

# FCC RF Test Report

APPLICANT : Ubiquiti Networks  
EQUIPMENT : m POWER  
BRAND NAME : Ubiquiti Networks  
MODEL NAME : mPower Mini  
FCC ID : SWX-MPOWERM  
STANDARD : FCC Part 15 Subpart C §15.247  
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Oct. 17, 2012 and completely tested on Oct. 26, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



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Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FR2O1701   | Rev. 01 | Initial issue of report | Nov. 22, 2012 |
|            |         |                         |               |
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|            |         |                         |               |

## SUMMARY OF TEST RESULT

| Report Section | FCC Rule           | IC Rule   | Description                 | Limit                   | Result | Remark                              |
|----------------|--------------------|-----------|-----------------------------|-------------------------|--------|-------------------------------------|
| 3.1            | 15.247(a)(2)       | A8.2(a)   | 6dB Bandwidth               | $\geq 0.5\text{MHz}$    | Pass   | -                                   |
| 3.1            | -                  | Gen 4.6.1 | 99% Bandwidth               | -                       | Pass   | -                                   |
| 3.2            | 15.247(b)          | A8.4      | Power Output Measurement    | $\leq 30\text{dBm}$     | Pass   | -                                   |
| 3.3            | 15.247(e)          | A8.2(b)   | Power Spectral Density      | $\leq 8\text{dBm/3kHz}$ | Pass   | -                                   |
| 3.4            | 15.247(d)          | A8.5      | Conducted Band Edges        | $\leq 20\text{dBc}$     | Pass   | -                                   |
|                |                    |           | Conducted Spurious Emission |                         | Pass   | -                                   |
| 3.5            | 15.247(d)          | A8.5      | Radiated Band Edges         | 15.209(a) & 15.247(d)   | Pass   | -                                   |
|                |                    |           | Radiated Spurious Emission  |                         | Pass   | Under limit 0.17 dB at 4824.000 MHz |
| 3.6            | 15.207             | Gen 7.2.4 | AC Conducted Emission       | 15.207(a)               | Pass   | Under limit 14.40 dB at 0.398 MHz   |
| 3.7            | 15.203 & 15.247(b) | A8.4      | Antenna Requirement         | N/A                     | Pass   | -                                   |

# 1 General Description

## 1.1 Applicant

**Ubiquiti Networks**

2580 Orchard Parkway San Jose, CA 95131

## 1.2 Manufacturer

**Nanning FuGui Precision Industrial Co., LTD.**

No. 18, Zhongbu Road, Nanning New & High-Tech Industrial Development Zone, Guangxi

## 1.3 Feature of Equipment Under Test

| Product Feature                 |                   |
|---------------------------------|-------------------|
| Equipment                       | m POWER           |
| Brand Name                      | Ubiquiti Networks |
| Model Name                      | mPower Mini       |
| FCC ID                          | SWX-MPOWERM       |
| EUT supports Radios application | WLAN 11bgn        |
| EUT Stage                       | Production Unit   |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

| Product Specification subjective to this standard |                                                                                                                                                |
|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Tx/Rx Frequency Range                             | 2412 MHz ~ 2462 MHz                                                                                                                            |
| Number of Channels                                | 11                                                                                                                                             |
| Carrier Frequency of Each Channel                 | 2412+(n-1)*5 MHz; n=1~11                                                                                                                       |
| Maximum Output Power to Antenna                   | 802.11b : 20.37 dBm (0.1089 W)<br>802.11g : 23.17 dBm (0.2075 W)<br>802.11n HT20 : 21.93 dBm (0.1560 W)<br>802.11n HT40 : 21.49 dBm (0.1409 W) |
| 99% Occupied Bandwidth                            | 802.11b : 14.55MHz<br>802.11g : 18.25MHz<br>802.11n HT20 : 19.10MHz<br>802.11n HT40 : 37.60MHz                                                 |
| Antenna Type                                      | Monopole Antenna type with gain 4.00 dBi                                                                                                       |
| Type of Modulation                                | 802.11b : DSSS (BPSK / QPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)                                                           |

## 1.4 Testing Site

|                           |                                                                                                                                                              |         |           |                                |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-----------|--------------------------------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.                                                                                                                                   |         |           |                                |
| <b>Test Site Location</b> | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-3273456 / FAX: +886-3-3284978 |         |           |                                |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                      |         |           | <b>FCC/IC Registration No.</b> |
|                           | TH02-HY                                                                                                                                                      | CO05-HY | 03CH06-HY | 722060/4086B-1                 |

## 1.5 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02
- ♦ ANSI C63.4-2003 and ANSI C63.10-2009
- ♦ IC RSS-210 Issue 8
- ♦ IC RSS-Gen Issue 3

### Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 1.6 Ancillary Equipment List

| Item | Equipment | Trade Name | Model Name     | FCC ID  | Data Cable | Power Cord                                                 |
|------|-----------|------------|----------------|---------|------------|------------------------------------------------------------|
| 1.   | Notebook  | DELL       | Latitude E6320 | FCC DoC | N/A        | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 2.   | Lamp      | N/A        | N/A            | N/A     | N/A        | Unshielded, 1.8 m                                          |

## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz) and radiated emission (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

### 2.1 Carrier Frequency Channel

| Frequency Band  | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|-----------------|---------|-------------|---------|-------------|
| 2400-2483.5 MHz | 1       | 2412        | 7       | 2442        |
|                 | 2       | 2417        | 8       | 2447        |
|                 | 3       | 2422        | 9       | 2452        |
|                 | 4       | 2427        | 10      | 2457        |
|                 | 5       | 2432        | 11      | 2462        |
|                 | 6       | 2437        |         |             |

## 2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

| 2.4GHz 802.11b mode |        |        |          |         |
|---------------------|--------|--------|----------|---------|
| Data Rate (MHz)     | 1M bps | 2M bps | 5.5M bps | 11M bps |
| Peak Power (dBm)    | 20.37  | 20.12  | 20.18    | 20.10   |

| 2.4GHz 802.11g mode |        |        |         |         |         |         |         |         |
|---------------------|--------|--------|---------|---------|---------|---------|---------|---------|
| Data Rate (MHz)     | 6M bps | 9M bps | 12M bps | 18M bps | 24M bps | 36M bps | 48M bps | 54M bps |
| Peak Power (dBm)    | 22.17  | 22.19  | 22.28   | 22.32   | 22.38   | 23.14   | 23.11   | 23.17   |

| 2.4GHz 802.11n HT20 mode |       |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Data Rate (MHz)          | MCS0  | MCS1  | MCS2  | MCS3  | MCS4  | MCS5  | MCS6  | MCS7  |
| Peak Power (dBm)         | 21.49 | 21.39 | 21.83 | 21.66 | 21.87 | 21.88 | 21.87 | 21.93 |

| 2.4GHz 802.11n HT40 mode |       |       |       |       |      |       |       |       |
|--------------------------|-------|-------|-------|-------|------|-------|-------|-------|
| Data Rate (MHz)          | MCS0  | MCS1  | MCS2  | MCS3  | MCS4 | MCS5  | MCS6  | MCS7  |
| Peak Power (dBm)         | 21.08 | 20.73 | 20.93 | 21.03 | 21.1 | 21.45 | 21.42 | 21.49 |

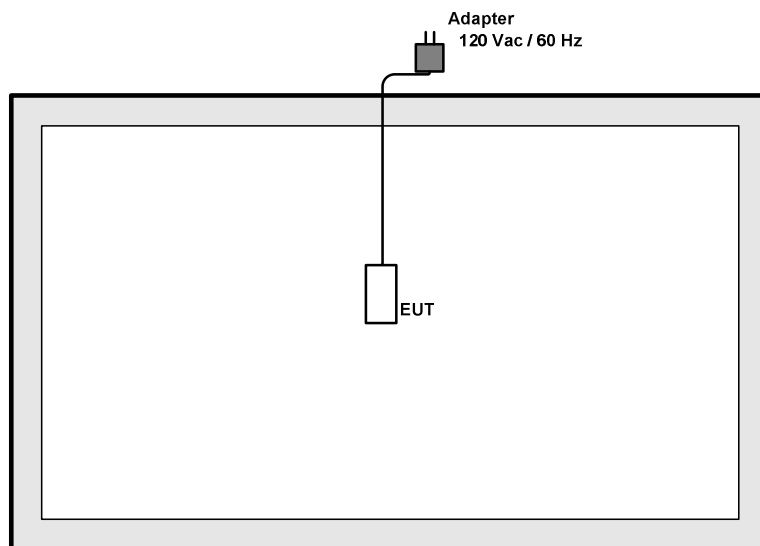
## 2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

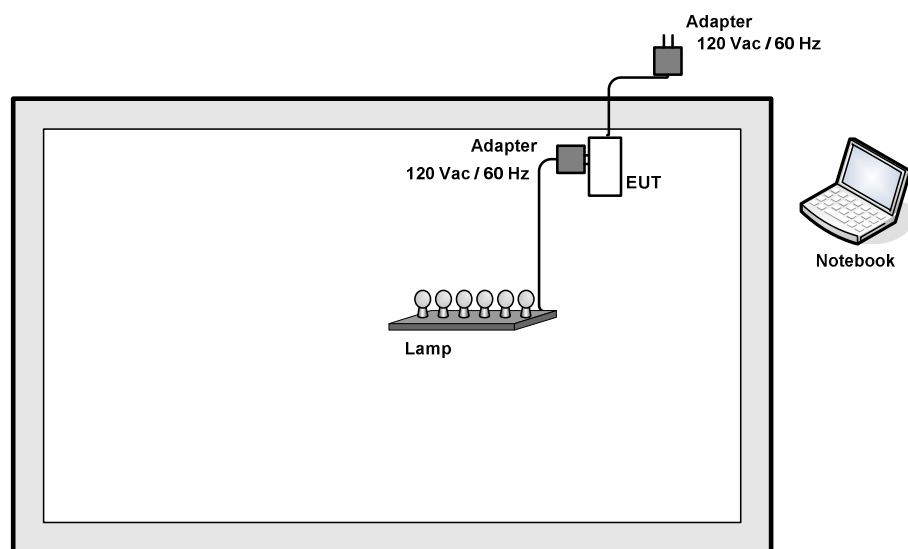
| Test Cases                                                      |                                          |              |           |              |
|-----------------------------------------------------------------|------------------------------------------|--------------|-----------|--------------|
| Conducted<br>TCs                                                | Test Items                               | Mode         | Data Rate | Test Channel |
|                                                                 | 6dB and 99% BW<br>Power Spectral Density | 802.11b      | 1 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/6/11       |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/6/9        |
|                                                                 | Output Power                             | 802.11b      | 1 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/6/11       |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/6/9        |
|                                                                 | Conducted Band Edge                      | 802.11b      | 1 Mbps    | 1/11         |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/11         |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/11         |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/9          |
|                                                                 | Conducted Spurious<br>Emission           | 802.11b      | 1 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/6/11       |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/6/9        |
| Radiated<br>TCs                                                 | Radiated Band Edge                       | 802.11b      | 1 Mbps    | 1/11         |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/11         |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/11         |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/9          |
|                                                                 | Radiated Spurious<br>Emission            | 802.11b      | 1 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11g      | 6 Mbps    | 1/6/11       |
|                                                                 |                                          | 802.11n HT20 | 6.5 Mbps  | 1/6/11       |
|                                                                 |                                          | 802.11n HT40 | 13.5 Mbps | 3/6/9        |
| AC<br>Conducted<br>Emission                                     | Mode 1 : WLAN Link + TC                  |              |           |              |
| Remark: TC stands for Test Configuration, and consists of lamp. |                                          |              |           |              |

## 2.4 Connection Diagram of Test System

### <WLAN Tx Mode>



### <AC Conducted Emission Mode>



## 2.5 RF Utility

For WLAN function, programmed RF utility, "artgui.exe" installed in the notebook make the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

### 3 Test Result

#### 3.1 6dB and 99% Bandwidth Measurement

##### 3.1.1 Limit of 6dB and 99% Bandwidth

The minimum 6 dB bandwidth shall be at least 500 KHz.

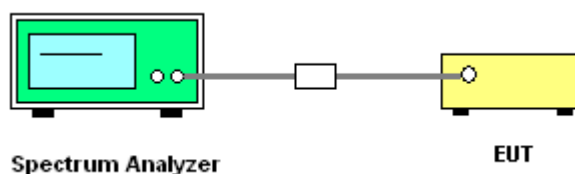
##### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

##### 3.1.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW). Set the Video bandwidth (VBW)  $\geq 3 * RBW$ . In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.
5. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.  
For 99% Bandwidth measurement, the RBW=30kHz, and VBW  $\geq RBW$ . Sweep = auto ;  
Detector function = sample. Trace = max hold.
6. Measure and record the results in the test report.

##### 3.1.4 Test Setup

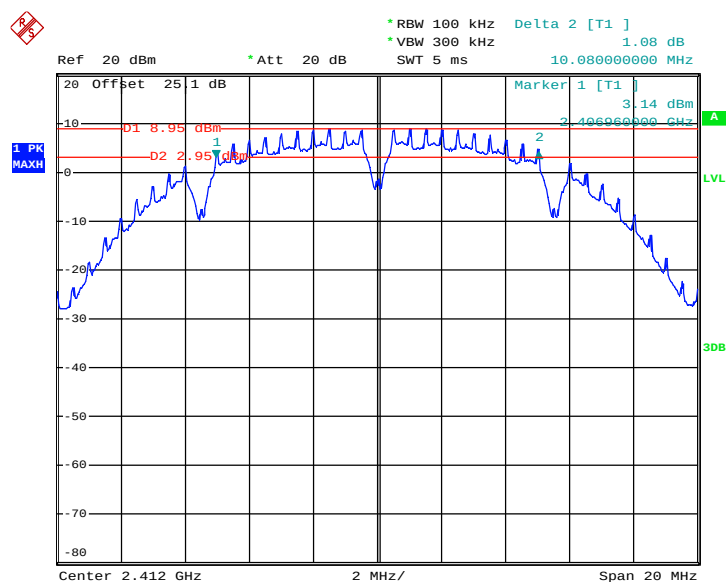


### 3.1.5 Test Result of 6dB Bandwidth

|                 |          |                     |        |
|-----------------|----------|---------------------|--------|
| Test Mode :     | 802.11b  | Temperature :       | 24~26℃ |
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

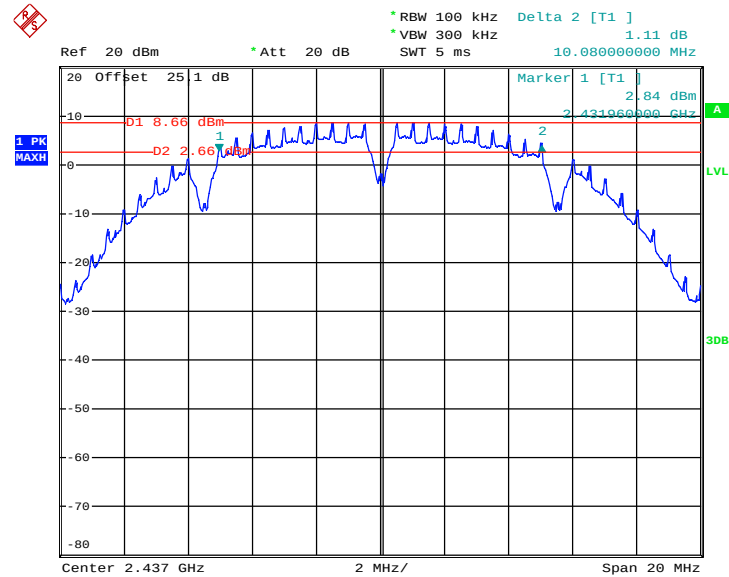
| Channel | Frequency (MHz) | 802.11b<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|-----------------|--------------------------------|-----------------------------------|-----------|
| 01      | 2412            | 10.08                          | 0.5                               | Pass      |
| 06      | 2437            | 10.08                          | 0.5                               | Pass      |
| 11      | 2462            | 10.08                          | 0.5                               | Pass      |

