

## TEST REPORT

**APPLICANT** : Sharp Corporation, Communication Systems Group  
**ADDRESS** : 2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima,  
739-0192, JAPAN  
**PRODUCTS** : Cellular Phone  
**MODEL NO.** : SH-02D  
**SERIAL NO.** : 004401113585398  
004401113585349  
**FCC ID** : APYHRO00160  
**TEST STANDARD** : CFR 47 FCC Rules and Regulations Part 15  
**TESTING LOCATION** : Japan Quality Assurance Organization  
KITA-KANSAI Testing Center  
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan  
**TEST RESULTS** : **Passed**  
**DATE OF TEST** : October 20 ~ 23, 2011



A handwritten signature in black ink, appearing to read 'K. Shibata', written over a horizontal line.

Kousei Shibata  
Manager  
Japan Quality Assurance Organization  
KITA-KANSAI Testing Center  
Testing Dept. SAITO EMC Branch  
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

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**DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT**

|                                   |                                             |
|-----------------------------------|---------------------------------------------|
| <b>EUT</b> : Equipment Under Test | <b>EMC</b> : Electromagnetic Compatibility  |
| <b>AE</b> : Associated Equipment  | <b>EMI</b> : Electromagnetic Interference   |
| <b>N/A</b> : Not Applicable       | <b>EMS</b> : Electromagnetic Susceptibility |
| <b>N/T</b> : Not Tested           |                                             |

- ☒ - indicates that the listed condition, standard or equipment is applicable for this report.  
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

## Documentation

### 1 Test Regulation

Applied Standard : CFR 47 FCC Rules and Regulations Part 15  
Subpart C – Intentional Radiators

Test Requirements : §15.247, §15.207 and §15.209

Test Procedure : ANSI C63.4–2003

The tests were performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000.

The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

### 2 Test Location

Japan Quality Assurance Organization (JQA)

KITA-KANSAI Testing Center Testing Department SAITO EMC Branch

7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

MINOH Test Site (KITA-KANSAI Testing Center)

7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-cho, Kameoka-shi, Kyoto, 621-0126, Japan

### 3 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center Testing Dept. SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies.

VLAC Code : VLAC-001-2 (Effective through : March 30, 2012)

BSMI Recognition No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006  
(Effective through : September 14, 2013)

IC Registration No. : 2079E-2 (Effective through : January 25, 2014)  
2079E-3, 2079E-4 (Effective through : July 20, 2014)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.  
(Effective through : February 22, 2012)

## 4 Description of the Equipment Under Test

### 4.1 General Information

1. Manufacturer : Sharp Corporation, Communication Systems Group  
2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima,  
739-0192, JAPAN
2. Products : Cellular Phone
3. Model No. : SH-02D
4. Serial No. : 004401113585398  
: 004401113585349
5. Product Type : Pre-production
6. Date of Manufacture : October, 2011
7. Transmitting Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
8. Receiving Frequency : 2412.0 MHz(01CH) –2462.0MHz(11CH)
9. Max. RF Output Power : 15.72dBm(Measure Value of IEEE802.11b)  
: 21.49dBm(Measure Value of IEEE802.11g)  
: 20.56dBm(Measure Value of IEEE802.11n)
10. Power Rating : 4.0VDC (Lithium-ion Battery Pack SH32 1370mAh)
11. EUT Grounding : None
12. EUT Authorization : Certification
13. Receive Date of EUT : October 19, 2011

### 4.2 Channel Plan

The carrier spacing is 5 MHz.

The carrier frequency is designated by the absolute frequency channel number (ARFCN).

The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) =  $2407.0 + 5 \cdot n$

Receiving Frequency (in MHz) =  $2407.0 + 5 \cdot n$

where, n : channel number ( $1 \leq n \leq 11$ )

## 5 Test Condition

### 5.1 Channel Separation

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

|                   |                                               |                                                        |
|-------------------|-----------------------------------------------|--------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)          |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input type="checkbox"/> - Shielded room (S4)          |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                        |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility |

Test instruments : Refer to Appendix C.

### 5.2 Minimum Hopping Channel

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

|                   |                                               |                                                        |
|-------------------|-----------------------------------------------|--------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)          |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input type="checkbox"/> - Shielded room (S4)          |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                        |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility |

Test instruments : Refer to Appendix C.

### 5.3 Occupied Bandwidth

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

|                   |                                               |                                                          |
|-------------------|-----------------------------------------------|----------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)            |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input checked="" type="checkbox"/> - Shielded room (S4) |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                          |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility   |

Test instruments : Refer to Appendix C.

### 5.4 Dwell Time

The requirements are ☐ - Applicable ☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

|                   |                                               |                                                        |
|-------------------|-----------------------------------------------|--------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)          |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input type="checkbox"/> - Shielded room (S4)          |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                        |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility |

Test instruments : Refer to Appendix C.

**5.5 Peak Output Power and Density (Conduction)**

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

|                   |                                               |                                                          |
|-------------------|-----------------------------------------------|----------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)            |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input checked="" type="checkbox"/> - Shielded room (S4) |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                          |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility   |

Test instruments : Refer to Appendix C.

**5.6 Spurious Emission (Conduction)**

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

|                   |                                               |                                                          |
|-------------------|-----------------------------------------------|----------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Shielded room (S1) | <input type="checkbox"/> - Shielded room (S2)            |
|                   | <input type="checkbox"/> - Shielded room (S3) | <input checked="" type="checkbox"/> - Shielded room (S4) |
| MINOH             | <input type="checkbox"/> - Shielded room      |                                                          |
| KAMEOKA           | <input type="checkbox"/> - Shielded room      | <input type="checkbox"/> - Conducted emission facility   |

Test instruments : Refer to Appendix C.

**5.7 AC Powerline Conducted Emission**

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

|                   |                                                             |                                                        |
|-------------------|-------------------------------------------------------------|--------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Anechoic chamber (A1)            | <input type="checkbox"/> - Measurement room (M1)       |
|                   | <input checked="" type="checkbox"/> - Measurement room (M2) | <input type="checkbox"/> - Measurement room (M3)       |
|                   | <input type="checkbox"/> - Shielded room (S1)               | <input type="checkbox"/> - Shielded room (S2)          |
| MINOH             | <input type="checkbox"/> - Shielded room                    |                                                        |
|                   | <input type="checkbox"/> - Anechoic chamber                 |                                                        |
| KAMEOKA           | <input type="checkbox"/> - Shielded room                    | <input type="checkbox"/> - Conducted emission facility |
|                   | <input type="checkbox"/> - 1st open site                    |                                                        |

Test instruments : Refer to Appendix C.

**5.8 Field Strength of Spurious Radiation**

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

|                   |                                                  |                                                             |
|-------------------|--------------------------------------------------|-------------------------------------------------------------|
| Test site : SAITO | <input type="checkbox"/> - Anechoic chamber (A1) | <input checked="" type="checkbox"/> - Anechoic chamber (A2) |
| KAMEOKA           | <input type="checkbox"/> - 1st open site         |                                                             |

Test instruments : Refer to Appendix C.

## 6 Preliminary Test and Test Setup

### 6.1 Channel Separation

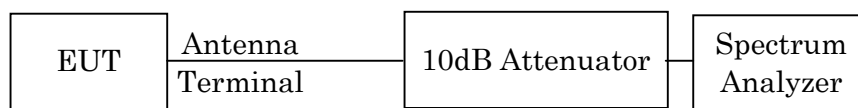
Not Applicable

### 6.2 Minimum Hopping Channel

Not Applicable

### 6.3 Occupied Bandwidth

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

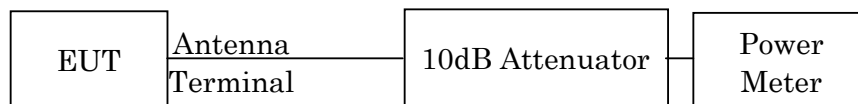
|                 |         |
|-----------------|---------|
| Res. Bandwidth  | 100 kHz |
| Video Bandwidth | 300 kHz |
| Span            | 30 MHz  |
| Sweep Time      | AUTO    |
| Trace           | Maxhold |

### 6.4 Dwell Time

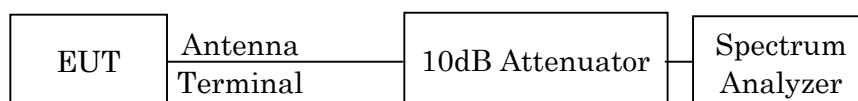
Not Applicable

### 6.5 Peak Output Power and Peak Power Density

The Conducted RF Power Output was measured with a power meter, one 10dB attenuator and a short, low loss cable.

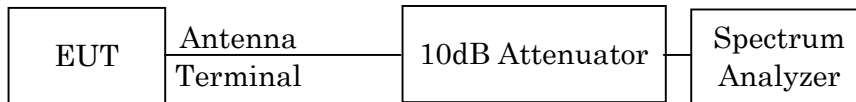


The Peak Power Density was measured with a spectrum analyzer, one 10dB attenuator and a short, low loss cable.



**6.6 Spurious Emission(Conduction)**

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

|                 |                 |           |
|-----------------|-----------------|-----------|
| Frequency Range | 30 MHz - 25 GHz | Band-Edge |
| Res. Bandwidth  | 100 kHz         | 100 kHz   |
| Video Bandwidth | 300 kHz         | 300 kHz   |
| Sweep Time      | AUTO            | AUTO      |
| Trace           | Maxhold         | Maxhold   |



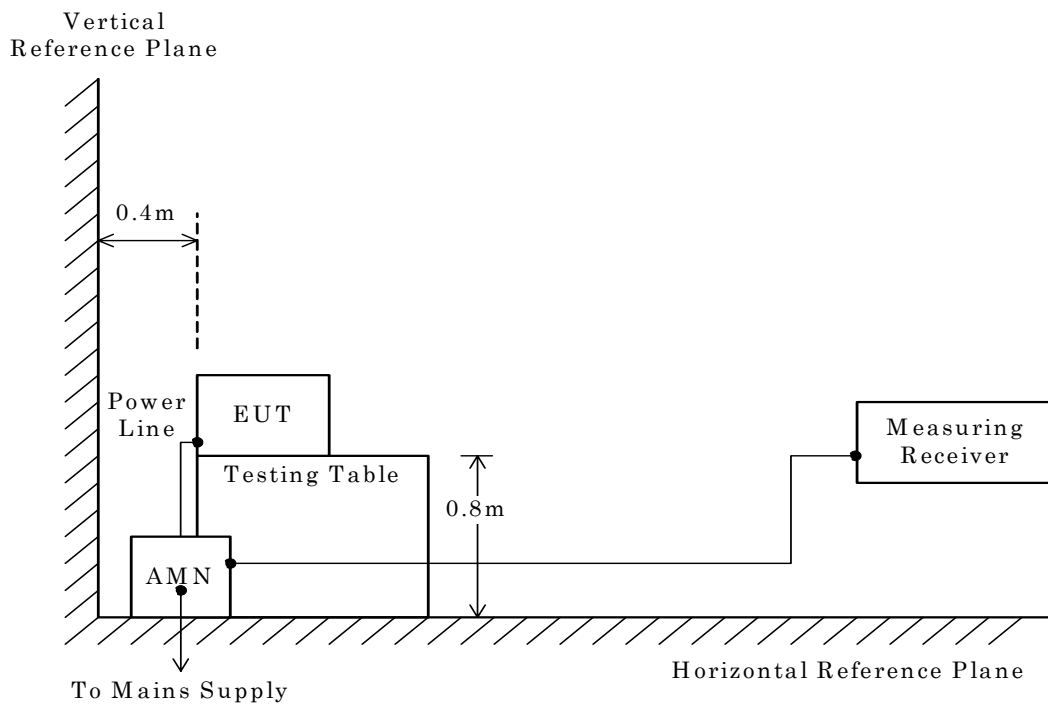
## 6.7 AC Powerline Conducted Emission

The preliminary tests were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for final tests.

– Side View –



NOTE

AMN : Artificial Mains Network

## 6.8 Field Strength of Spurious Emission

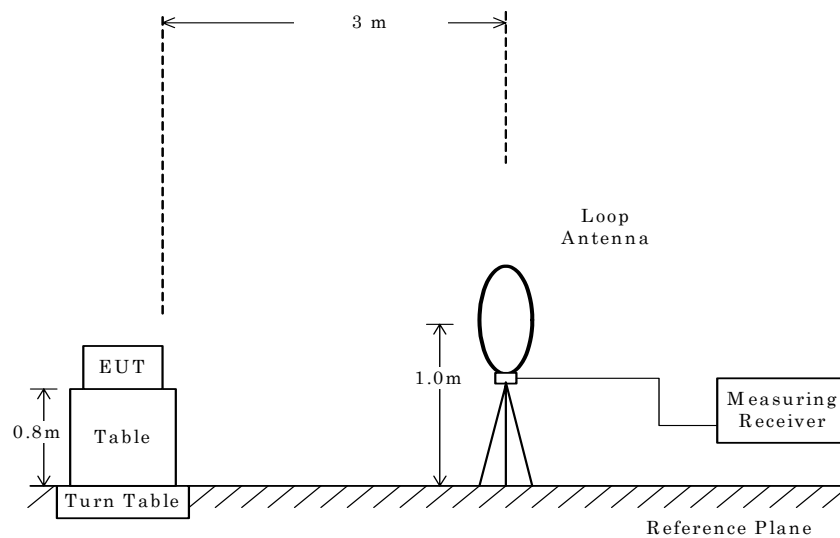
### 6.8.1 Field Strength of Spurious Emission 9 kHz – 30 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



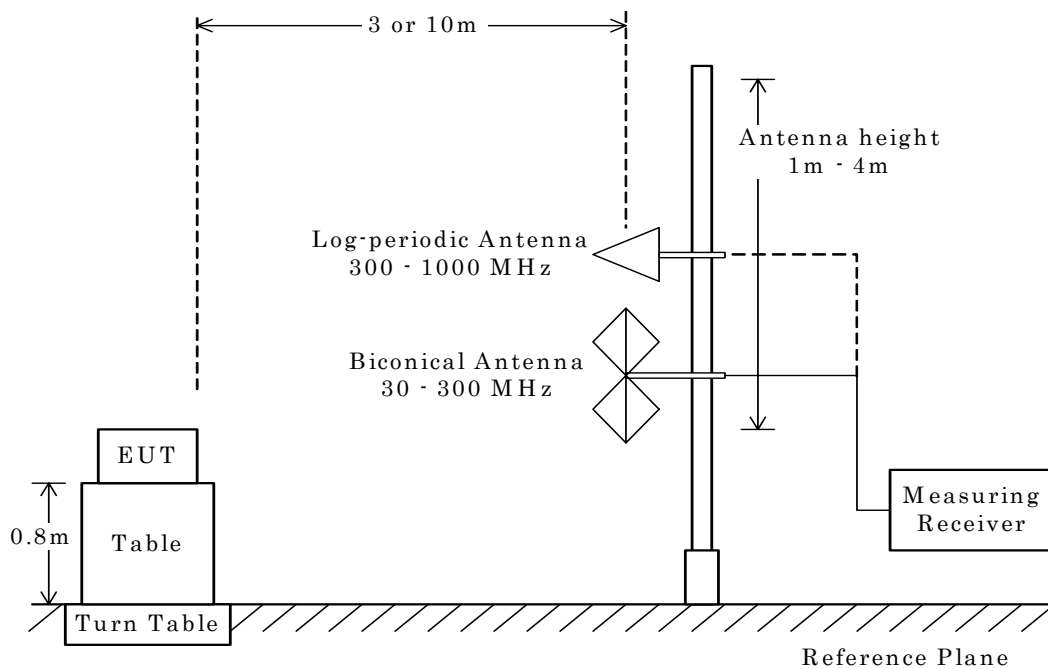
## 6.8.2 Field Strength of Spurious Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



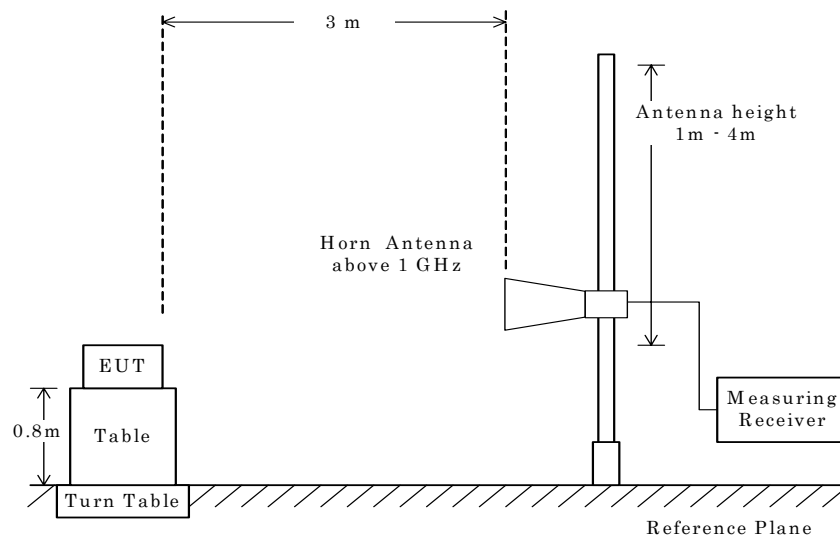
### 6.8.3 Field Strength of Spurious Emission above 1 GHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for the final tests.

– Side View –



#### NOTE

The antenna height is scanned depending on the EUT's size and mounting height.

**7 Equipment Under Test Modification**

- ☒ - No modifications were conducted by JQA to achieve compliance to the limitations.  
☐ - To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable

Date : Not Applicable

Typed Name : Not Applicable

Position : Not Applicable

Signatory : Not Applicable

**8 Responsible Party**Responsible Party of Test Item (Product)

Responsible Party :

Contact Person :

\_\_\_\_\_  
Signatory

**9 Deviation from Standard**

- ☒ - No deviations from the standard described in clause 1.  
☐ - The following deviations were employed from the standard described in clause 1.

\_\_\_\_\_

## 10 Test Results

### 10.1 RF Power Output (§2.1046)

#### 10.1.1 Channel Separation

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

☐ - Passed ☐ - Failed ☐ - Not judged

Channel Separation is \_\_\_\_\_ MHz  
Channel Separation(Inquiry) is \_\_\_\_\_ MHz

Uncertainty of Measurement Results +/-0.9 %(2σ)

Remarks : \_\_\_\_\_

#### 10.1.2 Minimum Hopping Channel

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

Number of Channel is \_\_\_\_\_  
Number of Channel (Inquiry) is \_\_\_\_\_

Remarks : \_\_\_\_\_

#### 10.1.3 Occupied Bandwidth

The requirements are ☒ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

|                                     |                   |    |                   |
|-------------------------------------|-------------------|----|-------------------|
| The 99% Bandwidth of IEEE802.11b is | <u>12.353</u> MHz | at | <u>2437.0</u> MHz |
| The 99% Bandwidth of IEEE802.11g is | <u>16.325</u> MHz | at | <u>2412.0</u> MHz |
| The 99% Bandwidth of IEEE802.11n is | <u>17.512</u> MHz | at | <u>2412.0</u> MHz |

|                                     |                   |    |                      |
|-------------------------------------|-------------------|----|----------------------|
| The 6dB Bandwidth of IEEE802.11b is | <u>7.397</u> MHz  | at | <u>2412.0</u> MHz    |
| The 6dB Bandwidth of IEEE802.11g is | <u>15.706</u> MHz | at | <u>2412/2437</u> MHz |
| The 6dB Bandwidth of IEEE802.11n is | <u>17.553</u> MHz | at | <u>2462.0</u> MHz    |

Uncertainty of Measurement Results +/-0.9 %(2σ)

Remarks : \_\_\_\_\_

**10.1.4 Dwell Time**

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]  
☒ - Not Applicable

☐ - Passed ☐ - Failed ☐ - Not judged

Dwell Time is \_\_\_\_\_ msec

Dwell Time (Inquiry) is \_\_\_\_\_ msec

Uncertainty of Measurement Results +/-0.6 %(2 $\sigma$ )

Remarks : \_\_\_\_\_

**10.1.5 Peak Output Power(Conduction)**

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

Peak Output Power of IEEE802.11b is 15.72 dBm at 2462.0 MHz

Peak Output Power of IEEE802.11g is 21.49 dBm at 2462.0 MHz

Peak Output Power of IEEE802.11n is 20.56 dBm at 2462.0 MHz

Uncertainty of Measurement Results at Amplitude +/-1.2 dB(2 $\sigma$ )

Remarks : \_\_\_\_\_

**10.1.6 Peak Power Density(Conduction)**

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

Peak Power Density of IEEE802.11b is -7.88 dBm at 2437.0 MHz

Peak Power Density of IEEE802.11g is -11.80 dBm at 2462.0 MHz

Peak Power Density of IEEE802.11n is -12.11 dBm at 2437.0 MHz

Uncertainty of Measurement Results at Amplitude +/-0.8 dB(2 $\sigma$ )

Remarks : \_\_\_\_\_

## 10.2 Spurious Emissions(Conduction)

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

|                                    |               |               |        |
|------------------------------------|---------------|---------------|--------|
| Uncertainty of Measurement Results | 9 kHz – 1GHz  | <u>+/-1.0</u> | dB(2σ) |
|                                    | 1GHz – 18GHz  | <u>+/-1.2</u> | dB(2σ) |
|                                    | 18GHz – 40GHz | <u>+/-1.6</u> | dB(2σ) |

Remarks : \_\_\_\_\_

## 10.3 AC Powerline Conducted Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Quasi-Peak) 16.9 dB at 1.90 MHz

Max. Limit Exceeding (Quasi-Peak) \_\_\_\_\_ dB at \_\_\_\_\_ MHz

Uncertainty of Measurement Results +/-2.5 dB(2σ)

Remarks : \_\_\_\_\_

## 10.4 Field Strength of Spurious Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]  
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Average) >4.3 dB at 22158.0 MHz

Max. Limit Exceeding (Average) \_\_\_\_\_ dB at \_\_\_\_\_ MHz

|                                    |                    |               |        |
|------------------------------------|--------------------|---------------|--------|
| Uncertainty of Measurement Results | 9 kHz – 30 MHz     | <u>+/-1.7</u> | dB(2σ) |
|                                    | 30 MHz – 300 MHz   | <u>+/-4.3</u> | dB(2σ) |
|                                    | 300 MHz – 1000 MHz | <u>+/-4.5</u> | dB(2σ) |
|                                    | 1 GHz – 18 GHz     | <u>+/-4.0</u> | dB(2σ) |
|                                    | 18 GHz – 40 GHz    | <u>+/-4.7</u> | dB(2σ) |

Remarks : \_\_\_\_\_



**11 Summary****General Remarks :**

The EUT was tested according to the requirements of the following standard.

CFR 47 FCC Rules and Regulations Part 15

The test configuration is shown in clause 12 to 14.

The conclusion for the test items of which are required by the applied regulation is indicated under the test results.

Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

**Test Results :**

The "as received" sample;

- ☒ - fulfill the test requirements of the regulation mentioned on clause 1.
- ☐ - doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:

Tested by:



---

Shigeru Kinoshita  
Deputy Manager  
JQA KITA-KANSAI Testing Center  
Testing Dept. SAITO EMC Branch



---

Shigeru Osawa  
Deputy Manager  
JQA KITA-KANSAI Testing Center  
Testing Dept. SAITO EMC Branch

## 12 Operating Condition

Transmitting/Receiving

Transmitting frequency : 2412.0 MHz(1CH) – 2462.0 MHz(11CH)

Receiver frequency : 2412.0 MHz(1CH) – 2462.0 MHz(11CH)

Modulation Type

1. 802.11b : DSSS

2. 802.11g : OFDM

3. 802.11n : OFDM

Other Clock Frequency

32.768 kHz, 19.2 MHz, 27.12 MHz

## 13 Test Configuration

The equipment under test (EUT) consists of :

|   | Item                                    | Manufacturer | Model No.            | Serial No.                                       | FCC ID      |
|---|-----------------------------------------|--------------|----------------------|--------------------------------------------------|-------------|
| A | Cellular Phone                          | Sharp        | SH-02D               | 0044011135<br>85398*1)<br>0044011135<br>85349*2) | APYHRO00160 |
| B | Lithium-ion Battery                     | Sharp        | SH32                 | --                                               | N/A         |
| C | AC Adapter for Global use               | NTT DoCoMo   | MAS-BH0008<br>-A 002 | --                                               | N/A         |
| D | USB conversion cable                    | Sharp        | SH-02D(Optional)     | --                                               | N/A         |
| E | Handsfree<br>(Include Conversion cable) | Sharp        | SHLDL1               | --                                               | N/A         |

\*1) Used for AC Powerline Conducted Emission and Field Strength of Spurious Emission

\*2) Used for Antenna Conducted Emission

The auxiliary equipment used for testing :

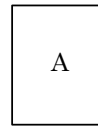
None

Type of Cable:

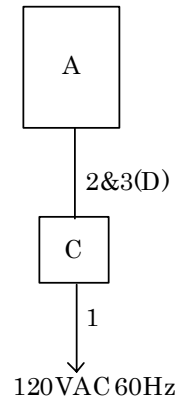
| No. | Description          | Identification<br>(Manu. etc.) | Connector<br>Shielded | Cable<br>Shielded | Ferrite<br>Core | Length<br>(m) |
|-----|----------------------|--------------------------------|-----------------------|-------------------|-----------------|---------------|
| 1   | AC Power Cord        | --                             | --                    | NO                | NO              | 0.5           |
| 2   | DC Power Cord        | --                             | NO                    | --                | NO              | 1.5           |
| 3   | USB conversion cable | --                             | --                    | NO                | NO              | 0.1           |
| 4   | Handsfree Cable      | --                             | NO                    | --                | NO              | 1.6           |

## 14 Equipment Under Test Arrangement (Drawings)

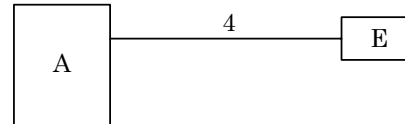
a) Single Unit



b) AC Adapter used



c) Stereo Earphone used



**Appendix A: Test Data****A.1 Channel Separation**

Not Applicable

**A.2 Minimum Hopping Channel**

Not Applicable

**A.3 Occupied Bandwidth**Test Date : October 20, 2011Temp.:24°C, Humi:48%

The resolution bandwidth was set to about 1% of emission bandwidth, -6dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

**A) IEEE 802.11b****1)Data Rate : 1Mbps**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | -6dBc Bandwidth (MHz) |
|---------|-----------------|---------------------|-----------------------|
| 01      | 2412.0          | 12.334              | 7.086                 |
| 06      | 2437.0          | 12.353              | 6.135                 |
| 11      | 2462.0          | 12.336              | 7.104                 |

**2)Data Rate : 2Mbps**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | -6dBc Bandwidth (MHz) |
|---------|-----------------|---------------------|-----------------------|
| 01      | 2412.0          | 12.337              | 7.117                 |
| 06      | 2437.0          | 12.335              | 6.746                 |
| 11      | 2462.0          | 12.319              | 6.591                 |

**3)Data Rate : 5.5Mbps**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | -6dBc Bandwidth (MHz) |
|---------|-----------------|---------------------|-----------------------|
| 01      | 2412.0          | 11.924              | 7.397                 |
| 06      | 2437.0          | 11.924              | 6.476                 |
| 11      | 2462.0          | 11.899              | 6.687                 |

**4)Data Rate : 11Mbps**

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | -6dBc Bandwidth (MHz) |
|---------|-----------------|---------------------|-----------------------|
| 01      | 2412.0          | 12.036              | 7.146                 |
| 06      | 2437.0          | 12.037              | 6.831                 |
| 11      | 2462.0          | 12.040              | 7.139                 |

## B) IEEE 802.11g

## 1) Data Rate : 6Mbps

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) | -6dBc Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|--------------------------|
| 01      | 2412.0             | 16.325                 | 15.089                   |
| 06      | 2437.0             | 16.323                 | 14.536                   |
| 11      | 2462.0             | 16.311                 | 15.091                   |

## 2) Data Rate : 54Mbps

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) | -6dBc Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|--------------------------|
| 01      | 2412.0             | 16.299                 | 15.706                   |
| 06      | 2437.0             | 16.306                 | 15.706                   |
| 11      | 2462.0             | 16.287                 | 15.128                   |

## C) IEEE 802.11n

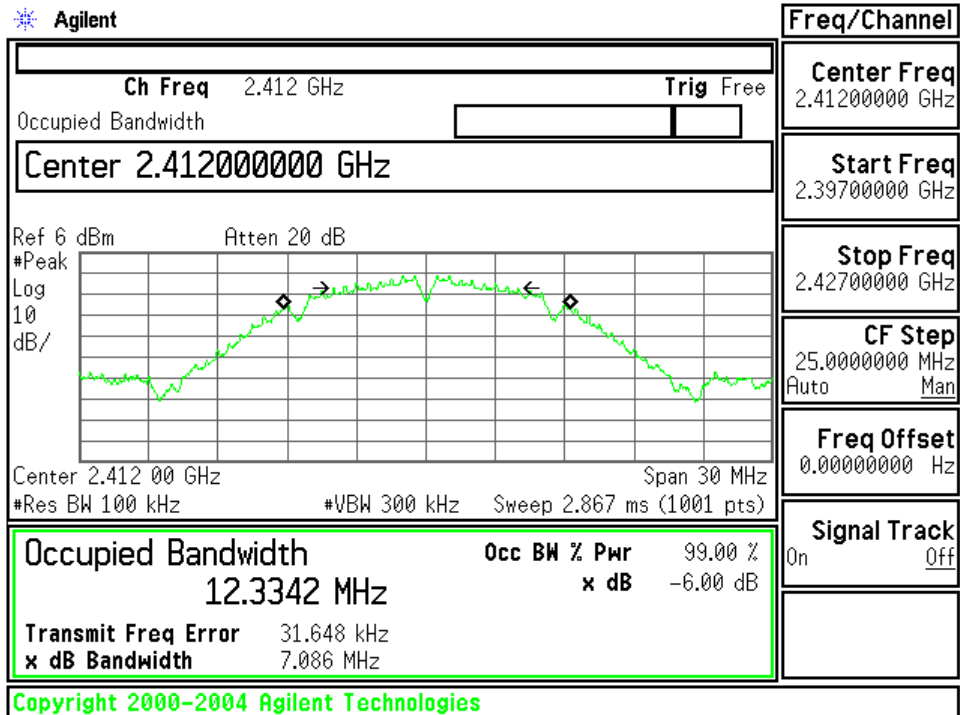
## 1) Data Rate : 6.5Mbps

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) | -6dBc Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|--------------------------|
| 01      | 2412.0             | 17.462                 | 17.130                   |
| 06      | 2437.0             | 17.472                 | 15.087                   |
| 11      | 2462.0             | 17.471                 | 17.553                   |

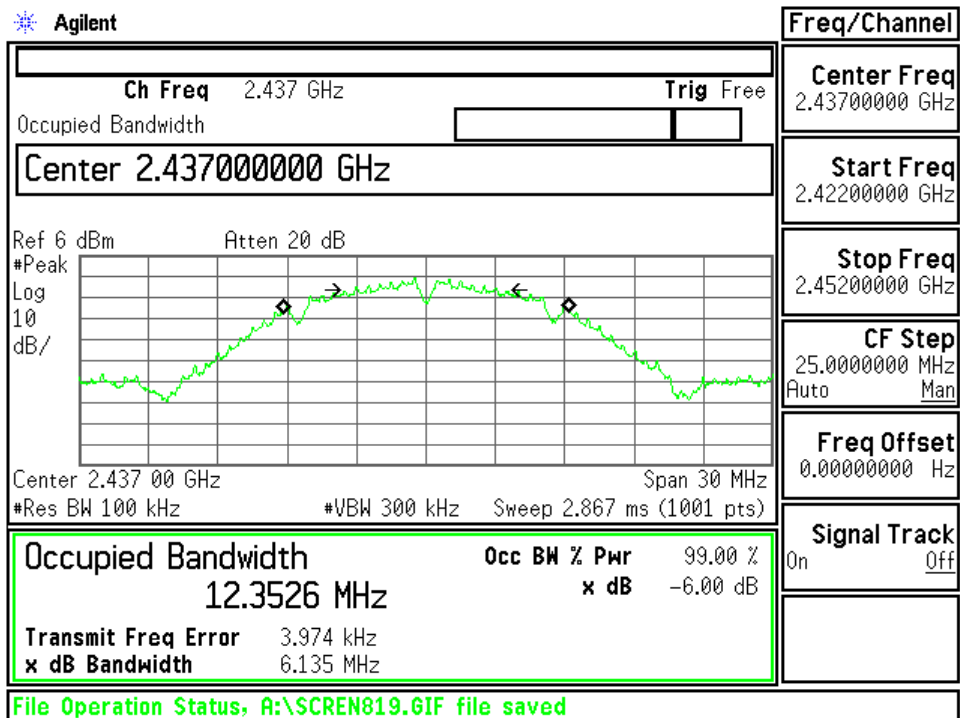
## 2) Data Rate : 65Mbps

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) | -6dBc Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|--------------------------|
| 01      | 2412.0             | 17.512                 | 16.077                   |
| 06      | 2437.0             | 17.504                 | 16.948                   |
| 11      | 2462.0             | 17.468                 | 16.934                   |

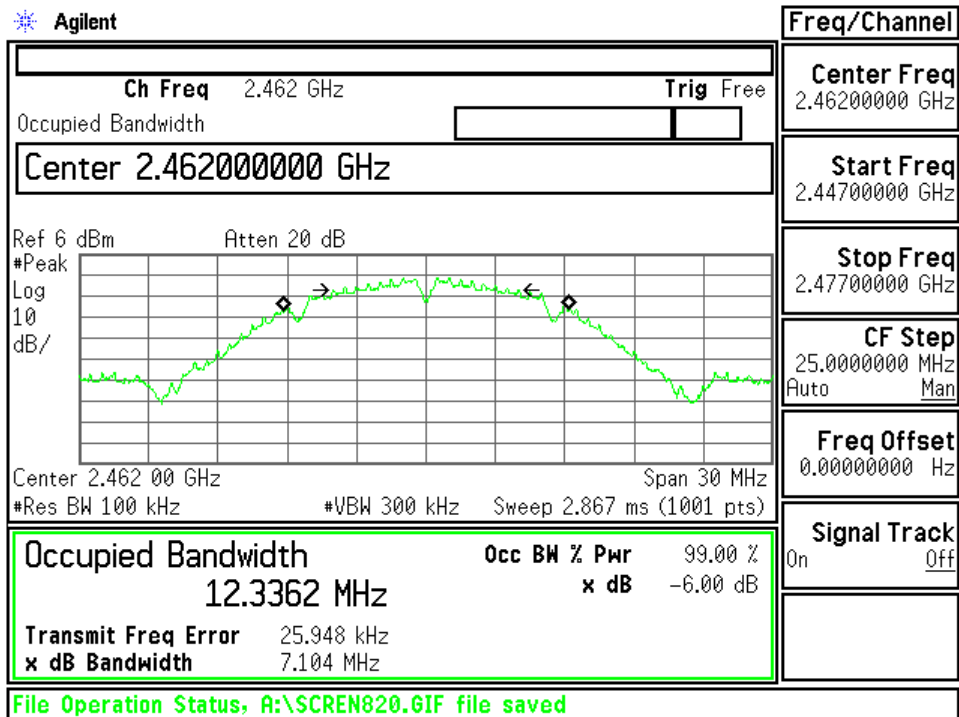
1)Data Rate : 1Mbps(IEEE 802.11b)  
Low Channel



