 73.98             | 18.42          | PK     |
| 15600              | 48.24           | -7.15                 | V                 | 41.09             | 53.98             | 12.89          | AV     |
| 10400              | 62.14           | -6.49                 | H                 | 55.65             | 68.20             | 12.55          | PK     |
| 15600              | 63.00           | -7.15                 | H                 | 55.85             | 73.98             | 18.13          | PK     |
| 15600              | 48.78           | -7.15                 | H                 | 41.63             | 53.98             | 12.35          | AV     |

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5240 MHz |
| Channel No.         | 48 Ch    |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 62.51           | -6.96                 | V                 | 55.55             | 68.20             | 12.65          | PK     |
| 15720              | 63.00           | -6.62                 | V                 | 56.38             | 73.98             | 17.60          | PK     |
| 15720              | 49.14           | -6.62                 | V                 | 42.52             | 53.98             | 11.46          | AV     |
| 10480              | 62.74           | -6.96                 | H                 | 55.78             | 68.20             | 12.42          | PK     |
| 15720              | 63.05           | -6.96                 | H                 | 56.09             | 73.98             | 17.89          | PK     |
| 15720              | 48.94           | -6.62                 | H                 | 42.32             | 53.98             | 11.66          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11a. Worst case is 6 Mbps in 802.11a.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5180 MHz

Channel No. 36 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10360           | 62.48        | -6.51              | V              | 55.97          | 68.20          | 12.23       | PK     |
| 15540           | 62.74        | -6.42              | V              | 56.32          | 73.98          | 17.66       | PK     |
| 15540           | 48.75        | -6.42              | V              | 42.33          | 53.98          | 11.65       | AV     |
| 10360           | 63.00        | -6.51              | H              | 56.49          | 68.20          | 11.71       | PK     |
| 15540           | 64.22        | -6.42              | H              | 57.80          | 73.98          | 16.18       | PK     |
| 15540           | 48.95        | -6.42              | H              | 42.53          | 53.98          | 11.45       | AV     |

Band : UNII 1

Operation Mode: 802.11 n\_20 MHz BW

Transfer Rate: 6.5 Mbps

Operating Frequency 5200 MHz

Channel No. 40 Ch

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10400           | 62.00        | -6.49              | V              | 55.51          | 68.20          | 12.69       | PK     |
| 15600           | 62.72        | -7.15              | V              | 55.57          | 73.98          | 18.41       | PK     |
| 15600           | 48.94        | -7.15              | V              | 41.79          | 53.98          | 12.19       | AV     |
| 10400           | 61.78        | -6.49              | H              | 55.29          | 68.20          | 12.91       | PK     |
| 15600           | 63.04        | -7.15              | H              | 55.89          | 73.98          | 18.09       | PK     |
| 15600           | 48.95        | -7.15              | H              | 41.80          | 53.98          | 12.18       | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5240 MHz           |
| Channel No.         | 48 Ch              |

| 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 |
|--------------------|-----------------|-----------------------|-------------------|-------------------|-------------------|----------------|--------|
| 10480              | 62.04           | -6.96                 | V                 | 55.08             | 68.20             | 13.12          | PK     |
| 15720              | 62.58           | -6.62                 | V                 | 55.96             | 73.98             | 18.02          | PK     |
| 15720              | 49.78           | -6.62                 | V                 | 43.16             | 53.98             | 10.82          | AV     |
| 10480              | 61.49           | -6.96                 | H                 | 54.53             | 68.20             | 13.67          | PK     |
| 15720              | 62.34           | -6.96                 | H                 | 55.38             | 73.98             | 18.60          | PK     |
| 15720              | 49.46           | -6.62                 | H                 | 42.84             | 53.98             | 11.14          | 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. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_20 MHz BW. Worst case is 6.5 Mbps in 802.11n\_20 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10380           | 61.72        | -5.38              | V              | 56.34          | 68.20          | 11.86       | PK     |
| 15570           | 62.24        | -6.41              | V              | 55.83          | 73.98          | 18.15       | PK     |
| 15570           | 48.23        | -6.41              | V              | 41.82          | 53.98          | 12.16       | AV     |
| 10380           | 61.04        | -5.38              | H              | 55.66          | 68.20          | 12.54       | PK     |
| 15570           | 63.74        | -6.41              | H              | 57.33          | 73.98          | 16.65       | PK     |
| 15570           | 48.48        | -6.41              | H              | 42.07          | 53.98          | 11.91       | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5230 MHz          |
| Channel No.         | 46 Ch             |

| Frequency [MHz] | Reading dBuV | AN.+CL-Amp G. [dB] | ANT. POL [H/V] | Total [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Detect |
|-----------------|--------------|--------------------|----------------|----------------|----------------|-------------|--------|
| 10460           | 62.06        | -6.88              | V              | 55.18          | 68.20          | 13.02       | PK     |
| 15690           | 64.08        | -6.64              | V              | 57.44          | 73.98          | 16.54       | PK     |
| 15690           | 48.74        | -6.64              | V              | 42.10          | 53.98          | 11.88       | AV     |
| 10460           | 62.48        | -6.88              | H              | 55.60          | 68.20          | 12.60       | PK     |
| 15690           | 63.14        | -6.64              | H              | 56.50          | 73.98          | 17.48       | PK     |
| 15690           | 48.47        | -6.64              | H              | 41.83          | 53.98          | 12.15       | 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.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |



4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
5. We have done all data rate in 802.11n\_40 MHz BW. Worst case is 13.5 Mbps in 802.11n\_40 MHz BW.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                                 |                                     |                             |                                                  |
|---------------------------------|-------------------------------------|-----------------------------|--------------------------------------------------|
| FCC PT.15.407<br>TEST REPORT    | FCC CERTIFICATION REPORT            |                             | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| Test Report No.<br>HCTR1312FR19 | Date of Issue:<br>December 23, 2013 | EUT Type: WLAN Access Point | FCC ID:<br>A3LWEA303I                            |

## 8.7.2 RADIATED RESTRICTED BAND EDGE MEASUREMENTS

### Test Requirements and limit, §15.407, §15.205, §15.209

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)).

### Monitoring MIMO (Ant 1 & 2)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 56.02           | 8.79                    | H                 | 64.81             | 73.98             | 9.17           | PK     |
| 5150               | 36.45           | 8.79                    | H                 | 45.24             | 53.98             | 8.74           | AV     |
| 5150               | 49.72           | 8.79                    | V                 | 58.51             | 73.98             | 15.47          | PK     |
| 5150               | 36.54           | 8.79                    | V                 | 45.33             | 53.98             | 8.65           | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5180 MHz           |
| Channel No.         | 36 Ch              |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 58.57           | 8.79                    | H                 | 67.36             | 73.98             | 6.62           | PK     |
| 5150               | 37.43           | 8.79                    | H                 | 46.22             | 53.98             | 7.76           | AV     |
| 5150               | 48.50           | 8.79                    | V                 | 57.29             | 73.98             | 16.69          | PK     |
| 5150               | 36.24           | 8.79                    | V                 | 45.03             | 53.98             | 8.95           | AV     |

|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 58.78           | 8.79                    | H                 | 67.57             | 73.98             | 6.41           | PK     |
| 5150               | 41.60           | 8.79                    | H                 | 50.39             | 53.98             | 3.59           | AV     |
| 5150               | 50.94           | 8.79                    | V                 | 59.73             | 73.98             | 14.25          | PK     |
| 5150               | 37.00           | 8.79                    | V                 | 45.79             | 53.98             | 8.19           | AV     |

**Notes:**

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a/n mode test. . Worst case of EUT is lowest data rate in 802.11a/n
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

### Service MIMO (Ant 1 & 2 & 3)

|                     |          |
|---------------------|----------|
| Band :              | UNII 1   |
| Operation Mode:     | 802.11 a |
| Transfer Rate:      | 6 Mbps   |
| Operating Frequency | 5180 MHz |
| Channel No.         | 36 Ch    |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 49.26           | 8.79                    | H                 | 58.05             | 73.98             | 15.93          | PK     |
| 5150               | 36.21           | 8.79                    | H                 | 45.00             | 53.98             | 8.98           | AV     |
| 5150               | 42.99           | 8.79                    | V                 | 51.78             | 73.98             | 22.2           | PK     |
| 5150               | 27.11           | 8.79                    | V                 | 35.9              | 53.98             | 18.08          | AV     |

|                     |                    |
|---------------------|--------------------|
| Band :              | UNII 1             |
| Operation Mode:     | 802.11 n_20 MHz BW |
| Transfer Rate:      | 6.5 Mbps           |
| Operating Frequency | 5180 MHz           |
| Channel No.         | 36 Ch              |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 49.86           | 8.79                    | H                 | 58.65             | 73.98             | 15.33          | PK     |
| 5150               | 36.02           | 8.79                    | H                 | 44.81             | 53.98             | 9.17           | AV     |
| 5150               | 44.51           | 8.79                    | V                 | 53.3              | 73.98             | 20.68          | PK     |
| 5150               | 26.88           | 8.79                    | V                 | 35.67             | 53.98             | 18.31          | AV     |



|                     |                   |
|---------------------|-------------------|
| Band :              | UNII 1            |
| Operation Mode:     | 802.11n_40 MHz BW |
| Transfer Rate:      | 13.5 Mbps         |
| Operating Frequency | 5190 MHz          |
| Channel No.         | 38 Ch             |

| Frequency<br>[MHz] | Reading<br>dBuV | AN.+CL+AMP+ATT.<br>[dB] | ANT. POL<br>[H/V] | Total<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] | Detect |
|--------------------|-----------------|-------------------------|-------------------|-------------------|-------------------|----------------|--------|
| 5150               | 50.81           | 8.79                    | H                 | 59.6              | 73.98             | 14.38          | PK     |
| 5150               | 36.44           | 8.79                    | H                 | 45.23             | 53.98             | 8.75           | AV     |
| 5150               | 44.87           | 8.79                    | V                 | 53.66             | 73.98             | 20.32          | PK     |
| 5150               | 27.54           | 8.79                    | V                 | 36.33             | 53.98             | 17.65          | AV     |