**6 dB Bandwidth Plot on 802.11b Channel 01**



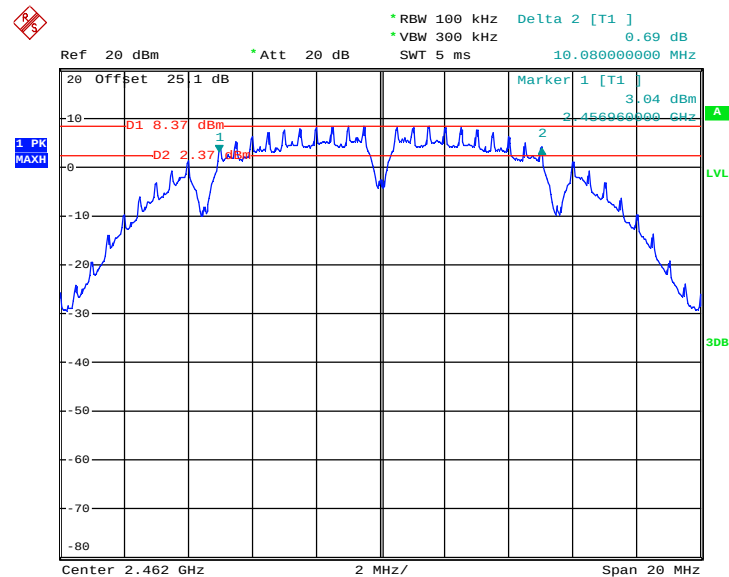
201701 15C 6dB.11b 2412 (ch01)

Date: 22.OCT.2012 23:09:03

**6 dB Bandwidth Plot on 802.11b Channel 06**


201701 15C 6dB.11b 2437 (ch06)

Date: 22.OCT.2012 23:21:19

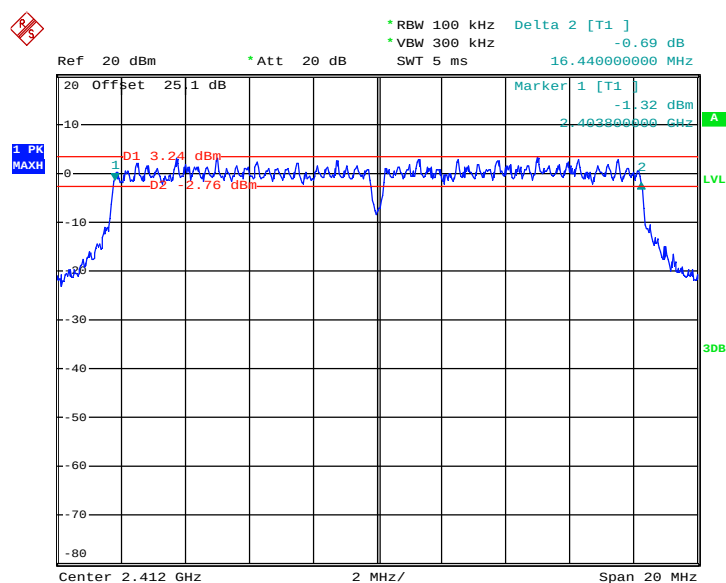
**6 dB Bandwidth Plot on 802.11b Channel 11**


201701 15C 6dB.11b 2462 (ch11)

Date: 22.OCT.2012 23:24:00

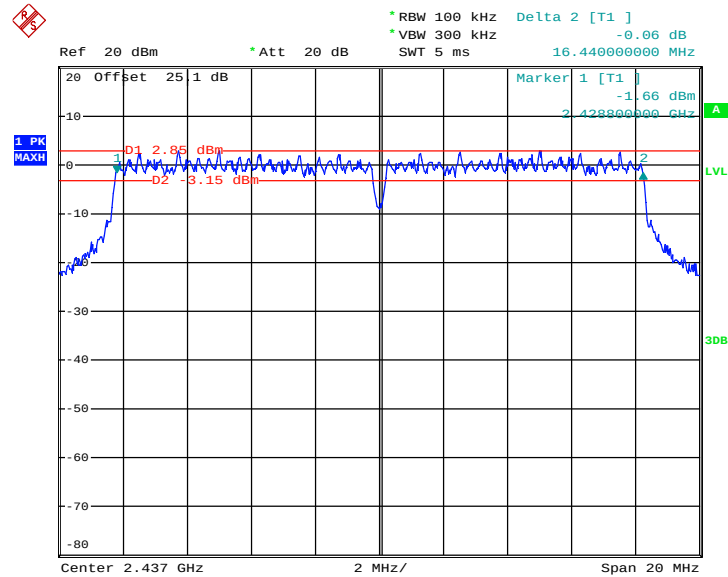
|                        |          |                            |         |
|------------------------|----------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11g  | <b>Temperature :</b>       | 24~26°C |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53%  |

| Channel | Frequency (MHz) | 802.11g<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|-----------------|--------------------------------|-----------------------------------|-----------|
| 01      | 2412            | 16.44                          | 0.5                               | Pass      |
| 06      | 2437            | 16.44                          | 0.5                               | Pass      |
| 11      | 2462            | 16.48                          | 0.5                               | Pass      |

**6 dB Bandwidth Plot on 802.11g Channel 01**


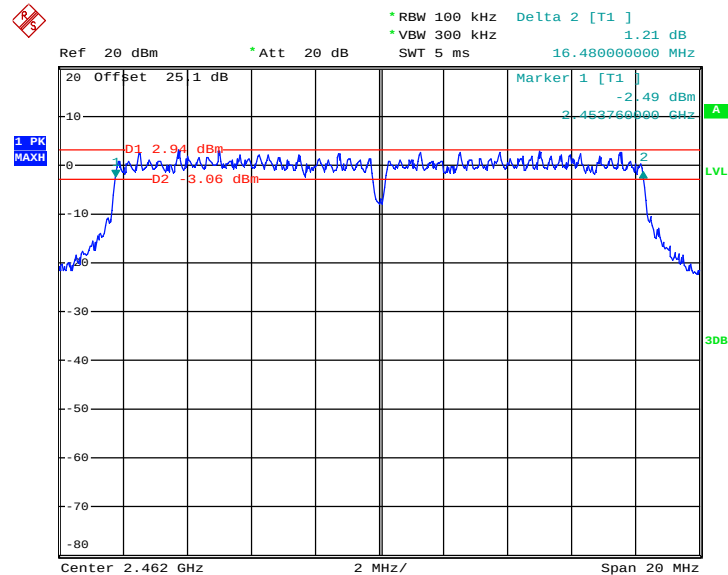
201701 15C 6dB.11g 2412 (ch01)

Date: 22.OCT.2012 23:34:42

**6 dB Bandwidth Plot on 802.11g Channel 06**


201701 15C 6dB.11g 2437 (ch06)

Date: 22.OCT.2012 23:31:56

**6 dB Bandwidth Plot on 802.11g Channel 11**


201701 15C 6dB.11g 2462 (ch11)

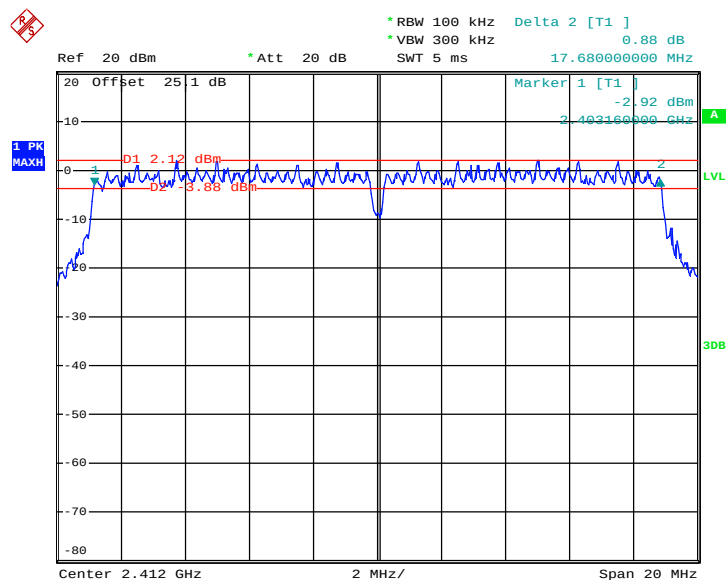
Date: 22.OCT.2012 23:28:43



|                        |              |                            |         |
|------------------------|--------------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 24~26°C |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53%  |

| Channel | Frequency (MHz) | 2.4GHz 802.11n HT20<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|-----------------|--------------------------------------------|-----------------------------------|-----------|
| 01      | 2412            | 17.68                                      | 0.5                               | Pass      |
| 06      | 2437            | 17.72                                      | 0.5                               | Pass      |
| 11      | 2462            | 17.72                                      | 0.5                               | Pass      |

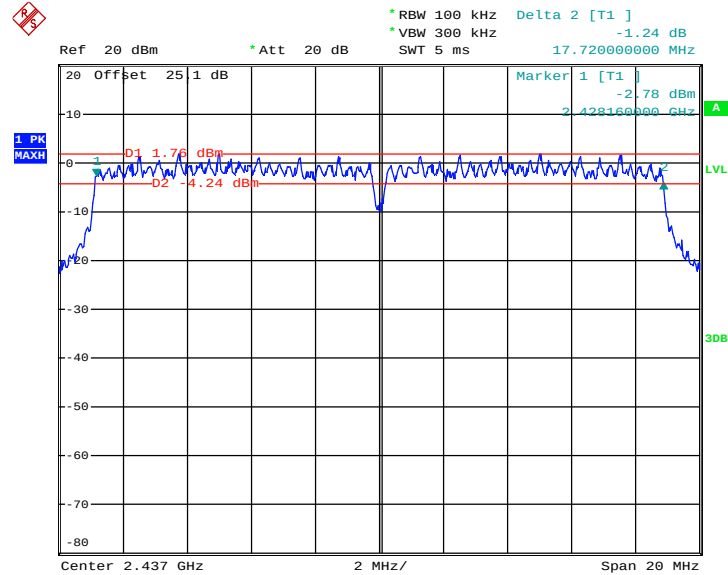
**6 dB Bandwidth Plot on 802.11n HT20 Channel 01**



201701 15C 6dB.11g\_N20 2412 (ch01)  
Date: 22.OCT.2012 23:38:03



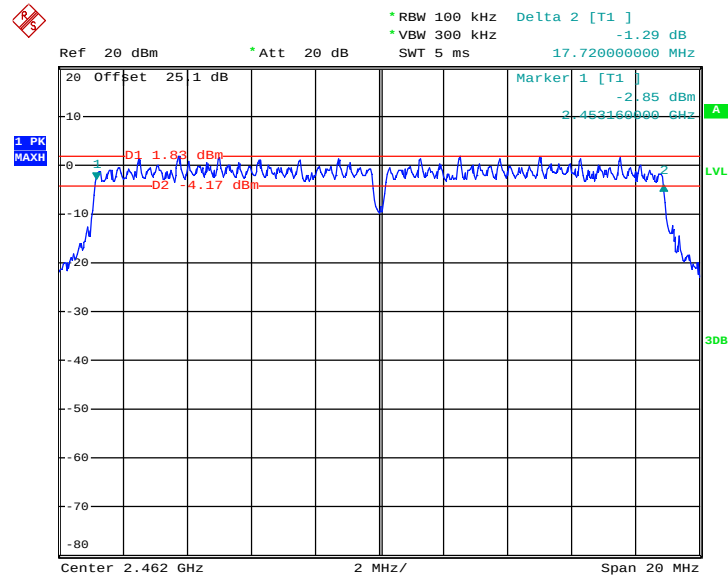
6 dB Bandwidth Plot on 802.11n HT20 Channel 06



201701 15C 6dB.11g\_N20 2437 (ch06)

Date: 22.OCT.2012 23:40:52

6 dB Bandwidth Plot on 802.11n HT20 Channel 11

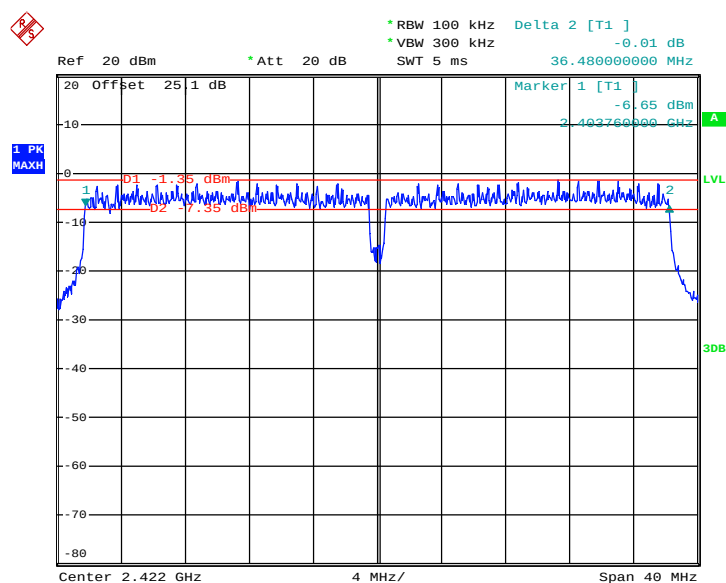


201701 15C 6dB.11g\_N20 2462 (ch11)

Date: 22.OCT.2012 23:43:20

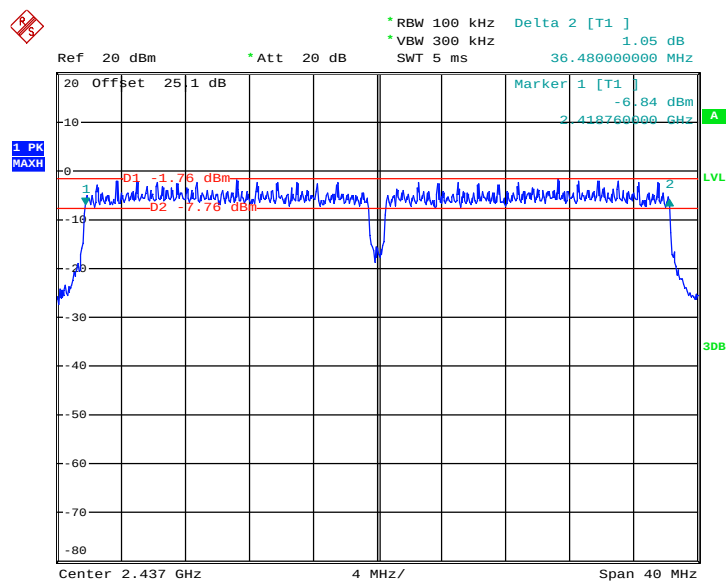
|                        |              |                            |         |
|------------------------|--------------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11n HT40 | <b>Temperature :</b>       | 24~26°C |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53%  |

| Channel | Frequency (MHz) | 802.11n HT40<br>6dB Bandwidth (MHz) | 6dB Bandwidth<br>Min. Limit (MHz) | Pass/Fail |
|---------|-----------------|-------------------------------------|-----------------------------------|-----------|
| 03      | 2422            | 36.48                               | 0.5                               | Pass      |
| 06      | 2437            | 36.48                               | 0.5                               | Pass      |
| 09      | 2452            | 36.48                               | 0.5                               | Pass      |

**6 dB Bandwidth Plot on 802.11n HT40 Channel 03**


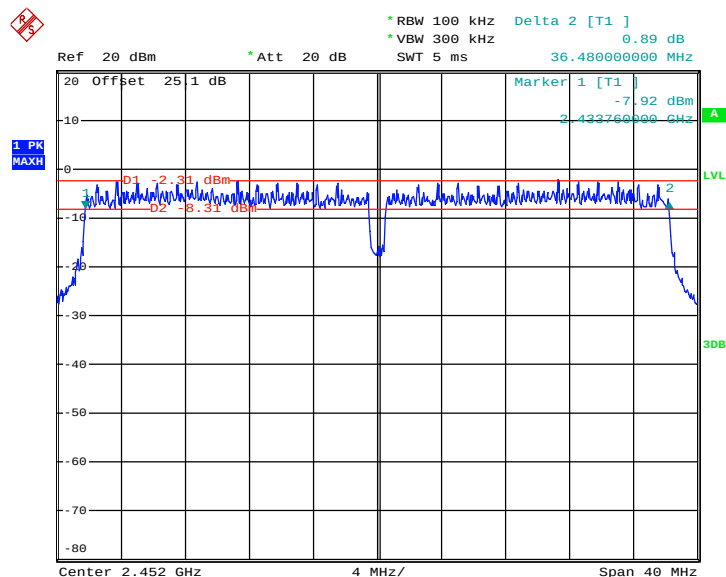
201701 15C 6dB.11g\_N40 2422 (ch03)