Middle Channel

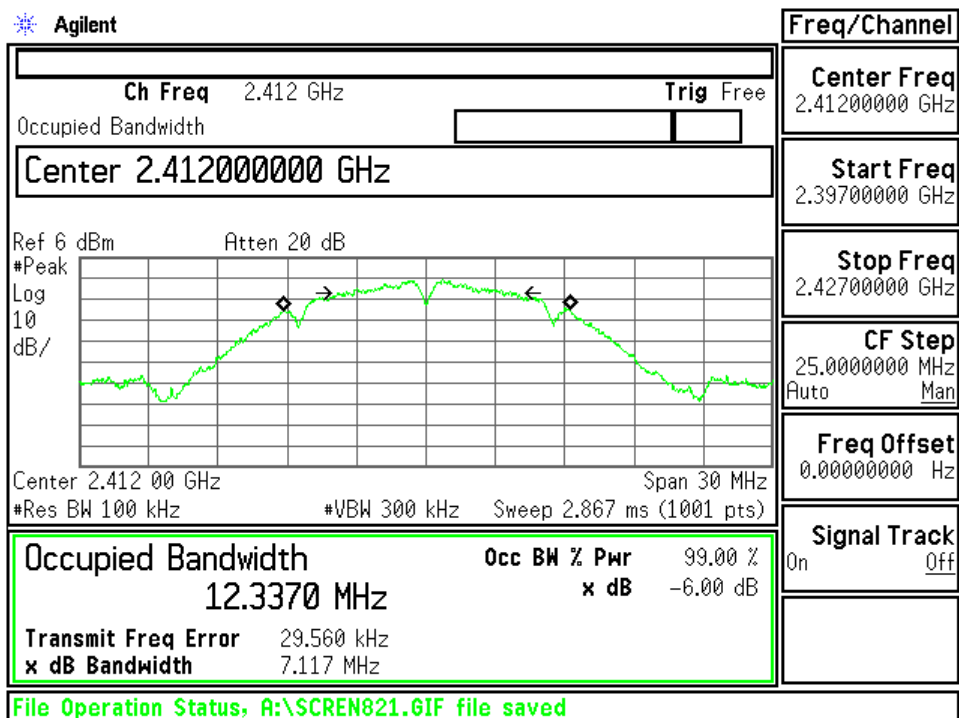


## High Channel



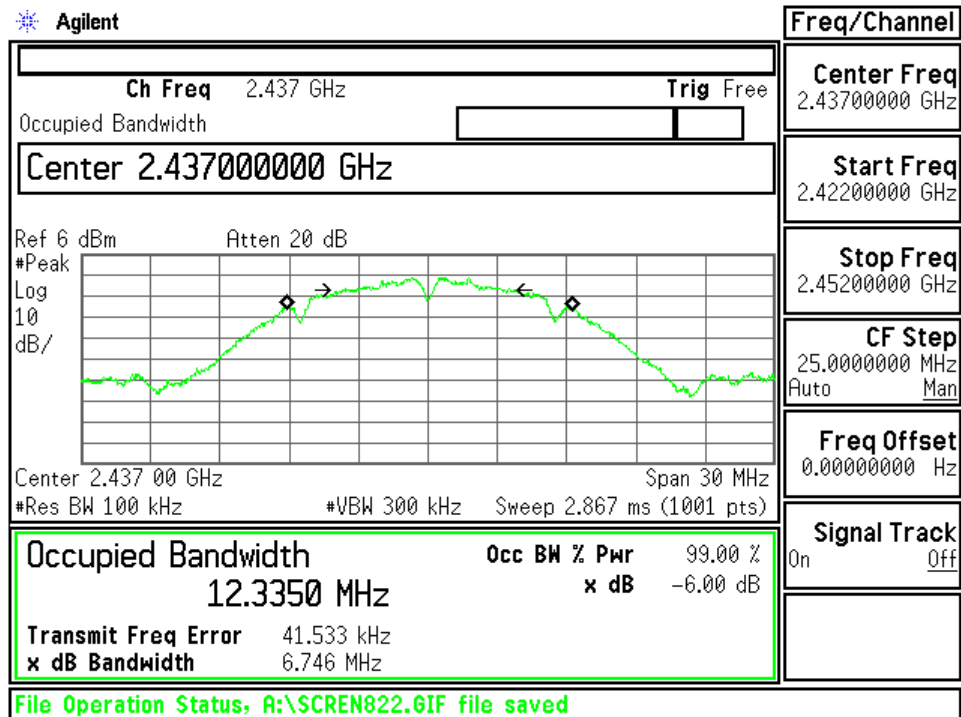
2)Data Rate : 2Mbps(IEEE 802.11b)

## Low Channel

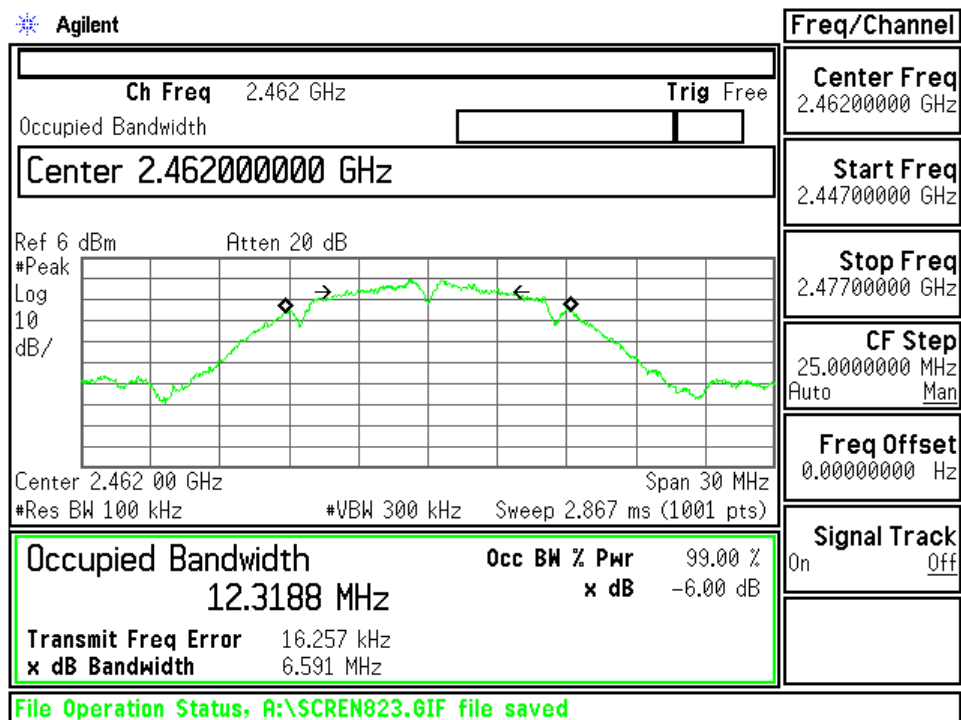




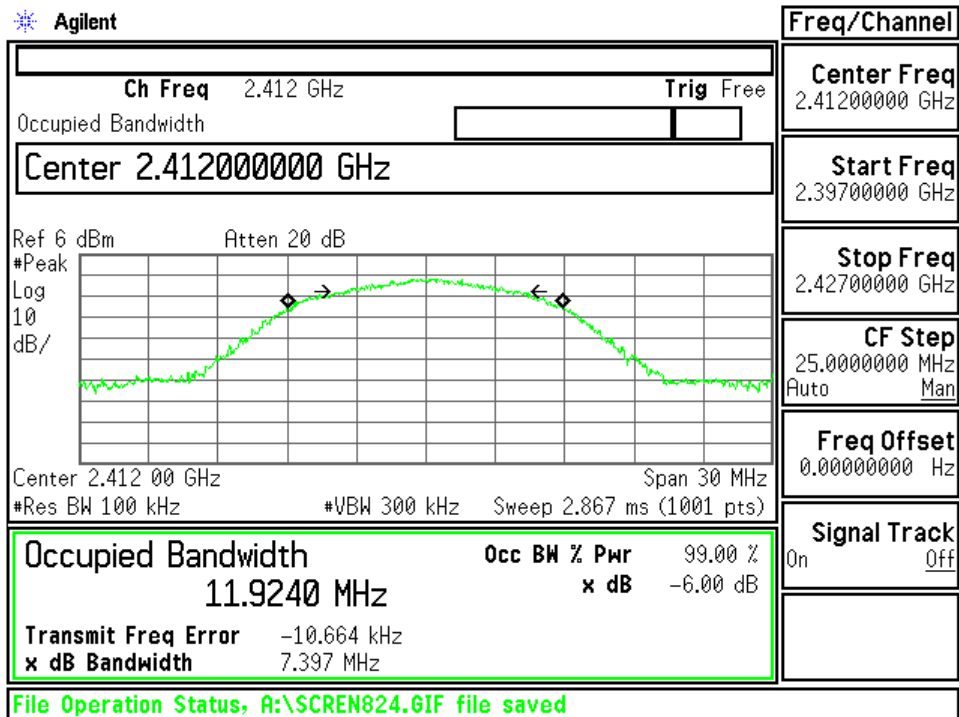
## Middle Channel



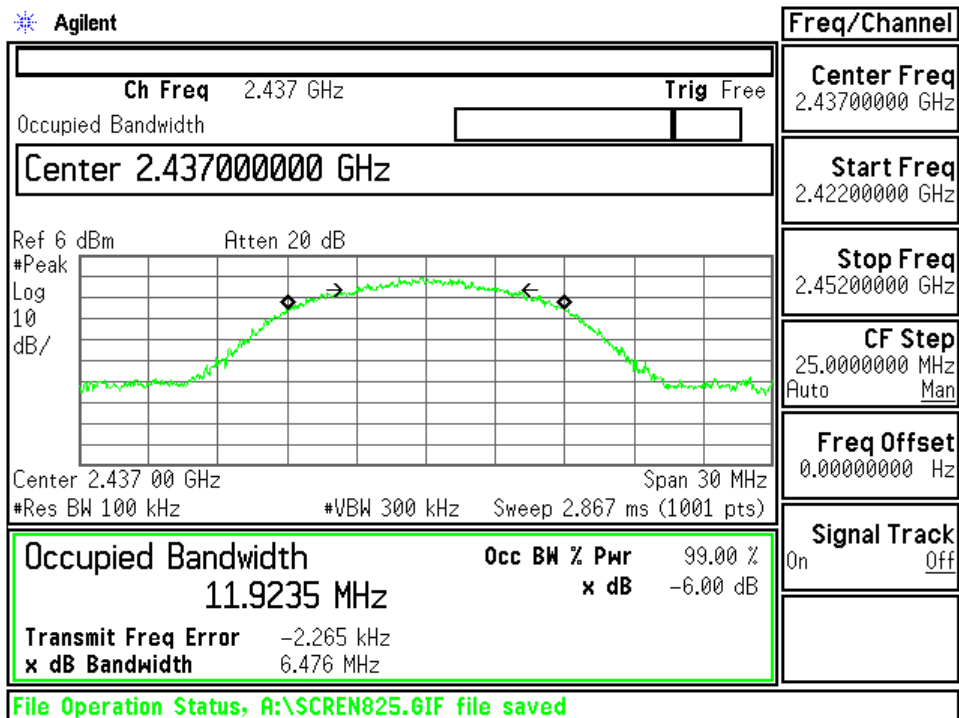
## High Channel



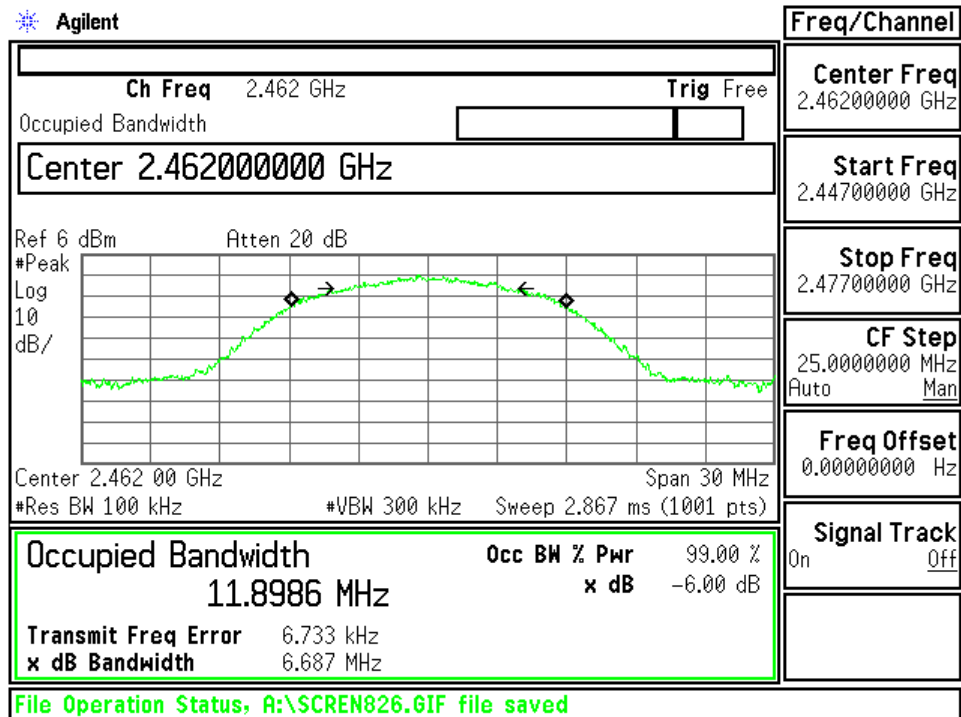
### 3)Data Rate : 5.5Mbps(IEEE 802.11b) Low Channel



### Middle Channel

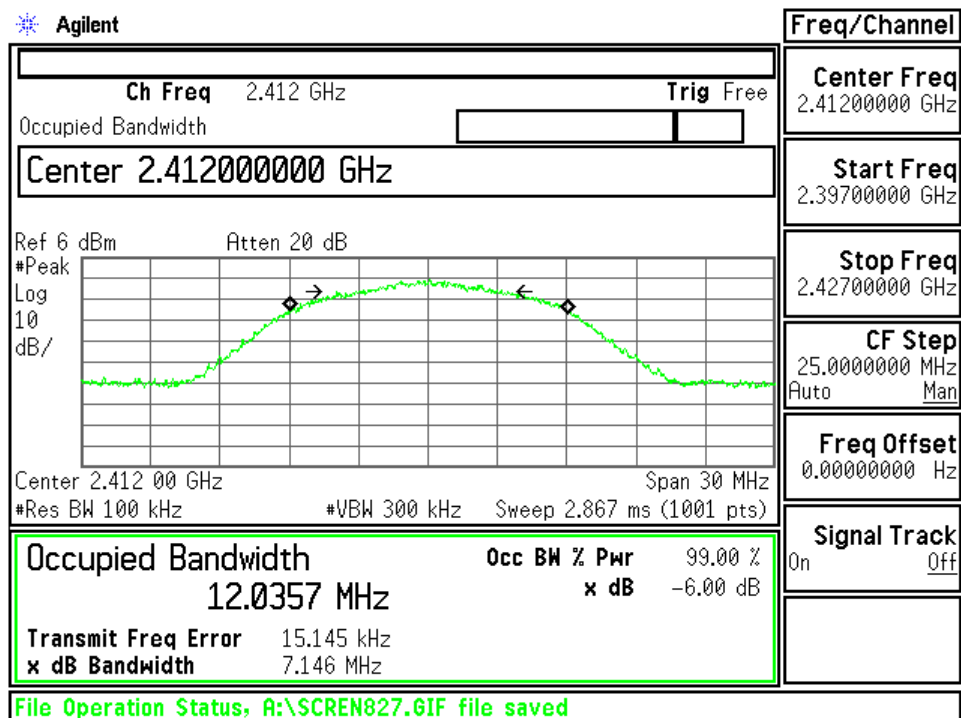


## High Channel

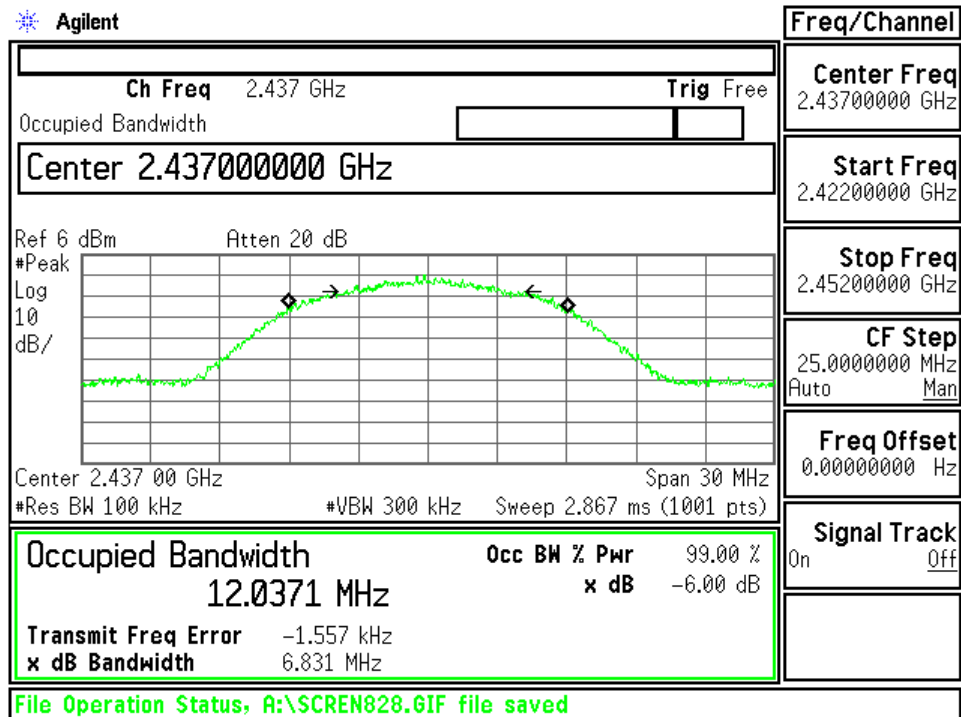


4)Data Rate : 11Mbps(IEEE 802.11b)

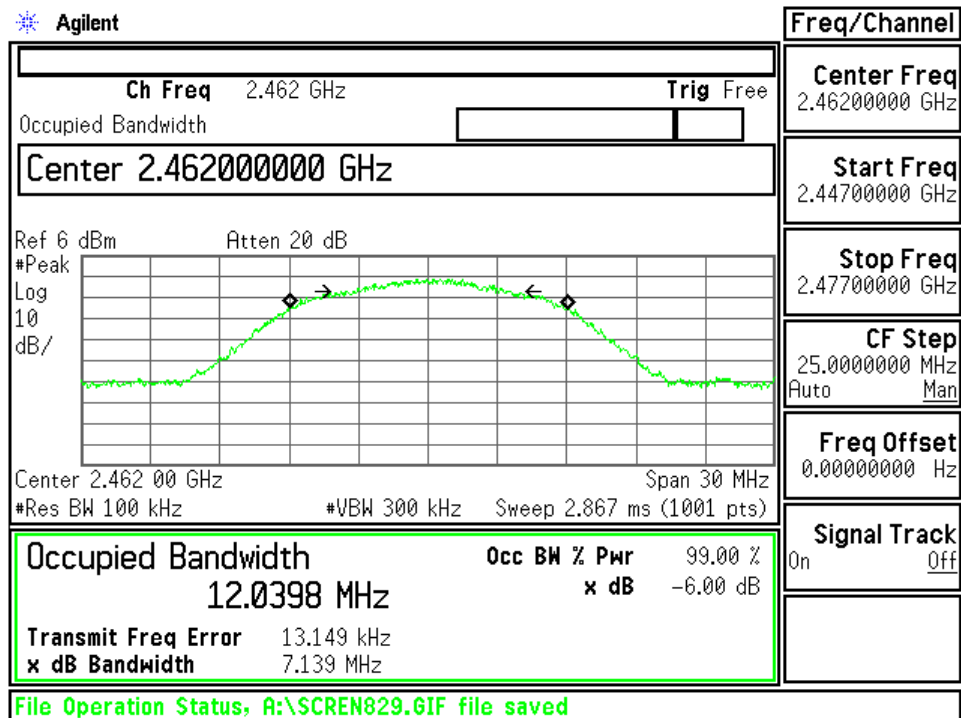
## Low Channel



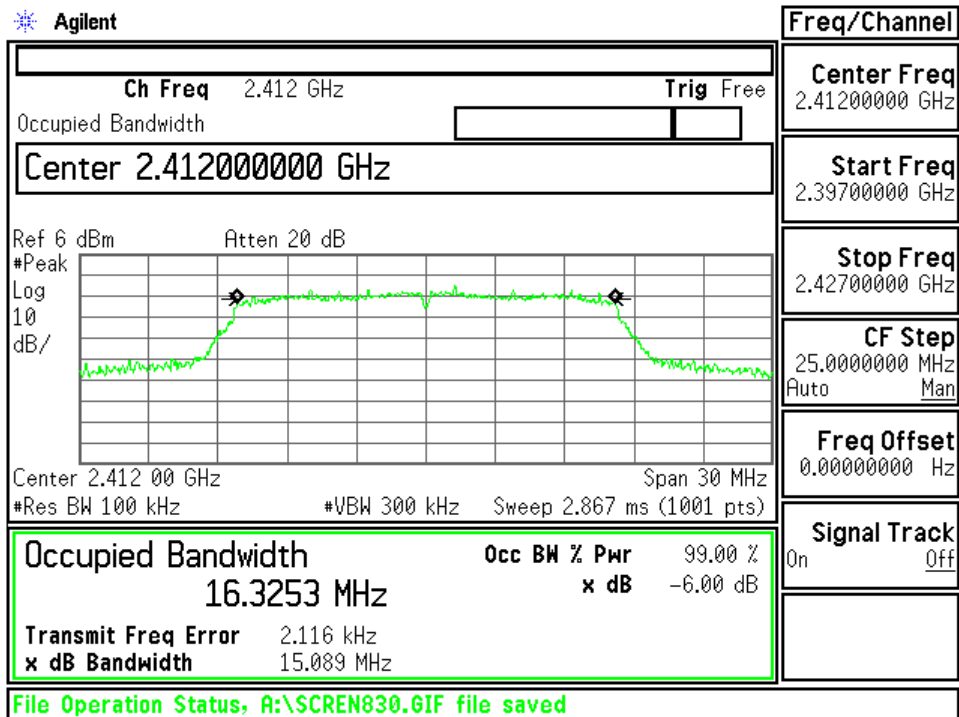
## Middle Channel



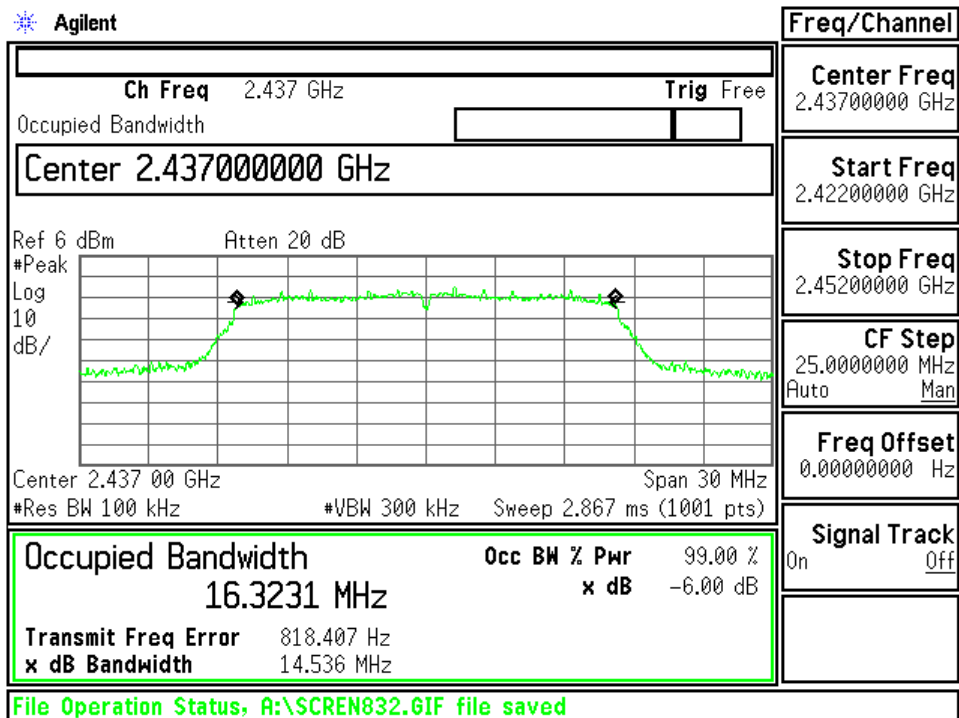
## High Channel



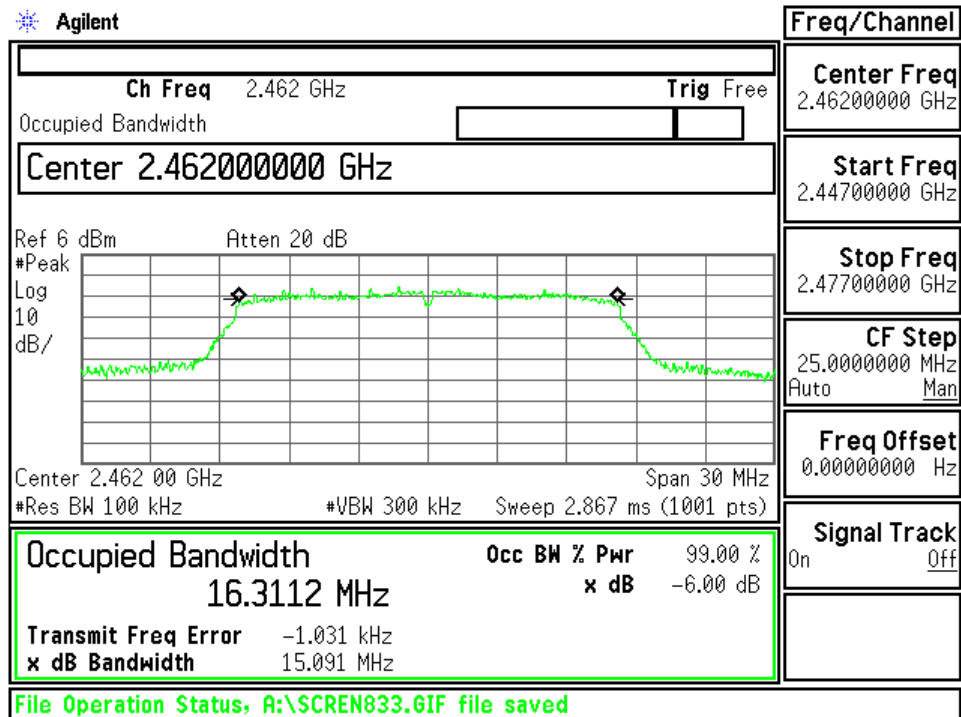
5)Data Rate : 6Mbps(IEEE 802.11g)  
Low Channel



Middle Channel

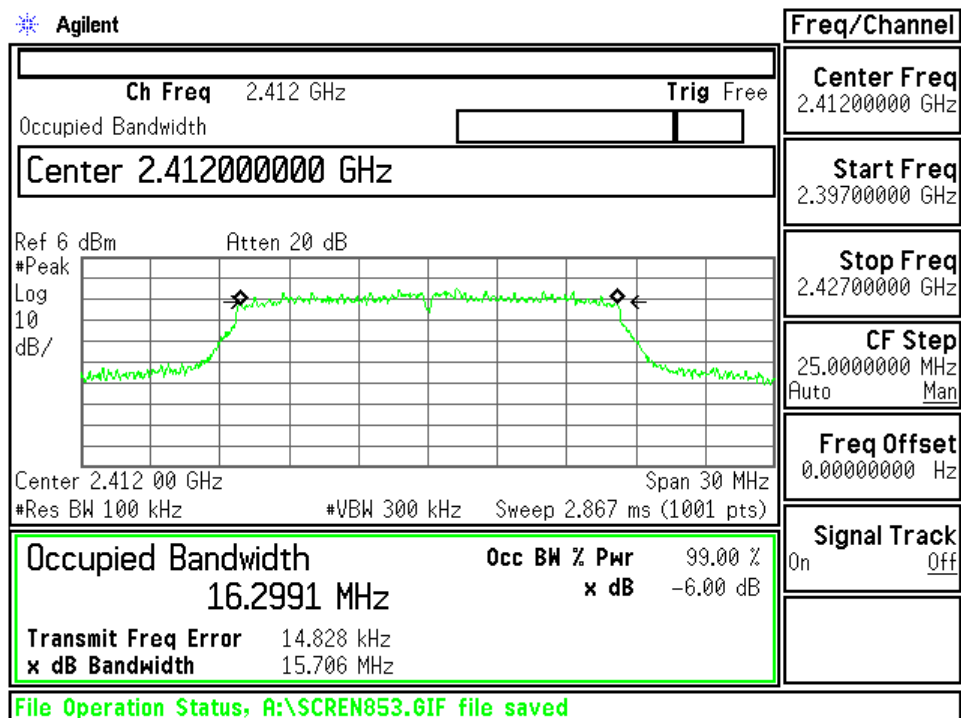


## High Channel

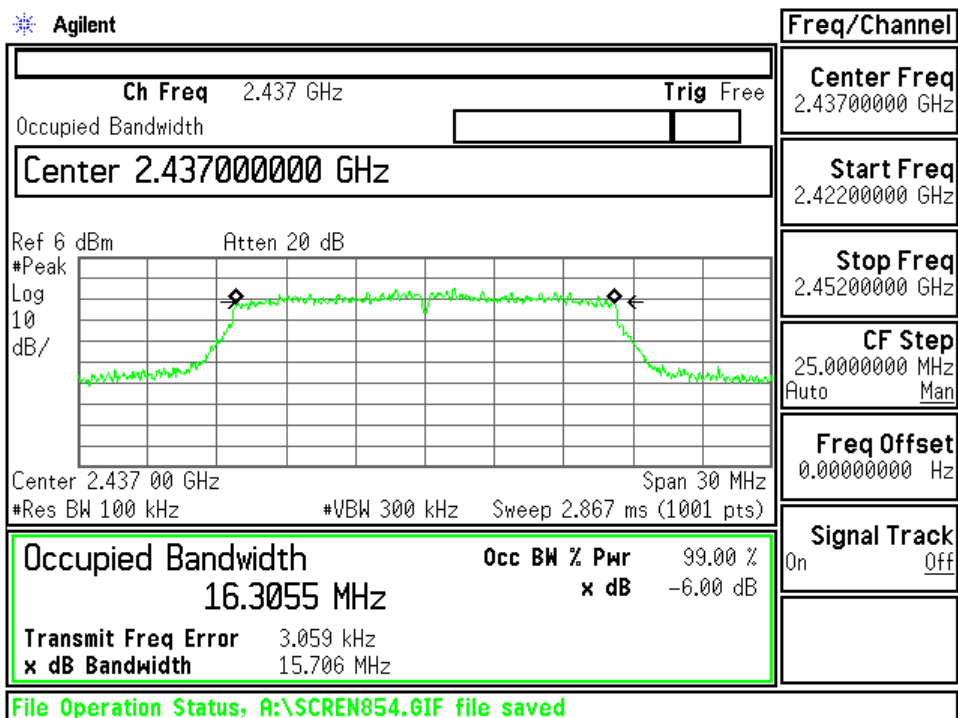


6)Data Rate : 54Mbps(IEEE 802.11g)