**Notes:**

1. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + ATT
2. We have done all data rate in 802.11a/n mode test. . Worst case of EUT is lowest data rate in 802.11a/n
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

|                                        |                                            |                                    |                                                  |
|----------------------------------------|--------------------------------------------|------------------------------------|--------------------------------------------------|
| <b>FCC PT.15.407<br/>TEST REPORT</b>   | <b>FCC CERTIFICATION REPORT</b>            |                                    | <a href="http://www.hct.co.kr">www.hct.co.kr</a> |
| <b>Test Report No.</b><br>HCTR1312FR19 | <b>Date of Issue:</b><br>December 23, 2013 | <b>EUT Type:</b> WLAN Access Point | <b>FCC ID:</b><br>A3LWEA303I                     |

## 9.8 POWERLINE CONDUCTED EMISSIONS

### Test Requirements and limit, §15.207

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 (dBμV) |          |
|-----------------------|---------------|----------|
|                       | 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.

Note : We don't perform powerline conducted emission test. Because the manufacturer does not sell the POE.

## 10. LIST OF TEST EQUIPMENT

| Manufacturer          | Model / Equipment                                      | Calibration Interval | Calibration Due | Serial No.                 |
|-----------------------|--------------------------------------------------------|----------------------|-----------------|----------------------------|
| Rohde & Schwarz       | ENV216/ LISN                                           | Annual               | 02/06/2014      | 100073                     |
| Schwarzbeck           | VULB 9160/ TRILOG Antenna                              | Biennial             | 12/17/2014      | 3150                       |
| Rohde & Schwarz       | ESI 40 / EMI TEST RECEIVER                             | Annual               | 04/16/2014      | 831564103                  |
| Agilent               | E4440A/ Spectrum Analyzer                              | Annual               | 04/25/2014      | US45303008                 |
| Agilent               | N9020A/ SIGNAL ANALYZER                                | Annual               | 05/14/2014      | MY51110063                 |
| Audix                 | AM4000/ Antenna Position Tower                         | N/A                  | N/A             | 060520-AM                  |
| Audix                 | Turn Table                                             | N/A                  | N/A             | N/A                        |
| Audix                 | EM 1000/ Controller                                    | N/A                  | N/A             | 13                         |
| Rohde & Schwarz       | SCU-18/ Signal Conditioning Unit                       | Annual               | 09/10/2014      | 10094                      |
| CERNEX                | CBL26405040 / POWER AMP                                | Annual               | 04/16/2014      | 19660                      |
| Schwarzbeck           | BBHA 9120D/ Horn Antenna                               | Biennial             | 07/05/2015      | 1151                       |
| Schwarzbeck           | BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)               | Biennial             | 10/30/2014      | BBHA9170124                |
| Rohde & Schwarz       | FSP / Spectrum Analyzer                                | Annual               | 02/08/2014      | 839117/011                 |
| Agilent               | N1911A/Power Meter                                     | Annual               | 01/22/2014      | MY45100523                 |
| Agilent               | N1921A /POWER SENSOR                                   | Annual               | 07/11/2014      | MY45241059                 |
| Wainwright Instrument | WHF3.0/18G-10EF / High Pass Filter                     | Annual               | 02/08/2014      | F6                         |
| Wainwright Instrument | WHNX6.0/26.5G-6SS / High Pass Filter                   | Annual               | 04/16/2014      | 1                          |
| Wainwright Instrument | WHNX7.0/18G-8SS / High Pass Filter                     | Annual               | 04/16/2014      | 29                         |
| Wainwright Instrument | WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter | Annual               | 03/19/2014      | 1                          |
| Hewlett Packard       | 11636B/Power Divider                                   | Annual               | 10/22/2014      | 11377                      |
| Agilent               | 87300B/Directional Coupler                             | Annual               | 12/24/2013      | 3116A03621                 |
| Hewlett Packard       | 11667B / Power Splitter                                | Annual               | 05/29/2014      | 05001                      |
| DIGITAL               | EP-3010 /DC POWER SUPPLY                               | Annual               | 10/29/2014      | 3110117                    |
| TESCOM                | TC-3000C / BLUETOOTH TESTER                            | Annual               | 04/24/2014      | 3000C000276                |
| Rohde & Schwarz       | CBT / BLUETOOTH TESTER                                 | Annual               | 04/25/2014      | 100422                     |
| EMCO                  | 6502.LOOP ANTENNA                                      | Biennial             | 01/11/2014      | 9009-2536                  |
| Agilent               | 8493C / Attenuator(10 dB)                              | Annual               | 07/24/2014      | 76649                      |
| Rohde & Schwarz       | FSV40/Spectrum Analyzer                                | Annual               | 06/10/2014      | 1307.9002K40-<br>100931-NK |
| CERNEX                | CBL06185030 / POWER AMP                                | Annual               | 07/24/2014      | 22965                      |
| CERNEX                | CBLU1183540 / POWER AMP                                | Annual               | 07/24/2014      | 22964                      |
| CERNEX                | CBL18265035 / POWER AMP                                | Annual               | 07/24/2014      | 22966                      |