Date: 22.OCT.2012 23:56:54

**6 dB Bandwidth Plot on 802.11n HT40 Channel 06**


201701 15C 6dB.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:54:31

**6 dB Bandwidth Plot on 802.11n HT40Channel 09**


201701 15C 6dB.11g\_N40 2452 (ch09)

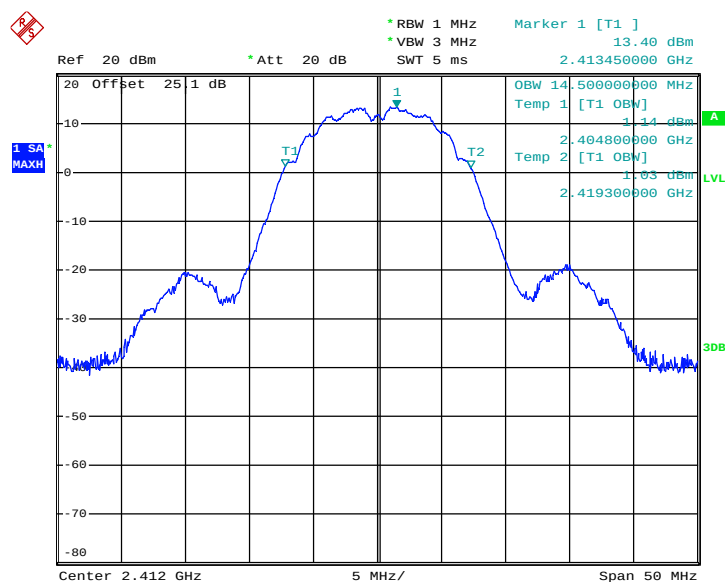
Date: 22.OCT.2012 23:48:08

### 3.1.6 Test Result of 99% Occupied Bandwidth

|                 |          |                     |        |
|-----------------|----------|---------------------|--------|
| Test Mode :     | 802.11b  | Temperature :       | 24~26℃ |
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

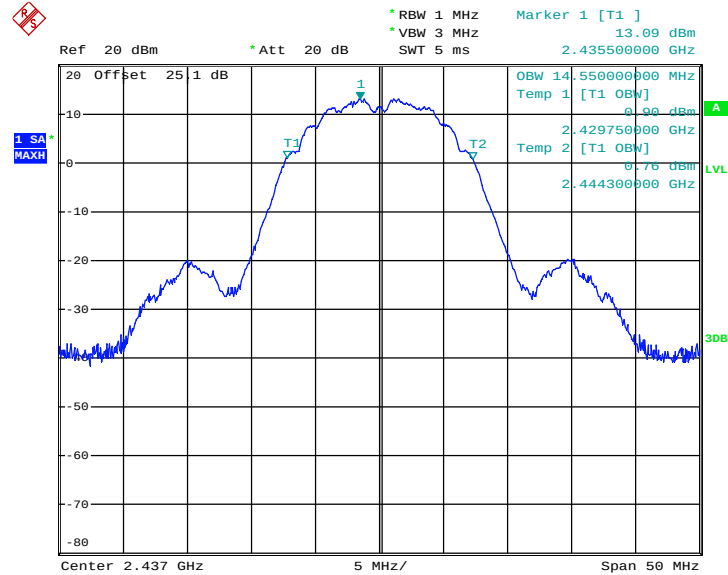
| Channel | Frequency (MHz) | 802.11b<br>99% Occupied Bandwidth (MHz) | Pass/Fail |
|---------|-----------------|-----------------------------------------|-----------|
| 01      | 2412            | 14.50                                   | Pass      |
| 06      | 2437            | 14.55                                   | Pass      |
| 11      | 2462            | 14.45                                   | Pass      |

**99% Occupied Bandwidth Plot on 802.11b Channel 01**



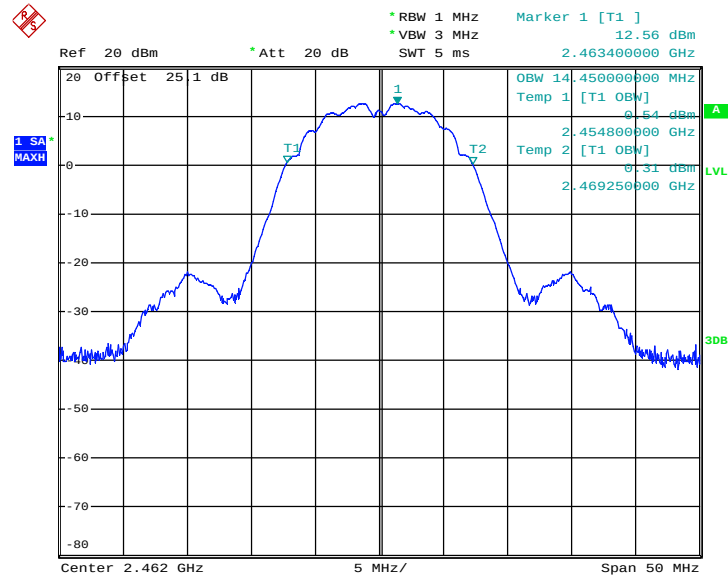
201701 15C IC-OB 802.11b 2412 (ch01)

Date: 22.OCT.2012 23:19:50

**99% Occupied Bandwidth Plot on 802.11b Channel 06**


201701 15C IC-OB 802.11b 2437 (ch06)

Date: 22.OCT.2012 23:22:40

**99% Occupied Bandwidth Plot on 802.11b Channel 11**


201701 15C IC-OB 802.11b 2462 (ch11)

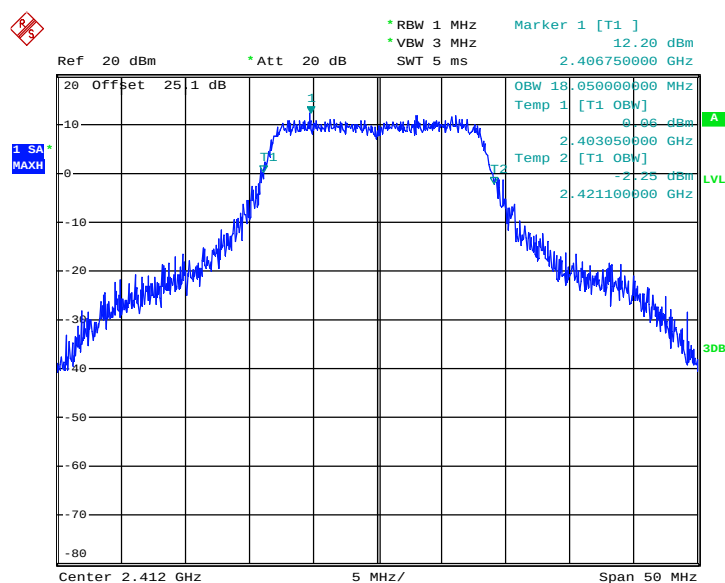
Date: 22.OCT.2012 23:26:13



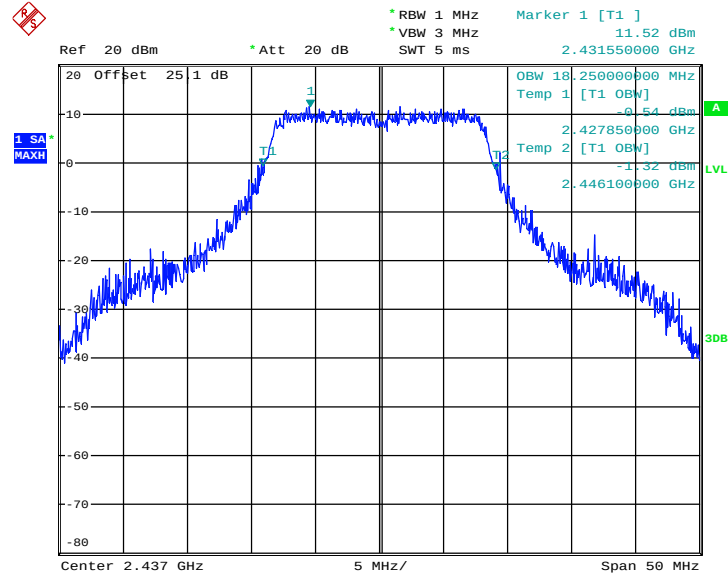
|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11g  | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency (MHz) | 802.11g<br>99% Occupied Bandwidth (MHz) | Pass/Fail |
|---------|-----------------|-----------------------------------------|-----------|
| 01      | 2412            | 18.05                                   | Pass      |
| 06      | 2437            | 18.25                                   | Pass      |
| 11      | 2462            | 18.20                                   | Pass      |

**99% Occupied Bandwidth Plot on 802.11g Channel 01**

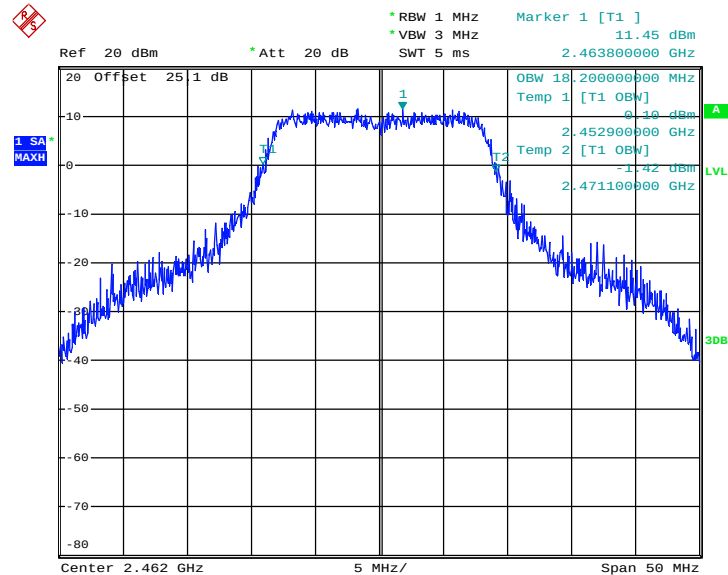


201701 15C IC-OB 802.11g 2412 (ch01)  
Date: 22.OCT.2012 23:36:18

**99% Occupied Bandwidth Plot on 802.11g Channel 06**


201701 15C IC-OB 802.11g 2437 (ch06)

Date: 22.OCT.2012 23:33:44

**99% Occupied Bandwidth Plot on 802.11g Channel 11**


201701 15C IC-OB 802.11g 2462 (ch11)

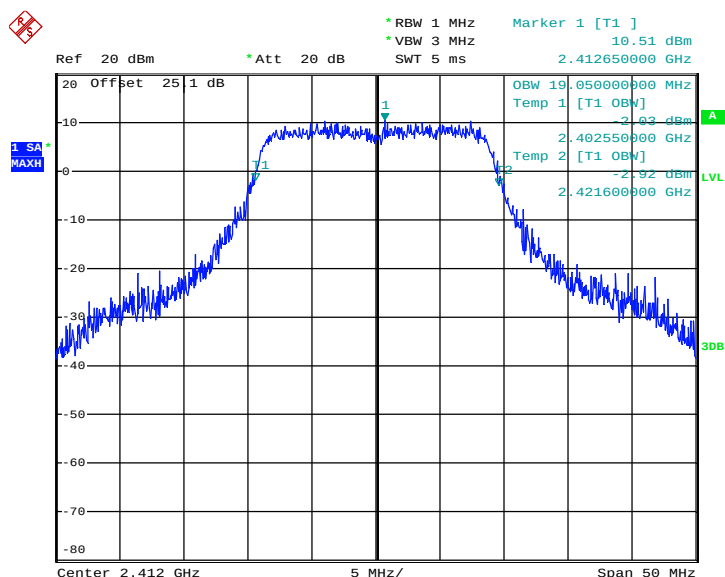
Date: 22.OCT.2012 23:30:42



|                        |              |                            |         |
|------------------------|--------------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 24~26°C |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53%  |

| Channel | Frequency (MHz) | 2.4GHz 802.11n HT20<br>99% Occupied Bandwidth (MHz) | Pass/Fail |
|---------|-----------------|-----------------------------------------------------|-----------|
| 01      | 2412            | 19.05                                               | Pass      |
| 06      | 2437            | 19.00                                               | Pass      |
| 11      | 2462            | 19.10                                               | Pass      |

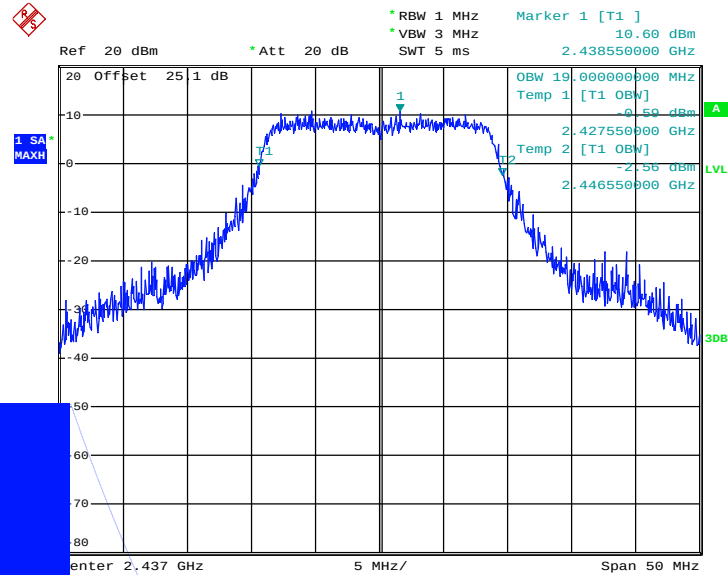
**99% Occupied Bandwidth Plot 802.11n HT20 Channel 01**



201701 15C IC-OB 802.11g\_N20 2412 (ch01)  
Date: 22.OCT.2012 23:39:52

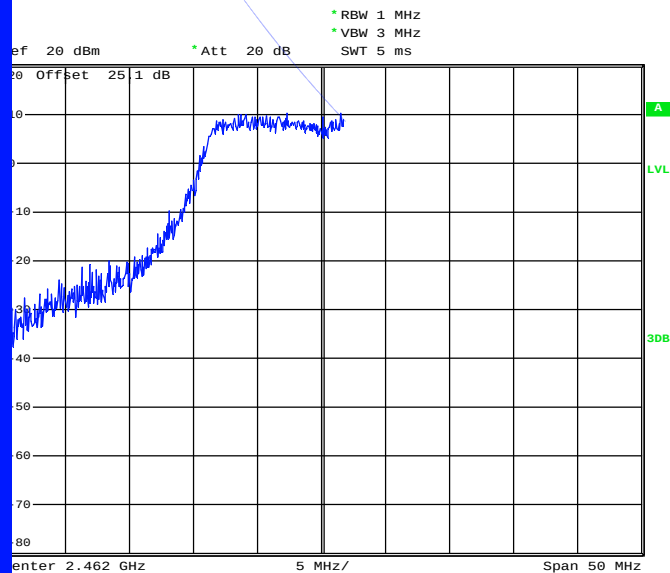


99% Occupied Bandwidth Plot 802.11n HT20 Channel 06



15C IC-0B 802.11g\_N20 2437 (ch06)  
22.OCT.2012 23:42:07

Occupied Bandwidth Plot 802.11n HT20 Channel 11

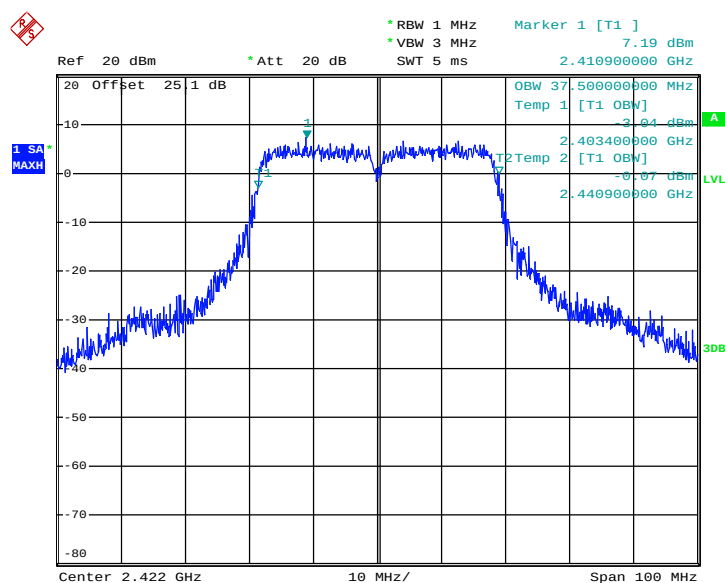




|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT40 | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53% |