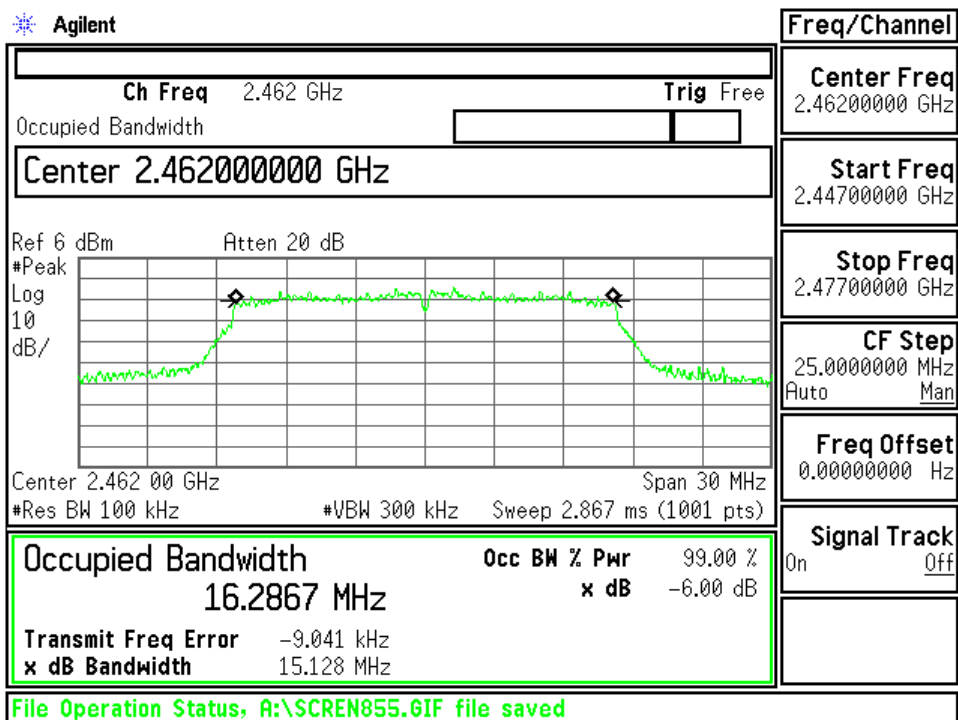
## Low Channel



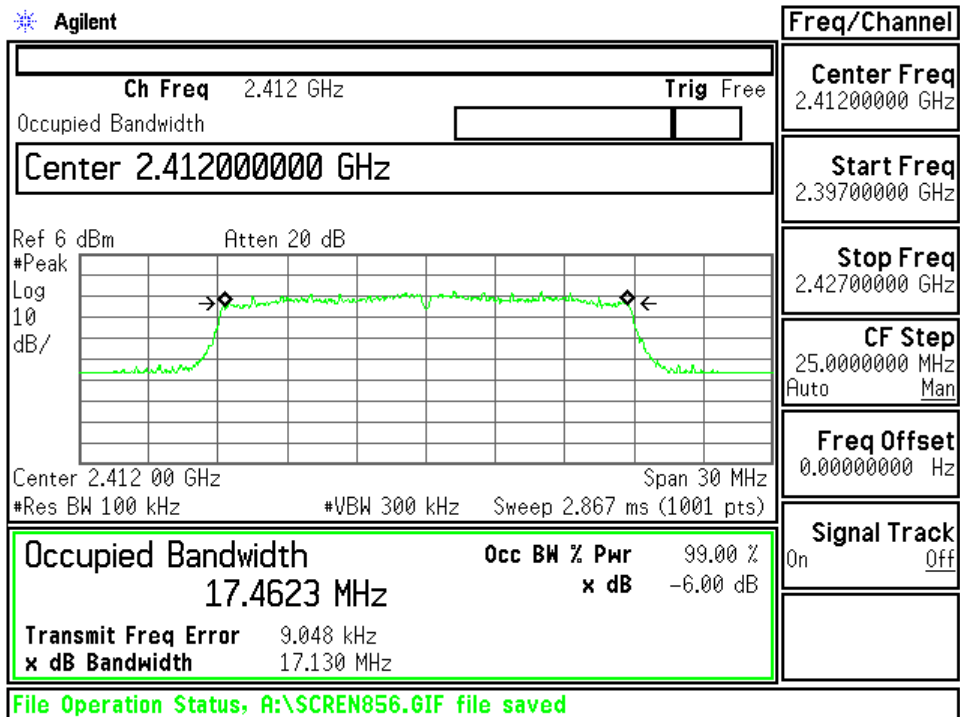
## Middle Channel



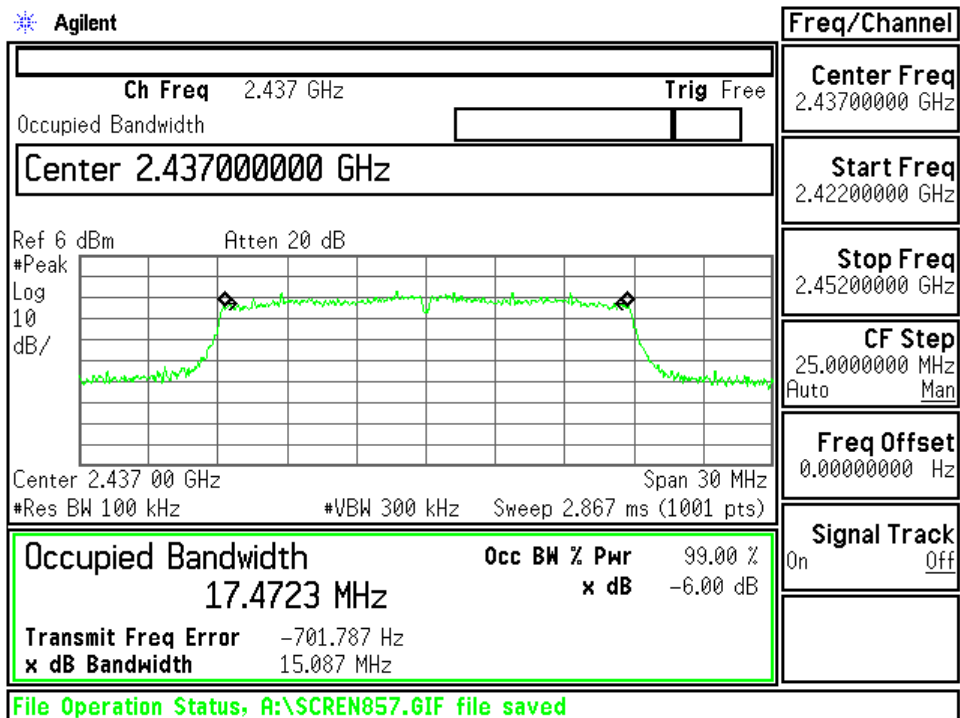
## High Channel



7)Data Rate : 6.5Mbps(IEEE 802.11n)  
Low Channel

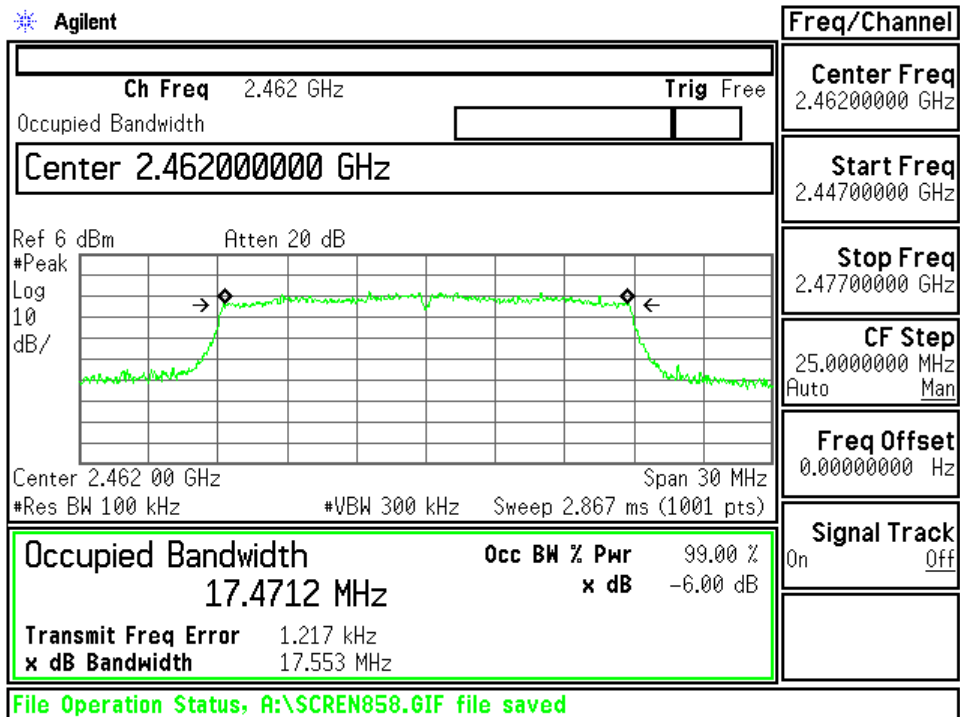


Middle Channel



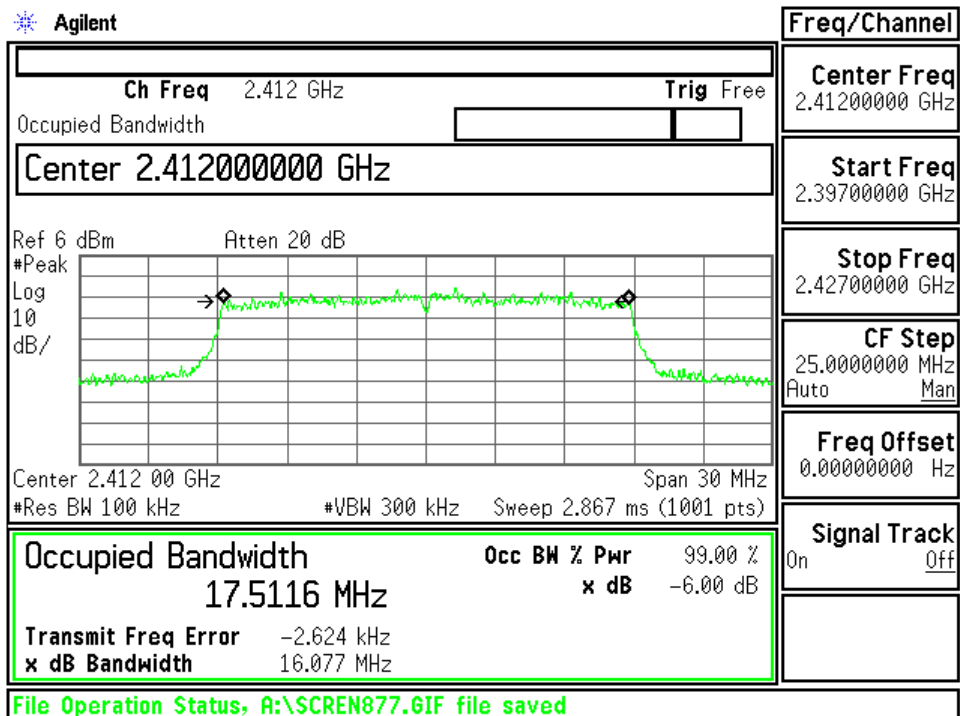


## High Channel

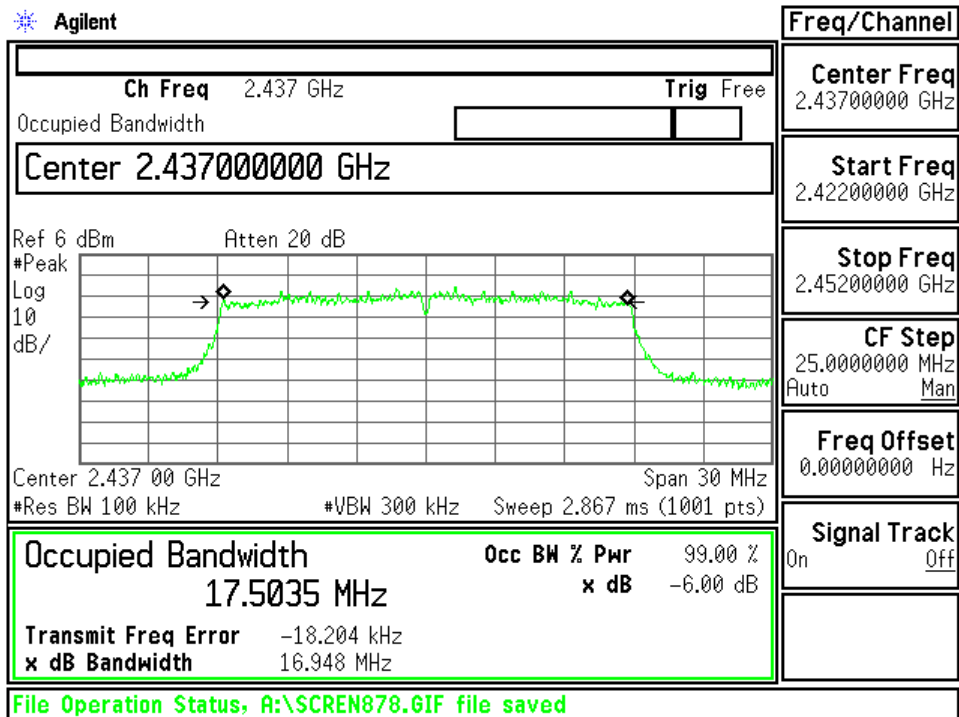


8)Data Rate : 65Mbps(IEEE 802.11n)

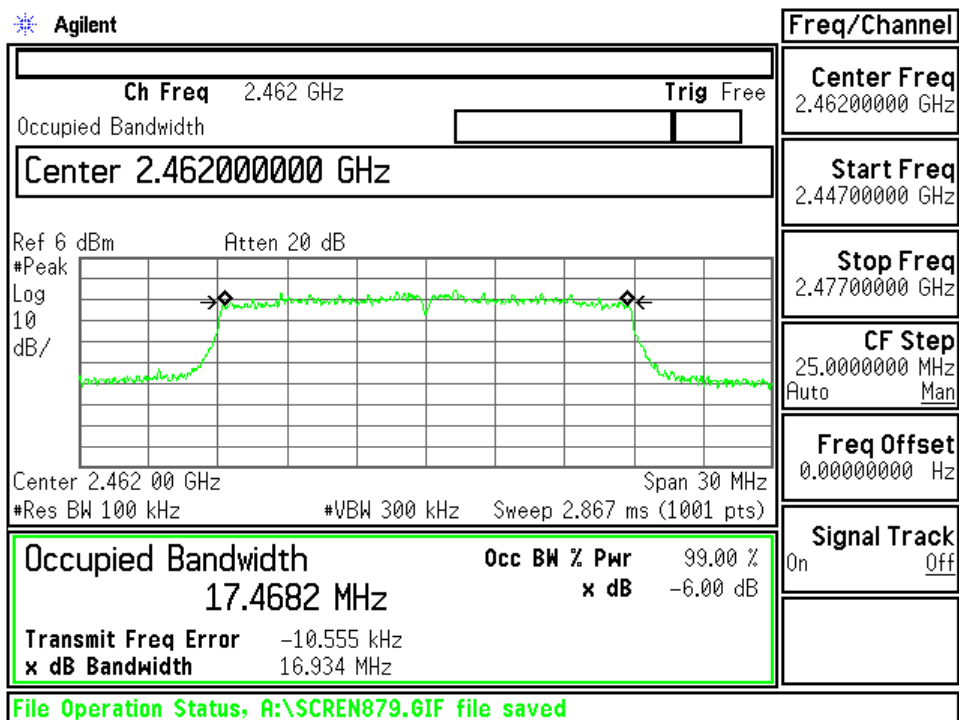
## Low Channel



## Middle Channel



## High Channel



**A.4 Dwell Time**

Not Applicable

## A.5 Peak Output Power(Conduction)

1)Data Rate : 1Mbps(IEEE 802.11b)

Data Rate : 1Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |       | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|-------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]  | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 5.38          | 15.26                       | 33.57 | 30.00  | +14.74 |
| 06                     | 2437  | 9.88              | 5.42          | 15.30                       | 33.88 | 30.00  | +14.70 |
| 11                     | 2462  | 9.88              | 5.76          | 15.64                       | 36.64 | 30.00  | +14.36 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | 5.76 dBm             |
| Result            | = | 15.64 dBm = 36.64 mW |

Minimum Margin: 30.00 - 15.64 = 14.36 (dB)

### NOTES

1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

2. Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

2)Data Rate : 2Mbps(IEEE 802.11b)

Data Rate : 2Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |       | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|-------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]  | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 5.35          | 15.23                       | 33.34 | 30.00  | +14.77 |
| 06                     | 2437  | 9.88              | 5.48          | 15.36                       | 34.36 | 30.00  | +14.64 |
| 11                     | 2462  | 9.88              | 5.65          | 15.53                       | 35.73 | 30.00  | +14.47 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | 5.65 dBm             |
| Result            | = | 15.53 dBm = 35.73 mW |

Minimum Margin: 30.00 - 15.53 = 14.47 (dB)

### NOTES

1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

2. Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 3)Data Rate : 5.5Mbps(IEEE 802.11b)

Data Rate : 5.5Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |       | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|-------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]  | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 5.20          | 15.08                       | 32.21 | 30.00  | +14.92 |
| 06                     | 2437  | 9.88              | 5.56          | 15.44                       | 34.99 | 30.00  | +14.56 |
| 11                     | 2462  | 9.88              | 5.64          | 15.52                       | 35.65 | 30.00  | +14.48 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | 5.64 dBm             |
| Result            | = | 15.52 dBm = 35.65 mW |

Minimum Margin: 30.00 - 15.52 = 14.48 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 4)Data Rate : 11Mbps(IEEE 802.11b)

Data Rate : 11Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |       | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|-------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]  | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 5.52          | 15.40                       | 34.67 | 30.00  | +14.60 |
| 06                     | 2437  | 9.88              | 5.67          | 15.55                       | 35.89 | 30.00  | +14.45 |
| 11                     | 2462  | 9.88              | 5.84          | 15.72                       | 37.33 | 30.00  | +14.28 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | 5.84 dBm             |
| Result            | = | 15.72 dBm = 37.33 mW |

Minimum Margin: 30.00 - 15.72 = 14.28 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 5)Data Rate : 6Mbps(IEEE 802.11g)

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

Data Rate : 6Mbps

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |        | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|--------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]   | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 10.85         | 20.73                       | 118.30 | 30.00  | + 9.27 |
| 06                     | 2437  | 9.88              | 11.18         | 21.06                       | 127.64 | 30.00  | + 8.94 |
| 11                     | 2462  | 9.88              | 11.61         | 21.49                       | 140.93 | 30.00  | + 8.51 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                       |
|-------------------|---|-----------------------|
| Correction Factor | = | 9.88 dB               |
| + ) Meter Reading | = | 11.61 dBm             |
| Result            | = | 21.49 dBm = 140.93 mW |

Minimum Margin: 30.00 - 21.49 = 8.51 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 6)Data Rate : 54Mbps(IEEE 802.11g)

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

Data Rate : 54Mbps

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |        | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|--------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]   | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 10.31         | 20.19                       | 104.47 | 30.00  | + 9.81 |
| 06                     | 2437  | 9.88              | 10.63         | 20.51                       | 112.46 | 30.00  | + 9.49 |
| 11                     | 2462  | 9.88              | 10.79         | 20.67                       | 116.68 | 30.00  | + 9.33 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                       |
|-------------------|---|-----------------------|
| Correction Factor | = | 9.88 dB               |
| + ) Meter Reading | = | 10.79 dBm             |
| Result            | = | 20.67 dBm = 116.68 mW |

Minimum Margin: 30.00 - 20.67 = 9.33 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 7)Data Rate : 6.5Mbps(IEEE 802.11n)

Data Rate : 6.5Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |        | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|--------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]   | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 10.41         | 20.29                       | 106.91 | 30.00  | + 9.71 |
| 06                     | 2437  | 9.88              | 10.35         | 20.23                       | 105.44 | 30.00  | + 9.77 |
| 11                     | 2462  | 9.88              | 10.68         | 20.56                       | 113.76 | 30.00  | + 9.44 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                       |
|-------------------|---|-----------------------|
| Correction Factor | = | 9.88 dB               |
| + ) Meter Reading | = | 10.68 dBm             |
| Result            | = | 20.56 dBm = 113.76 mW |

Minimum Margin: 30.00 - 20.56 = 9.44 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## 8)Data Rate : 65Mbps(IEEE 802.11n)

Data Rate : 65Mbps

Test Date: October 21, 2011

Temp.: 26 °C, Humi: 49 %

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |        | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|--------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW]   | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | 9.84          | 19.72                       | 93.76  | 30.00  | +10.28 |
| 06                     | 2437  | 9.88              | 10.07         | 19.95                       | 98.86  | 30.00  | +10.05 |
| 11                     | 2462  | 9.88              | 10.22         | 20.10                       | 102.33 | 30.00  | + 9.90 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                       |
|-------------------|---|-----------------------|
| Correction Factor | = | 9.88 dB               |
| + ) Meter Reading | = | 10.22 dBm             |
| Result            | = | 20.10 dBm = 102.33 mW |

Minimum Margin: 30.00 - 20.10 = 9.90 (dB)

## NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

|                   |            |
|-------------------|------------|
| Detector Function | Video B.W. |
| Peak              | Off        |

## A.6 Peak Power Density(Conduction)

1)Data Rate : 1Mbps(IEEE 802.11b)

Data Rate : 1Mbps

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

| Transmitting Frequency | Correction Factor | Meter Reading | Conducted Peak Output Power | Limits | Margin |
|------------------------|-------------------|---------------|-----------------------------|--------|--------|
| CH [MHz]               | [dB]              | [dBm]         | [dBm] [mW]                  | [dBm]  | [dB]   |
| 01 2412                | 9.88              | -18.29        | -8.41 0.14                  | 8.00   | +16.41 |
| 06 2437                | 9.88              | -17.76        | -7.88 0.16                  | 8.00   | +15.88 |
| 11 2462                | 9.88              | -19.11        | -9.23 0.12                  | 8.00   | +17.23 |

Calculated result at 2437.000 MHz, as the worst point shown on underline:

|                   |   |                     |
|-------------------|---|---------------------|
| Correction Factor | = | 9.88 dB             |
| + ) Meter Reading | = | -17.76 dBm          |
| Result            | = | -7.88 dBm = 0.16 mW |

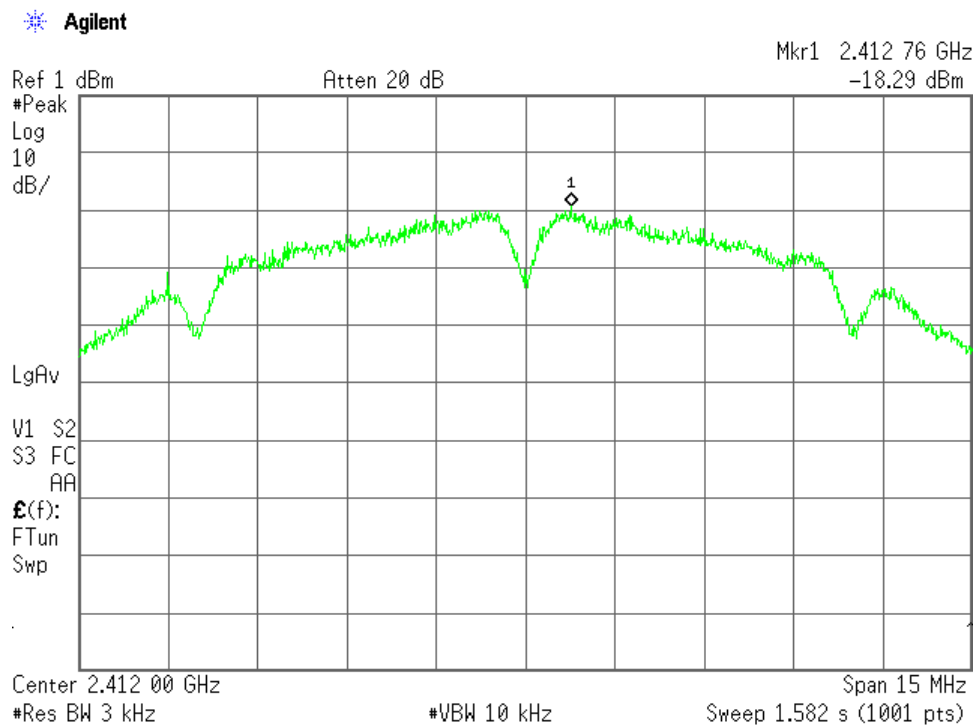
Minimum Margin: 8.00 - -7.88 = 15.88 (dB)

### NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

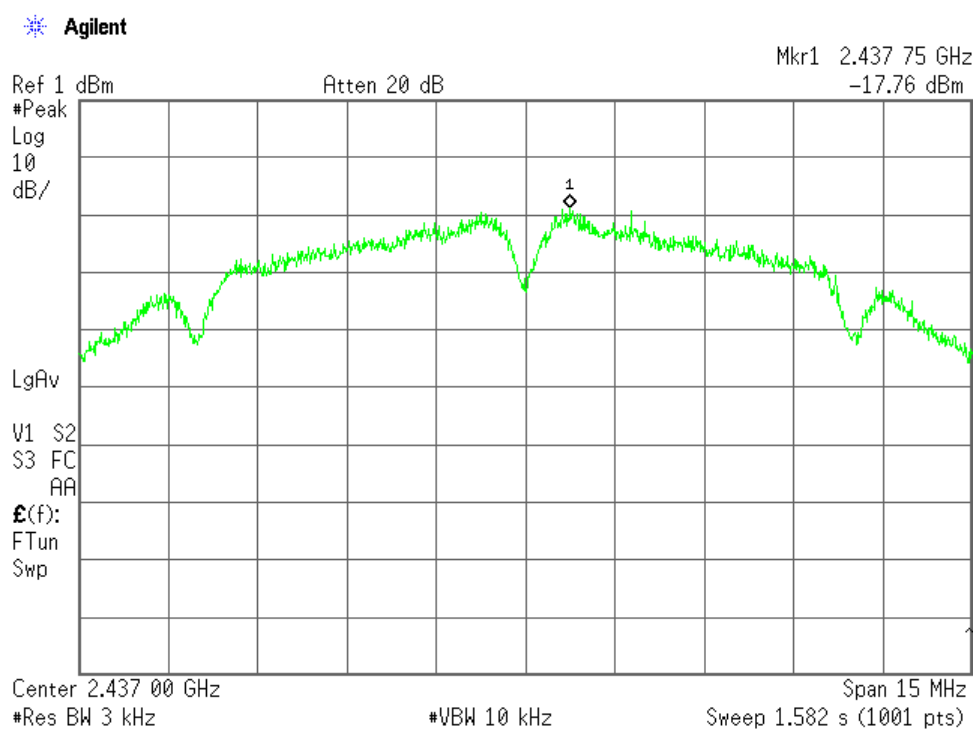
| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

### Low Channel

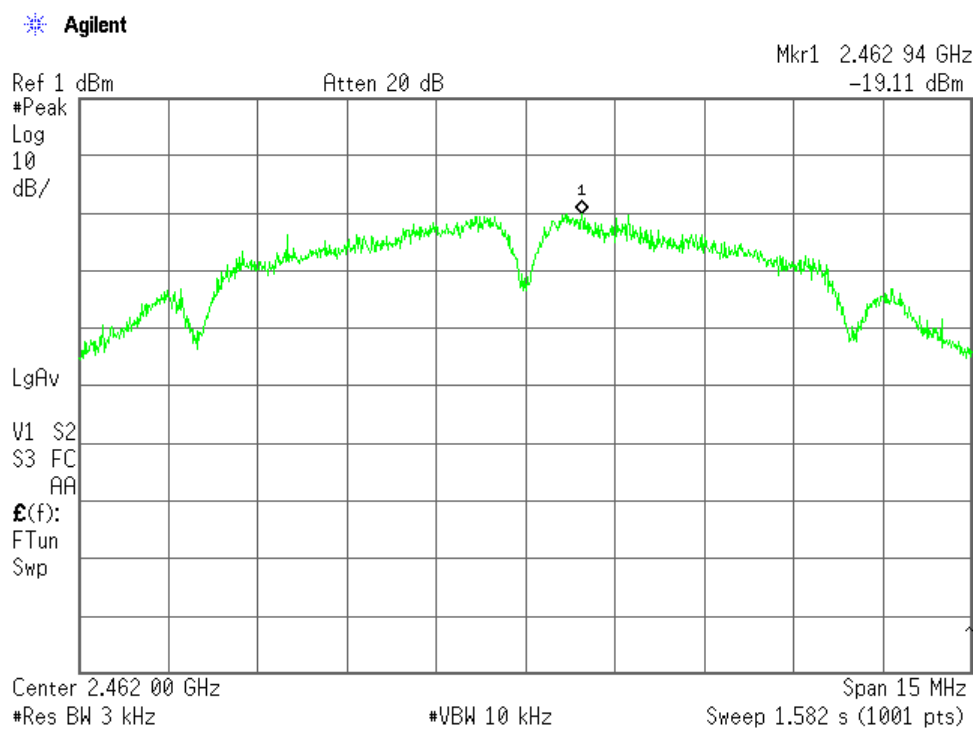




## Middle Channel



## High Channel



2)Data Rate : 2Mbps(IEEE 802.11b)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 2Mbps

| Transmitting Frequency | Correction Factor | Meter Reading | Conducted Peak Output Power | Limits | Margin |
|------------------------|-------------------|---------------|-----------------------------|--------|--------|
| CH [MHz]               | [dB]              | [dBm]         | [dBm] [mW]                  | [dBm]  | [dB]   |
| 01 2412                | 9.88              | -18.51        | -8.63 0.14                  | 8.00   | +16.63 |
| 06 2437                | 9.88              | -18.24        | -8.36 0.15                  | 8.00   | +16.36 |
| 11 2462                | 9.88              | -17.83        | -7.95 0.16                  | 8.00   | +15.95 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                     |
|-------------------|---|---------------------|
| Correction Factor | = | 9.88 dB             |
| + ) Meter Reading | = | -17.83 dBm          |
| Result            | = | -7.95 dBm = 0.16 mW |

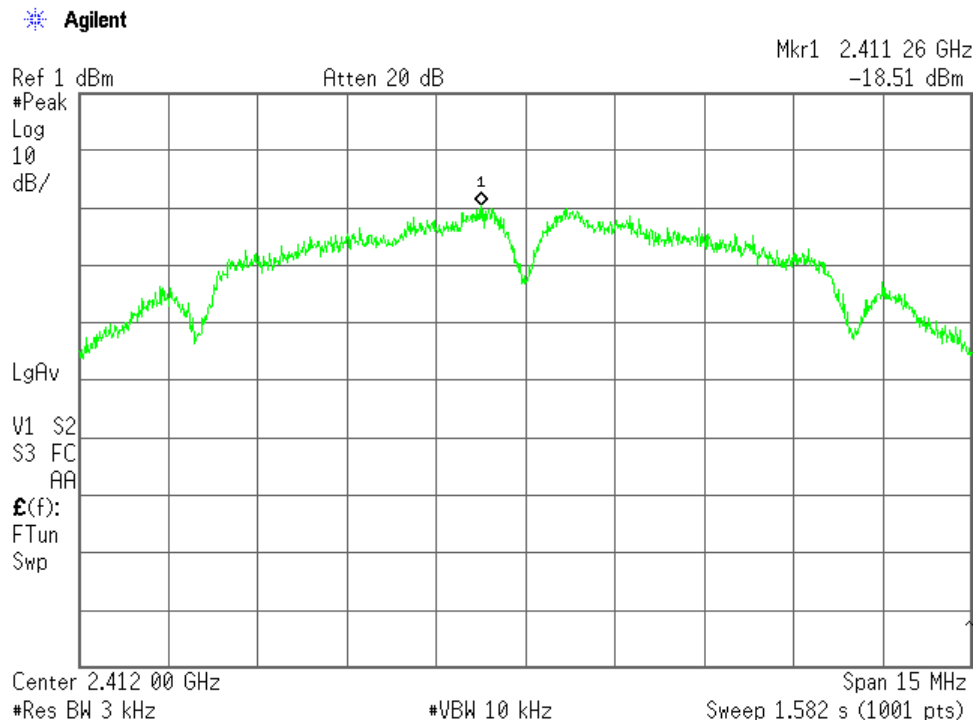
Minimum Margin: 8.00 - -7.95 = 15.95 (dB)

#### NOTES

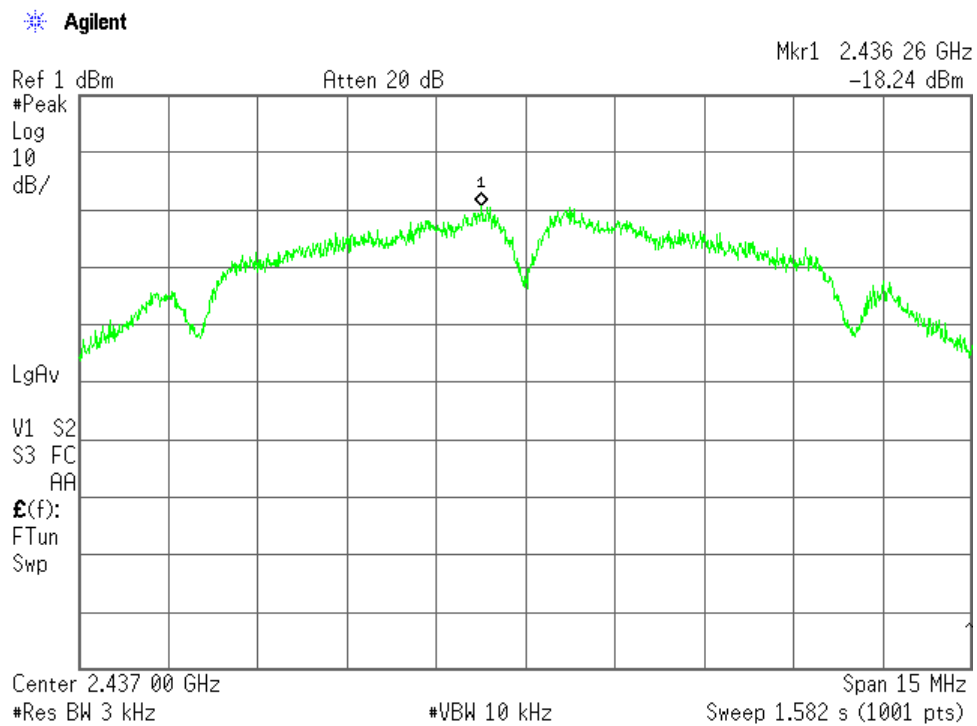
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

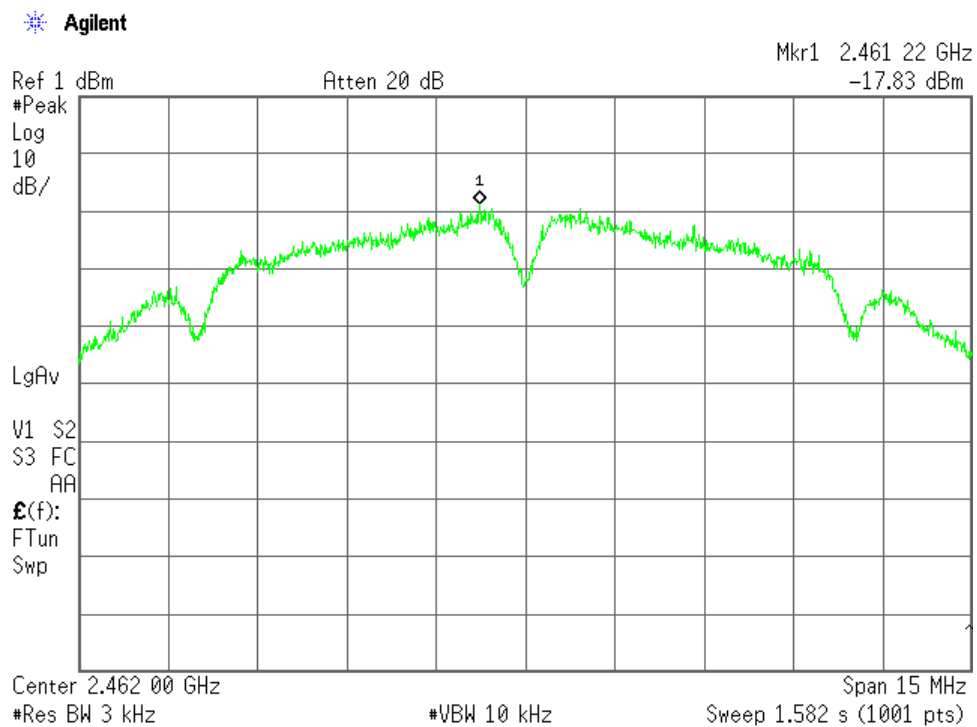
#### Low Channel



## Middle Channel



## High Channel



3)Data Rate : 5.5Mbps(IEEE 802.11b)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 5.5Mbps

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |      | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW] | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | -19.26        | -9.38                       | 0.12 | 8.00   | +17.38 |
| 06                     | 2437  | 9.88              | -19.12        | -9.24                       | 0.12 | 8.00   | +17.24 |
| 11                     | 2462  | 9.88              | -18.17        | -8.29                       | 0.15 | 8.00   | +16.29 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                     |
|-------------------|---|---------------------|
| Correction Factor | = | 9.88 dB             |
| + ) Meter Reading | = | -18.17 dBm          |
| Result            | = | -8.29 dBm = 0.15 mW |

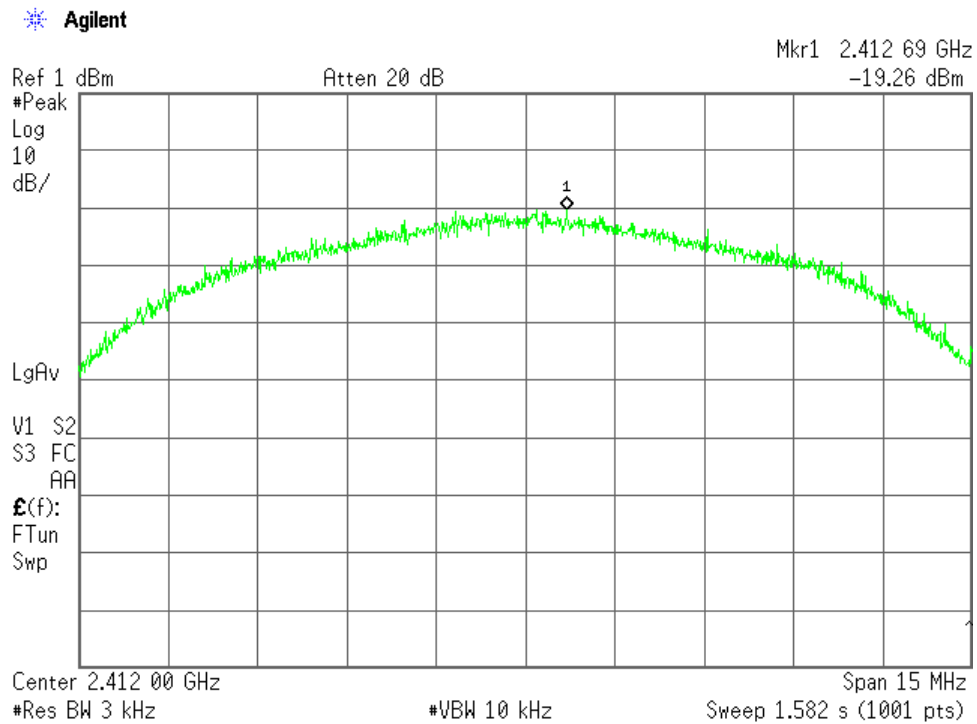
Minimum Margin: 8.00 - -8.29 = 16.29 (dB)