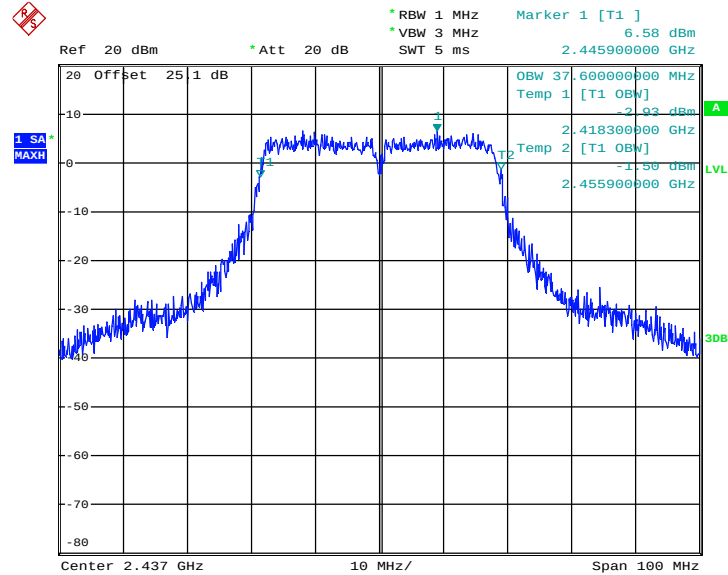
| Channel | Frequency (MHz) | 2.4GHz 802.11n HT40<br>99% Occupied Bandwidth (MHz) | Pass/Fail |
|---------|-----------------|-----------------------------------------------------|-----------|
| 03      | 2422            | 37.50                                               | Pass      |
| 06      | 2437            | 37.60                                               | Pass      |
| 09      | 2452            | 37.40                                               | Pass      |

**99% Occupied Bandwidth Plot 802.11n HT40 Channel 03**



201701 15C IC-0B 802.11g\_N40 2422 (ch03)  
Date: 22.OCT.2012 23:58:55

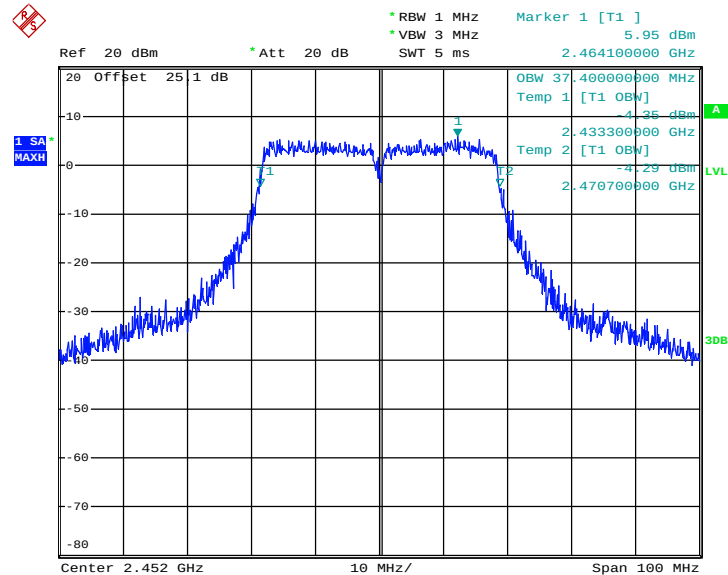
### 99% Occupied Bandwidth Plot 802.11n HT40 Channel 06



201701 15C IC-OB 802.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:55:51

### 99% Occupied Bandwidth Plot 802.11n HT40 Channel 09



201701 15C IC-OB 802.11g\_N40 2452 (ch09)

Date: 22.OCT.2012 23:52:54

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

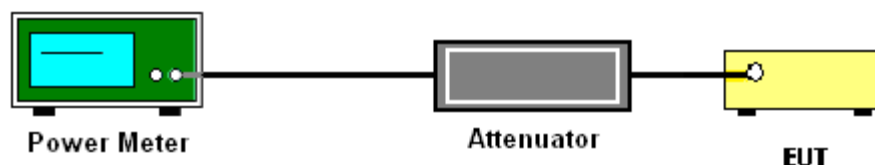
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak Output Power

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11b  | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency (MHz) | 802.11b<br>Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|------------------------------------|-------------------|-----------|
| 01      | 2412            | 17.39                              | 30                | Pass      |
| 06      | 2437            | 19.19                              | 30                | Pass      |
| 11      | 2462            | 20.37                              | 30                | Pass      |

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11g  | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency (MHz) | 802.11g<br>Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|------------------------------------|-------------------|-----------|
| 01      | 2412            | 21.22                              | 30                | Pass      |
| 06      | 2437            | 23.00                              | 30                | Pass      |
| 11      | 2462            | 23.17                              | 30                | Pass      |

|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency (MHz) | 802.11n HT20<br>Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|-----------------------------------------|-------------------|-----------|
| 01      | 2412            | 20.98                                   | 30                | Pass      |
| 06      | 2437            | 21.91                                   | 30                | Pass      |
| 11      | 2462            | 21.93                                   | 30                | Pass      |

|                        |              |                            |       |
|------------------------|--------------|----------------------------|-------|
| <b>Test Mode :</b>     | 802.11n HT40 | <b>Temperature :</b>       | 24~26 |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53 |

| Channel | Frequency (MHz) | 802.11n HT40<br>Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---------|-----------------|-----------------------------------------|-------------------|-----------|
| 03      | 2422            | 20.35                                   | 30                | Pass      |
| 06      | 2437            | 21.49                                   | 30                | Pass      |
| 09      | 2452            | 21.05                                   | 30                | Pass      |

**3.2.6 Test Result of Average output Power (Reporting Only)**

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11b  | <b>Temperature :</b>       | 24~26  |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53  |
| <b>Duty Cycle:</b>     | 100%     | <b>Duty Factor:</b>        | 0.00dB |

| Channel | Frequency (MHz) | 802.11b<br>Average Output Power (dBm) |
|---------|-----------------|---------------------------------------|
| 01      | 2412            | 15.10                                 |
| 06      | 2437            | 17.01                                 |
| 11      | 2462            | 18.17                                 |

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11g  | <b>Temperature :</b>       | 24~26  |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53  |
| <b>Duty Cycle:</b>     | 92.26%   | <b>Duty Factor:</b>        | 0.35dB |

| Channel | Frequency (MHz) | 802.11g<br>Average Output Power (dBm) |
|---------|-----------------|---------------------------------------|
| 01      | 2412            | 12.18                                 |
| 06      | 2437            | 14.43                                 |
| 11      | 2462            | 14.70                                 |

|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 24~26  |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53  |
| <b>Duty Cycle:</b>     | 91.16%       | <b>Duty Factor:</b>        | 0.40dB |

| Channel | Frequency (MHz) | 802.11n HT20<br>Average Output Power (dBm) |
|---------|-----------------|--------------------------------------------|
| 01      | 2412            | 11.81                                      |
| 06      | 2437            | 13.50                                      |
| 11      | 2462            | 13.83                                      |

|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT40 | <b>Temperature :</b>       | 24~26  |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53  |
| <b>Duty Cycle:</b>     | 87.97%       | <b>Duty Factor:</b>        | 0.56dB |

| Channel | Frequency (MHz) | 802.11n HT40<br>Average Output Power (dBm) |
|---------|-----------------|--------------------------------------------|
| 03      | 2422            | 10.28                                      |
| 06      | 2437            | 12.67                                      |
| 09      | 2452            | 12.28                                      |

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3KHz band at any time interval of continuous transmission.

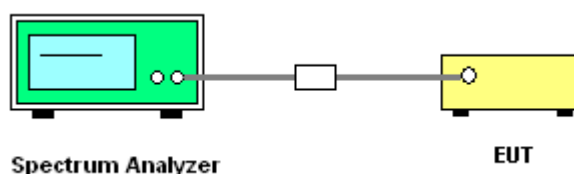
#### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 9.1 Option 1 of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v02
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

#### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11b  | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency<br>(MHz) | 802.11b Power Density |                | Max. Limits<br>(dBm/3KHz) | Pass/Fail |
|---------|--------------------|-----------------------|----------------|---------------------------|-----------|
|         |                    | PSD/100KHz (dBm)      | PSD/3KHz (dBm) |                           |           |
| 01      | 2412               | 8.10                  | -5.63          | 8                         | Pass      |
| 06      | 2437               | 8.59                  | -6.10          | 8                         | Pass      |
| 11      | 2462               | 8.32                  | -5.11          | 8                         | Pass      |

|                        |          |                            |        |
|------------------------|----------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11g  | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency<br>(MHz) | 802.11g Power Density |                | Max. Limits<br>(dBm/3KHz) | Pass/Fail |
|---------|--------------------|-----------------------|----------------|---------------------------|-----------|
|         |                    | PSD/100KHz (dBm)      | PSD/3KHz (dBm) |                           |           |
| 01      | 2412               | 3.14                  | -11.51         | 8                         | Pass      |
| 06      | 2437               | 2.71                  | -11.54         | 8                         | Pass      |
| 11      | 2462               | 2.95                  | -10.69         | 8                         | Pass      |

|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53% |

| Channel | Frequency<br>(MHz) | 802.11n HT20 Power Density |                | Max. Limits<br>(dBm/3KHz) | Pass/Fail |
|---------|--------------------|----------------------------|----------------|---------------------------|-----------|
|         |                    | PSD/100KHz (dBm)           | PSD/3KHz (dBm) |                           |           |
| 01      | 2412               | 1.70                       | -12.68         | 8                         | Pass      |
| 06      | 2437               | 1.47                       | -11.88         | 8                         | Pass      |
| 11      | 2462               | 1.72                       | -12.53         | 8                         | Pass      |



|                        |              |                            |        |
|------------------------|--------------|----------------------------|--------|
| <b>Test Mode :</b>     | 802.11n HT40 | <b>Temperature :</b>       | 24~26℃ |
| <b>Test Engineer :</b> | Bill Kuo     | <b>Relative Humidity :</b> | 50~53% |

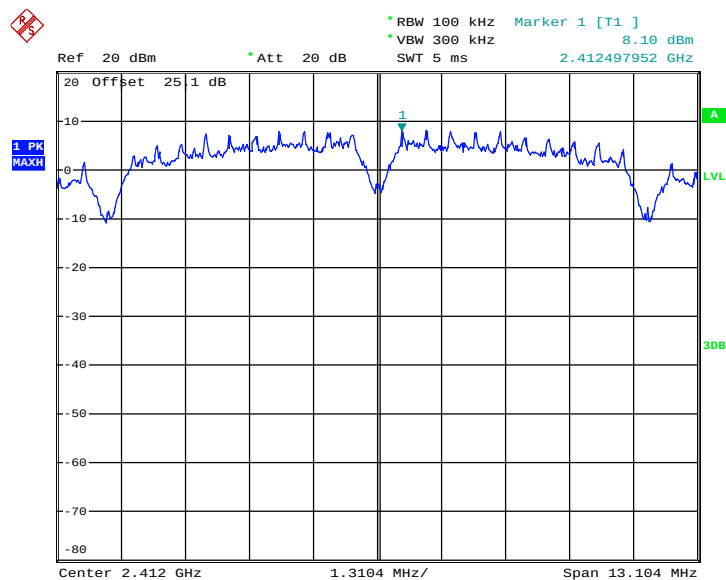
| Channel | Frequency<br>(MHz) | 802.11n HT40 Power Density |                | Max. Limits<br>(dBm/3KHz) | Pass/Fail |
|---------|--------------------|----------------------------|----------------|---------------------------|-----------|
|         |                    | PSD/100KHz (dBm)           | PSD/3KHz (dBm) |                           |           |
| 03      | 2422               | -2.03                      | -16.23         | 8                         | Pass      |
| 06      | 2437               | -2.27                      | -16.81         | 8                         | Pass      |
| 09      | 2452               | -2.77                      | -16.66         | 8                         | Pass      |

**Note:**

1. Measured power density (dBm) has offset with cable loss.
2. The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.

### 3.3.6 Test Result of Power Spectral Density Plots (100kHz)

PSD 100kHz Plot on 802.11b Channel 01

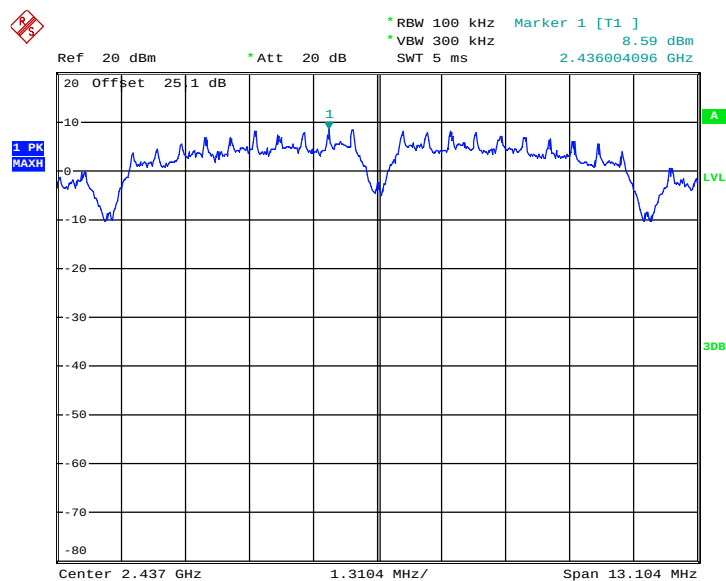


201701 15C PSD (100K) 802.11b 2412 (ch01)

Date: 22.OCT.2012 23:09:30



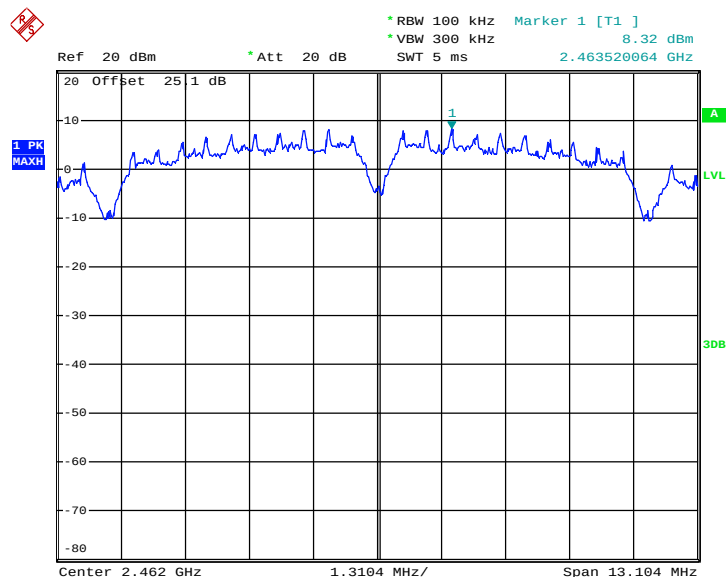
### PSD 100kHz Plot on 802.11b Channel 06



201701 15C PSD (100K) 802.11b 2437 (ch06)

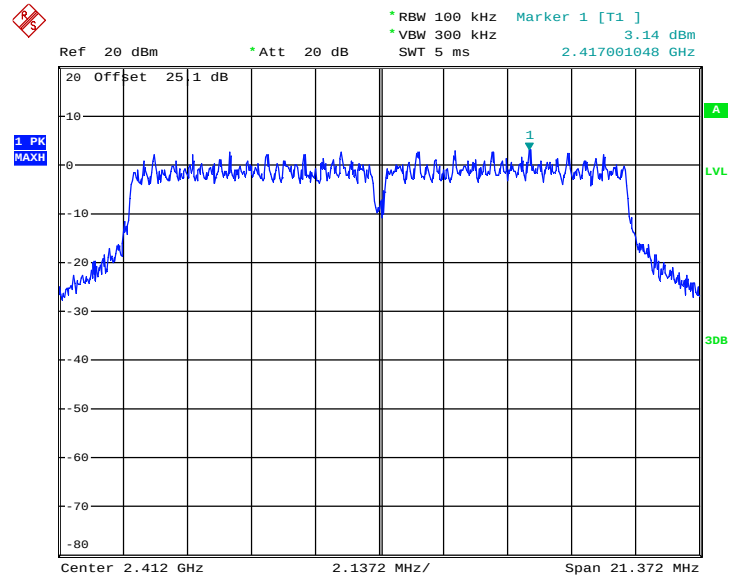
Date: 22.OCT.2012 23:21:46

### PSD 100kHz Plot on 802.11b Channel 11



201701 15C PSD (100K) 802.11b 2462 (ch11)

Date: 22.OCT.2012 23:24:43

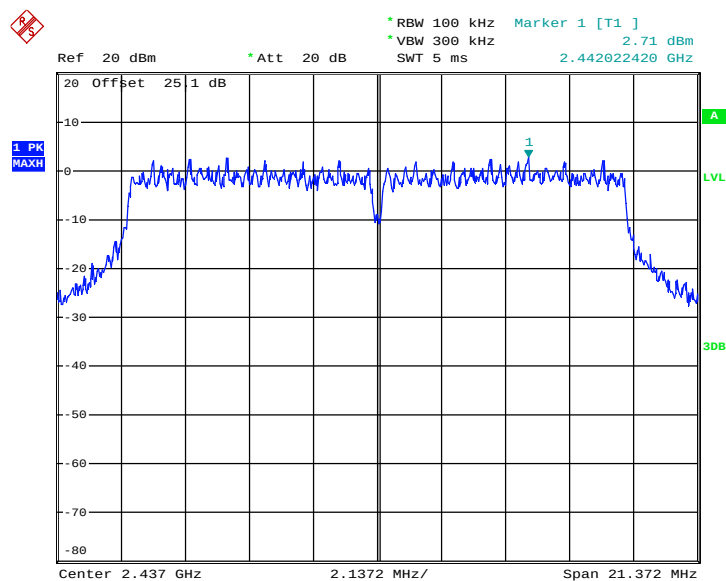
**PSD 100kHz Plot on 802.11g Channel 01**


201701 15C PSD (100K) 802.11g 2412 (ch01)

Date: 22.OCT.2012 23:35:11



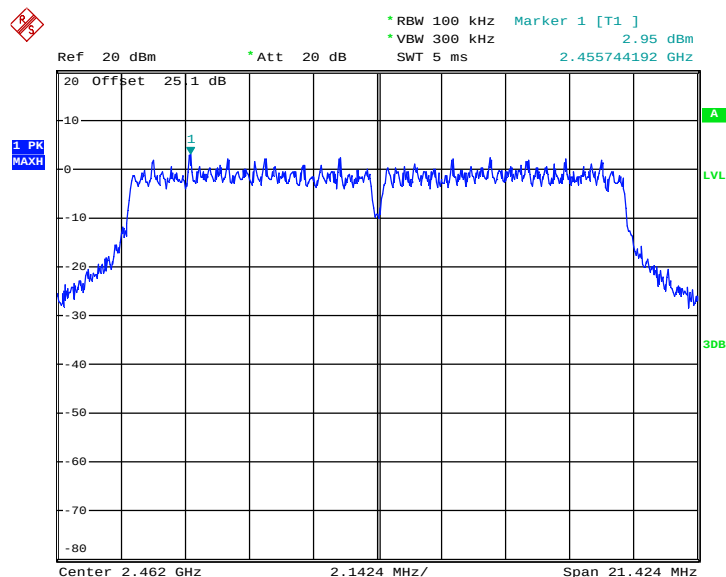
### PSD 100kHz Plot on 802.11g Channel 06



201701 15C PSD (100K) 802.11g 2437 (ch06)

Date: 22.OCT.2012 23:32:25

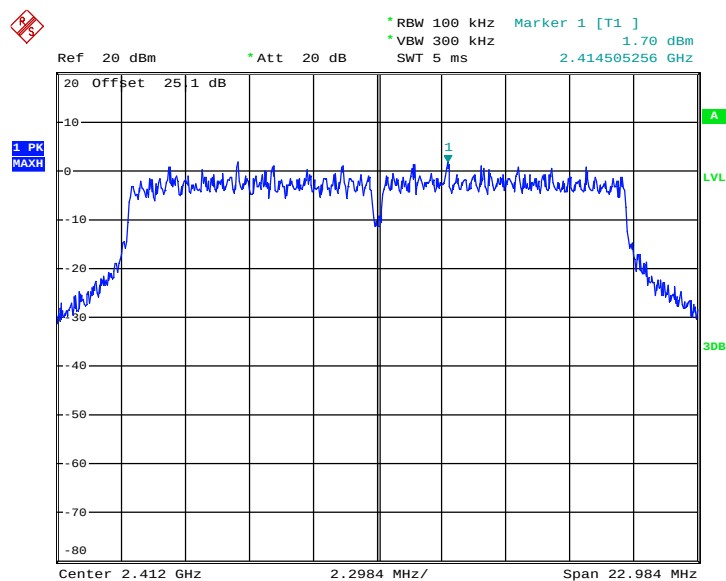
### PSD 100kHz Plot on 802.11g Channel 11



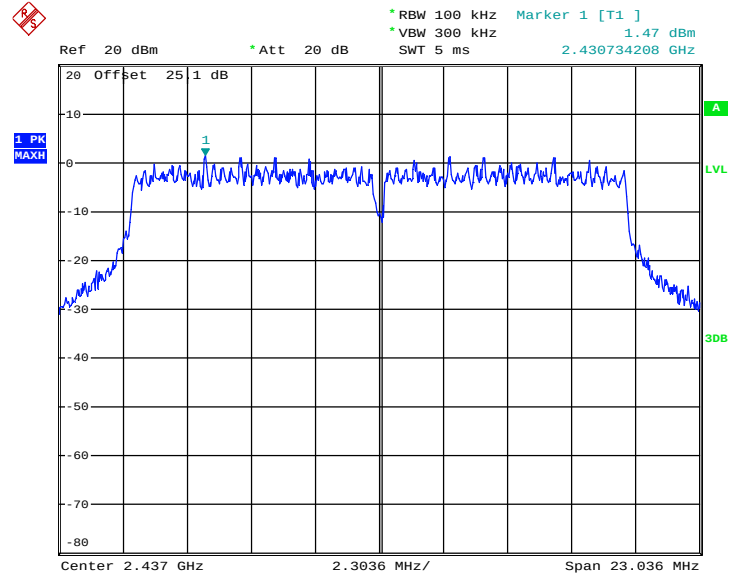
201701 15C PSD (100K) 802.11g 2462 (ch11)

Date: 22.OCT.2012 23:29:27

**PSD 100kHz Plot on 802.11n HT20 Channel 01**

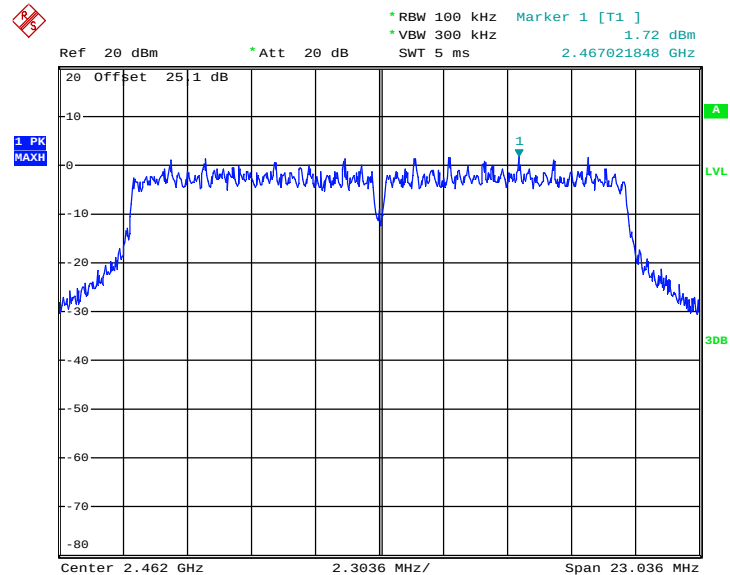


201701 15C PSD (100K) 802.11g\_N20 2412 (ch01)  
Date: 22.OCT.2012 23:38:40

**PSD 100kHz Plot on 802.11n HT20 Channel 06**


201701 15C PSD (100K) 802.11g\_N20 2437 (ch06)

Date: 22.OCT.2012 23:41:19

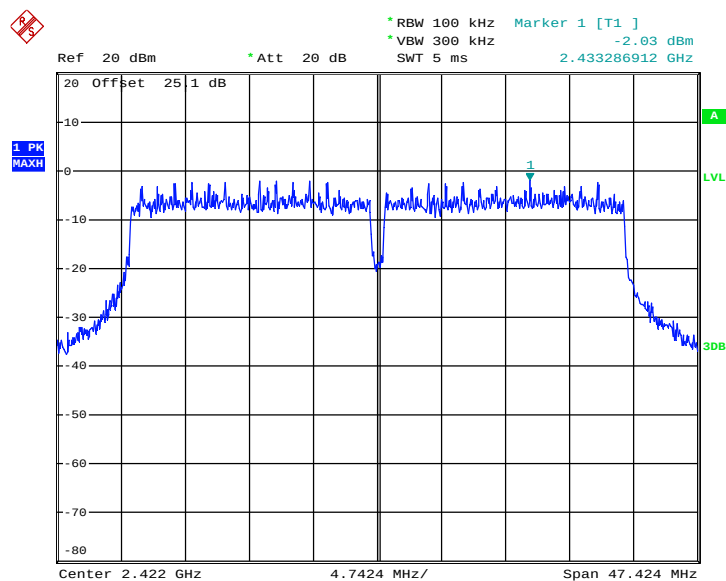
**PSD 100kHz Plot on 802.11n HT20 Channel 11**


201701 15C PSD (100K) 802.11g\_N20 2462 (ch11)

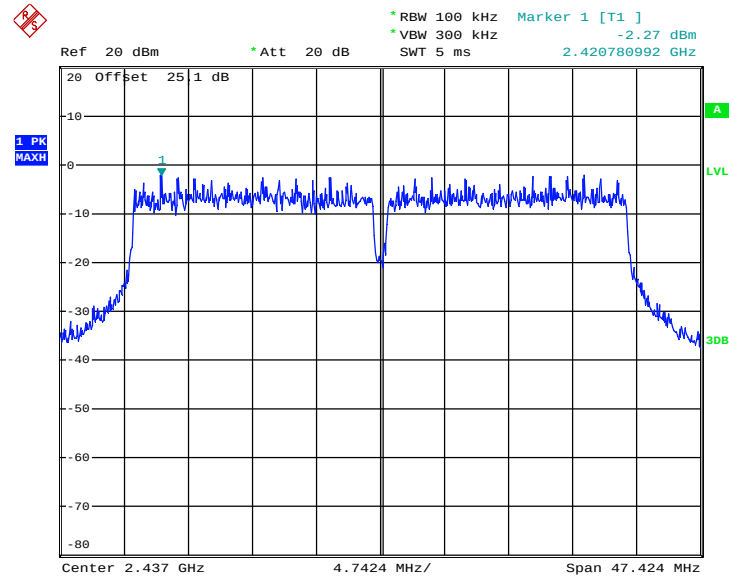
Date: 22.OCT.2012 23:43:48



PSD 100kHz Plot on 802.11n HT40 Channel 03

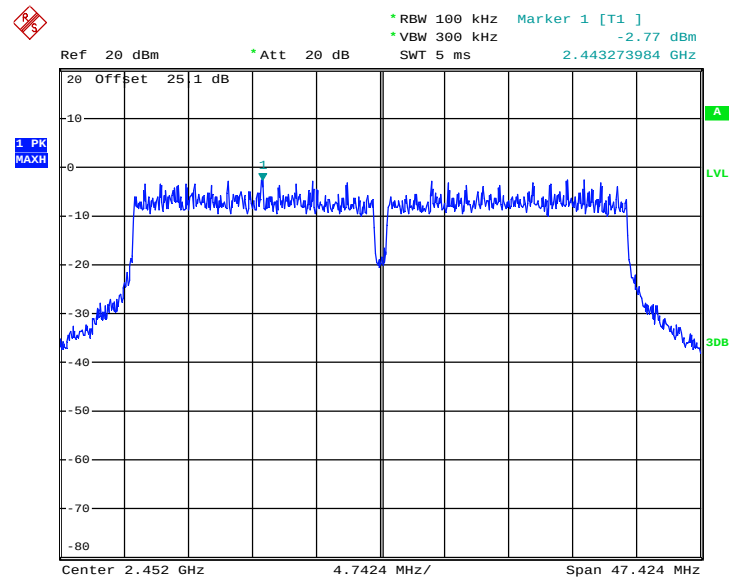


201701 15C PSD (100K) 802.11g\_N40 2422 (ch03)  
Date: 22.OCT.2012 23:57:24

**PSD 100kHz Plot on 802.11n HT40 Channel 06**


201701 15C PSD (100K) 802.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:55:00

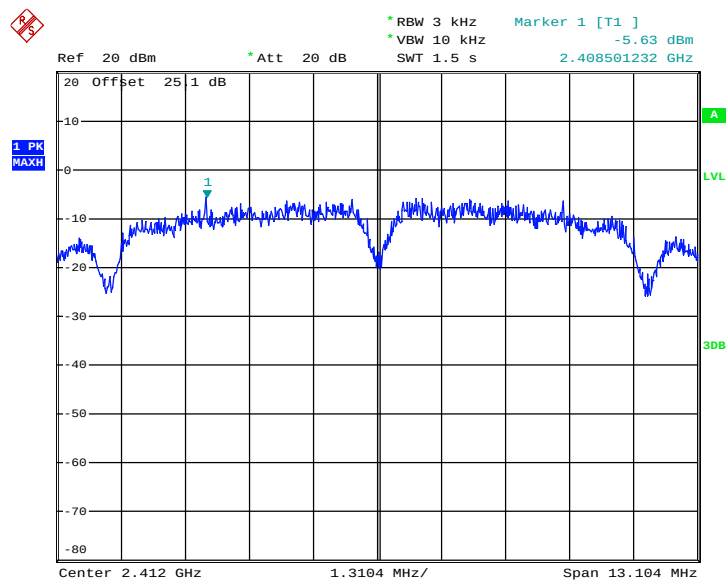
**PSD 100kHz Plot on 802.11n HT40 Channel 09**


201701 15C PSD (100K) 802.11g\_N40 2452 (ch09)

Date: 22.OCT.2012 23:48:40

### 3.3.7 Test Result of Power Spectral Density Plots (3kHz)

PSD 3kHz Plot on 802.11b Channel 01

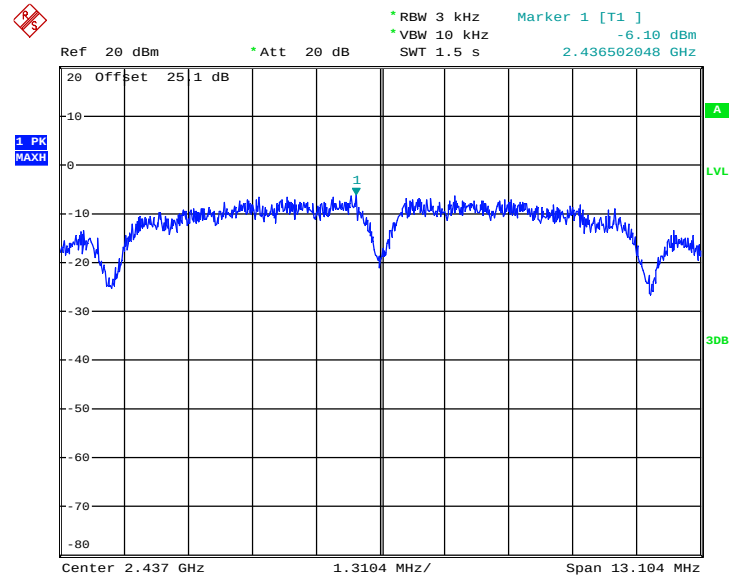


201701 15C PSD 802.11b 2412 (ch01)