#### NOTES

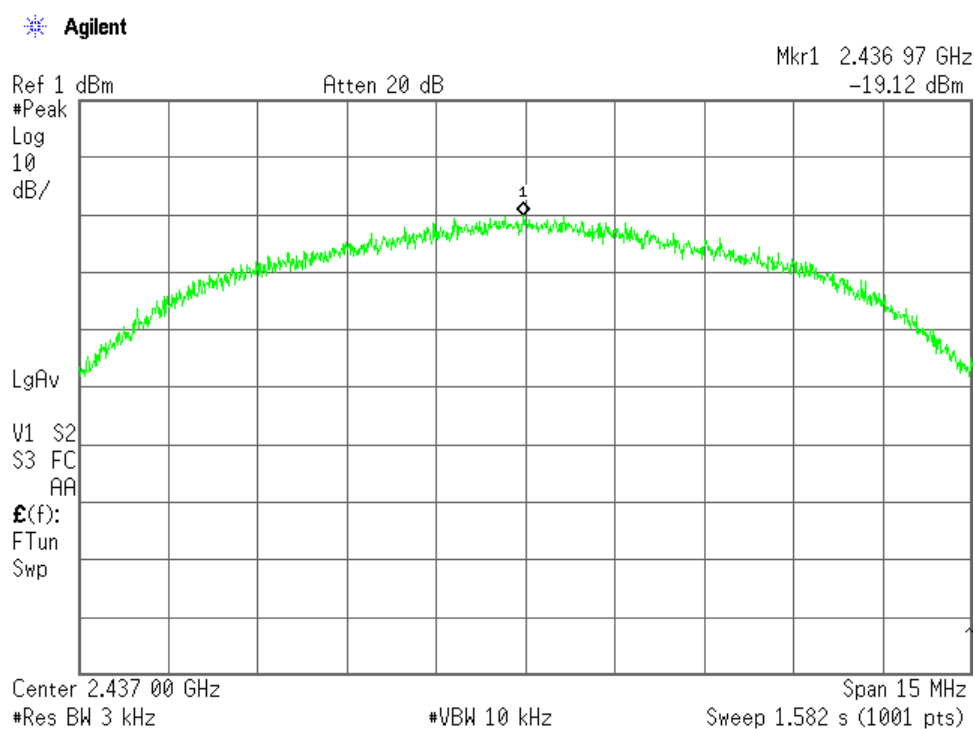
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

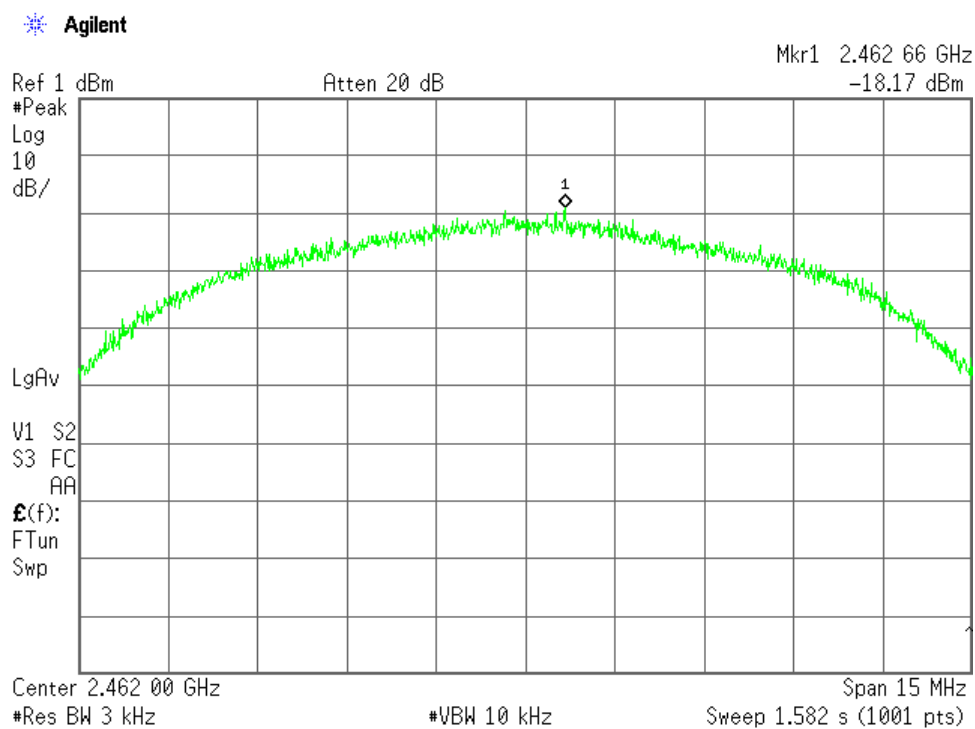
#### Low Channel



## Middle Channel



## High Channel



4)Data Rate : 11Mbps(IEEE 802.11b)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 11Mbps

| Transmitting Frequency |       | Correction Factor | Meter Reading | Conducted Peak Output Power |      | Limits | Margin |
|------------------------|-------|-------------------|---------------|-----------------------------|------|--------|--------|
| CH                     | [MHz] | [dB]              | [dBm]         | [dBm]                       | [mW] | [dBm]  | [dB]   |
| 01                     | 2412  | 9.88              | -19.53        | -9.65                       | 0.11 | 8.00   | +17.65 |
| 06                     | 2437  | 9.88              | -19.50        | -9.62                       | 0.11 | 8.00   | +17.62 |
| 11                     | 2462  | 9.88              | -18.94        | -9.06                       | 0.12 | 8.00   | +17.06 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                     |
|-------------------|---|---------------------|
| Correction Factor | = | 9.88 dB             |
| + ) Meter Reading | = | -18.94 dBm          |
| Result            | = | -9.06 dBm = 0.12 mW |

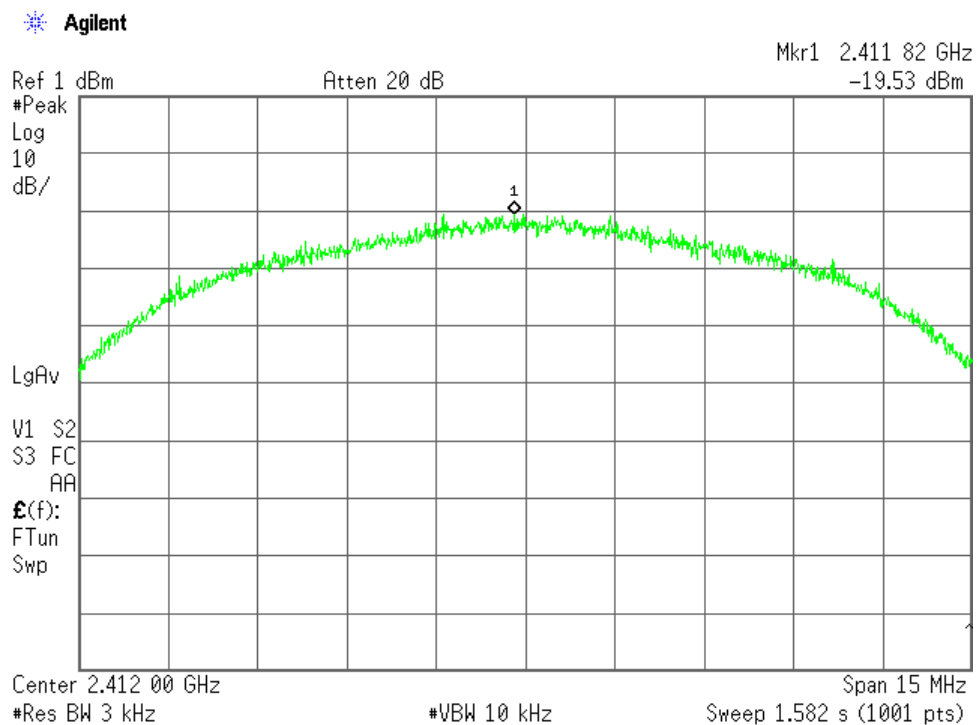
Minimum Margin: 8.00 - -9.06 = 17.06 (dB)

#### NOTES

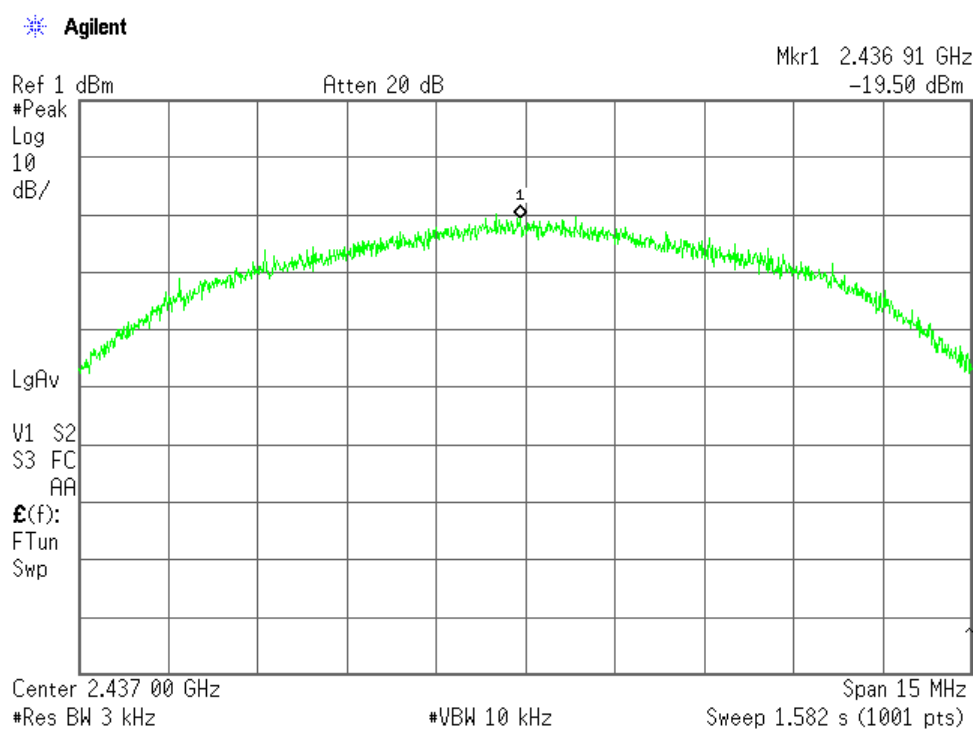
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

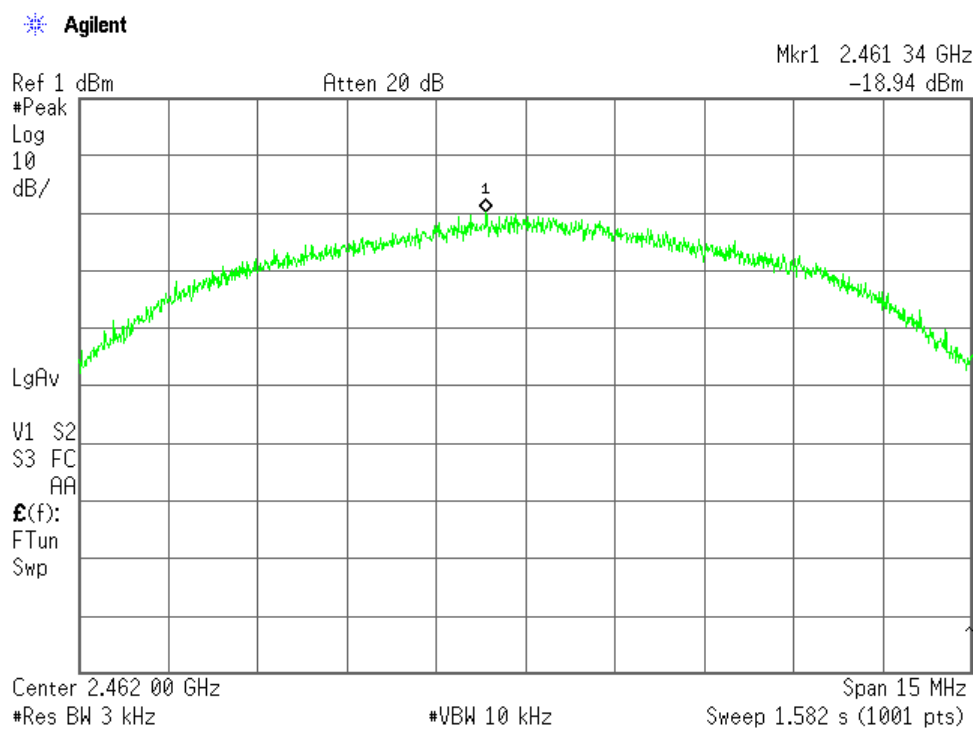
#### Low Channel



## Middle Channel



## High Channel



5)Data Rate : 6Mbps(IEEE 802.11g)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 6Mbps

| Transmitting Frequency | Correction Factor | Meter Reading | Conducted Peak Output Power | Limits | Margin |
|------------------------|-------------------|---------------|-----------------------------|--------|--------|
| CH [MHz]               | [dB]              | [dBm]         | [dBm] [mW]                  | [dBm]  | [dB]   |
| 01 2412                | 9.88              | -22.80        | -12.92 0.05                 | 8.00   | +20.92 |
| 06 2437                | 9.88              | -22.61        | -12.73 0.05                 | 8.00   | +20.73 |
| 11 2462                | 9.88              | -21.68        | -11.80 0.07                 | 8.00   | +19.80 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | -21.68 dBm           |
| Result            | = | -11.80 dBm = 0.07 mW |

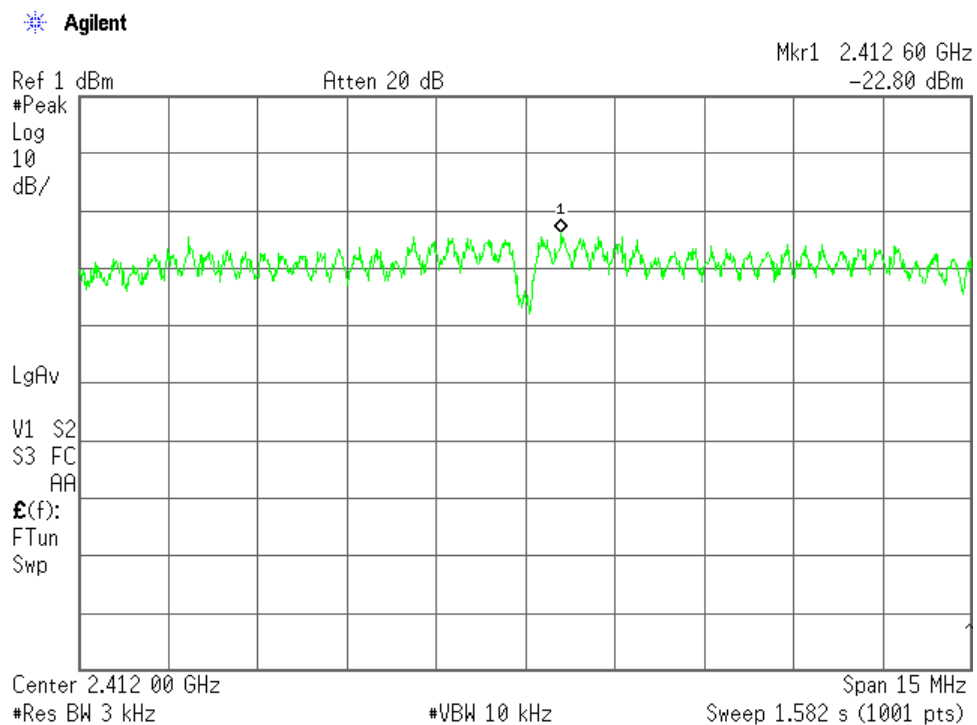
Minimum Margin: 8.00 - -11.80 = 19.80 (dB)

#### NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

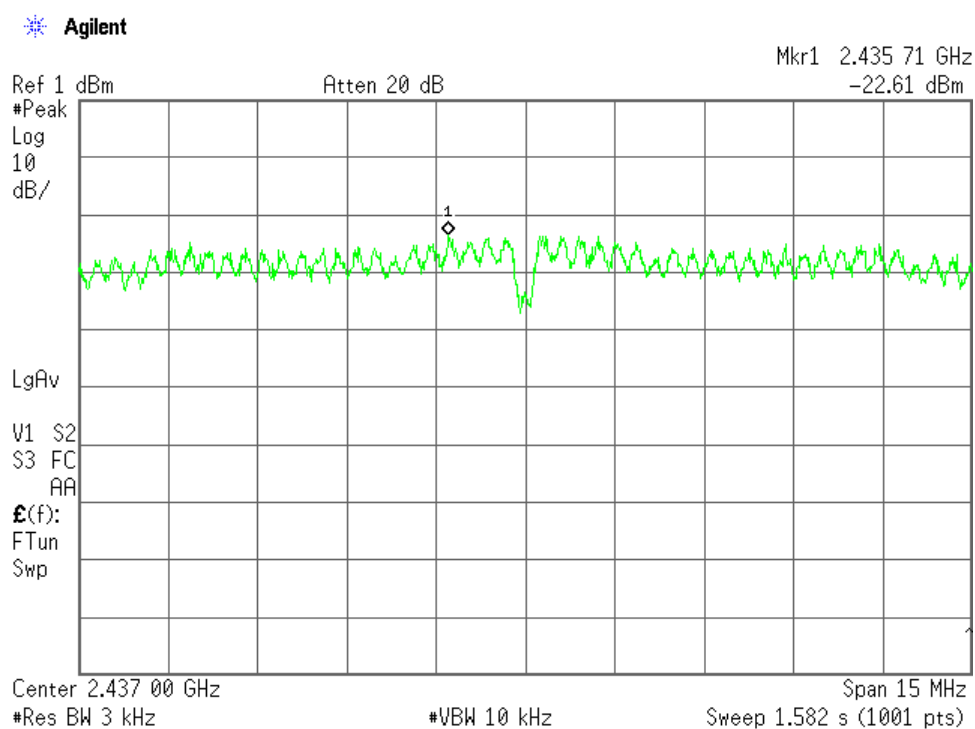
| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

#### Low Channel

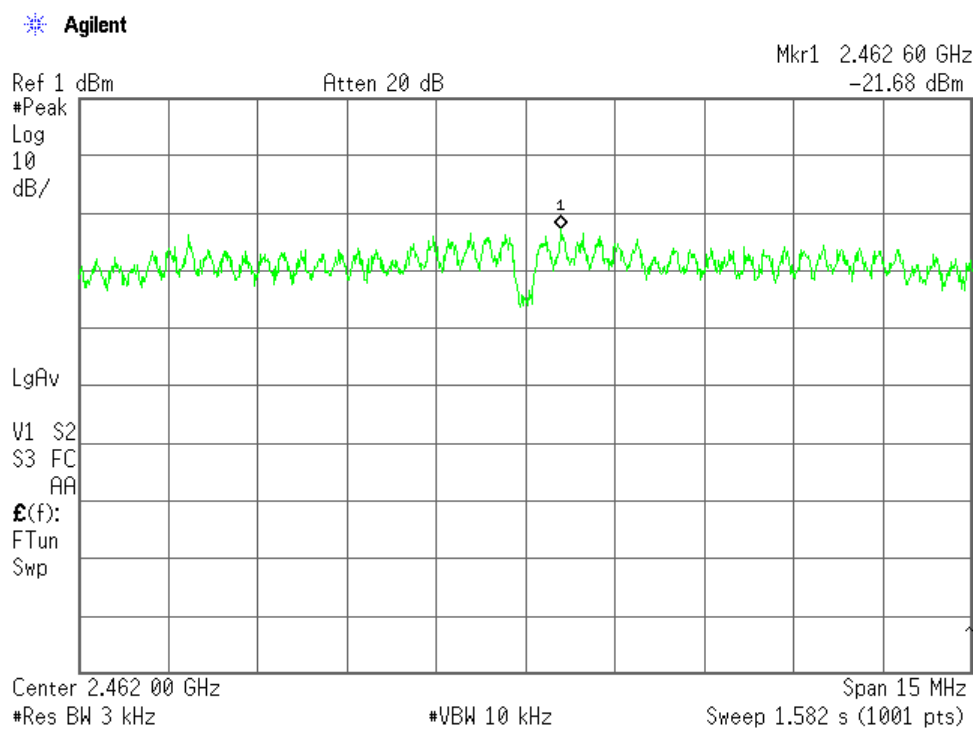




## Middle Channel



## High Channel



6)Data Rate : 54Mbps(IEEE 802.11g)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 54Mbps

| Transmitting Frequency | Correction Factor | Meter Reading | Conducted Peak Output Power | Limits | Margin |
|------------------------|-------------------|---------------|-----------------------------|--------|--------|
| CH [MHz]               | [dB]              | [dBm]         | [dBm] [mW]                  | [dBm]  | [dB]   |
| 01 2412                | 9.88              | -23.25        | -13.37 0.05                 | 8.00   | +21.37 |
| 06 2437                | 9.88              | -22.49        | -12.61 0.05                 | 8.00   | +20.61 |
| 11 2462                | 9.88              | -22.10        | -12.22 0.06                 | 8.00   | +20.22 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | -22.10 dBm           |
| Result            | = | -12.22 dBm = 0.06 mW |

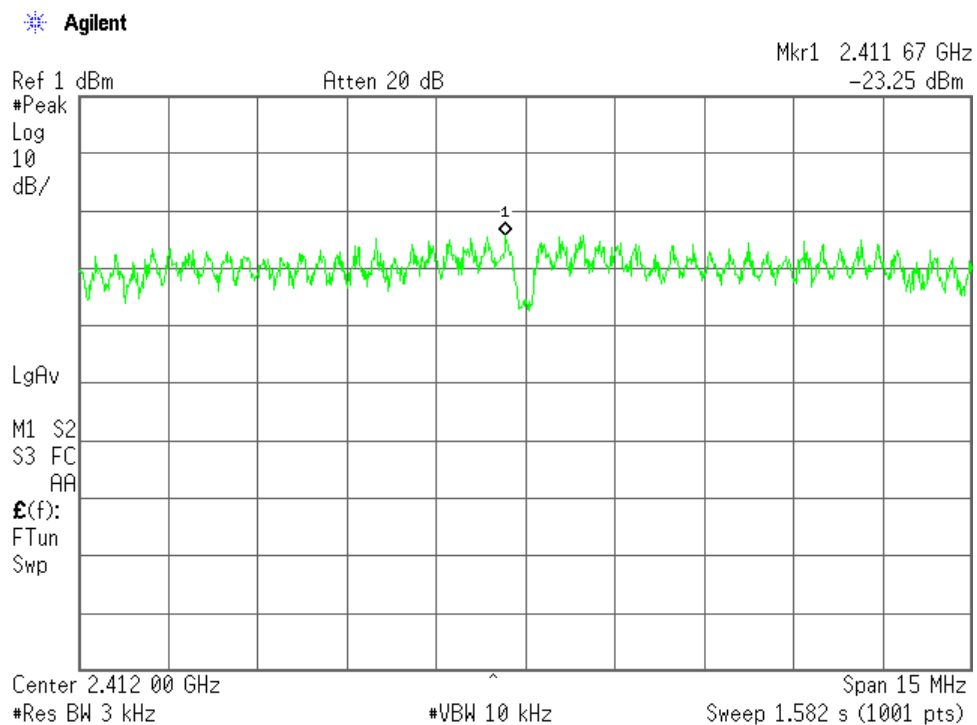
Minimum Margin: 8.00 - -12.22 = 20.22 (dB)

#### NOTES

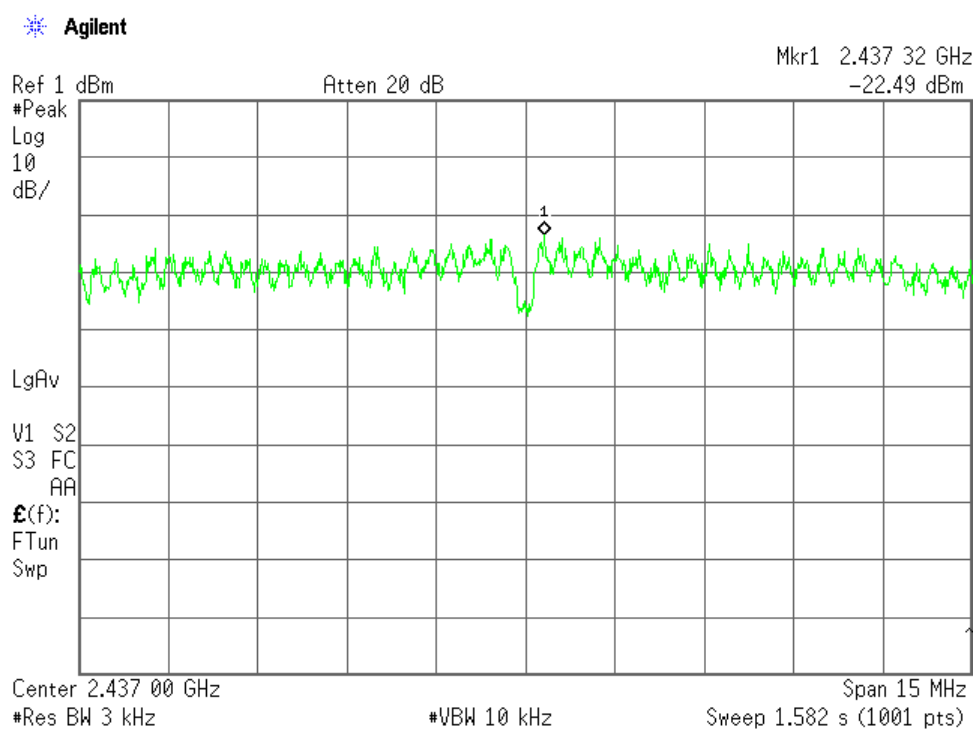
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

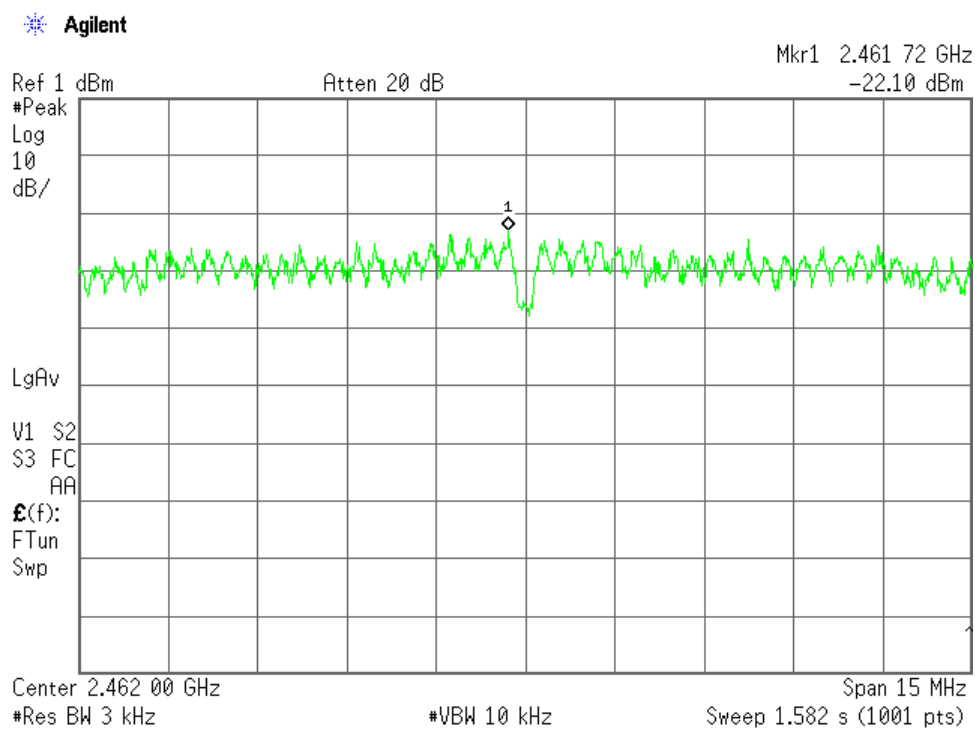
#### Low Channel



## Middle Channel



## High Channel



# 7)Data Rate : 6.5Mbps(IEEE 802.11n)

Data Rate : 6.5Mbps

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

| Transmitting Frequency |       | Correction Factor<br>[dB] | Meter Reading<br>[dBm] | Conducted Peak Output Power |      | Limits<br>[dBm] | Margin<br>[dB] |
|------------------------|-------|---------------------------|------------------------|-----------------------------|------|-----------------|----------------|
| CH                     | [MHz] |                           |                        | [dBm]                       | [mW] |                 |                |
| 01                     | 2412  | 9.88                      | -23.32                 | -13.44                      | 0.05 | 8.00            | +21.44         |
| 06                     | 2437  | 9.88                      | -21.99                 | -12.11                      | 0.06 | 8.00            | +20.11         |
| 11                     | 2462  | 9.88                      | -23.50                 | -13.62                      | 0.04 | 8.00            | +21.62         |

Calculated result at 2437.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | -21.99 dBm           |
| Result            | = | -12.11 dBm = 0.06 mW |

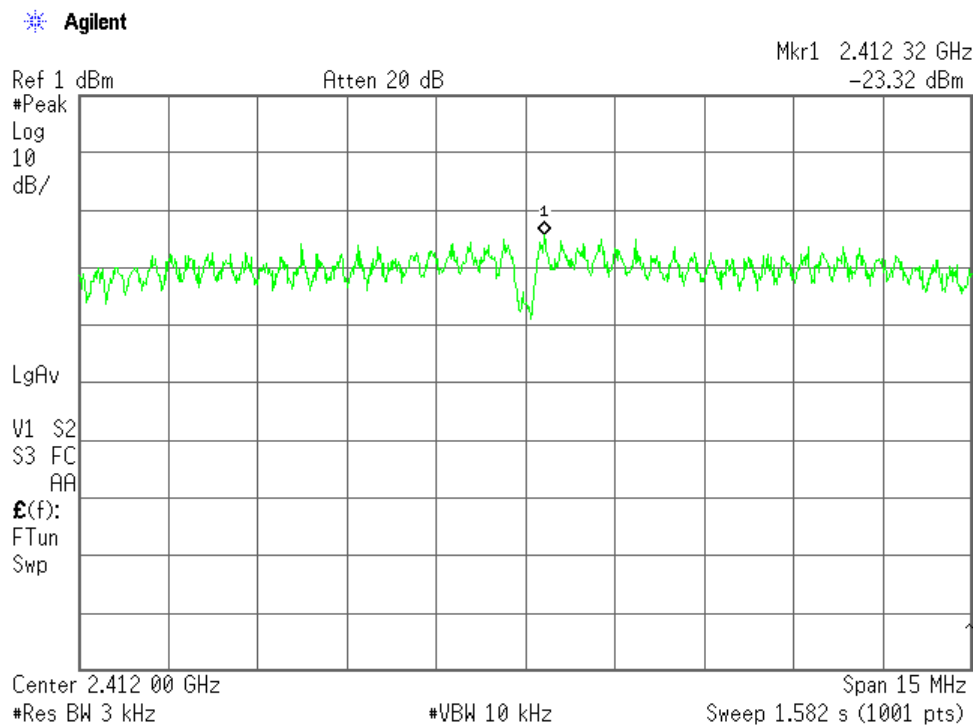
Minimum Margin: 8.00 - -12.11 = 20.11 (dB)

## NOTES

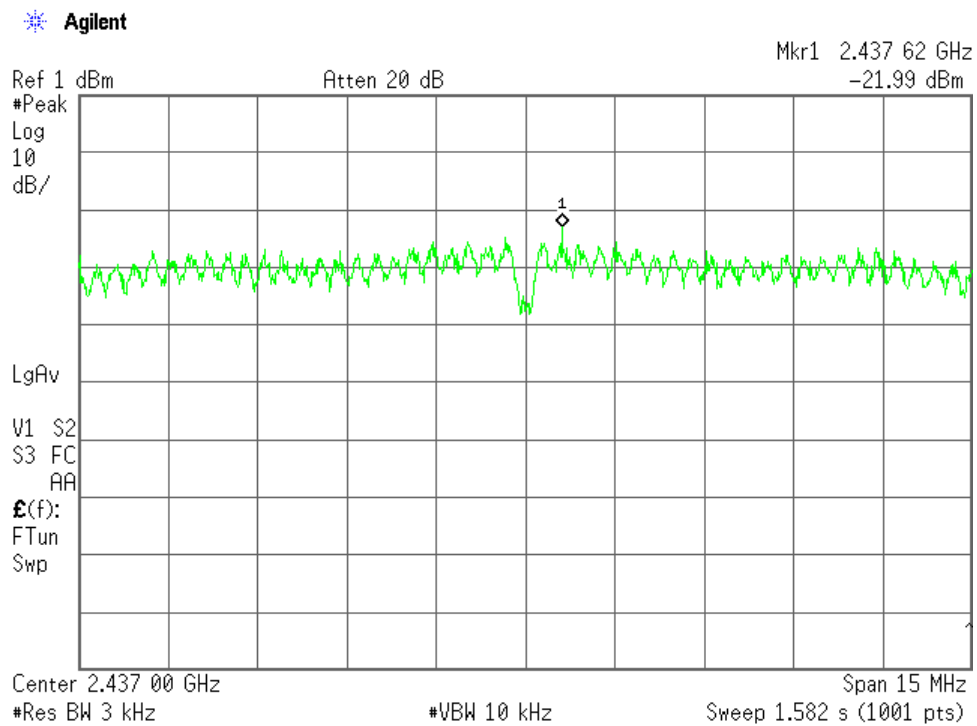
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

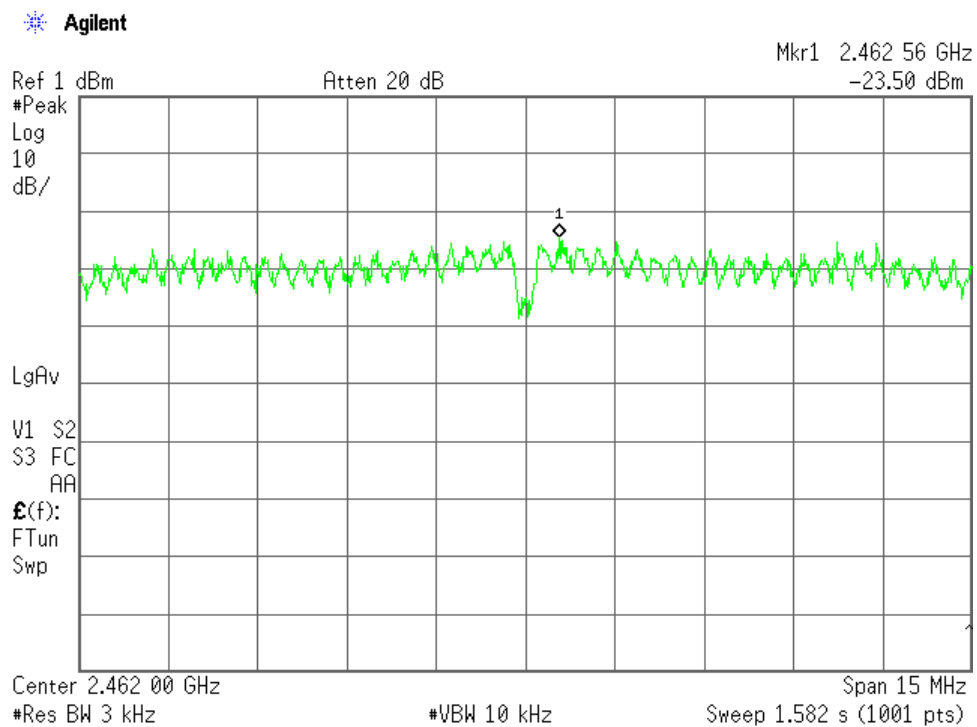
## Low Channel



## Middle Channel



## High Channel



8)Data Rate : 65Mbps(IEEE 802.11n)