Date: 22.OCT.2012 23:09:25



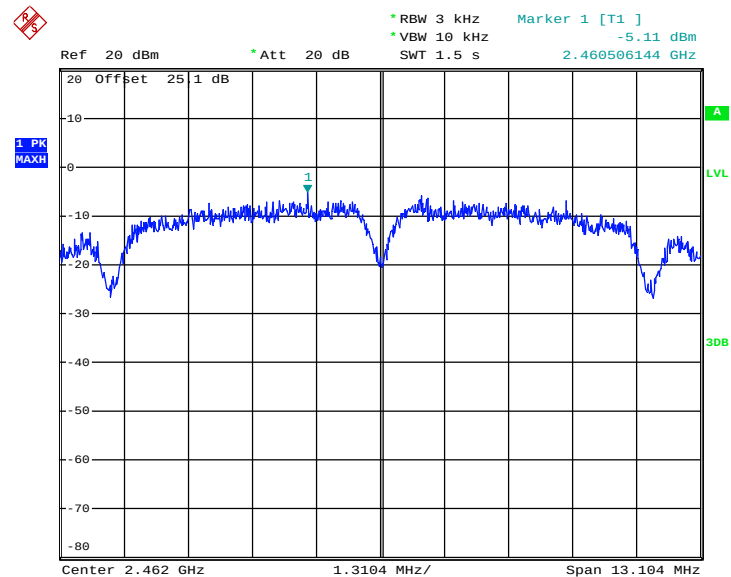
PSD 3kHz Plot on 802.11b Channel 06



201701 15C PSD 802.11b 2437 (ch06)

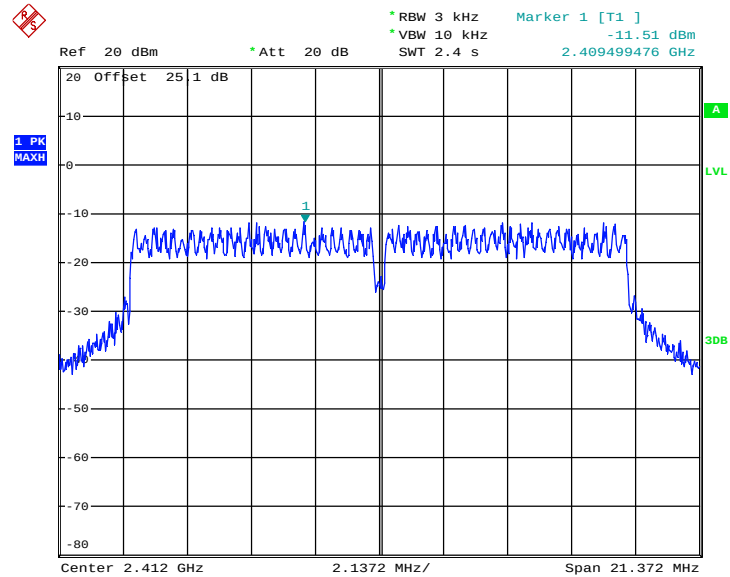
Date: 22.OCT.2012 23:21:40

PSD 3kHz Plot on 802.11b Channel 11



201701 15C PSD 802.11b 2462 (ch11)

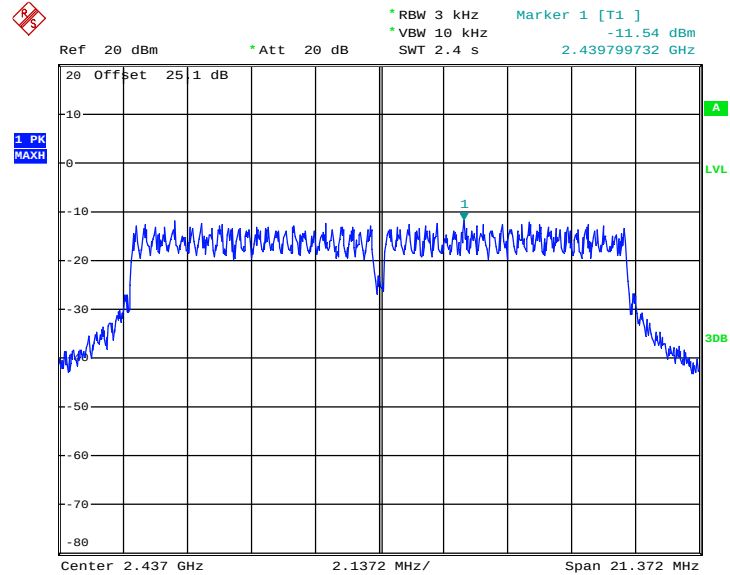
Date: 22.OCT.2012 23:24:27

**PSD 3kHz Plot on 802.11g Channel 01**


201701 15C PSD 802.11g 2412 (ch01)

Date: 22.OCT.2012 23:35:04

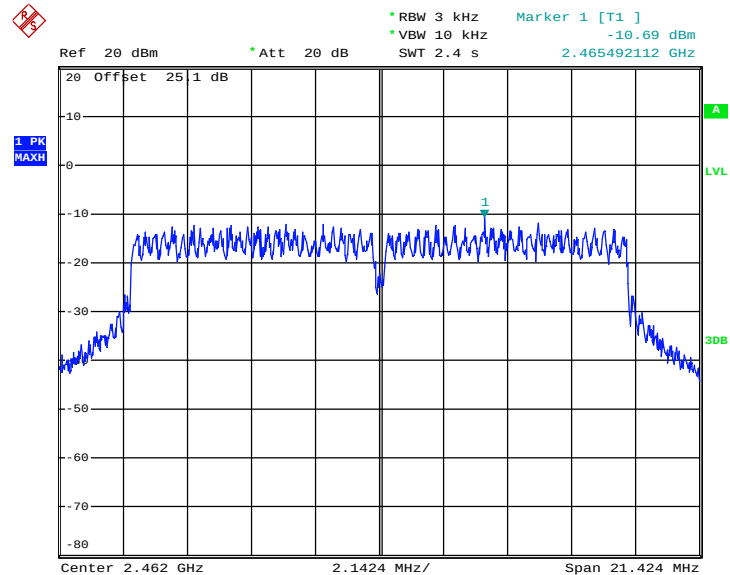
### PSD 3kHz Plot on 802.11g Channel 06



201701 15C PSD 802.11g 2437 (ch06)

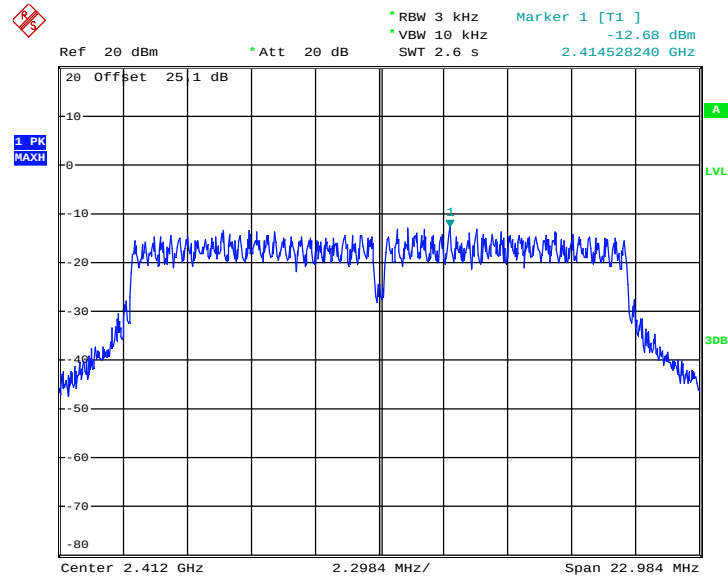
Date: 22.OCT.2012 23:32:19

### PSD 3kHz Plot on 802.11g Channel 11



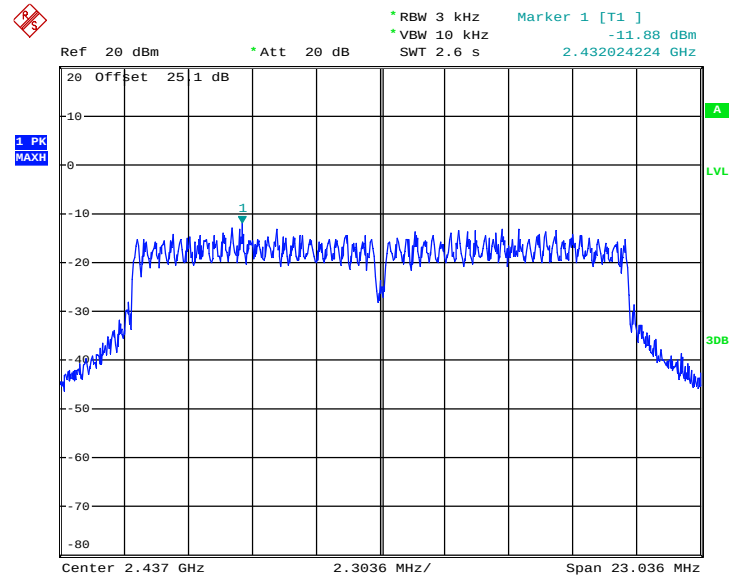
201701 15C PSD 802.11g 2462 (ch11)

Date: 22.OCT.2012 23:29:20

**PSD 3kHz Plot on 802.11n HT20 Channel 01**


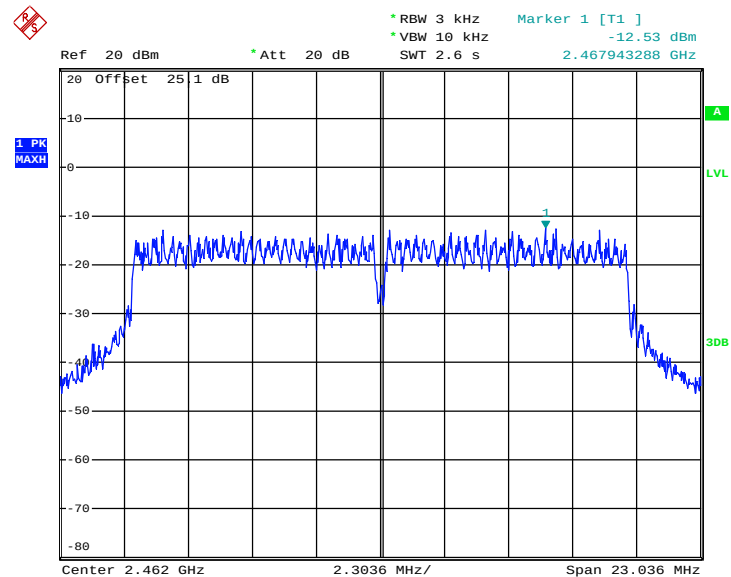
201701 15C PSD 802.11g\_N20 2412 (ch01)

Date: 22.OCT.2012 23:38:25

**PSD 3kHz Plot on 802.11n HT20 Channel 06**


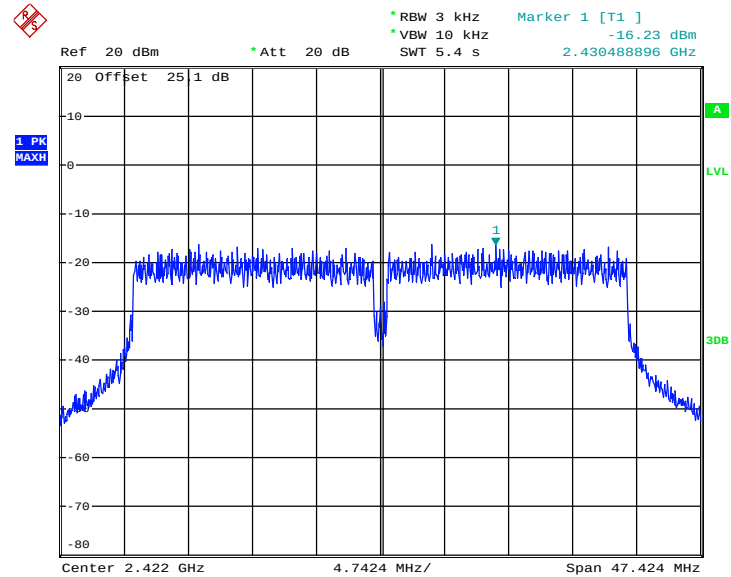
201701 15C PSD 802.11g\_N20 2437 (ch06)

Date: 22.OCT.2012 23:41:13

**PSD 3kHz Plot on 802.11n HT20 Channel 11**


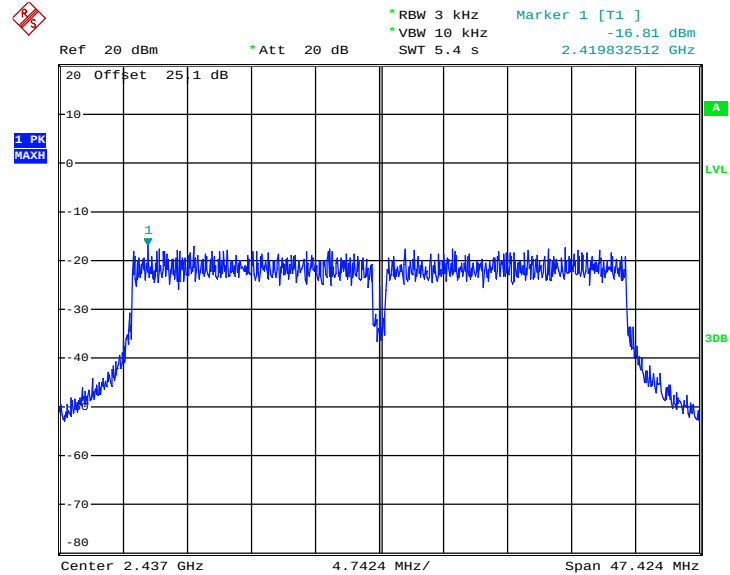
201701 15C PSD 802.11g\_N20 2462 (ch11)

Date: 22.OCT.2012 23:43:42

**PSD 3kHz Plot on 802.11n HT40 Channel 03**


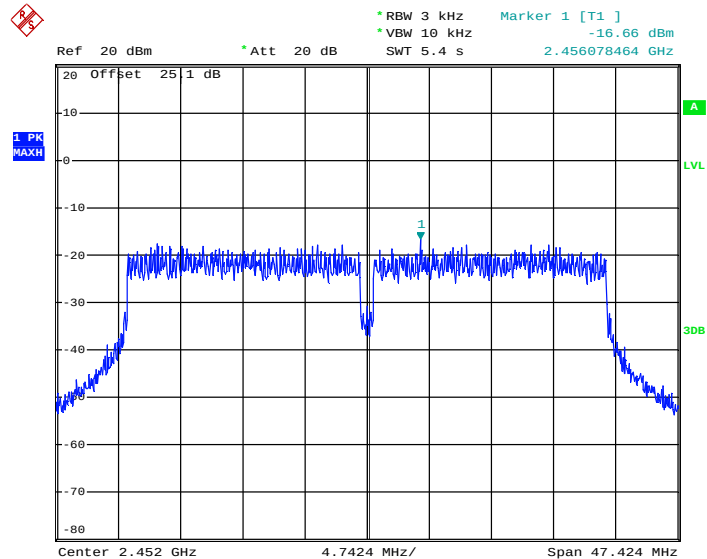
201701 15C PSD 802.11g\_N40 2422 (ch03)

Date: 22.OCT.2012 23:57:18

**PSD 3kHz Plot on 802.11n HT40 Channel 06**


201701 15C PSD 802.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:54:55

**PSD 3kHz Plot on 802.11n HT40 Channel 09**


201701 15C PSD 802.11g\_N40 2452 (ch09)

Date: 22.OCT.2012 23:48:33

## 3.4 Conducted Band Edges and Spurious Emission Measurement

### 3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

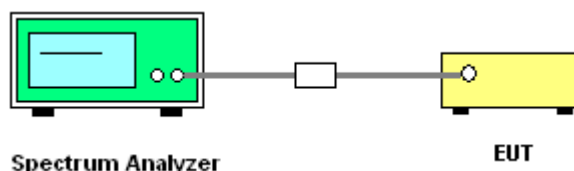
### 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.4.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz, when maximum peak conducted output power procedure is used. The attenuation is set to 30dB, when maximum conducted output power procedure is used.
5. Measure and record the results in the test report.

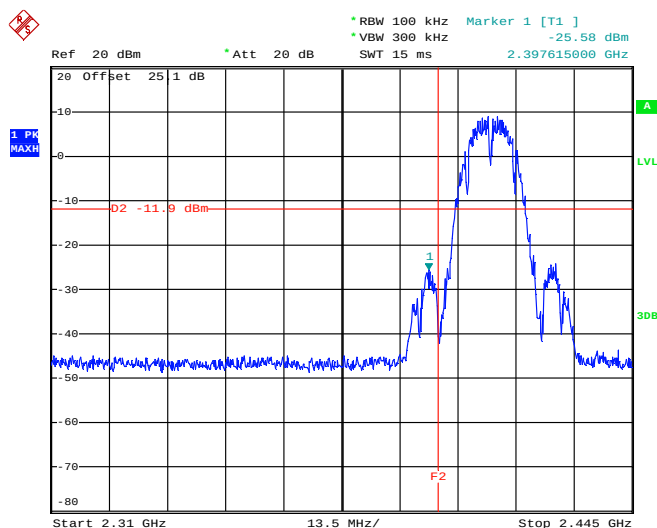
### 3.4.4 Test Setup



### 3.4.5 Test Plots of Conducted Band Edges

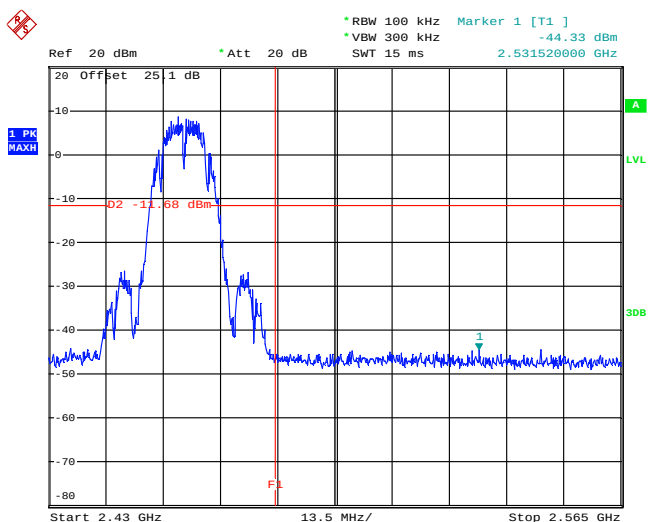
|                |              |                     |          |
|----------------|--------------|---------------------|----------|
| Test Mode :    | 802.11b      | Temperature :       | 24~26°C  |
| Test Band :    | Low and High | Relative Humidity : | 50~53%   |
| Test Channel : | 01 and 11    | Test Engineer :     | Bill Kuo |

**Low Band Edge Plot on 802.11b Channel 01**



201701 15C BandEdge 802.11b 2412 (ch01)  
Date: 22.OCT.2012 23:18:14

**High Band Edge Plot on 802.11b Channel 11**

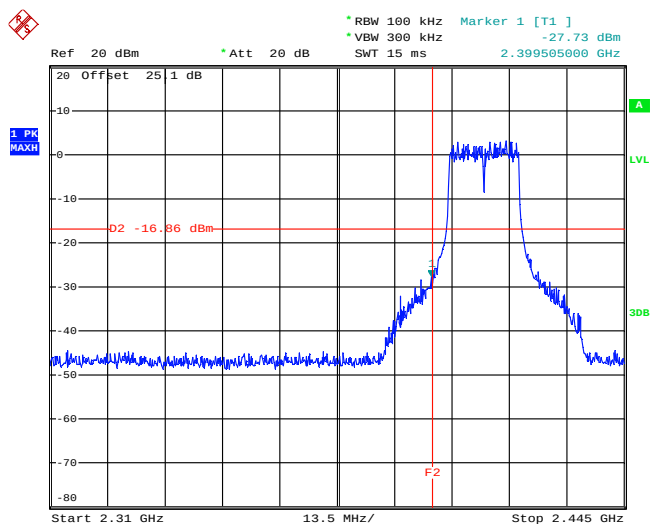


201701 15C BandEdge 802.11b 2462 (ch11)  
Date: 22.OCT.2012 23:25:15



|                |              |                     |          |
|----------------|--------------|---------------------|----------|
| Test Mode :    | 802.11g      | Temperature :       | 24~26°C  |
| Test Band :    | Low and High | Relative Humidity : | 50~53%   |
| Test Channel : | 01 and 11    | Test Engineer :     | Bill Kuo |

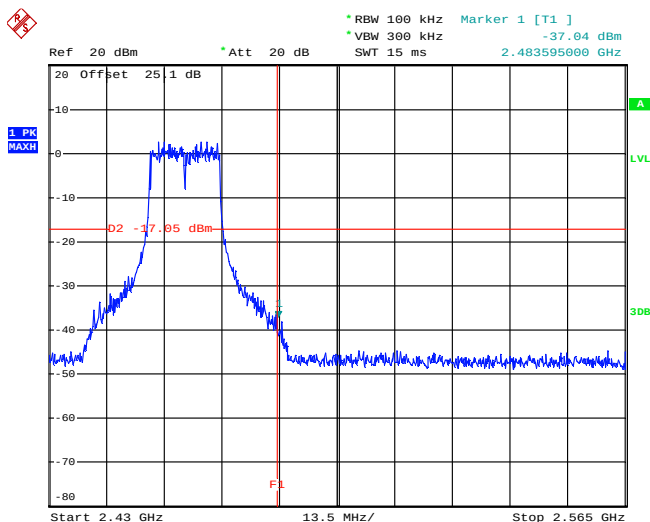
Low Band Edge Plot on 802.11g Channel 01



201701 15C BandEdge 802.11g 2412 (ch01)

Date: 22.OCT.2012 23:35:26

High Band Edge Plot on 802.11g Channel 11

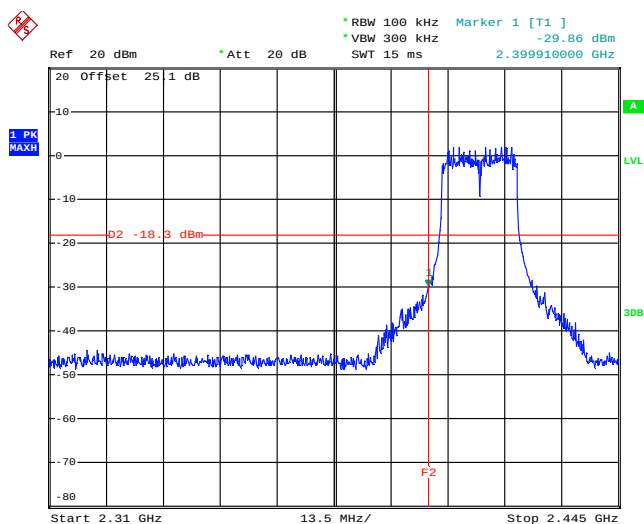


201701 15C BandEdge 802.11g 2462 (ch11)

Date: 22.OCT.2012 23:29:44

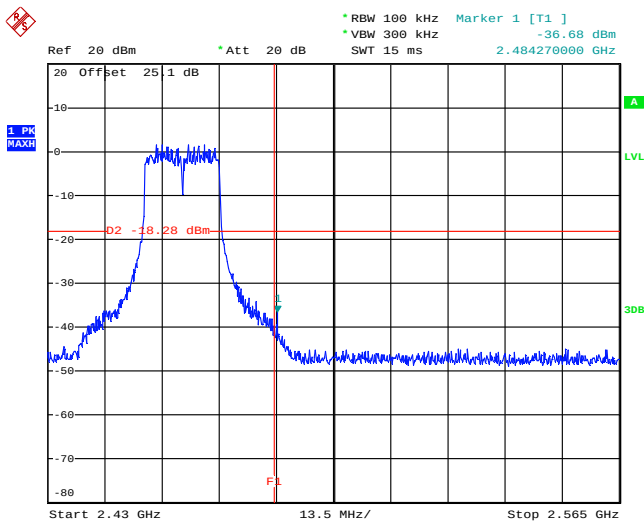


|                |              |                     |          |
|----------------|--------------|---------------------|----------|
| Test Mode :    | 802.11n HT20 | Temperature :       | 24~26°C  |
| Test Band :    | Low and High | Relative Humidity : | 50~53%   |
| Test Channel : | 01 and 11    | Test Engineer :     | Bill Kuo |

**Low Band Edge Plot on 802.11n HT20 Channel 01**

2o1701 15C BandEdge 802.11g\_N20 2412 (ch01)

Date: 22.OCT.2012 23:38:56

**High Band Edge Plot on 802.11n HT20 Channel 11**

2o1701 15C BandEdge 802.11g\_N20 2462 (ch11)

Date: 22.OCT.2012 23:44:03



|                       |              |                            |          |
|-----------------------|--------------|----------------------------|----------|
| <b>Test Mode :</b>    | 802.11n HT40 | <b>Temperature :</b>       | 24~26℃   |
| <b>Test Band :</b>    | Low and High | <b>Relative Humidity :</b> | 50~53%   |
| <b>Test Channel :</b> | 03 and 09    | <b>Test Engineer :</b>     | Bill Kuo |

Ref 20 dBm \* Att 20 dB SWT 15 ms

\* RBW 100 kHz VBW 300 kHz

Marker 1 [T1] -32.37 dBm

2.399370000 GHz

20 Offset 25 1 dB

1 PK MAXH

D2 -22.93 dBm

F2

Start 2.31 GHz 13.5 MHz/ Stop 2.445 GHz

Date: 22.OCT.2012 23:57:53

Ref 20 dBm Att 20 dB RBW 100 kHz VBW 300 kHz SWT 15 ms Marker 1 [T1 ] -38.96 dBm 2.491155000 GHz

20 Offset 25 1 dB

1 PK MAXR

D2 -22.77 dBm

F1

Start 2.43 GHz 13.5 MHz/ Stop 2.565 GHz

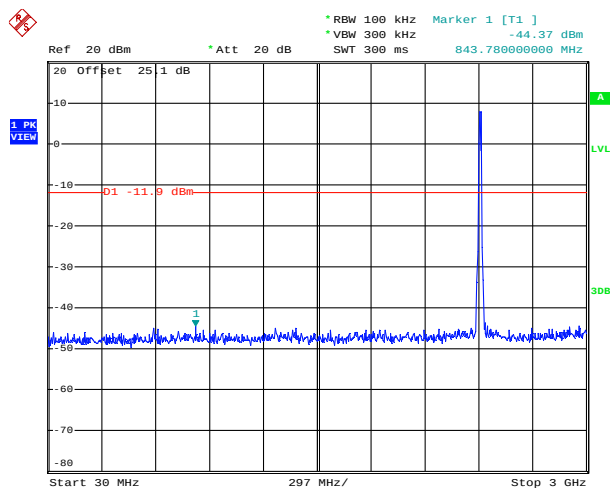
Date: 22.OCT.2012 23:48:55

### 3.4.6 Test Plots of Spurious Emission

|                       |                         |                            |          |
|-----------------------|-------------------------|----------------------------|----------|
| <b>Test Mode :</b>    | 802.11b                 | <b>Temperature :</b>       | 24~26°C  |
| <b>Test Band :</b>    | 30MHz-3GHz and 2G-25GHz | <b>Relative Humidity :</b> | 50~53%   |
| <b>Test Channel :</b> | 01, 06, 11              | <b>Test Engineer :</b>     | Bill Kuo |

#### 802.11b 30 MHz~3 GHz

##### Conducted Spurious Emission Plot on Channel 01

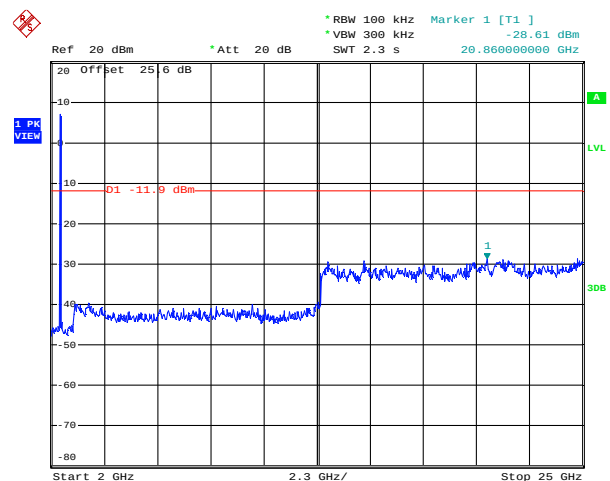


201701 15C Spurious 802.11b 2412 (ch01)

Date: 22.OCT.2012 23:18:39

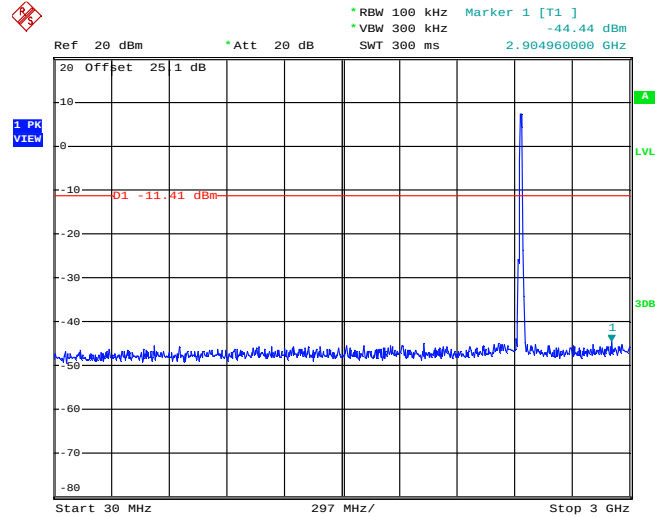
#### 802.11b 2 GHz~25 GHz

##### Conducted Spurious Emission Plot on Channel 01

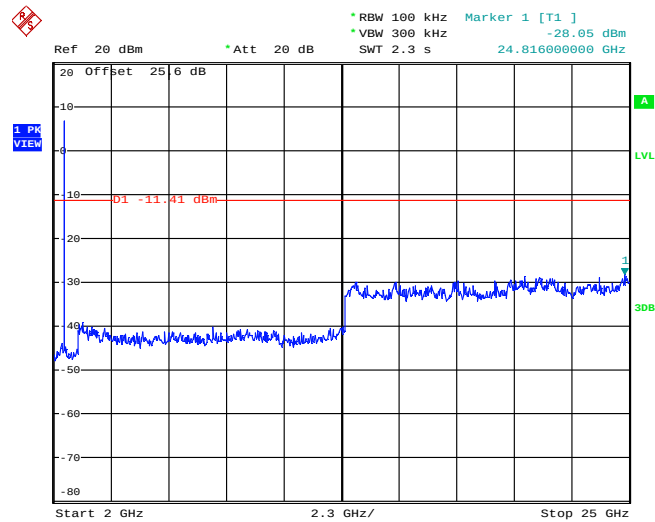


201701 15C Spurious 802.11b 2412 (ch01)

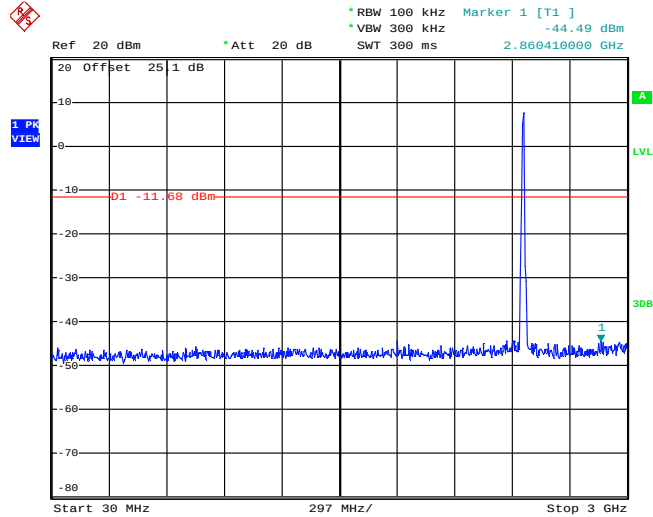
Date: 22.OCT.2012 23:18:56

**802.11b 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 06**


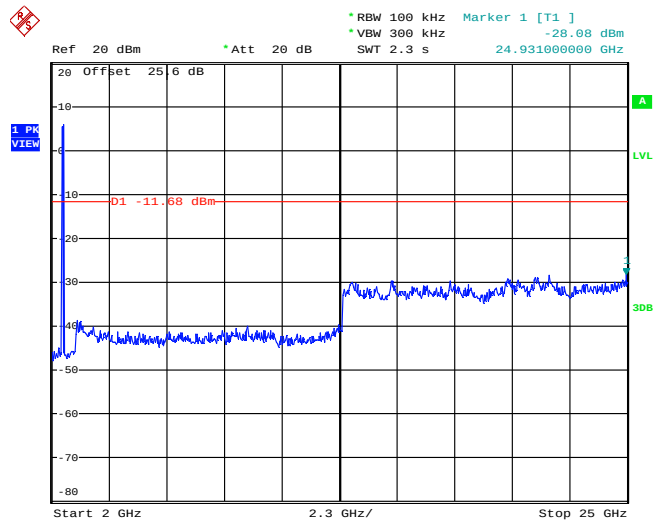
201701 15C Spurious 802.11b 2437 (ch06)  
Date: 22.OCT.2012 23:22:06