Test Date: October 20, 2011

Temp.: 24 °C, Humi: 48 %

Data Rate : 65Mbps

| Transmitting Frequency | Correction Factor | Meter Reading | Conducted Peak Output Power | Limits | Margin |
|------------------------|-------------------|---------------|-----------------------------|--------|--------|
| CH [MHz]               | [dB]              | [dBm]         | [dBm] [mW]                  | [dBm]  | [dB]   |
| 01 2412                | 9.88              | -24.66        | -14.78 0.03                 | 8.00   | +22.78 |
| 06 2437                | 9.88              | -23.09        | -13.21 0.05                 | 8.00   | +21.21 |
| 11 2462                | 9.88              | -22.91        | -13.03 0.05                 | 8.00   | +21.03 |

Calculated result at 2462.000 MHz, as the worst point shown on underline:

|                   |   |                      |
|-------------------|---|----------------------|
| Correction Factor | = | 9.88 dB              |
| + ) Meter Reading | = | -22.91 dBm           |
| Result            | = | -13.03 dBm = 0.05 mW |

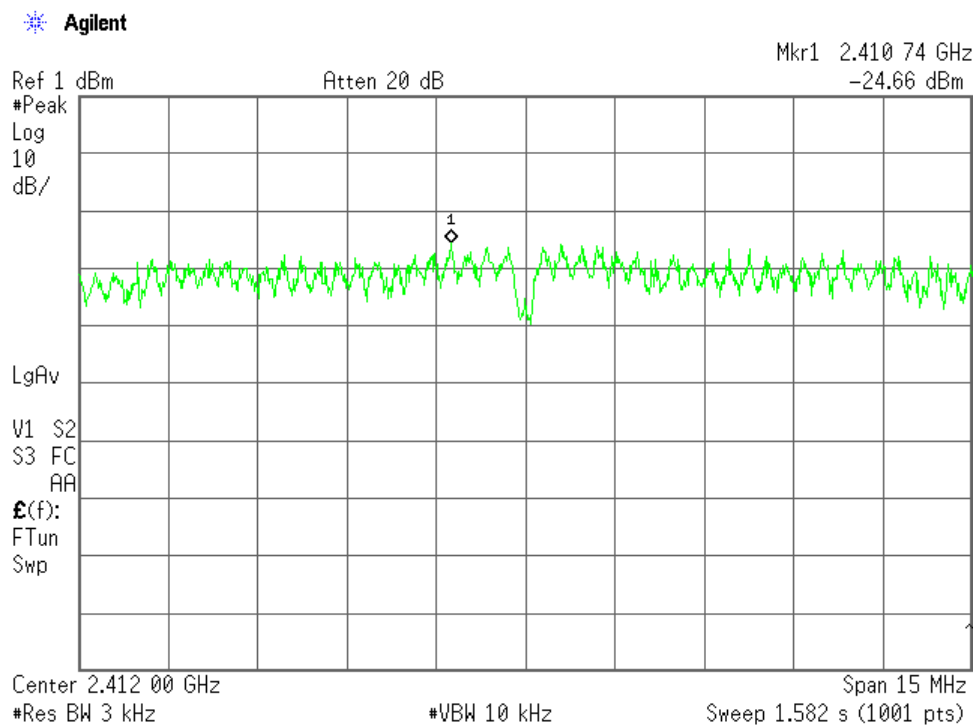
Minimum Margin: 8.00 - -13.03 = 21.03 (dB)

#### NOTES

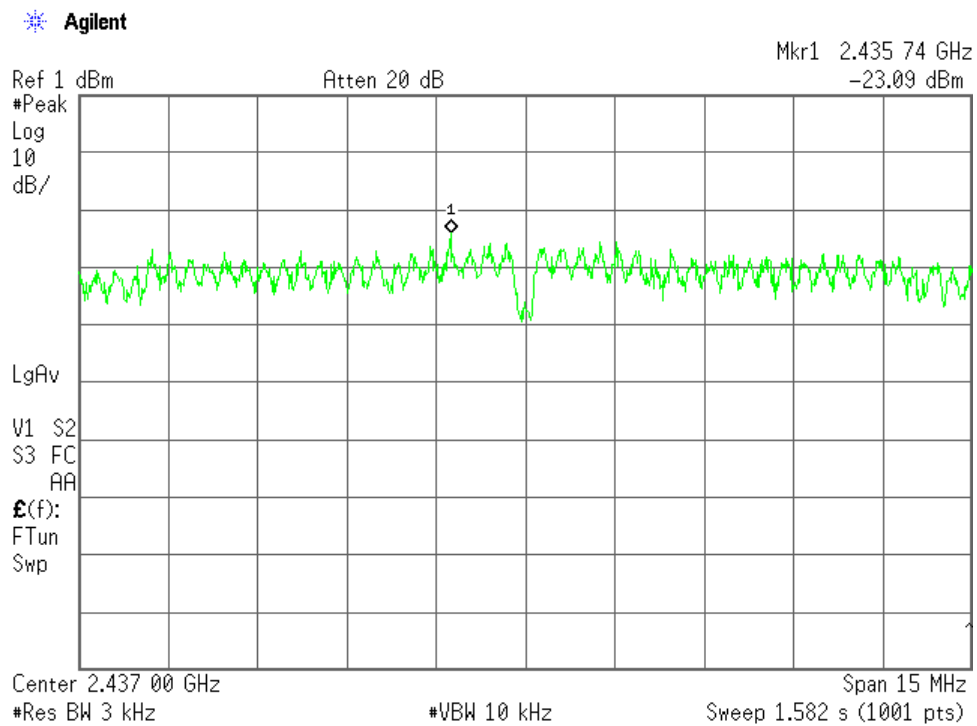
- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Setting of measuring instrument(s) :

| Detector Function | RES B.W. | Video B.W. |
|-------------------|----------|------------|
| Peak              | 3kHz     | 10kHz      |

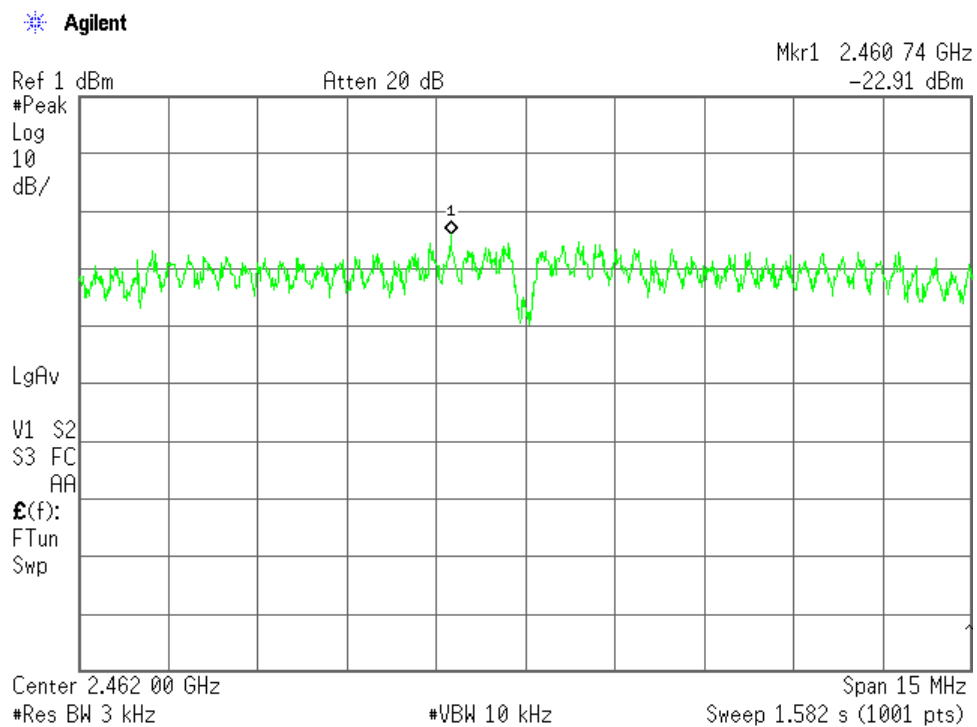
#### Low Channel



## Middle Channel



## High Channel



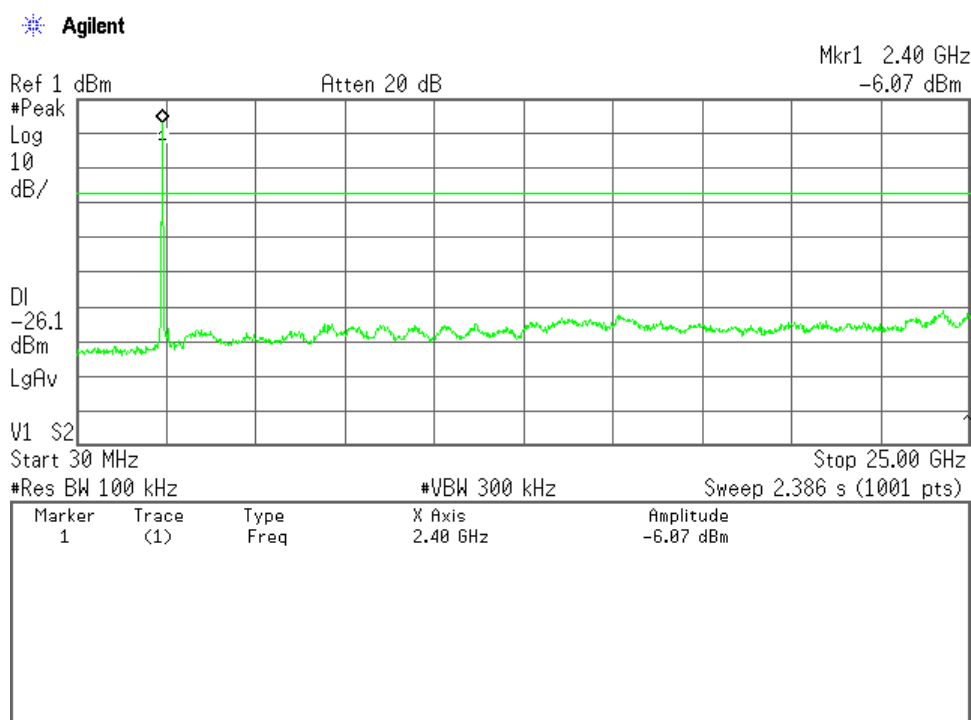
## A.7 Spurious Emission(Conduction)

Test Date : October 21, 2011

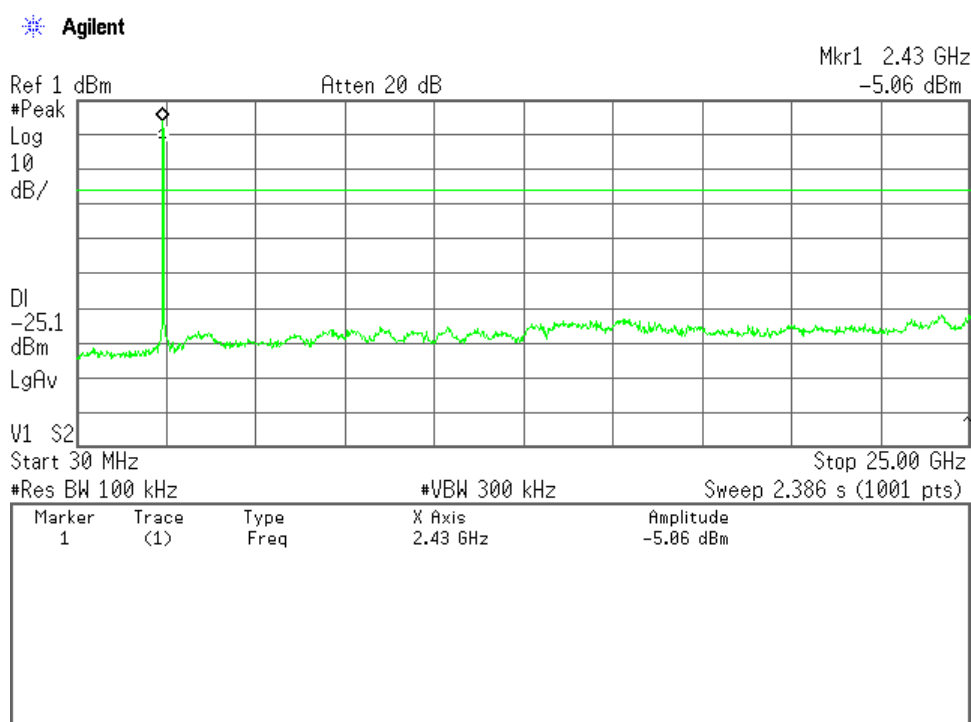
Temp.:26°C, Humi:49%

1)Data Rate : 1Mbps(IEEE 802.11b)

Low Channel

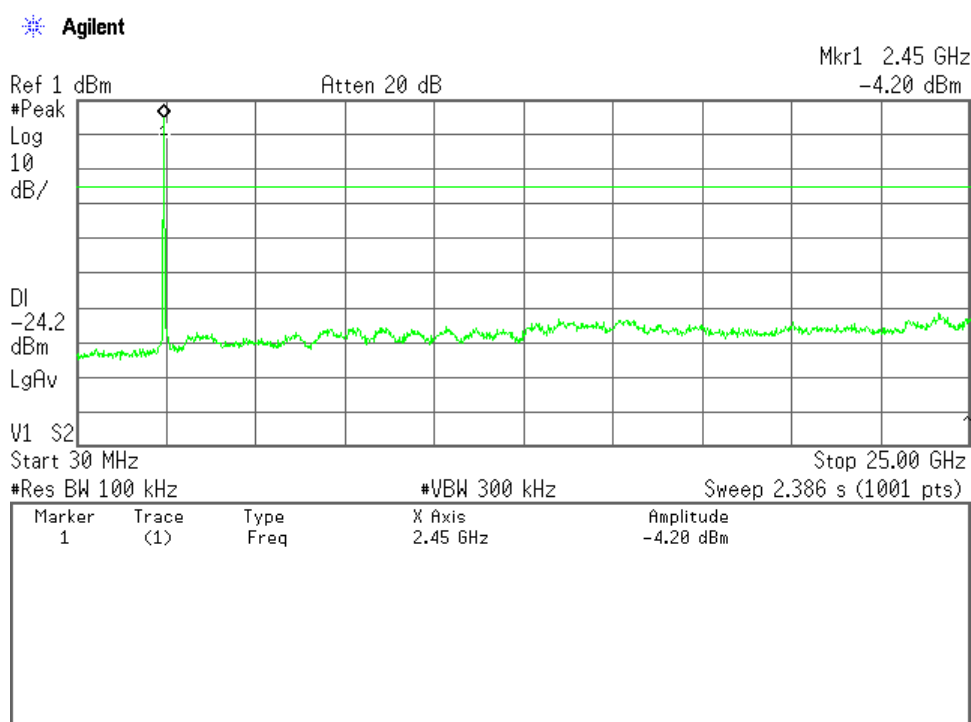


Middle Channel



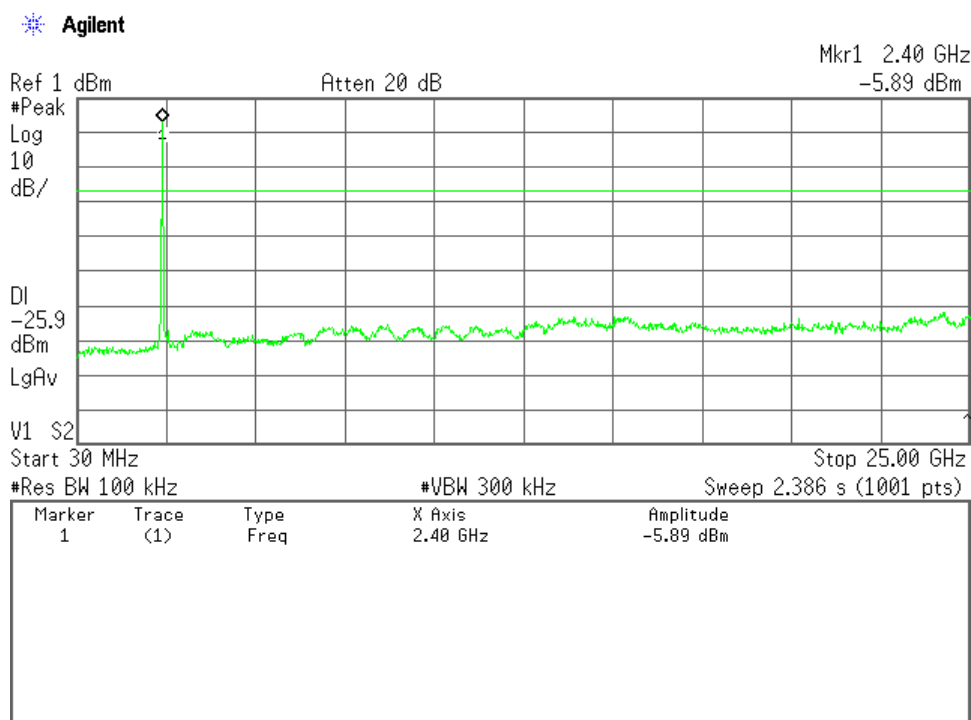


## High Channel

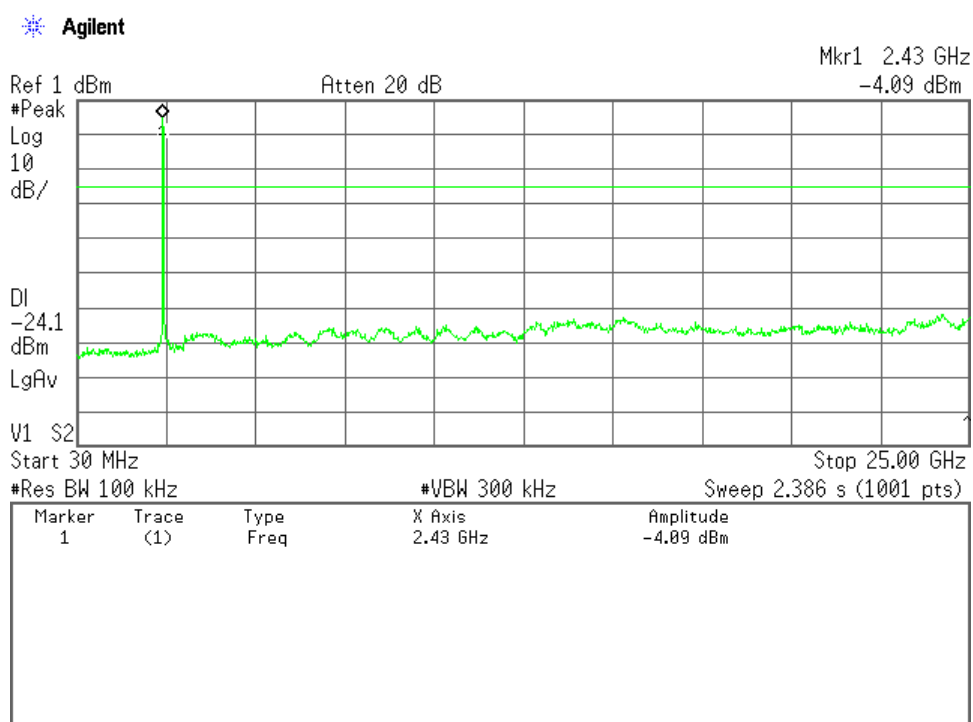


## 2)Data Rate : 11Mbps(IEEE 802.11b)

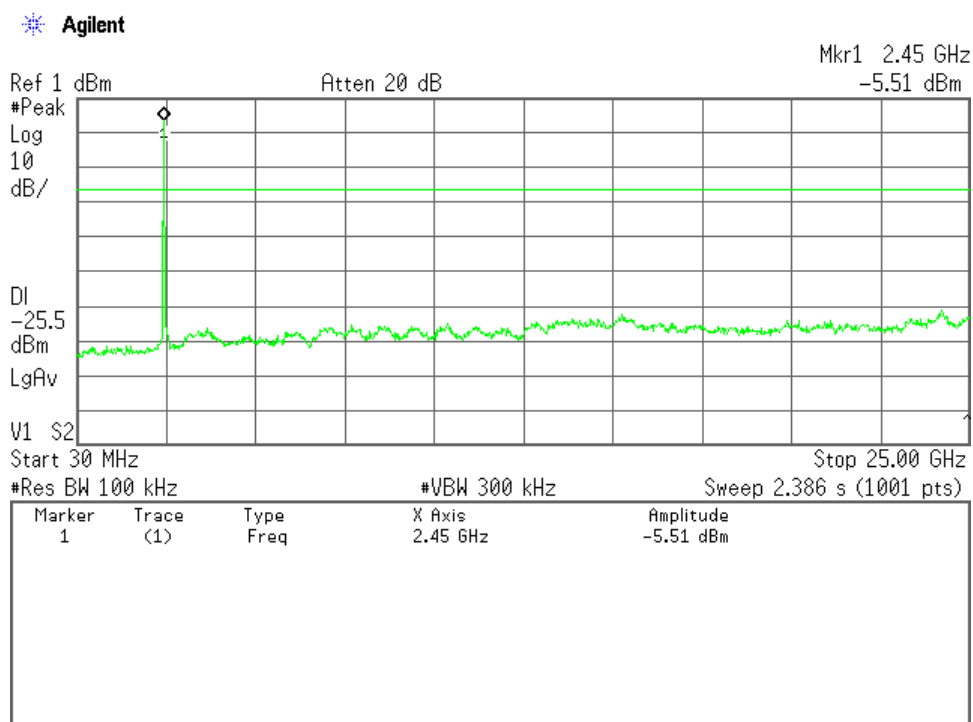
### Low Channel



## Middle Channel

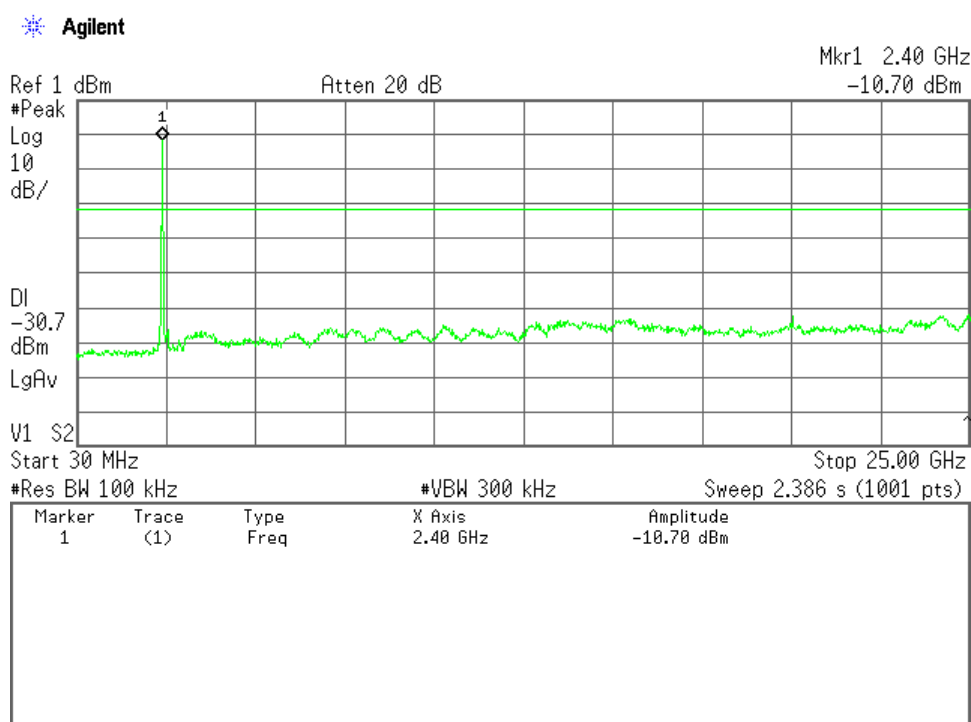


## High Channel

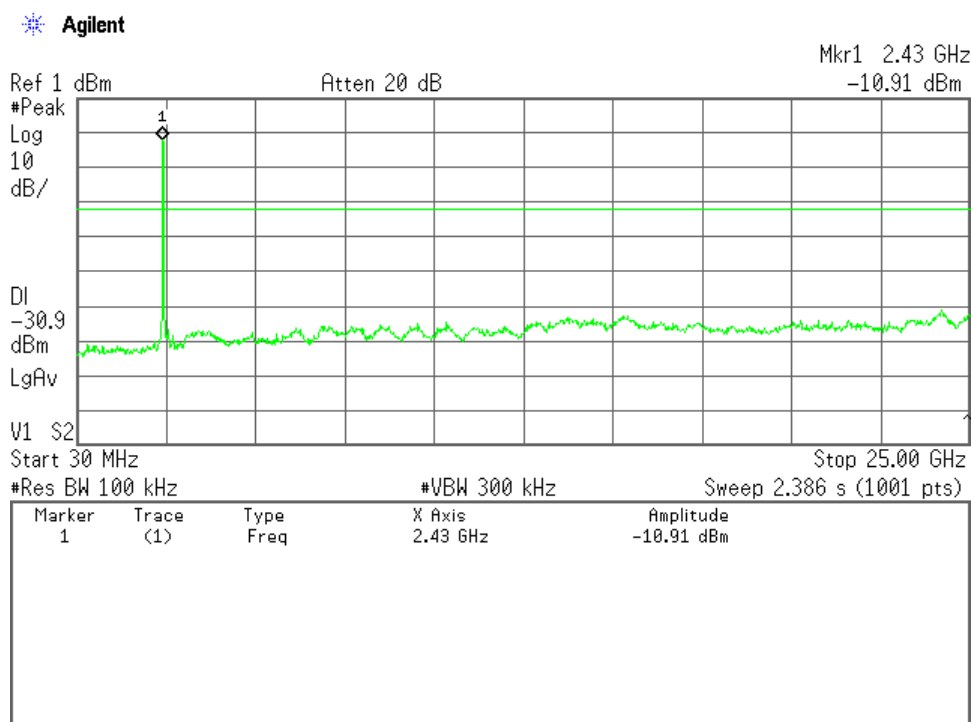


## 3)Data Rate : 6Mbps(IEEE 802.11g)

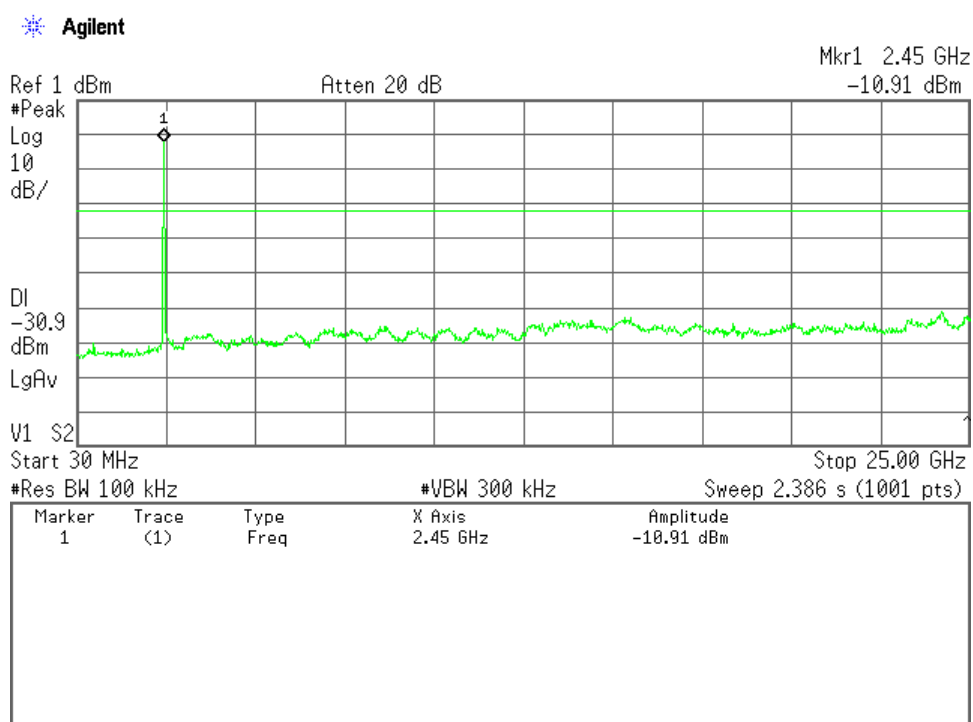
### Low Channel



### Middle Channel

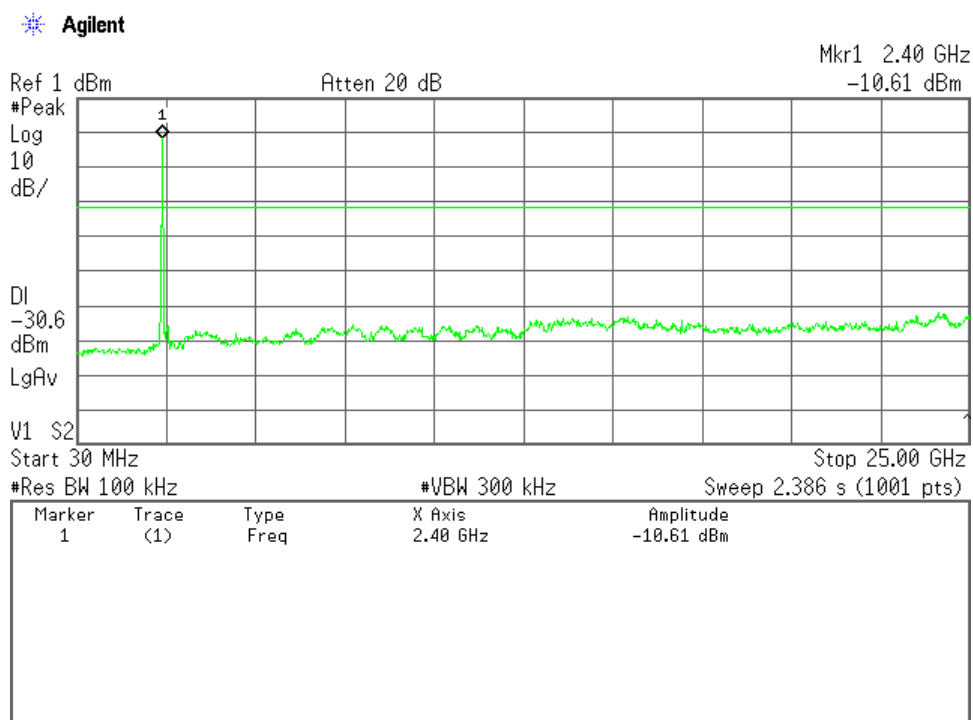


## High Channel

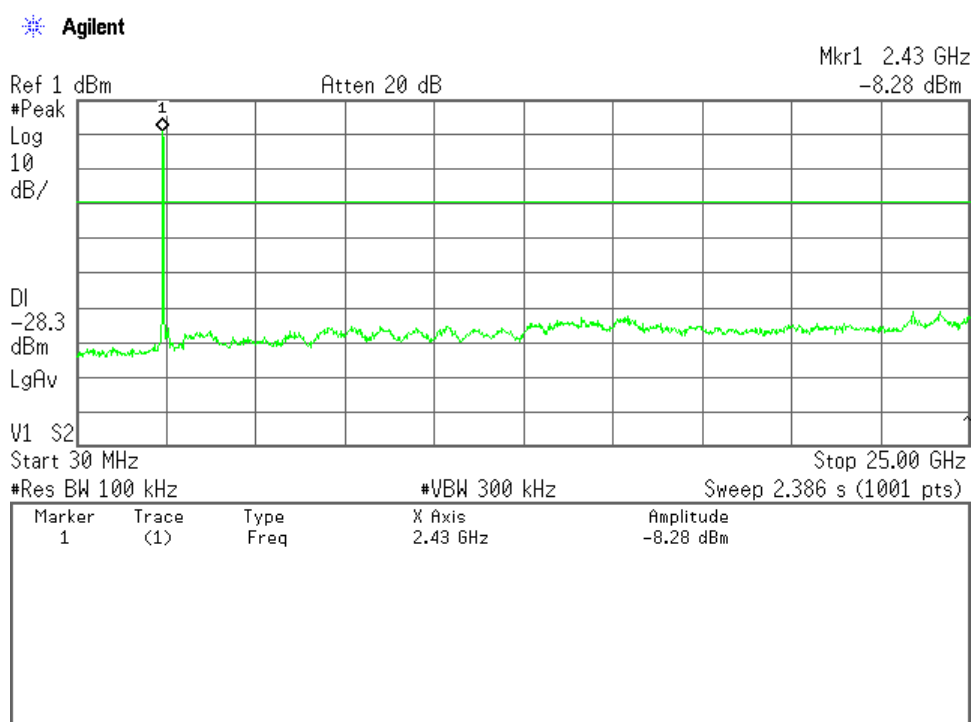


## 4)Data Rate : 54Mbps(IEEE 802.11g)

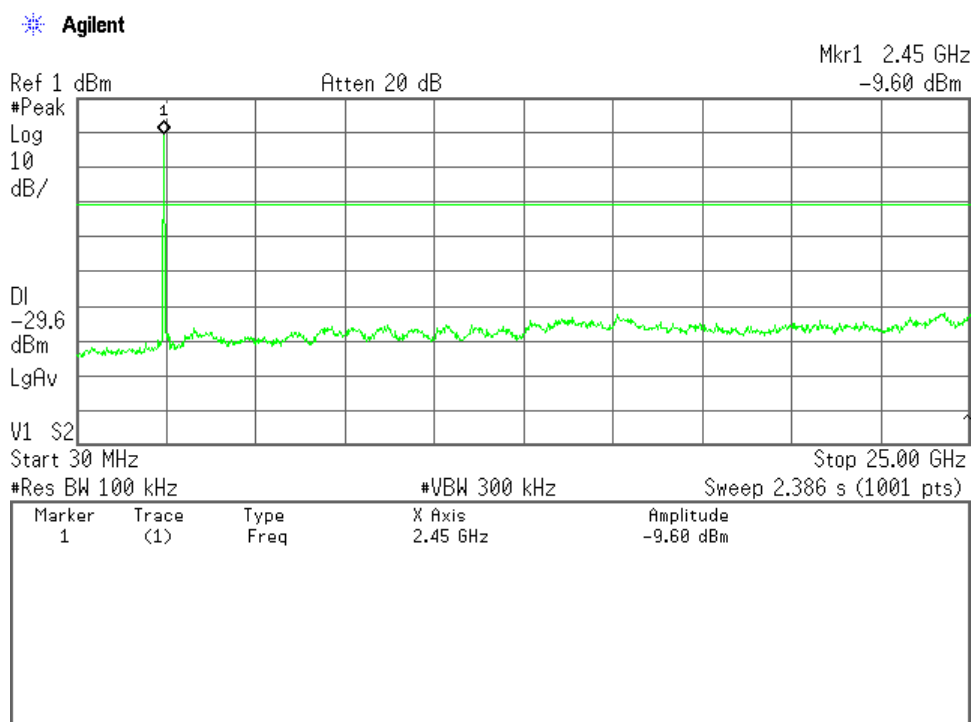
### Low Channel



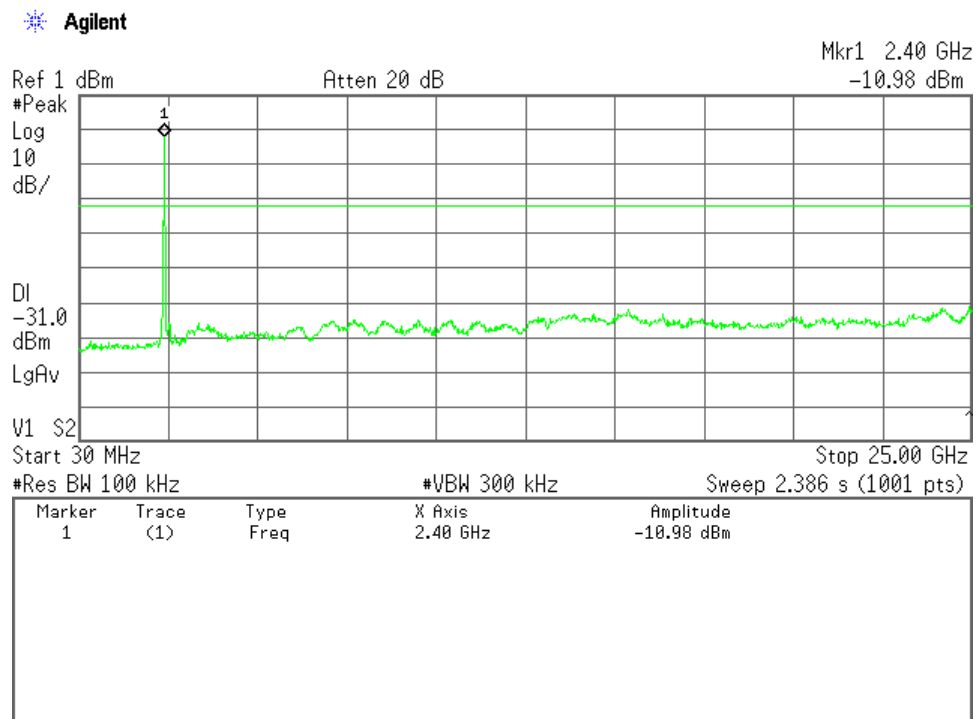
## Middle Channel



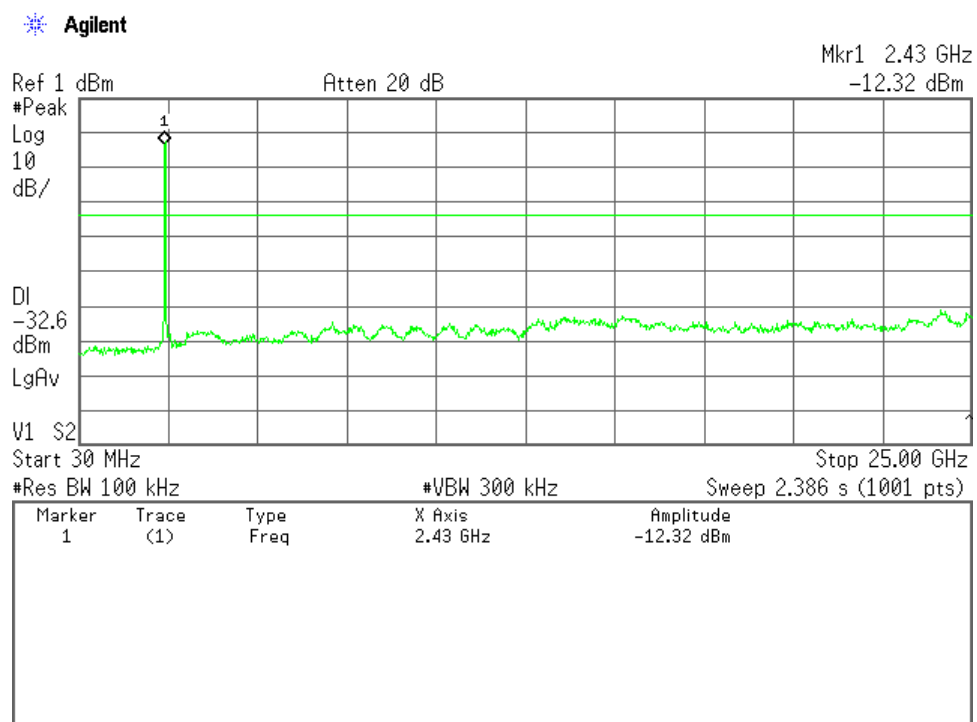
## High Channel



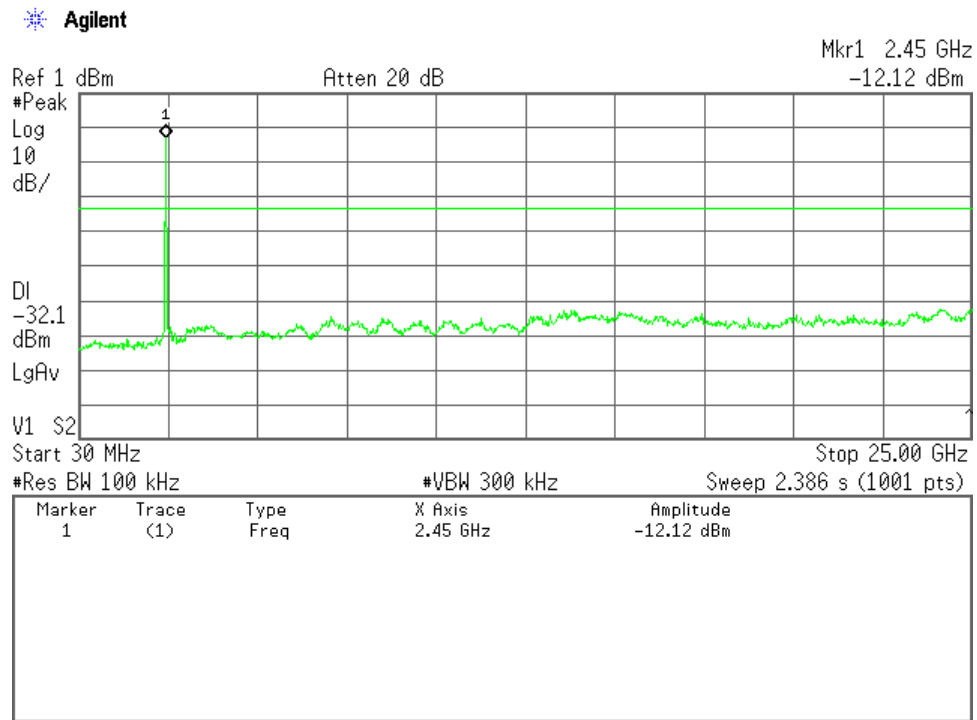
## 5)Data Rate : 6.5Mbps(IEEE 802.11n) Low Channel



## Middle Channel

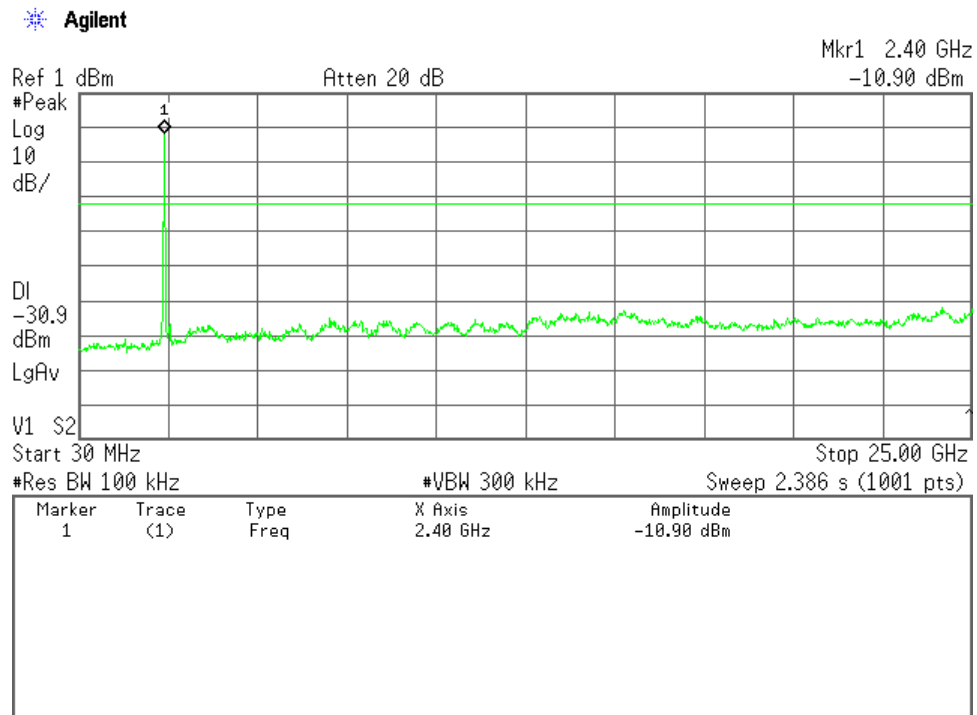


## High Channel

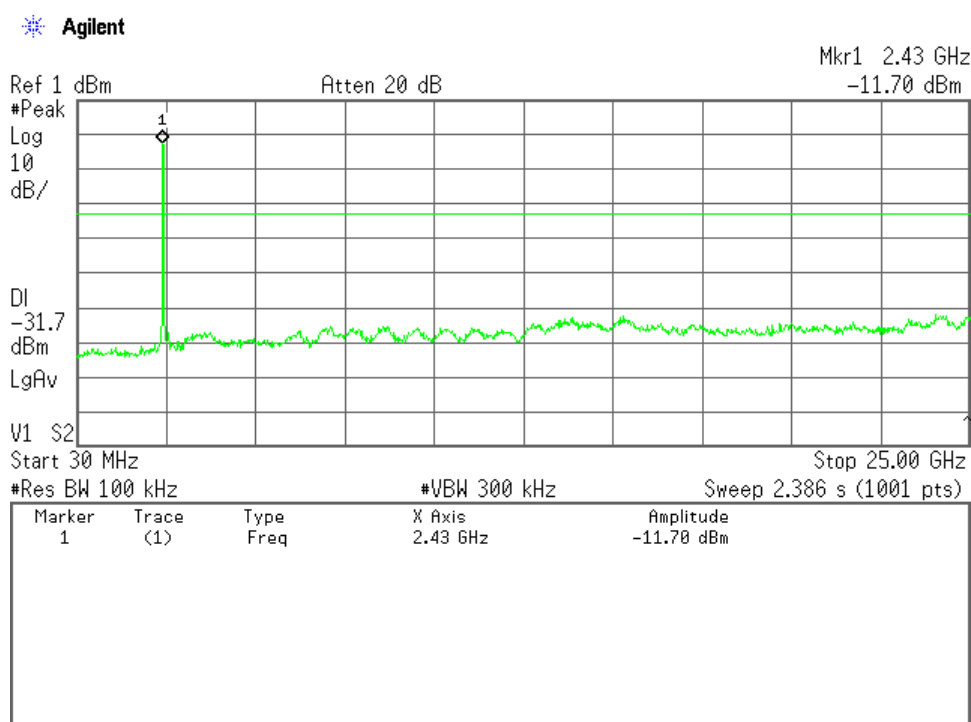


## 6)Data Rate : 65Mbps(IEEE 802.11n)

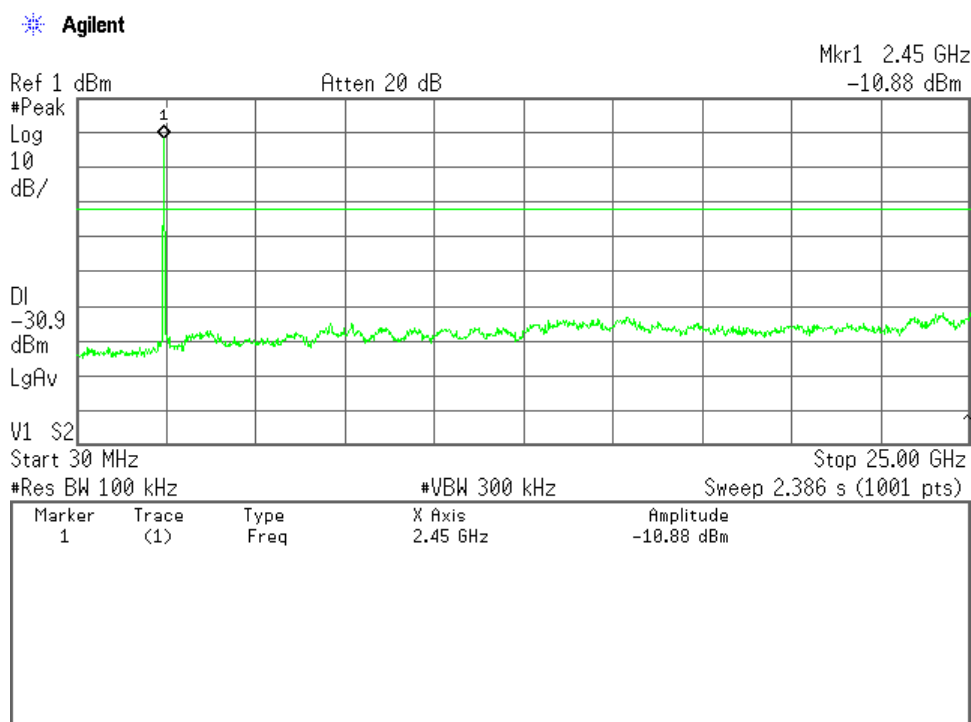
### Low Channel



## Middle Channel



## High Channel

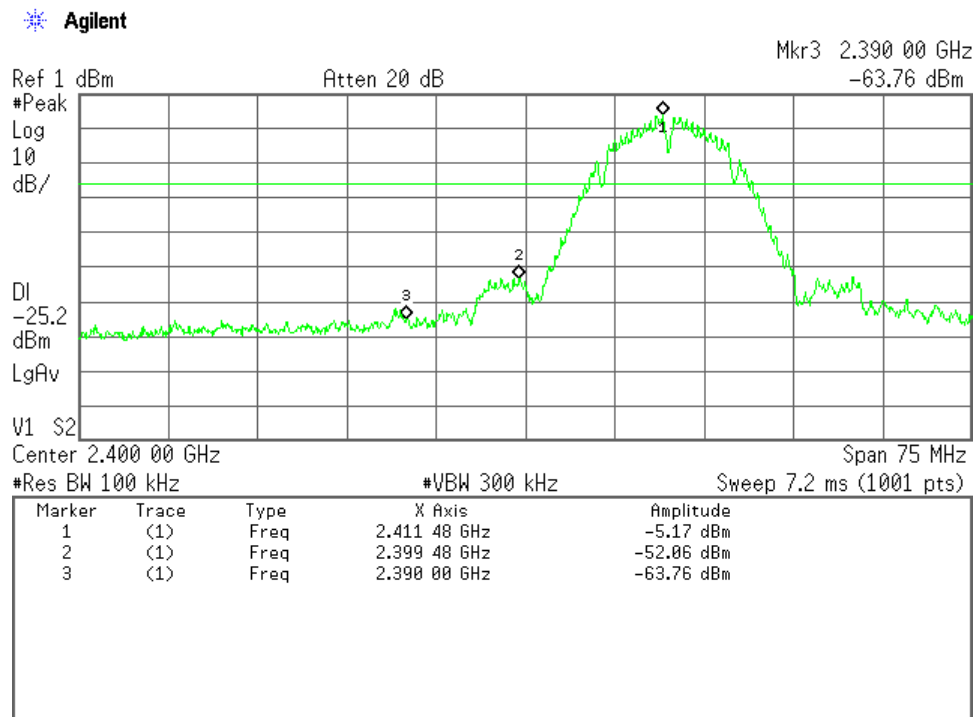




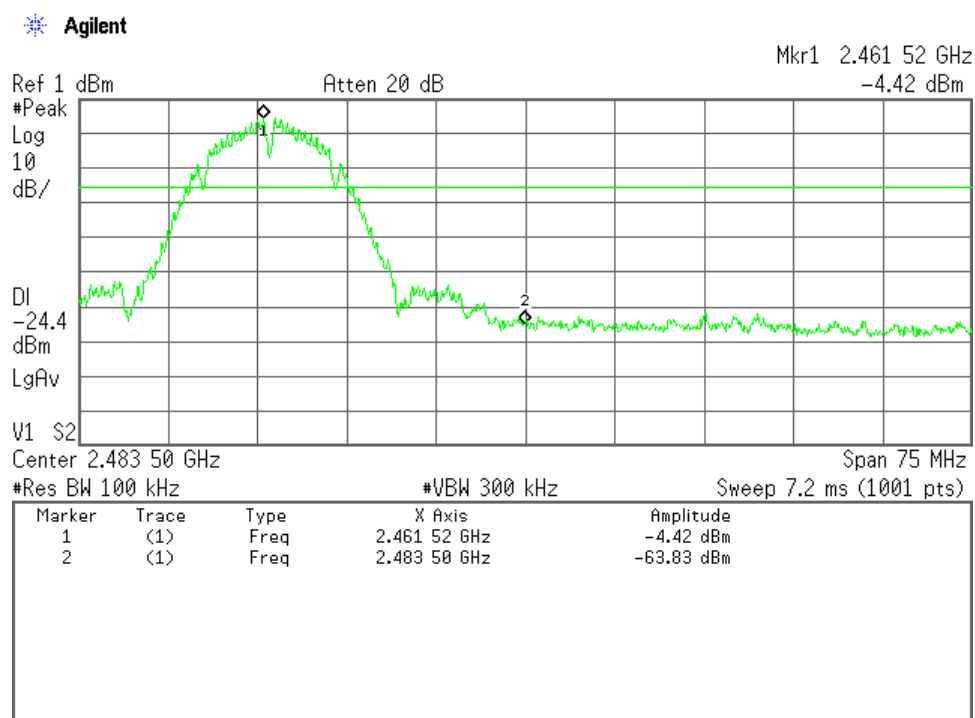
## Band-Edge Emission

1)Data Rate : 1Mbps(IEEE 802.11b)

Low Channel

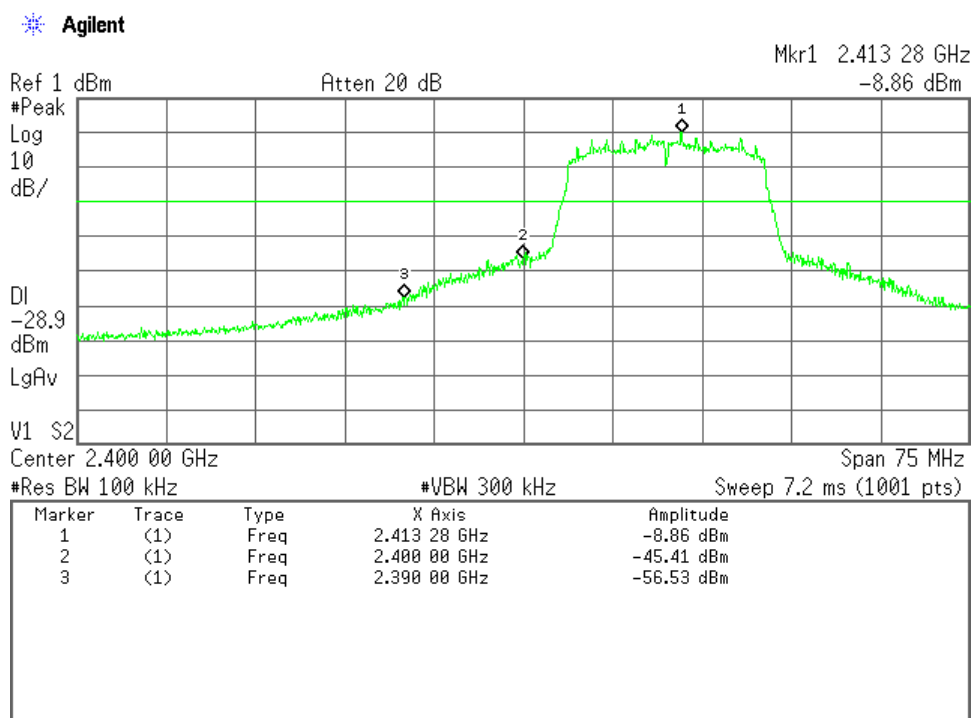


High Channel

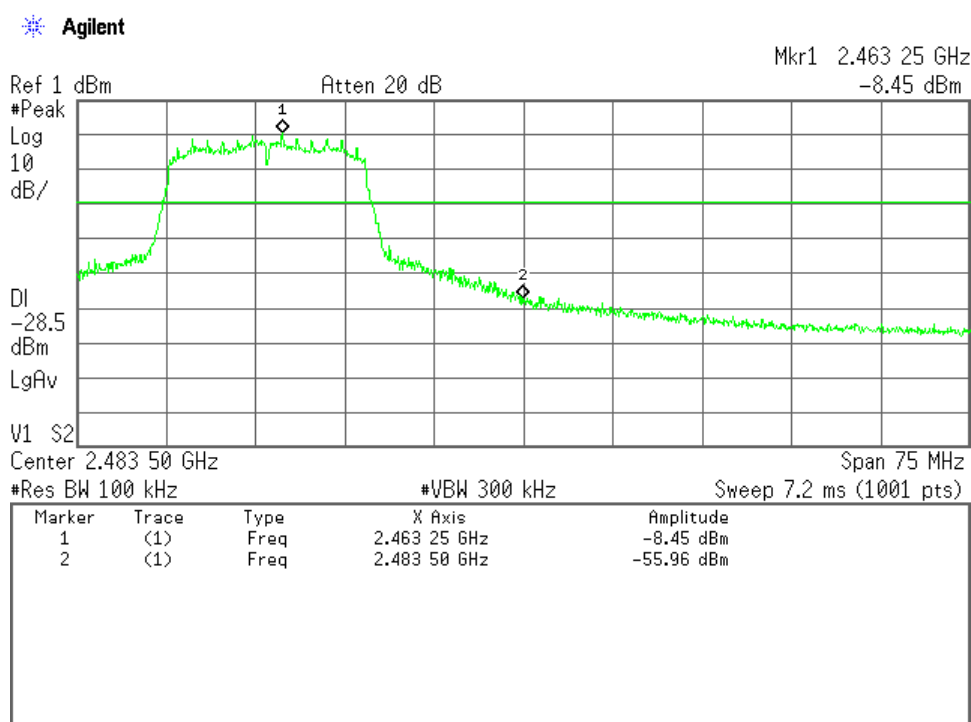


## 2)Data Rate : 6Mbps(IEEE 802.11g)

### Low Channel

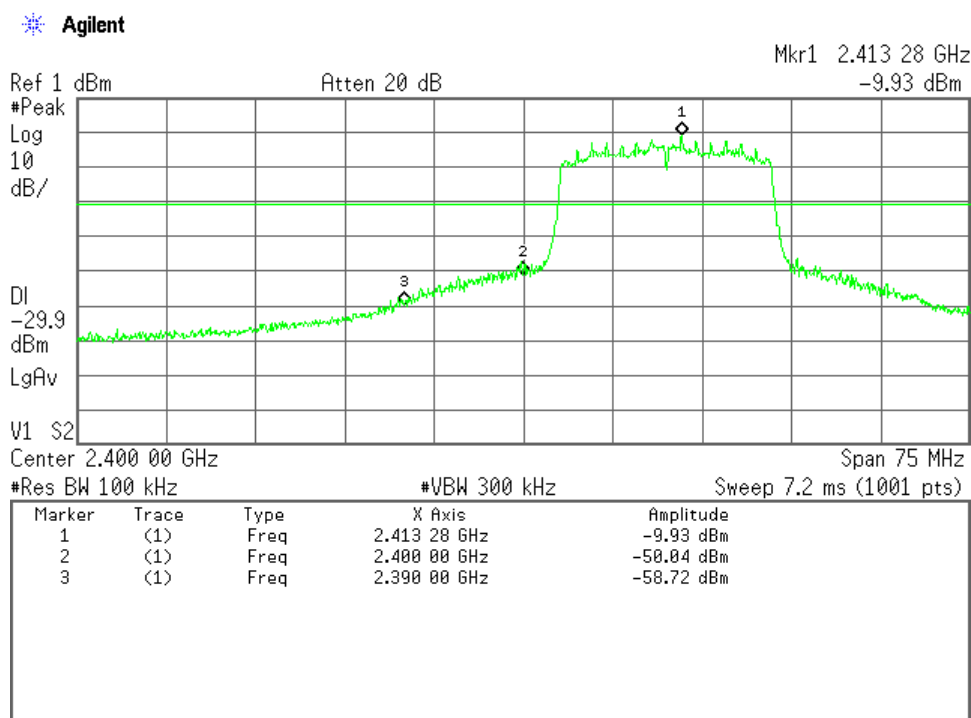


### High Channel

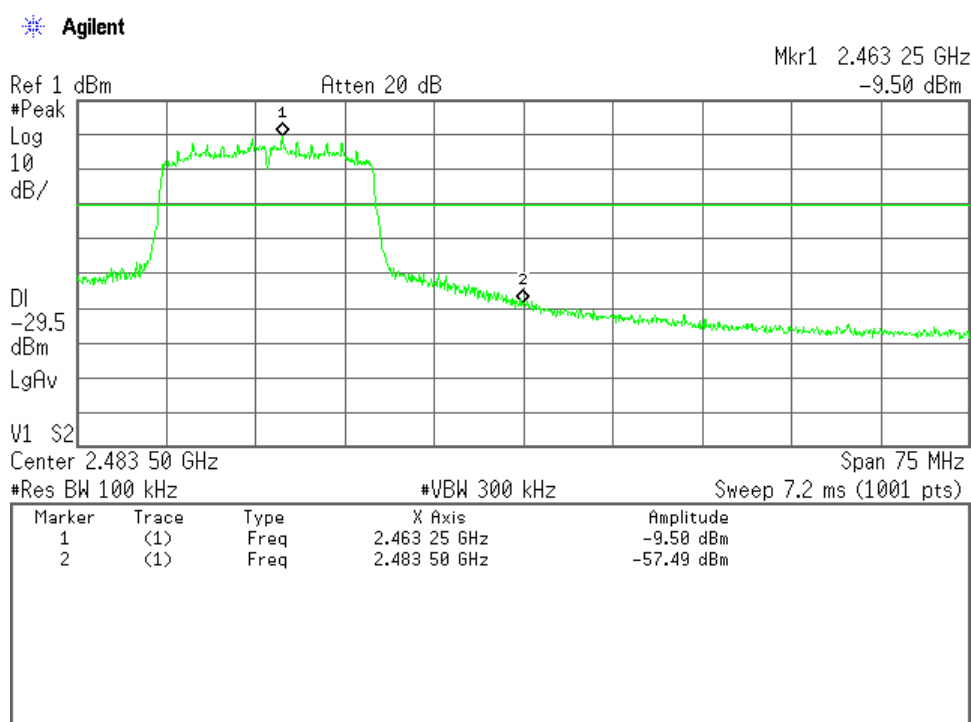


## 2)Data Rate : 6.5Mbps(IEEE 802.11n)

### Low Channel



### High Channel



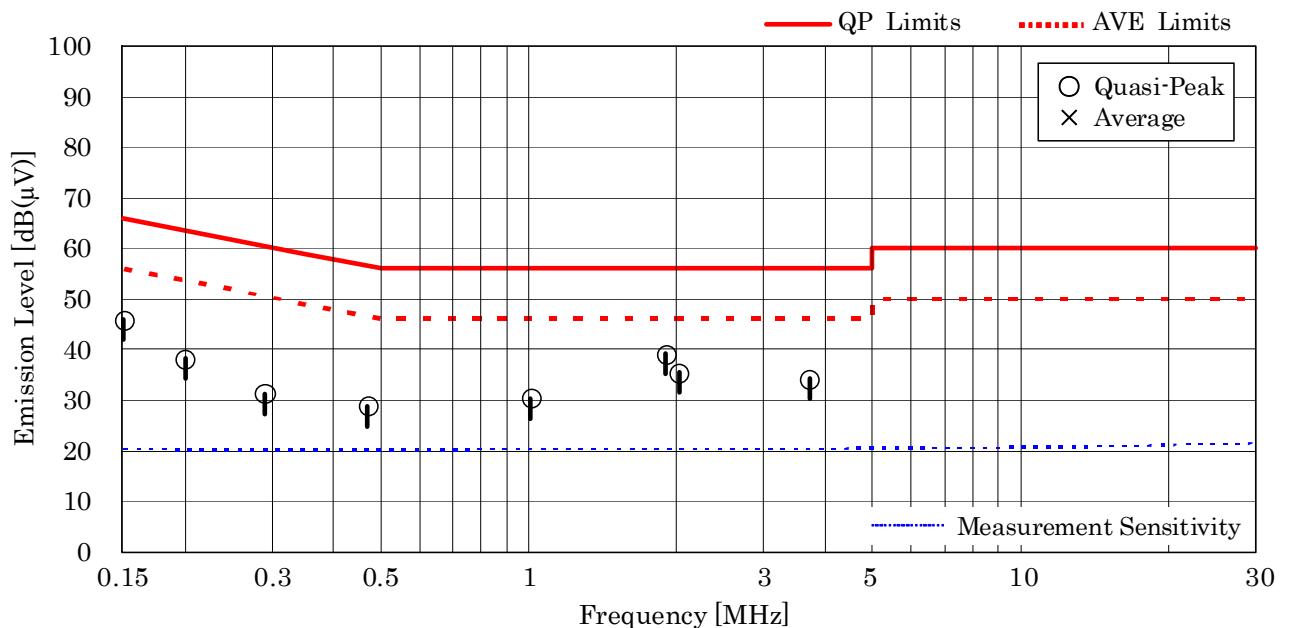
## A.8 AC Powerline Conducted Emission

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE 802.11b, IEEE 802.11g and IEEE 802.11n) has been listed.

Test Date: October 22, 2011

Temp.: 24 °C, Humi.: 55 %

| Frequency<br>[MHz] | Corr.<br>Factor<br>[dB] | Meter Readings [dB(μV)] |     |      |     | Limits<br>[dB(μV)] |      | Results<br>[dB(μV)] |     | Margin<br>[dB] | Remarks |
|--------------------|-------------------------|-------------------------|-----|------|-----|--------------------|------|---------------------|-----|----------------|---------|
|                    |                         | VA                      |     | VB   |     | QP                 | AVE  | QP                  | AVE |                |         |
|                    |                         | QP                      | AVE | QP   | AVE | QP                 | AVE  | QP                  | AVE |                |         |
| 0.15               | 10.3                    | 35.6                    | --  | 35.4 | --  | 66.0               | 56.0 | 45.9                | --  | +20.1          | -       |
| 0.20               | 10.2                    | 26.9                    | --  | 28.0 | --  | 63.6               | 53.6 | 38.2                | --  | +25.4          | -       |
| 0.29               | 10.2                    | 21.1                    | --  | 20.3 | --  | 60.5               | 50.5 | 31.3                | --  | +29.2          | -       |
| 0.47               | 10.2                    | 18.6                    | --  | 14.8 | --  | 56.5               | 46.5 | 28.8                | --  | +27.7          | -       |
| 1.01               | 10.3                    | 20.1                    | --  | 15.1 | --  | 56.0               | 46.0 | 30.4                | --  | +25.6          | -       |
| 1.90               | 10.3                    | 28.6                    | --  | 28.8 | --  | 56.0               | 46.0 | 39.1                | --  | +16.9          | -       |
| 2.02               | 10.3                    | 25.1                    | --  | 25.1 | --  | 56.0               | 46.0 | 35.4                | --  | +20.6          | -       |
| 3.72               | 10.4                    | 23.8                    | --  | 23.2 | --  | 56.0               | 46.0 | 34.2                | --  | +21.8          | -       |



### NOTES

1. The spectrum was checked from 0.15 MHz to 30 MHz.
2. The correction factor includes the AMN insertion loss and the cable loss.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. The symbol of "--" means "not applicable".
6. Calculated result at 1.90 MHz, as the worst point shown on underline:  
Correction Factor + Meter Reading = 10.3 + 28.8 = 39.1 dB(μV)
7. QP : Quasi-Peak Detector / AVE : Average Detector
8. Test receiver setting(s) : CISPR QP 9 kHz / Average 9 kHz

## A.9 Field Strength of Spurious Radiation

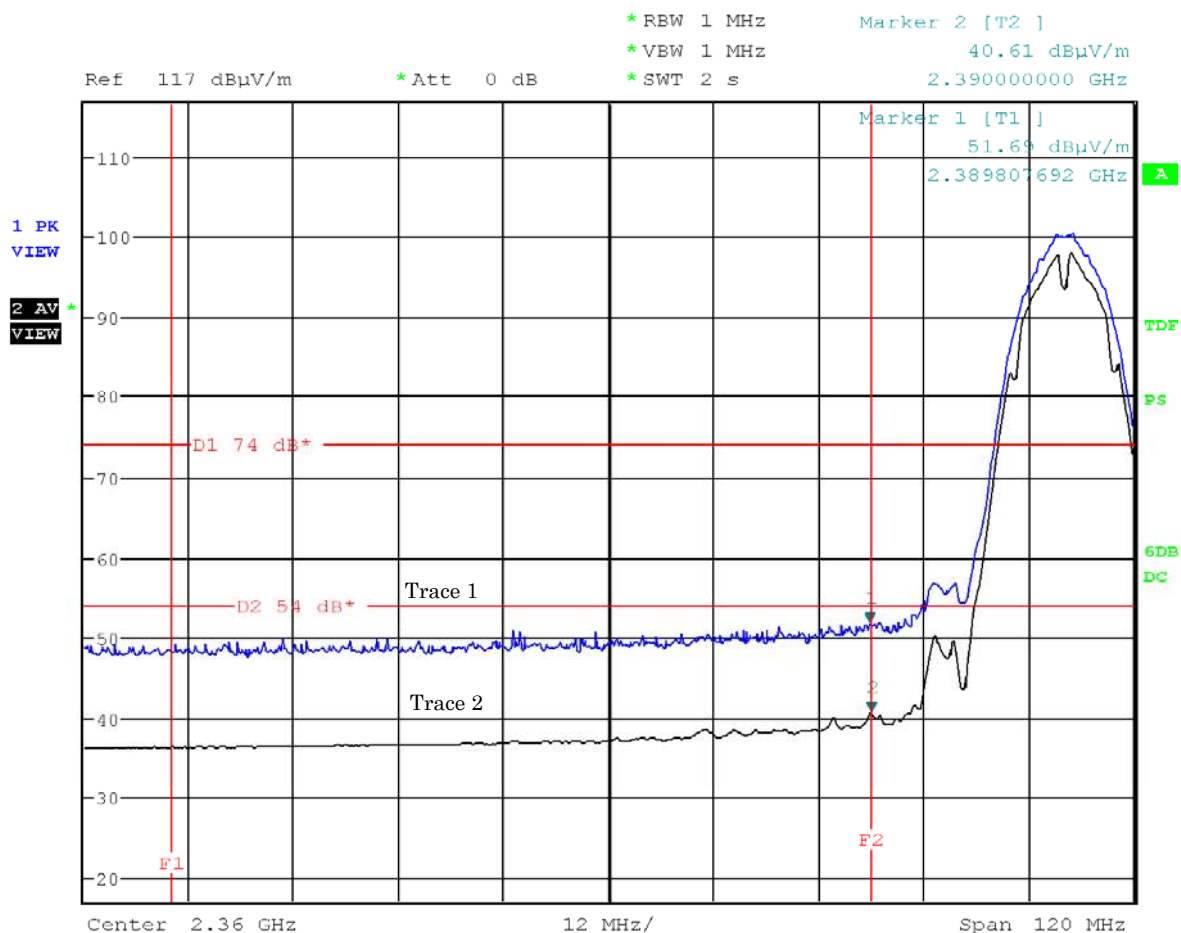
### A.9.1 Band-edge Compliance

Test Date : October 23, 2011

Temp.:25°C, Humi:61%

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 1Mbps(IEEE 802.11b))

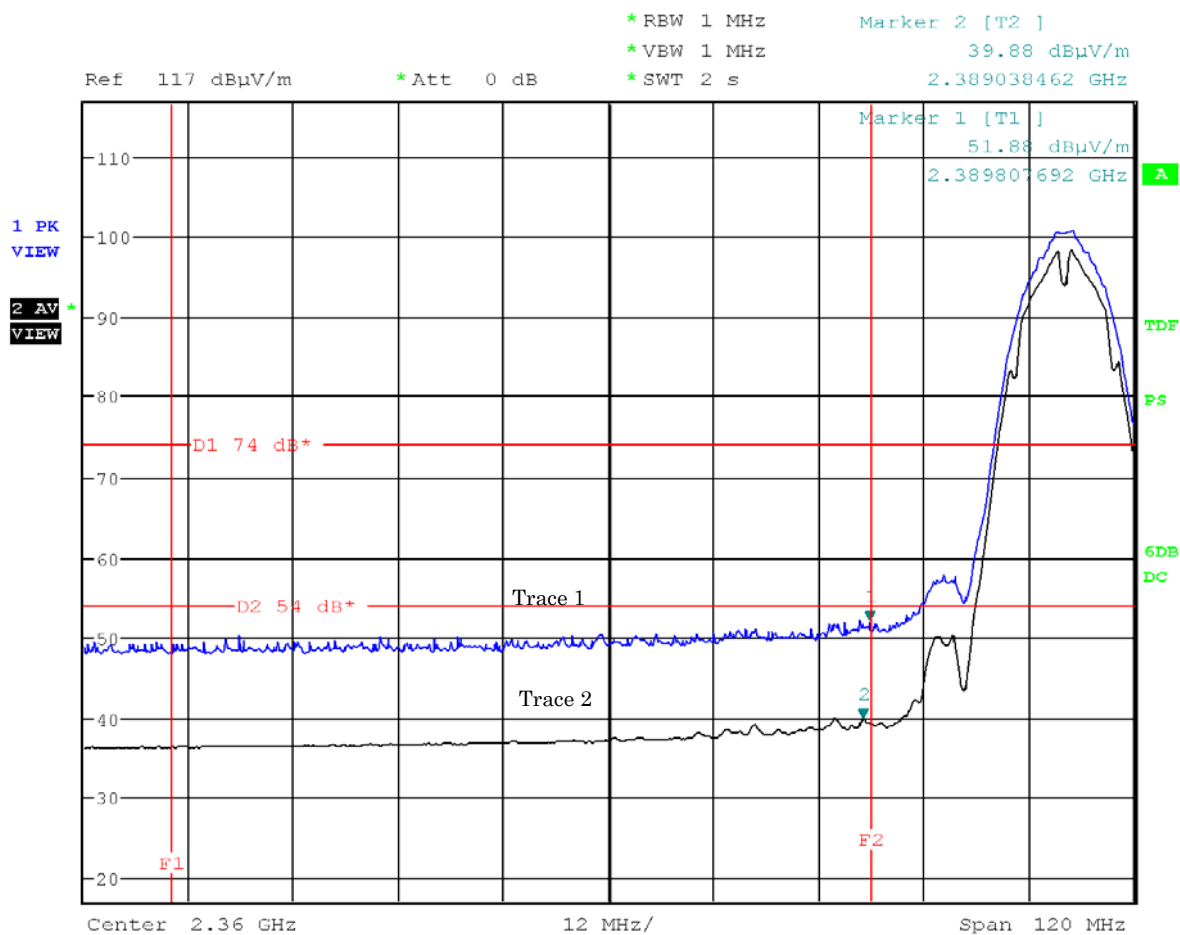
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 1Mbps(IEEE 802.11b))

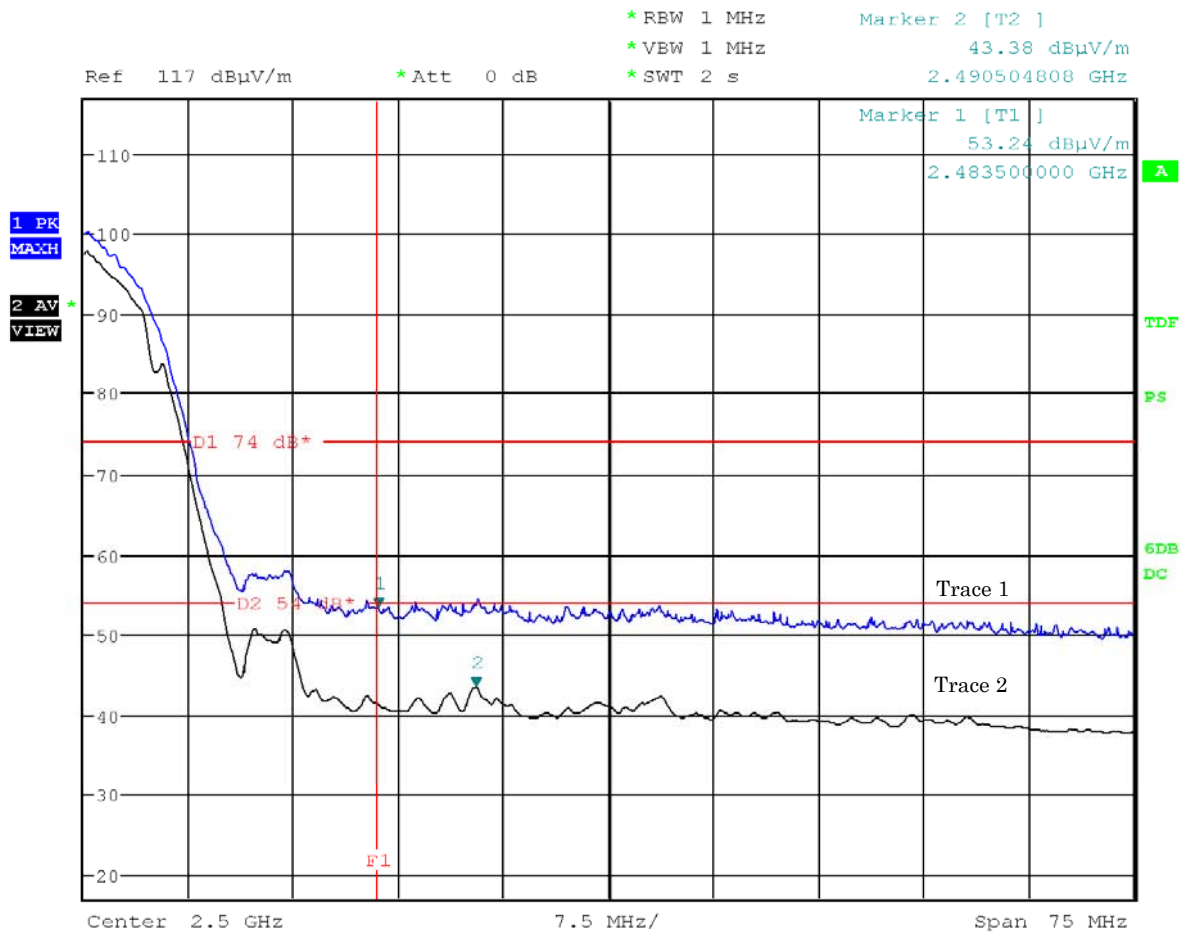
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 1Mbps(IEEE 802.11b))

Antenna Polarization : Horizontal



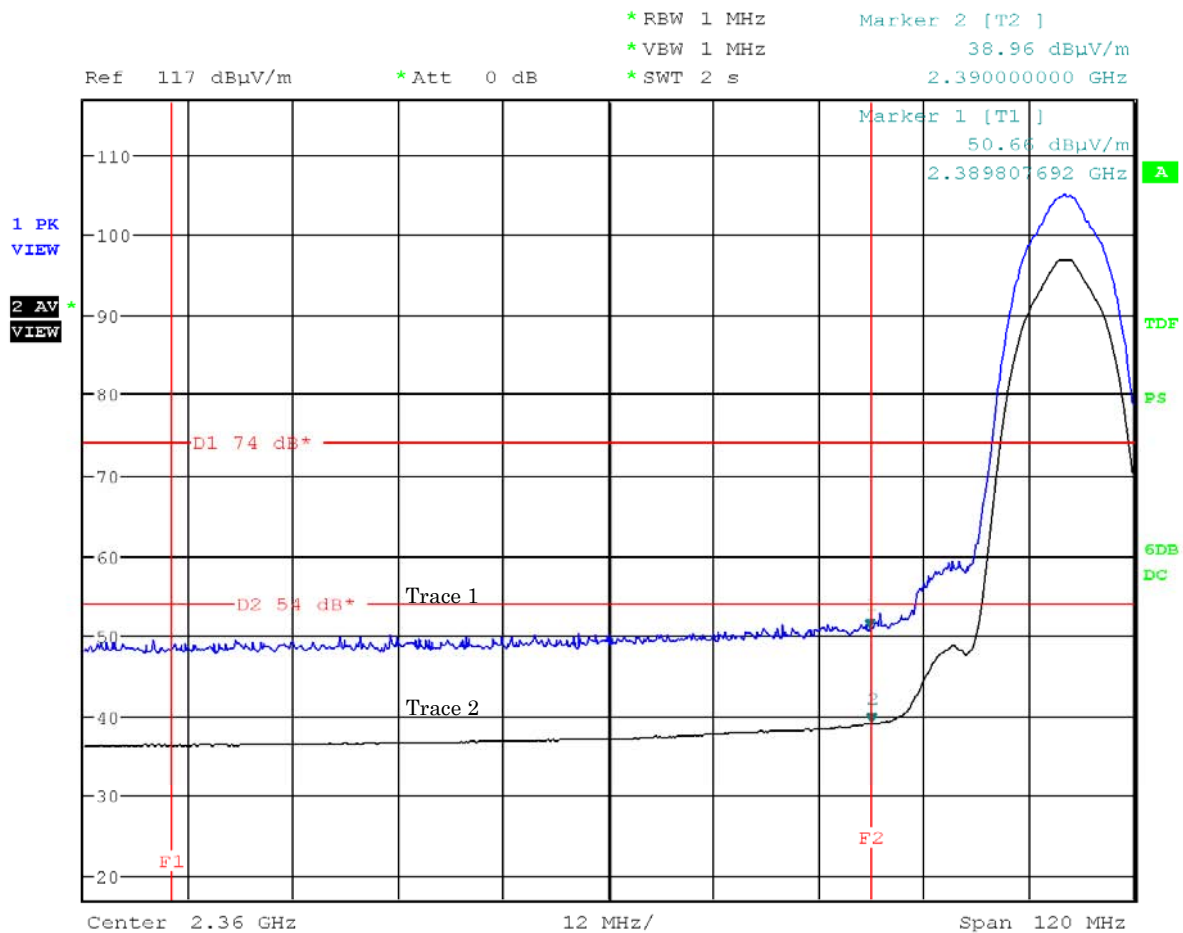
Note: The trace 1 is Peak detection. The trace 2 is Average detection.





Mode of EUT : TX( 1ch: 2412 MHz, data rate : 11Mbps(IEEE 802.11b))

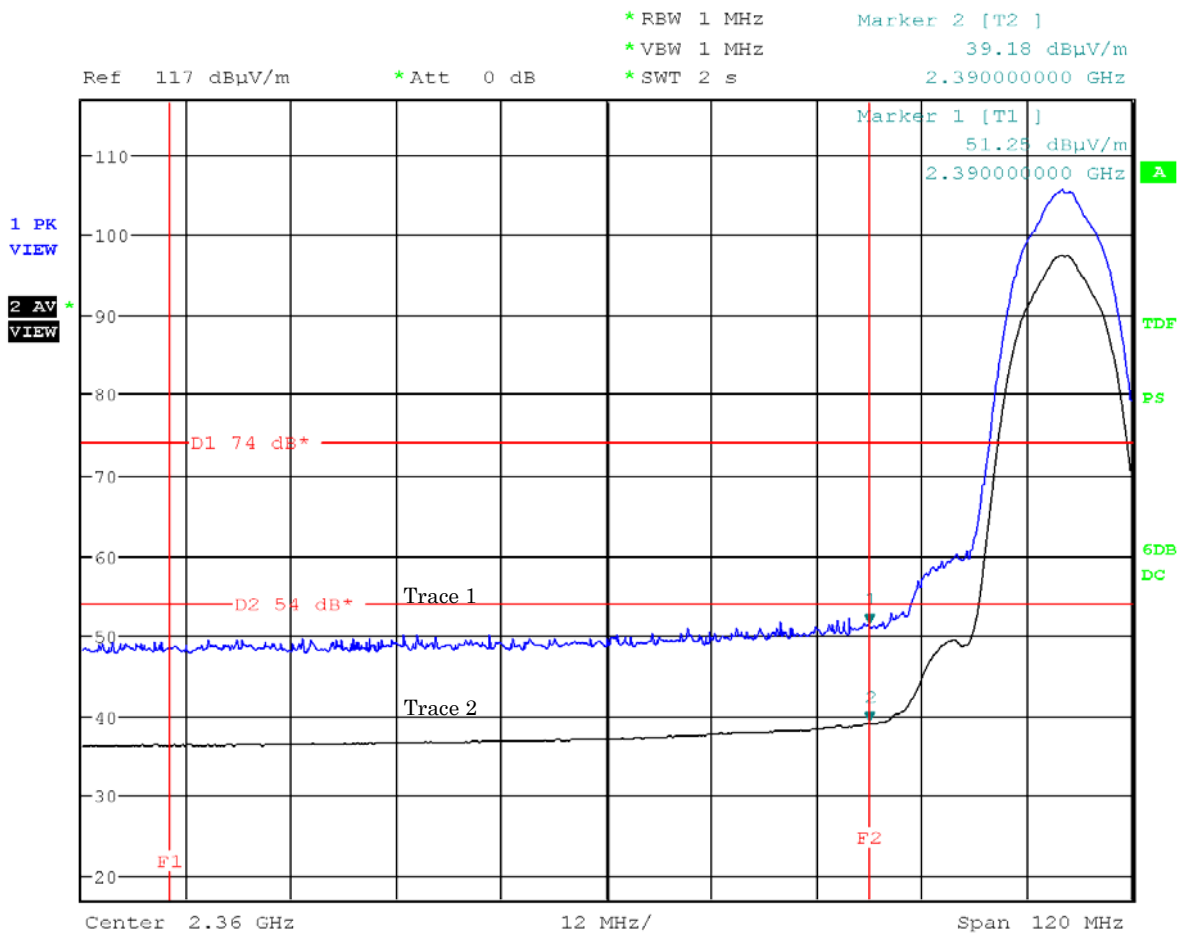
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 11Mbps(IEEE 802.11b))

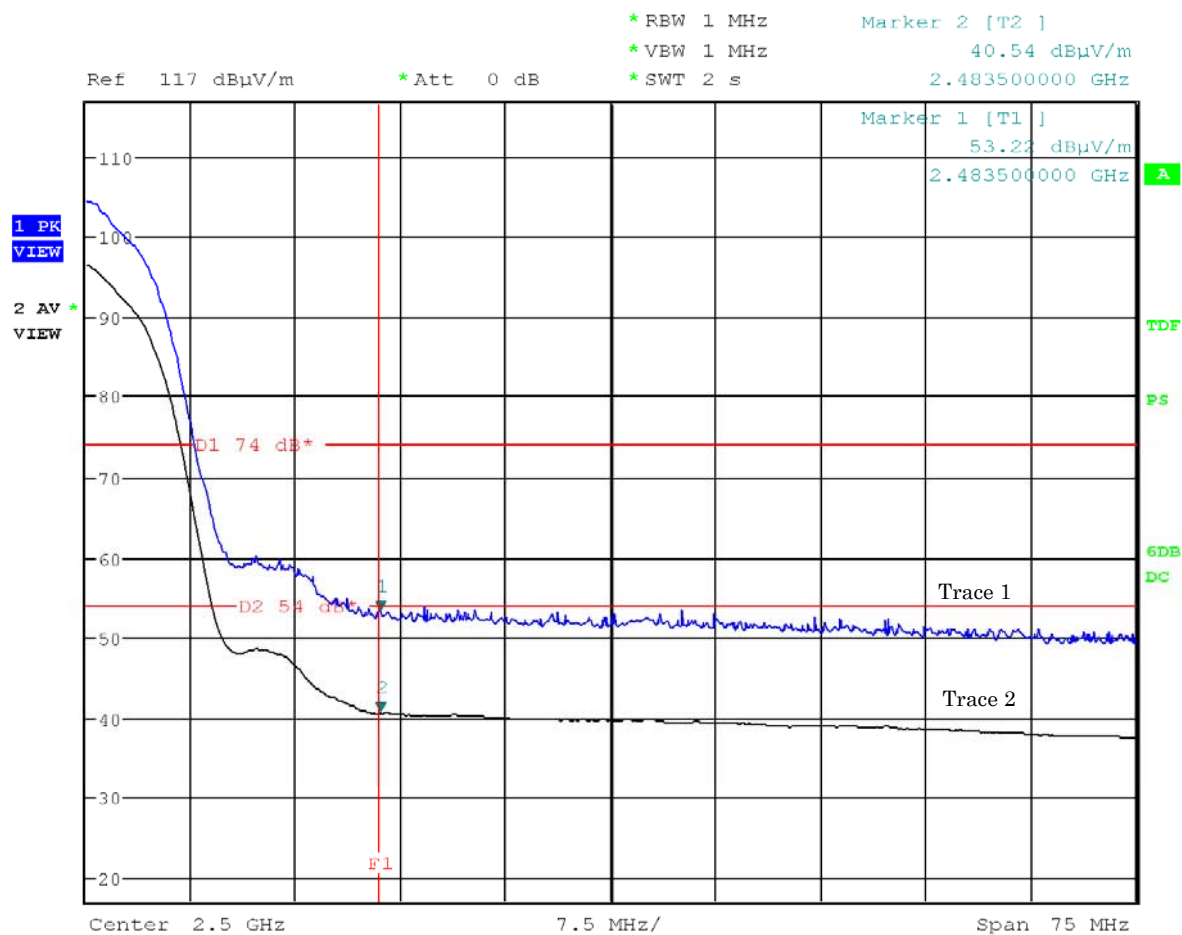
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 11Mbps(IEEE 802.11b))

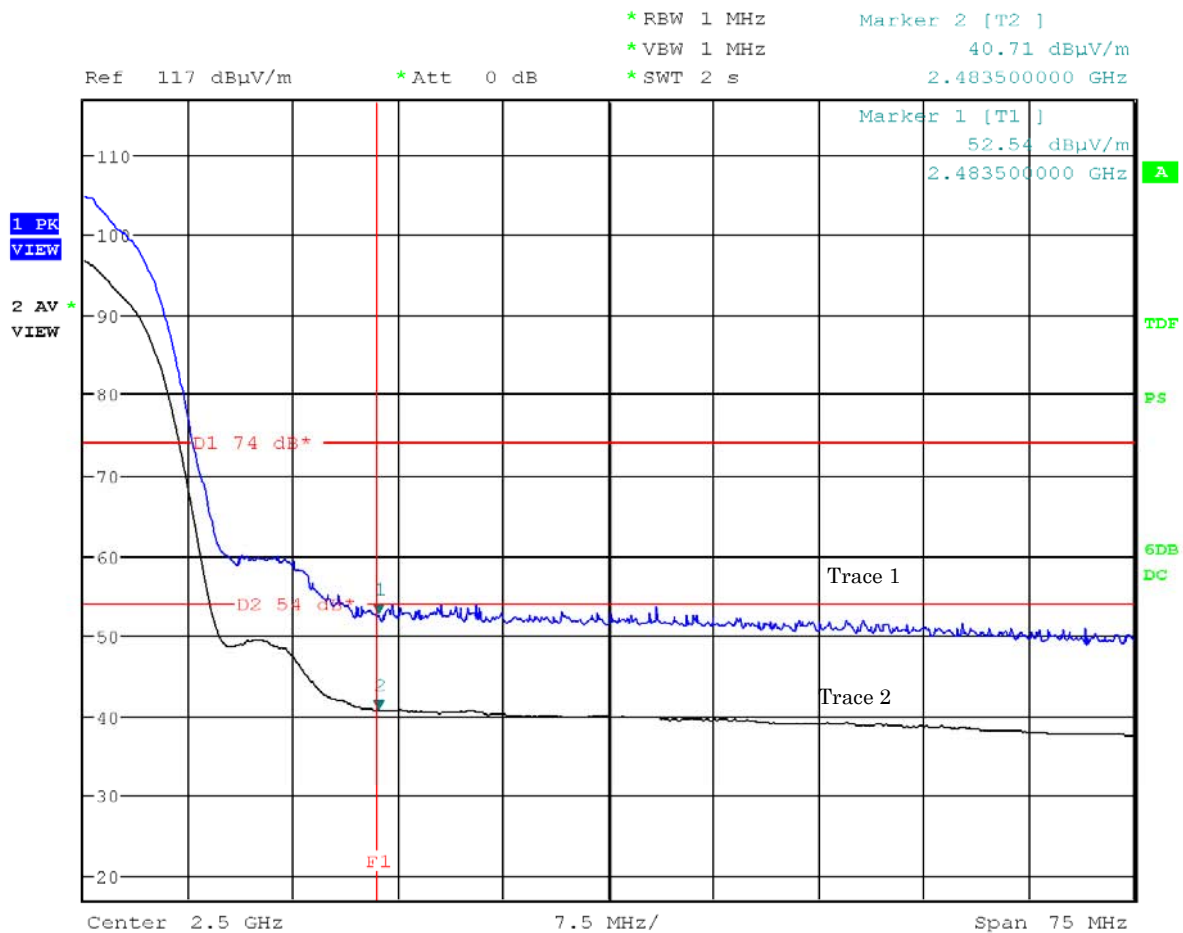
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 11Mbps(IEEE 802.11b))

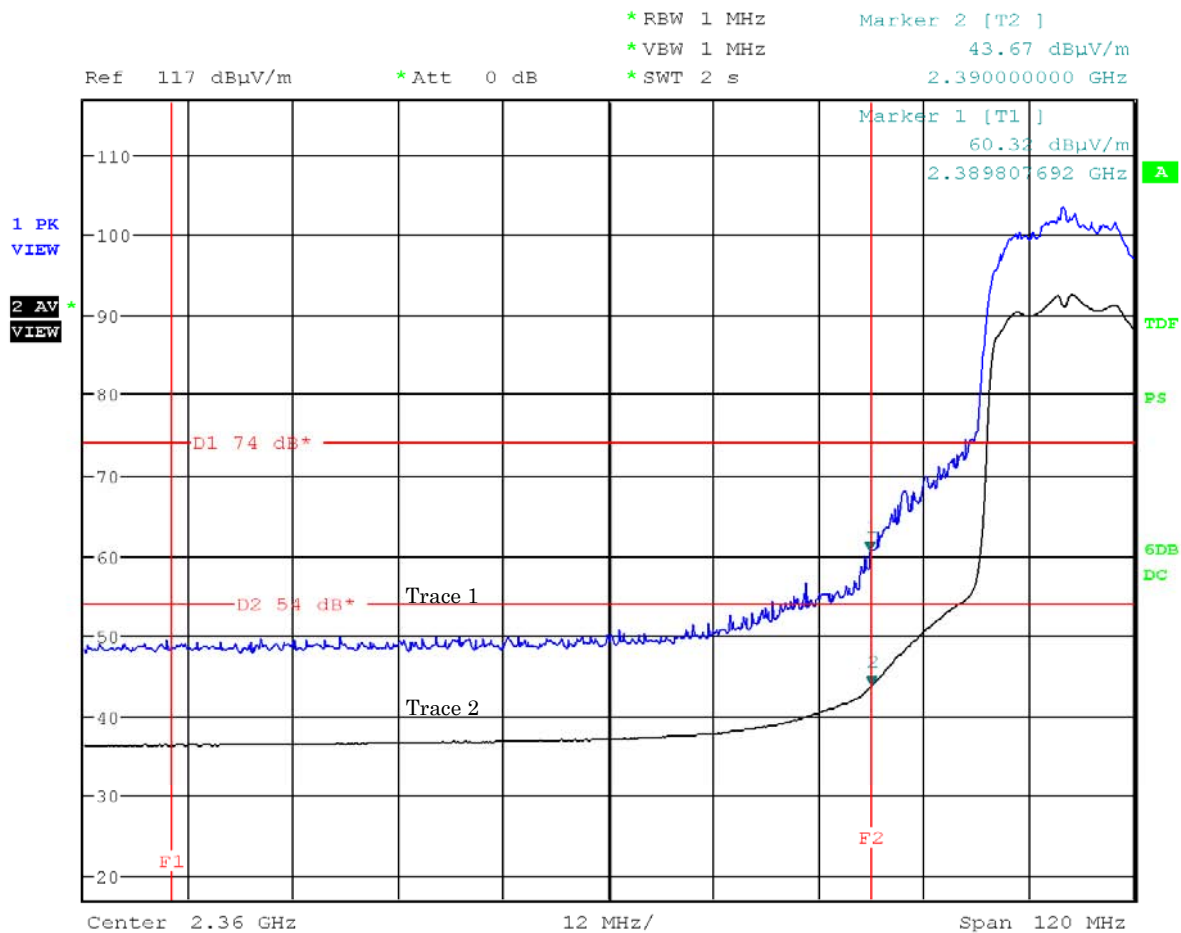
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6Mbps(IEEE 802.11g))

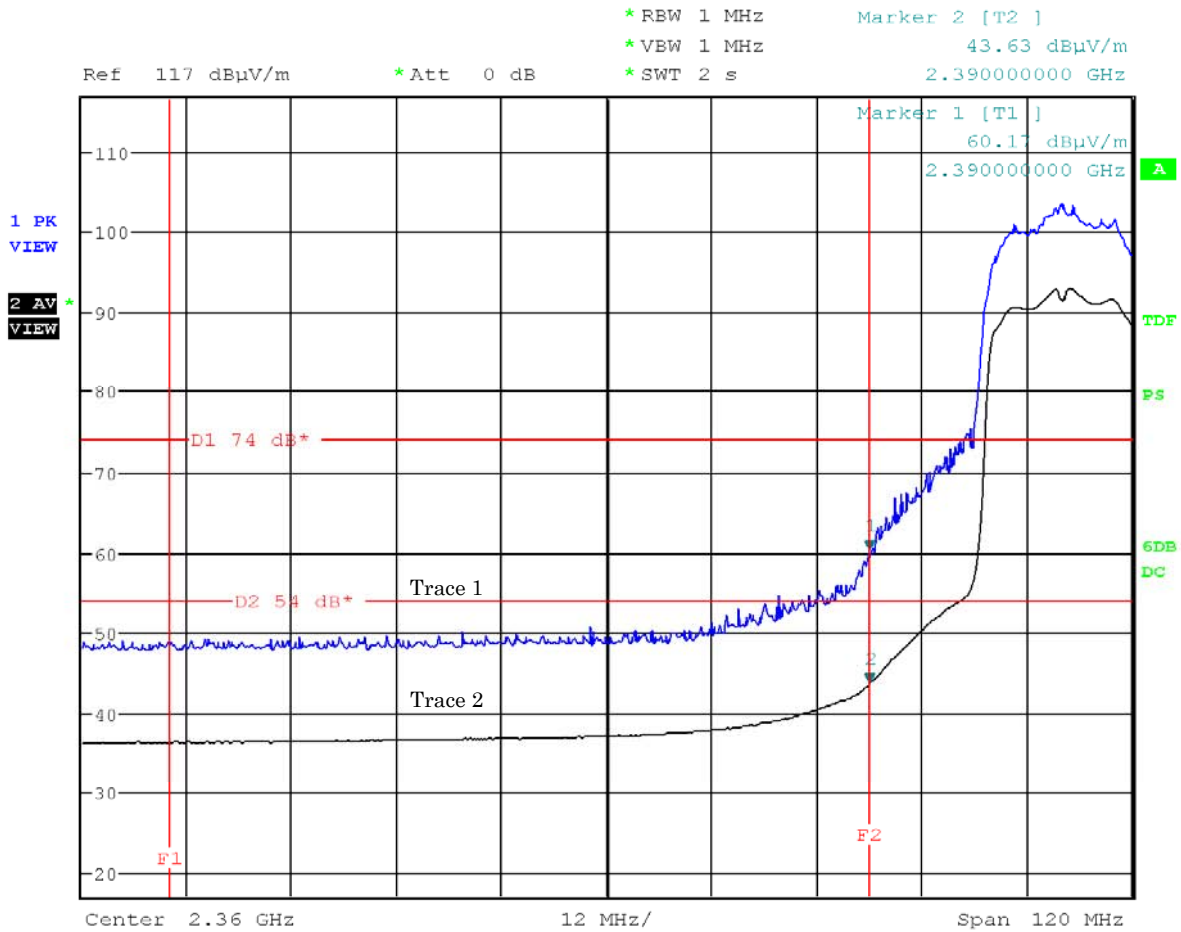
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6Mbps(IEEE 802.11g))

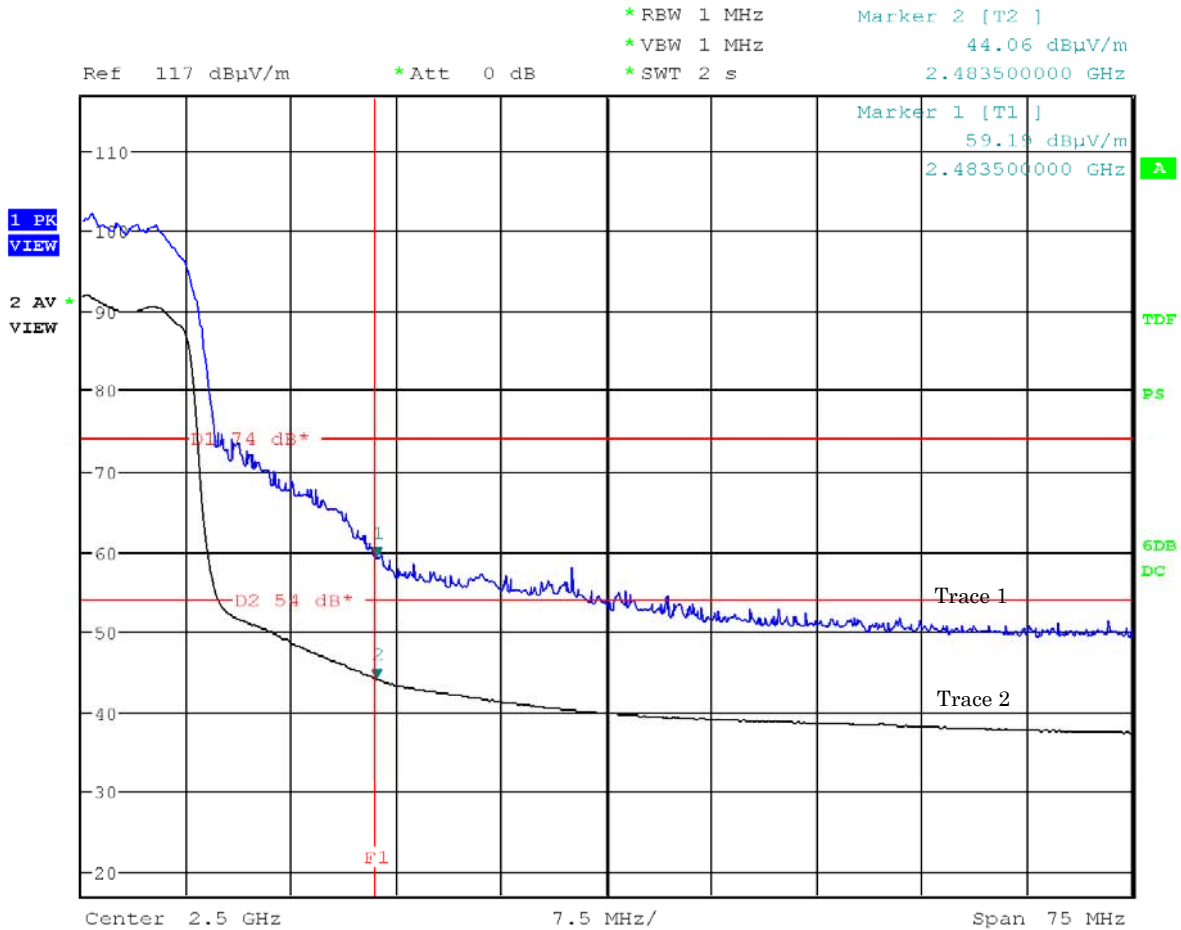
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6Mbps(IEEE 802.11g))

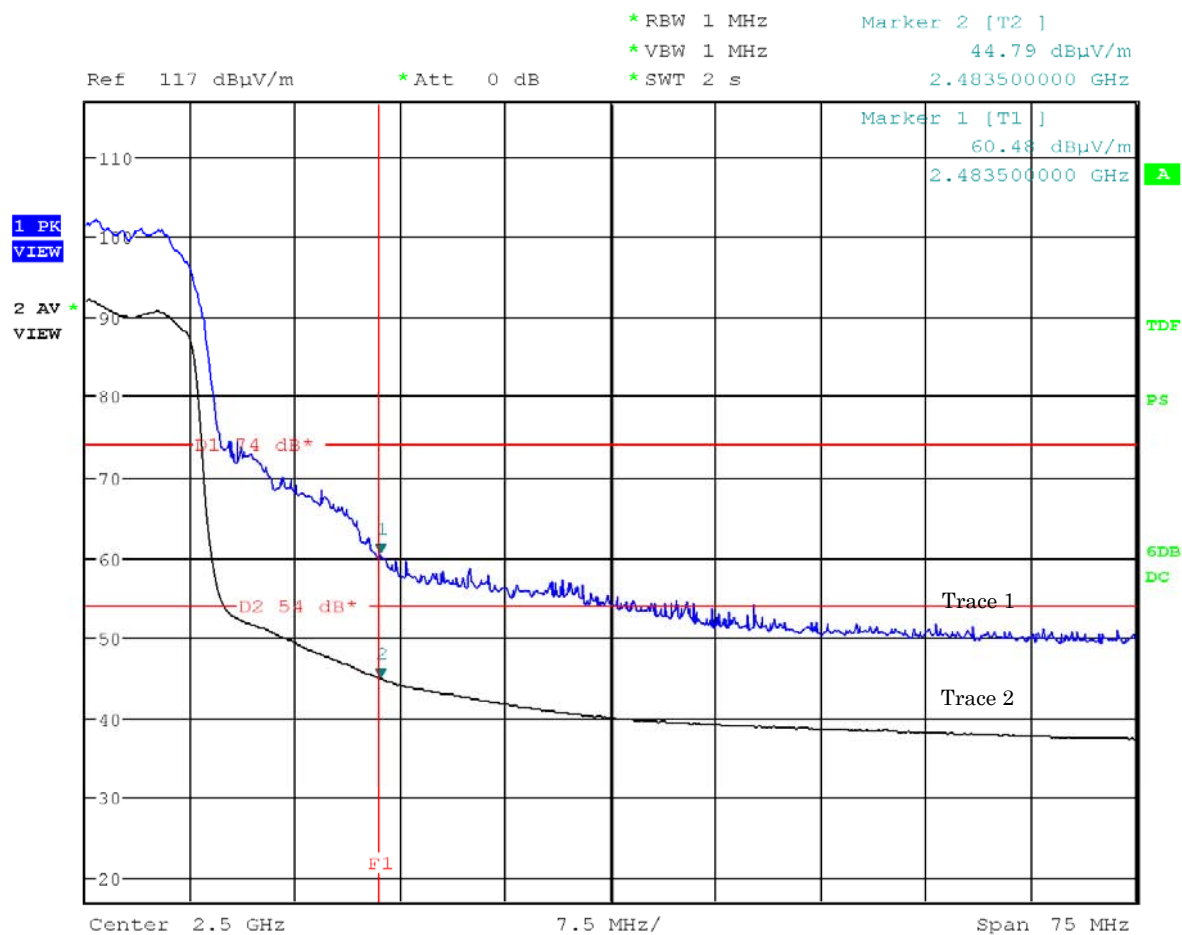
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6Mbps(IEEE 802.11g))

Antenna Polarization : Vertical

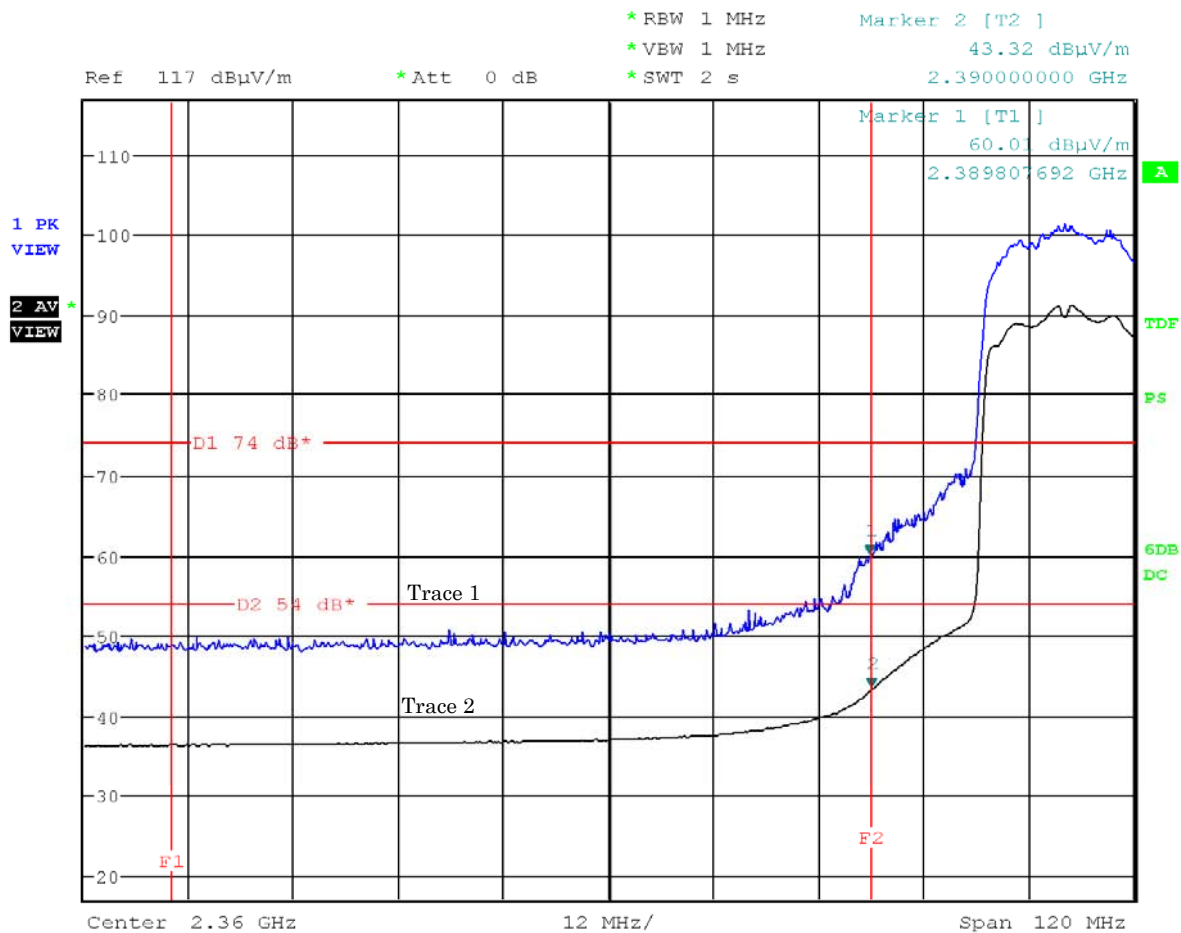


Note: The trace 1 is Peak detection. The trace 2 is Average detection.



Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n))

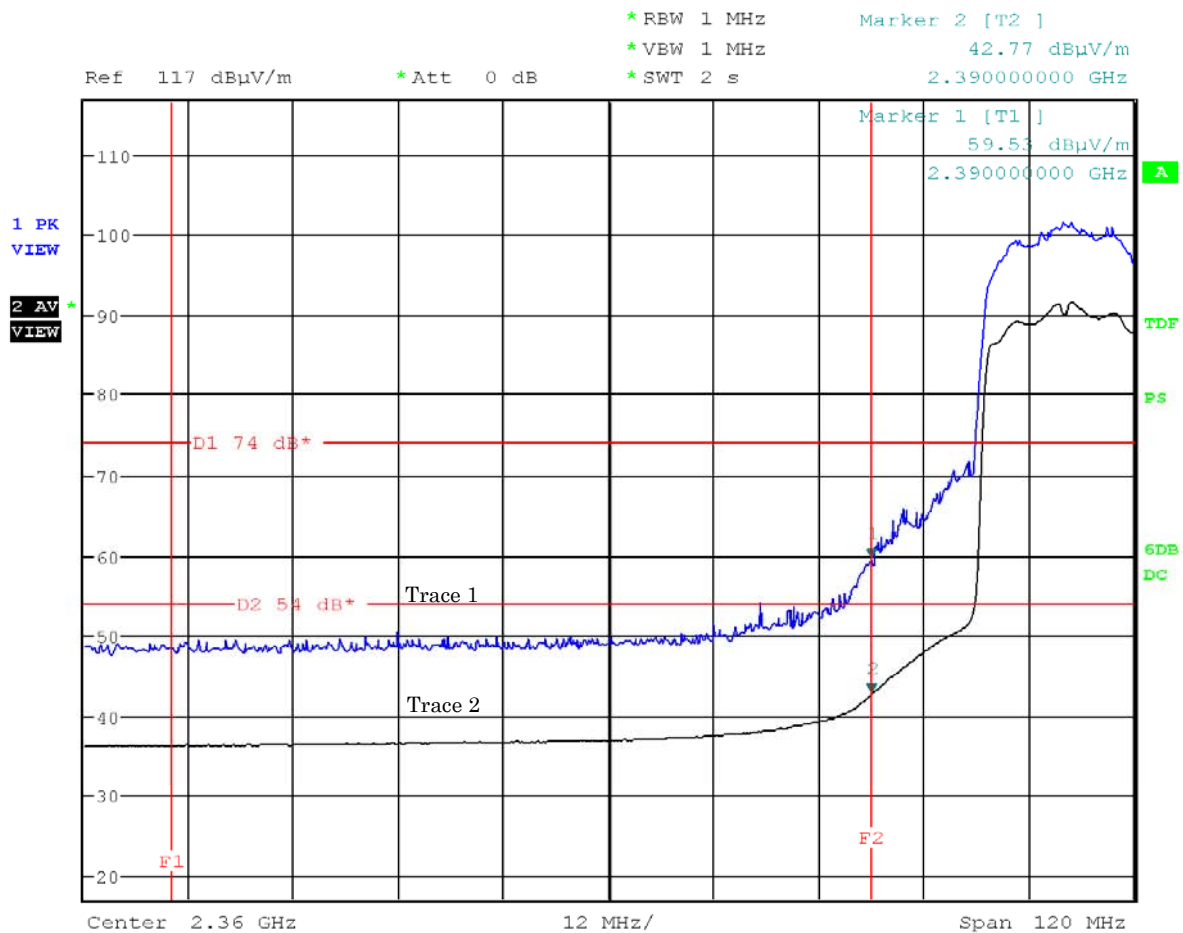
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 1ch: 2412 MHz, data rate : 6.5Mbps(IEEE 802.11n))

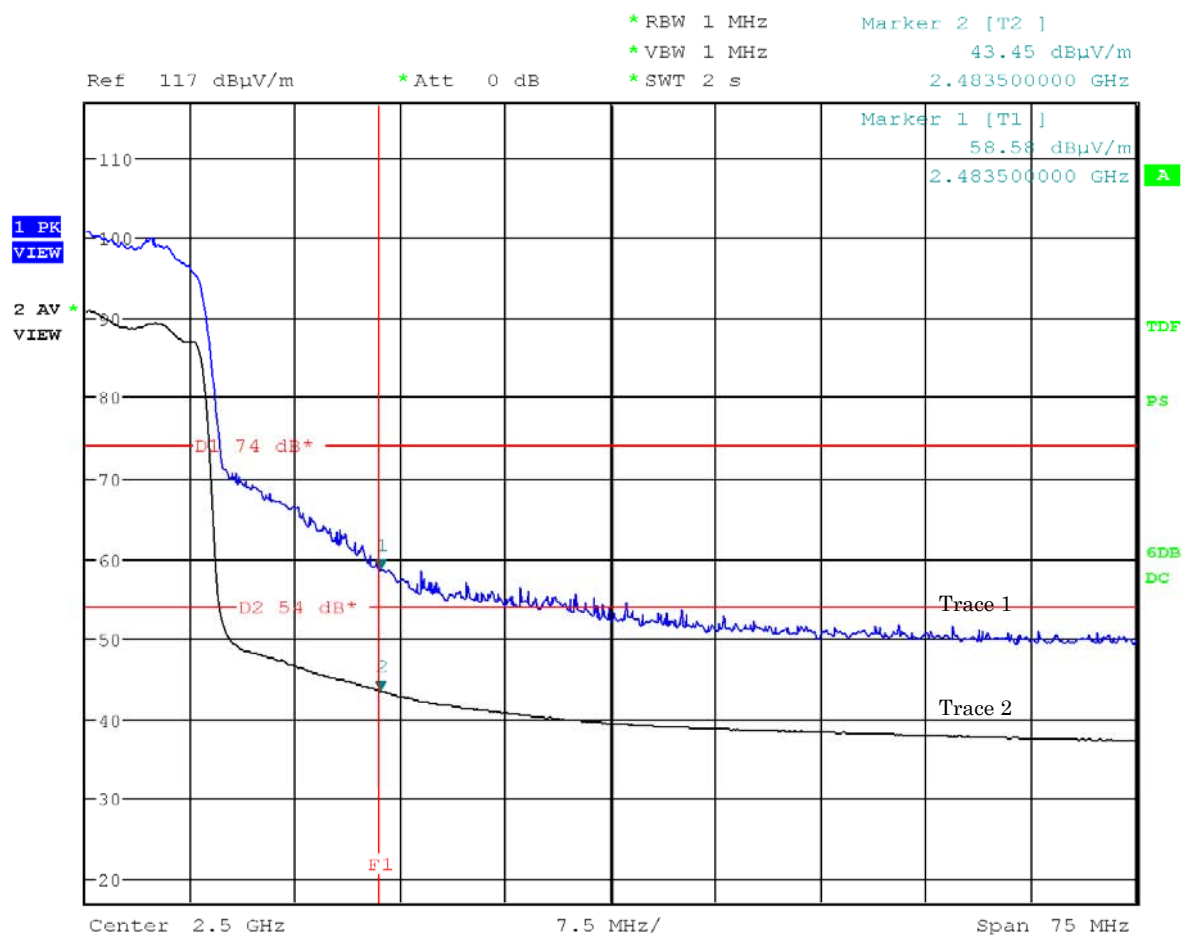
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6.5Mbps(IEEE 802.11n))

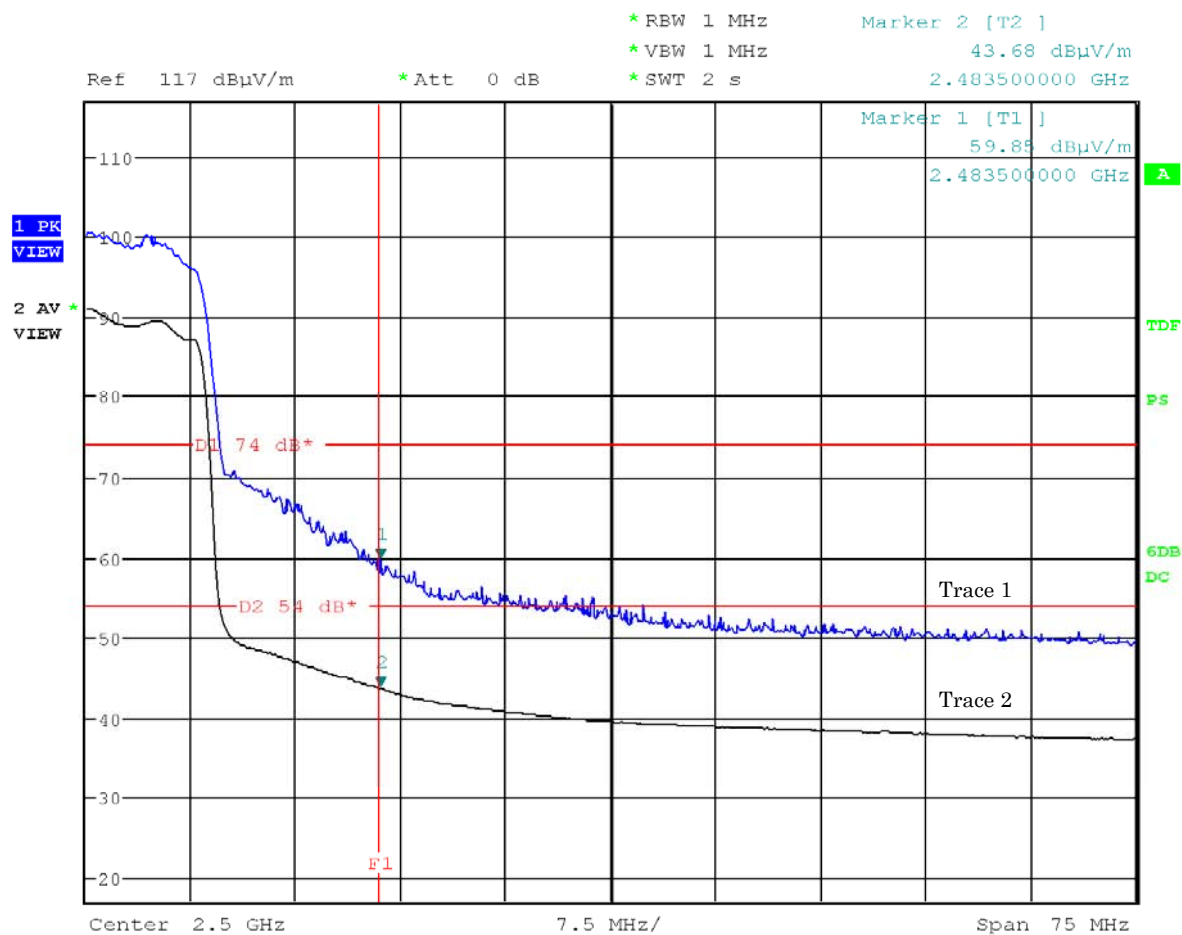
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

Mode of EUT : TX( 11ch: 2462 MHz, data rate : 6.5Mbps(IEEE 802.11n))

Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is Average detection.

## A.9.2 Other Spurious Emission

### A.9.2.1 Other Spurious Emission(9kHz – 30MHz)

Test Date : October 22, 2011

Temp.:22°C, Humi:55%

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE802.11b, IEEE802.11g and IEEE802.11n) has been listed.

Results : No spurious emissions in the range 20dB below the limit.

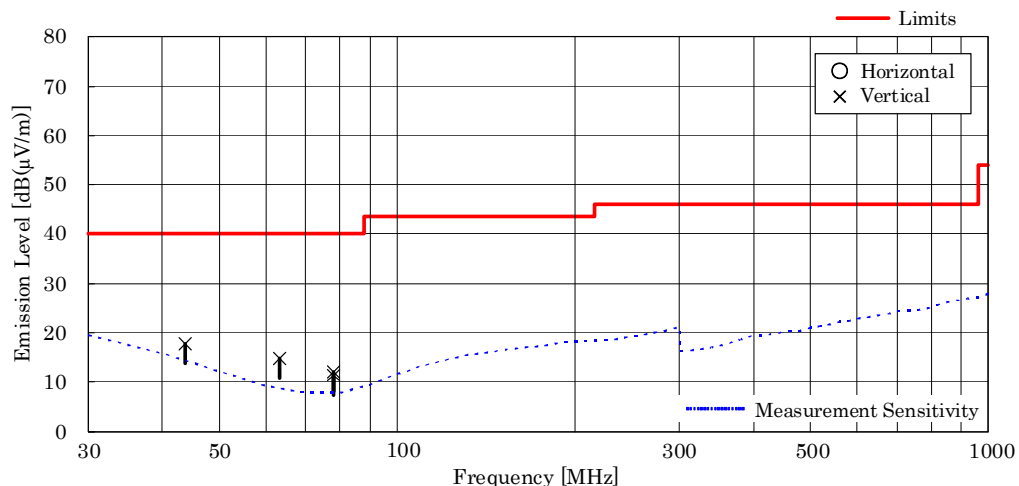
### A.9.2.2 Other Spurious Emission(30MHz – 1000MHz)

Mode of EUT : All modes have been investigated and the worst case mode for channel (06ch: 2437MHz / IEEE802.11b, IEEE802.11g and IEEE802.11n) has been listed.

Test Date: October 22, 2011

Temp.: 24 °C, Humi: 55 %

| Frequency<br>[MHz] | Antenna<br>Factor<br>[dB(1/m)] | Cable<br>Loss<br>[dB] | Meter Readings<br>[dB(μV)] |       | Limits<br>[dB(μV/m)] | Results<br>[dB(μV/m)] |       | Margin<br>[dB] | Remarks |
|--------------------|--------------------------------|-----------------------|----------------------------|-------|----------------------|-----------------------|-------|----------------|---------|
|                    |                                |                       | Hori.                      | Vert. |                      | Hori.                 | Vert. |                |         |
| 43.7               | 13.5                           | 0.9                   | < 0.0                      | 3.3   | 40.0                 | < 14.4                | 17.7  | +22.3          | -       |
| 63.1               | 7.6                            | 1.1                   | < 0.0                      | 6.0   | 40.0                 | < 8.7                 | 14.7  | +25.3          | -       |
| 77.9               | 6.5                            | 1.2                   | < 0.0                      | 3.7   | 40.0                 | < 7.7                 | 11.4  | +28.6          | -       |
| 78.0               | 6.5                            | 1.2                   | < 0.0                      | 4.3   | 40.0                 | < 7.7                 | 12.0  | +28.0          | -       |



#### NOTES

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Calculated result at 43.7 MHz, as the worst point shown on underline:  
Antenna Factor + Cable Loss + Meter Reading = 13.5 + 0.9 + 3.3 = 17.7 dB(μV/m)
6. Test receiver setting(s) : CISPR QP 120 kHz (QP : Quasi-Peak)

### A.9.2.3 Other Spurious Emission(Above 1000MHz)

#### A.9.2.3.1 Mode of TX

##### A.9.2.3.1.1 IEEE802.11b

Test Date: October 23, 2011

Temp.: 25 °C, Humi: 61 %

| Frequency<br>[MHz]            | Antenna<br>Factor<br>[dB(1/m)] | Corr.<br>Factor<br>[dB] | Meter Readings [dB(μV)] |        |          |        | Limits<br>[dB(μV/m)] |      | Results<br>[dB(μV/m)] |        | Margin<br>[dB] | Remarks |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--------|----------|--------|----------------------|------|-----------------------|--------|----------------|---------|
|                               |                                |                         | Horizontal              |        | Vertical |        | PK                   | AVE  | PK                    | AVE    |                |         |
| Test condition : Tx Low Ch    |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4824.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 12060.0                       | 33.6                           | -25.9                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19296.0                       | 40.3                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.7                | < 48.7 | > + 5.3        | A/B     |
| Test condition : TX Middle Ch |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4874.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 7311.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12185.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19496.0                       | 40.2                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.6                | < 48.6 | > + 5.4        | A/B     |
| Test condition : TX High Ch   |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4924.0                        | 27.3                           | -21.2                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.1                | < 36.1 | > +17.9        | A/B     |
| 7386.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12310.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19696.0                       | 40.3                           | -21.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.9                | < 48.9 | > + 5.1        | A/B     |
| 22158.0                       | 40.3                           | -20.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 59.7                | < 49.7 | > + 4.3        | A/B     |

Calculated result at 22158.0 MHz, as the worst point shown on underline:

Antenna Factor = 40.3 dB(1/m)

Corr. Factor = -20.6 dB

+ ) Meter Reading = <30.0 dB(μV)

Result = <49.7 dB(μV/m)

Minimum Margin: 54.0 - <49.7 = >4.3 (dB)

#### NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:
  - Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
  - Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)
  - Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

|   | Detector Function | Resolution B.W. | Video B.W. | Sweep Time |
|---|-------------------|-----------------|------------|------------|
| A | Peak              | 1 MHz           | 1 MHz      | AUTO       |
| B | Peak              | 1 MHz           | 10 Hz      | AUTO       |

### A.9.2.3.1.2 IEEE802.11g

Test Date: October 23, 2011

Temp.: 25 °C, Humi: 61 %

| Frequency<br>[MHz]            | Antenna<br>Factor<br>[dB(1/m)] | Corr.<br>Factor<br>[dB] | Meter Readings [dB(μV)] |        |          |        | Limits<br>[dB(μV/m)] |      | Results<br>[dB(μV/m)] |        | Margin<br>[dB] | Remarks |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--------|----------|--------|----------------------|------|-----------------------|--------|----------------|---------|
|                               |                                |                         | Horizontal              |        | Vertical |        | PK                   | AVE  | PK                    | AVE    |                |         |
| Test condition : Tx Low Ch    |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4824.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 12060.0                       | 33.6                           | -25.9                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19296.0                       | 40.3                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.7                | < 48.7 | > + 5.3        | A/B     |
| Test condition : TX Middle Ch |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4874.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 7311.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12185.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19496.0                       | 40.2                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.6                | < 48.6 | > + 5.4        | A/B     |
| Test condition : TX High Ch   |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4924.0                        | 27.3                           | -21.2                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.1                | < 36.1 | > +17.9        | A/B     |
| 7386.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12310.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19696.0                       | 40.3                           | -21.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.9                | < 48.9 | > + 5.1        | A/B     |
| 22158.0                       | 40.3                           | -20.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 59.7                | < 49.7 | > + 4.3        | A/B     |

Calculated result at 22158.0 MHz, as the worst point shown on underline:

Antenna Factor = 40.3 dB(1/m)  
Corr. Factor = -20.6 dB  
+ ) Meter Reading = <30.0 dB(μV)  
Result = <49.7 dB(μV/m)

Minimum Margin: 54.0 - <49.7 => 4.3 (dB)

#### NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:  
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)  
Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)  
Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

|   | Detector Function | Resolution B.W. | Video B.W. | Sweep Time |
|---|-------------------|-----------------|------------|------------|
| A | Peak              | 1 MHz           | 1 MHz      | AUTO       |
| B | Peak              | 1 MHz           | 10 Hz      | AUTO       |

### A.9.2.3.1.3 IEEE802.11n

Test Date: October 23, 2011

Temp.: 25 °C, Humi: 61 %

| Frequency<br>[MHz]            | Antenna<br>Factor<br>[dB(1/m)] | Corr.<br>Factor<br>[dB] | Meter Readings [dB(μV)] |        |          |        | Limits<br>[dB(μV/m)] |      | Results<br>[dB(μV/m)] |        | Margin<br>[dB] | Remarks |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--------|----------|--------|----------------------|------|-----------------------|--------|----------------|---------|
|                               |                                |                         | Horizontal              |        | Vertical |        | PK                   | AVE  | PK                    | AVE    |                |         |
| Test condition : Tx Low Ch    |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4824.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 12060.0                       | 33.6                           | -25.9                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19296.0                       | 40.3                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.7                | < 48.7 | > + 5.3        | A/B     |
| Test condition : TX Middle Ch |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4874.0                        | 27.3                           | -21.1                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.2                | < 36.2 | > +17.8        | A/B     |
| 7311.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12185.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19496.0                       | 40.2                           | -21.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.6                | < 48.6 | > + 5.4        | A/B     |
| Test condition : TX High Ch   |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 4924.0                        | 27.3                           | -21.2                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 46.1                | < 36.1 | > +17.9        | A/B     |
| 7386.0                        | 29.9                           | -19.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.5                | < 40.5 | > +13.5        | A/B     |
| 12310.0                       | 33.5                           | -25.8                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 47.7                | < 37.7 | > +16.3        | A/B     |
| 19696.0                       | 40.3                           | -21.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 58.9                | < 48.9 | > + 5.1        | A/B     |
| 22158.0                       | 40.3                           | -20.6                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 59.7                | < 49.7 | > + 4.3        | A/B     |

Calculated result at 22158.0 MHz, as the worst point shown on underline:

|                   |   |                |
|-------------------|---|----------------|
| Antenna Factor    | = | 40.3 dB(1/m)   |
| Corr. Factor      | = | -20.6 dB       |
| + ) Meter Reading | = | <30.0 dB(μV)   |
| Result            | = | <49.7 dB(μV/m) |

Minimum Margin: 54.0 - <49.7 => 4.3 (dB)

#### NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:  
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)  
Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (7.6 - 18.0GHz)  
Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

|   | Detector Function | Resolution B.W. | Video B.W. | Sweep Time |
|---|-------------------|-----------------|------------|------------|
| A | Peak              | 1 MHz           | 1 MHz      | AUTO       |
| B | Peak              | 1 MHz           | 10 Hz      | AUTO       |



### A.9.2.3.2 Mode of RX

Test Date: October 23, 2011

Temp.: 25 °C, Humi: 61 %

| Frequency<br>[MHz]            | Antenna<br>Factor<br>[dB(1/m)] | Corr.<br>Factor<br>[dB] | Meter Readings [dB(μV)] |        |          |        | Limits<br>[dB(μV/m)] |      | Results<br>[dB(μV/m)] |        | Margin<br>[dB] | Remarks |
|-------------------------------|--------------------------------|-------------------------|-------------------------|--------|----------|--------|----------------------|------|-----------------------|--------|----------------|---------|
|                               |                                |                         | Horizontal              |        | Vertical |        | PK                   | AVE  | PK                    | AVE    |                |         |
|                               |                                |                         | PK                      | AVE    | PK       | AVE    |                      |      |                       |        |                |         |
| Test condition : RX Middle Ch |                                |                         |                         |        |          |        |                      |      |                       |        |                |         |
| 2437.0                        | 21.4                           | -22.2                   | 40.8                    | 30.7   | 41.2     | 30.7   | 74.0                 | 54.0 | 40.4                  | 29.9   | +24.1          | A/B     |
| 4874.0                        | 27.3                           | -21.4                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 45.9                | < 35.9 | > +18.1        | A/B     |
| 7311.0                        | 29.9                           | -19.7                   | < 40.0                  | < 30.0 | < 40.0   | < 30.0 | 74.0                 | 54.0 | < 50.2                | < 40.2 | > +13.8        | A/B     |

Calculated result at 4874.0 MHz, as the worst point shown on underline:

Antenna Factor = 27.3 dB(1/m)

Corr. Factor = -21.4 dB

+ ) Meter Reading = <30.0 dB(μV)

Result = <35.9 dB(μV/m)

Minimum Margin: 54.0 - <35.9 = >18.1 (dB)

#### NOTES

- Test Distance : 3 m
- The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
- The correction factor is shown as follows:  
Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 7.6GHz)
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- PK : Peak Detector / AVE : Average Detector
- Setting of measuring instrument(s) :

|   | Detector Function | Resolution B.W. | Video B.W. | Sweep Time |
|---|-------------------|-----------------|------------|------------|
| A | Peak              | 1 MHz           | 1 MHz      | AUTO       |
| B | Peak              | 1 MHz           | 10 Hz      | AUTO       |

**Appendix B: Test Arrangement (Photographs)****B.1 AC Powerline Conducted Emission**

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## B.2 Radiated Emission

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## Appendix C: Test Instruments

### C.1 Channel Separation

Not Applicable

### C.2 Minimum Hopping Channel

Not Applicable

### C.3 Occupied Bandwidth

| Type              | Model       | Manufacturer | ID No. | Last Cal. | Interval |
|-------------------|-------------|--------------|--------|-----------|----------|
| Spectrum Analyzer | E4446A      | Agilent      | A-39   | 2011/9    | 1 Year   |
| Attenuator        | 54A-10      | Weinschel    | D-29   | 2011/9    | 1 Year   |
| RF Cable          | SUCOFLEX102 | SUHNER       | C-52   | 2011/6    | 1 Year   |

### C.4 Dwell Time

Not Applicable

#### C.5.1 Peak Output Power (Conduction)

| Type         | Model       | Manufacturer | ID No. | Last Cal. | Interval |
|--------------|-------------|--------------|--------|-----------|----------|
| Power Meter  | N1911A      | Agilent      | B-63   | 2011/7    | 1 Year   |
| Power Sensor | N1921A      | Agilent      | B-64   | 2011/7    | 1 Year   |
| Attenuator   | 54A-10      | Weinschel    | D-29   | 2011/9    | 1 Year   |
| RF Cable     | SUCOFLEX102 | SUHNER       | C-52   | 2011/6    | 1 Year   |

#### C.5.2 Peak Output Power Density (Conduction)

| Type              | Model       | Manufacturer | ID No. | Last Cal. | Interval |
|-------------------|-------------|--------------|--------|-----------|----------|
| Spectrum Analyzer | E4446A      | Agilent      | A-39   | 2011/9    | 1 Year   |
| Attenuator        | 54A-10      | Weinschel    | D-29   | 2011/9    | 1 Year   |
| RF Cable          | SUCOFLEX102 | SUHNER       | C-52   | 2011/6    | 1 Year   |

### C.6 Spurious Emission (Conduction)

| Type              | Model       | Manufacturer | ID No. | Last Cal. | Interval |
|-------------------|-------------|--------------|--------|-----------|----------|
| Spectrum Analyzer | E4446A      | Agilent      | A-39   | 2011/9    | 1 Year   |
| Attenuator        | 54A-10      | Weinschel    | D-29   | 2011/9    | 1 Year   |
| RF Cable          | SUCOFLEX102 | SUHNER       | C-52   | 2011/6    | 1 Year   |

### C.7 AC Power Conducted Emission

| Type          | Model    | Manufacturer    | ID No. | Last Cal. | Interval |
|---------------|----------|-----------------|--------|-----------|----------|
| Test Receiver | ESCI 7   | Rohde & Schwarz | A-8    | 2011/1    | 1 Year   |
| AMN (main)    | KNW-407R | Kyoritsu        | D-39   | 2011/9    | 1 Year   |
| RF Cable      | RG223/U  | SUHNER          | H-35   | 2011/6    | 1 Year   |

### C.8 Radiated Emission

#### C.8.1 Radiated Emission 9 kHz – 30 MHz

| Type          | Model   | Manufacturer    | ID No. | Last Cal. | Interval |
|---------------|---------|-----------------|--------|-----------|----------|
| Test Receiver | ESU 26  | Rohde & Schwarz | A-6    | 2011/5    | 1 Year   |
| Loop Antenna  | HFH2-Z2 | Rohde & Schwarz | C-2    | 2011/8    | 1 Year   |
| RF Cable      | RG213/U | SUHNER          | H-28   | 2011/8    | 1 Year   |

### C.8.2 Radiated Emission 30MHz – 1000 MHz

| Type                 | Model             | Manufacturer    | ID No. | Last Cal. | Interval |
|----------------------|-------------------|-----------------|--------|-----------|----------|
| Test Receiver        | ESU 26            | Rohde & Schwarz | A-6    | 2011/5    | 1 Year   |
| Biconical Antenna    | VHA9103/BBA9106   | Schwarzbeck     | C-30   | 2011/5    | 1 Year   |
| Log-periodic Antenna | UHALP9108-A1      | Schwarzbeck     | C-31   | 2011/5    | 1 Year   |
| RF Cable             | S 10162 B-11 etc. | SUHNER          | H-4    | 2011/3    | 1 Year   |
| Site Attenuation     | --                | ----            | H-15   | 2011/2    | 1 Year   |

### C.8.3 Radiated Emission Above 1000 MHz

| Type                  | Model         | Manufacturer     | ID No.  | Last Cal. | Interval |
|-----------------------|---------------|------------------|---------|-----------|----------|
| Test Receiver         | ESU 26        | Rohde & Schwarz  | A-6     | 2011/5    | 1 Year   |
| RF Cable              | SUCOFLEX104   | SUHNER           | C-40-11 | 2010/12   | 1 Year   |
| RF Cable              | SUCOFLEX104   | SUHNER           | C-40-14 | 2010/12   | 1 Year   |
| RF Cable              | SUCOFLEX102   | SUHNER           | C-54    | 2010/12   | 1 Year   |
| RF Cable              | SUCOFLEX102EA | SUHNER           | C-69    | 2010/12   | 1 Year   |
| Attenuator            | 2-10          | Weinschel        | D-79    | 2010/10   | 1 Year   |
| Attenuator            | 54-10         | Weinschel        | D-28    | 2011/9    | 1 Year   |
| Pre-Amplifier         | WJ-6611-513   | Watkins Johnson  | A-23    | 2010/12   | 1 Year   |
| Pre-Amplifier         | WJ-6882-824   | Watkins Johnson  | A-21    | 2010/12   | 1 Year   |
| Pre-Amplifier         | DBL-0618N515  | DBS Microwave    | A-33    | 2010/12   | 1 Year   |
| Pre-Amplifier         | BZ1804LD1     | B&T Technologies | A-29    | 2010/12   | 1 Year   |
| Band Rejection Filter | BRM50701      | MICRO-TRONICS    | D-93    | 2011/2    | 1 Year   |
| Horn Antenna          | 91888-2       | EATON            | C-41-1  | 2011/6    | 1 Year   |
| Horn Antenna          | 91889-2       | EATON            | C-41-2  | 2011/6    | 1 Year   |
| Horn Antenna          | 3160-05       | EMCO             | C-55    | 2011/6    | 2 Years  |
| Horn Antenna          | 3160-06       | EMCO             | C-57    | 2011/6    | 2 Years  |
| Horn Antenna          | 3160-07       | EMCO             | C-58    | 2011/6    | 2 Years  |
| Horn Antenna          | 3160-08       | EMCO             | C-59    | 2011/6    | 2 Years  |
| Horn Antenna          | 3160-09       | EMCO             | C-48    | 2011/6    | 2 Years  |