**802.11b 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 06**


201701 15C Spurious 802.11b 2437 (ch06)  
Date: 22.OCT.2012 23:22:24

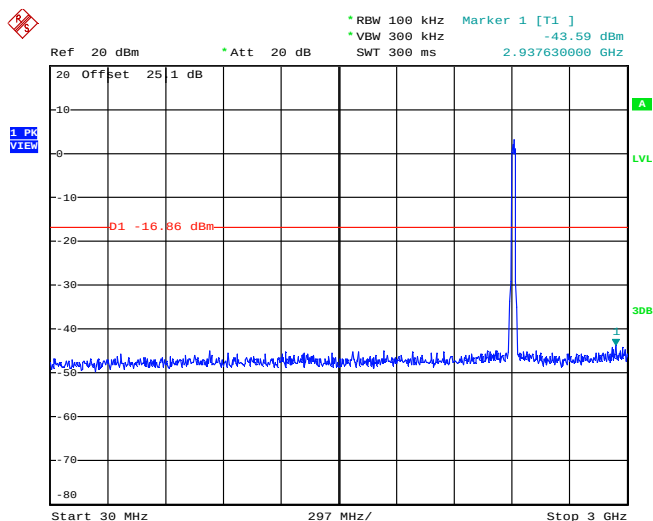
**802.11b 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11b 2462 (ch11)  
Date: 22.OCT.2012 23:25:37

**802.11b 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 11**


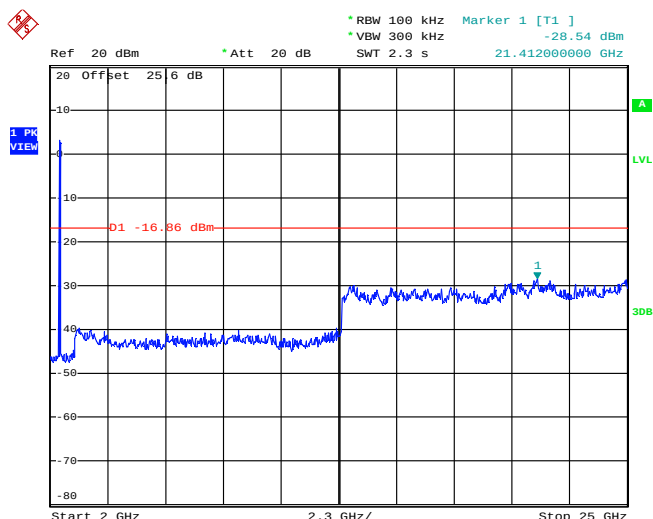
201701 15C Spurious 802.11b 2462 (ch11)  
Date: 22.OCT.2012 23:25:55

|                |                         |                     |          |
|----------------|-------------------------|---------------------|----------|
| Test Mode :    | 802.11g                 | Temperature :       | 24~26°C  |
| Test Band :    | 30MHz-3GHz and 2G-25GHz | Relative Humidity : | 50~53%   |
| Test Channel : | 01, 06, 11              | Test Engineer :     | Bill Kuo |

**802.11g 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 01**


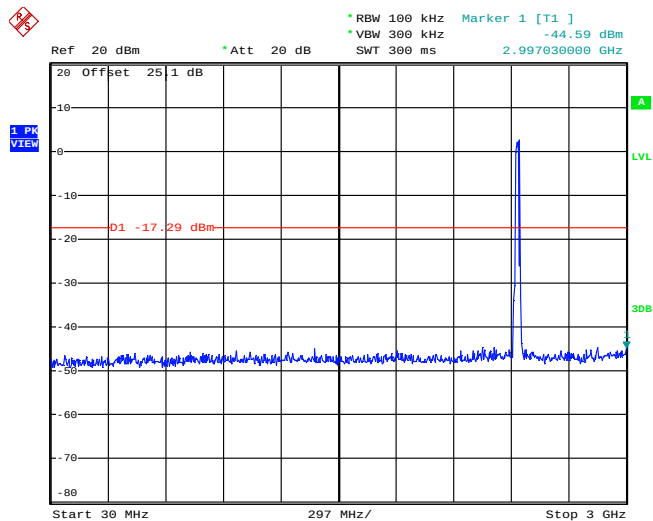
201701 15C Spurious 802.11g 2412 (ch01)

Date: 22.OCT.2012 23:35:48

**802.11g 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 01**


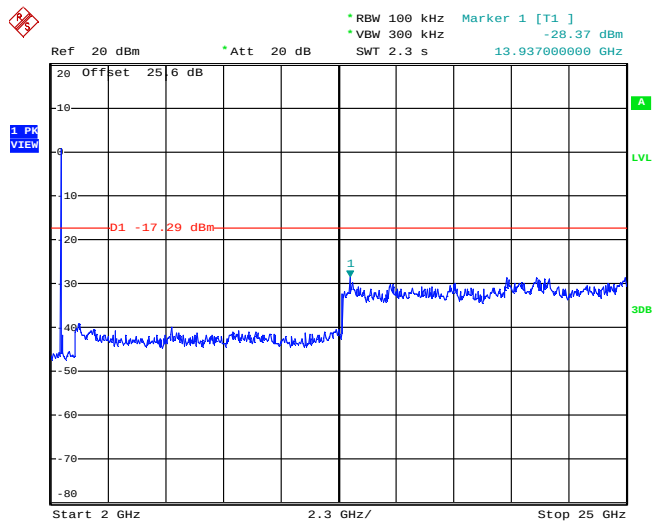
201701 15C Spurious 802.11g 2412 (ch01)

Date: 22.OCT.2012 23:36:06

**802.11g 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 06**


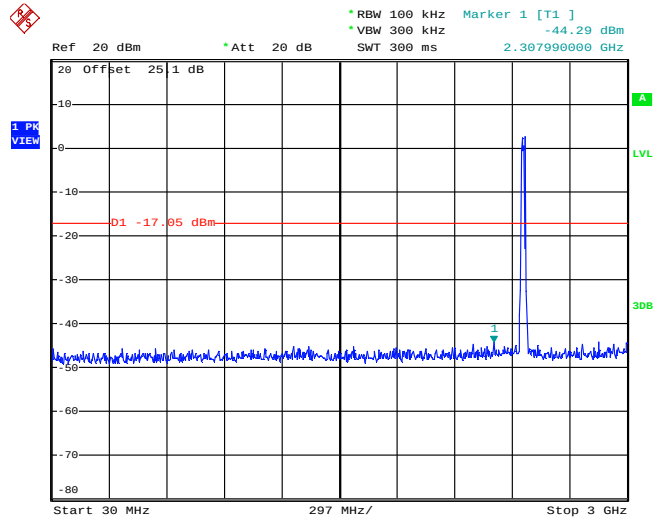
201701 15C Spurious 802.11g 2437 (ch06)

Date: 22.OCT.2012 23:32:45

**802.11g 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 06**


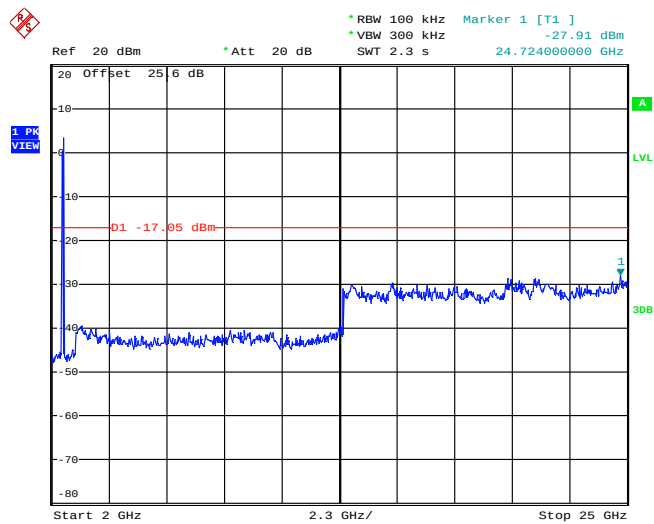
201701 15C Spurious 802.11g 2437 (ch06)

Date: 22.OCT.2012 23:33:03

**802.11g 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11g 2462 (ch11)

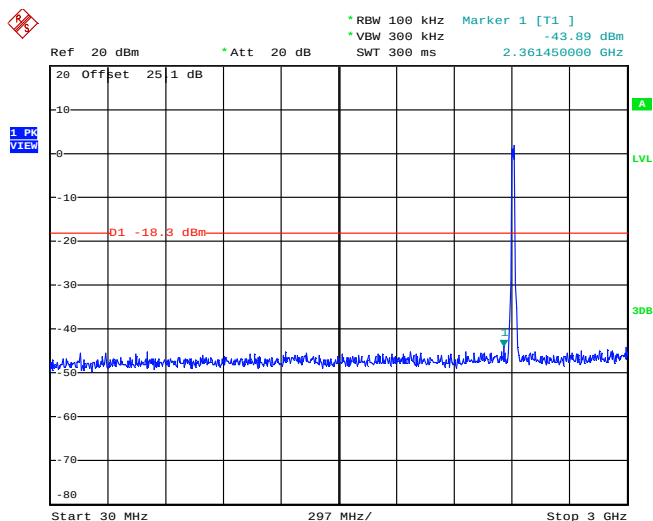
Date: 22.OCT.2012 23:30:10

**802.11g 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11g 2462 (ch11)

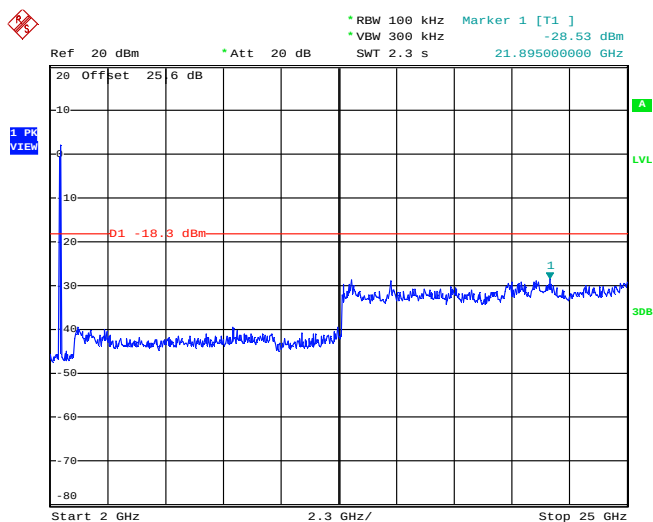
Date: 22.OCT.2012 23:30:27

|                |                         |                     |          |
|----------------|-------------------------|---------------------|----------|
| Test Mode :    | 802.11n HT20            | Temperature :       | 24~26°C  |
| Test Band :    | 30MHz-3GHz and 2G-25GHz | Relative Humidity : | 50~53%   |
| Test Channel : | 01, 06, 11              | Test Engineer :     | Bill Kuo |

**802.11n HT20 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 01**


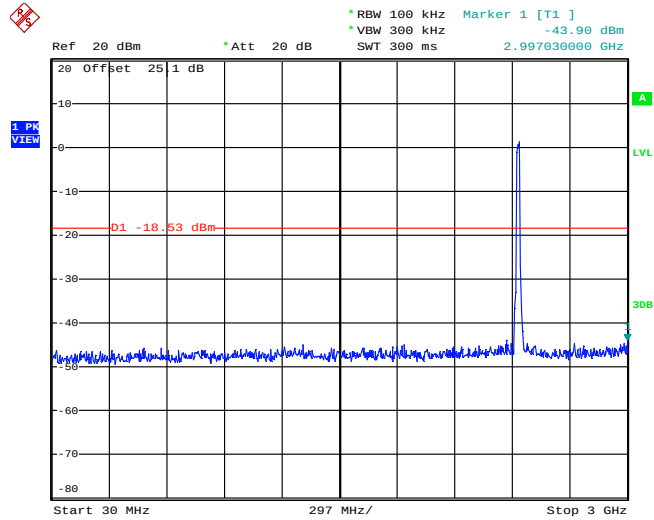
201701 15C Spurious 802.11g\_N20 2412 (ch01)

Date: 22.OCT.2012 23:39:17

**802.11n HT20 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 01**


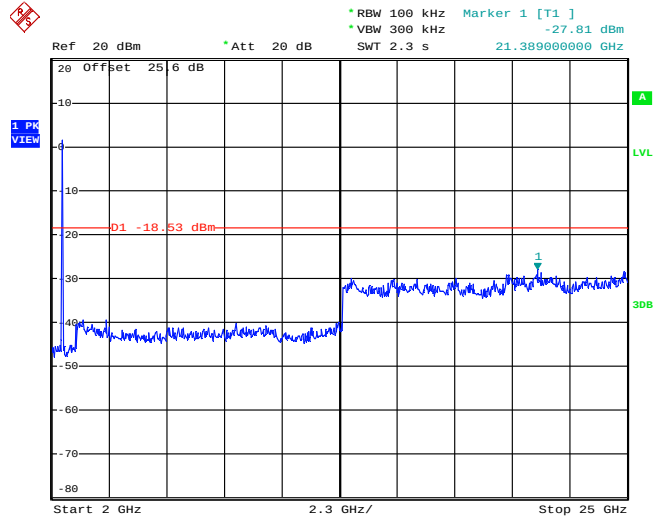
201701 15C Spurious 802.11g\_N20 2412 (ch01)

Date: 22.OCT.2012 23:39:34

**802.11n HT20 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 06**


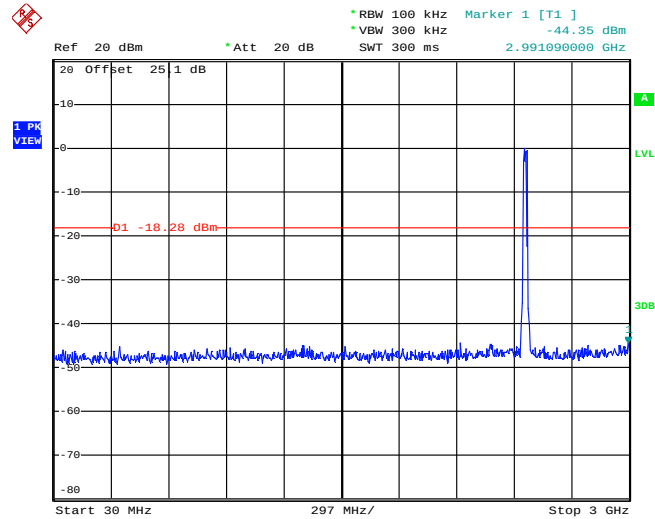
201701 15C Spurious 802.11g\_N20 2437 (ch06)

Date: 22.OCT.2012 23:41:39

**802.11n HT20 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 06**


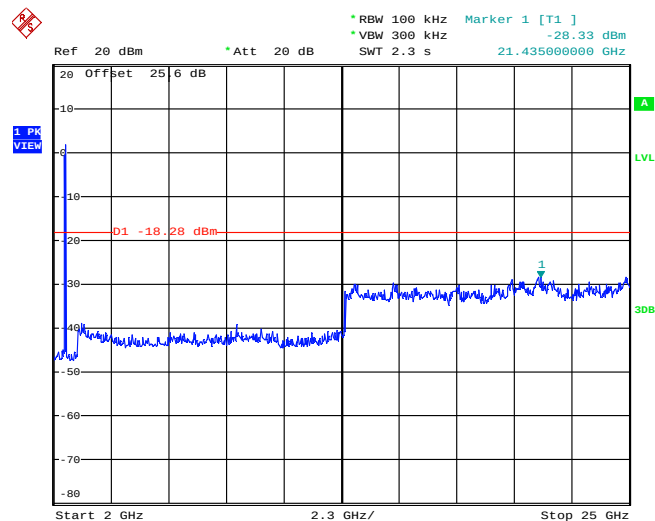
201701 15C Spurious 802.11g\_N20 2437 (ch06)

Date: 22.OCT.2012 23:41:56

**802.11n HT20 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11g\_N20 2462 (ch11)

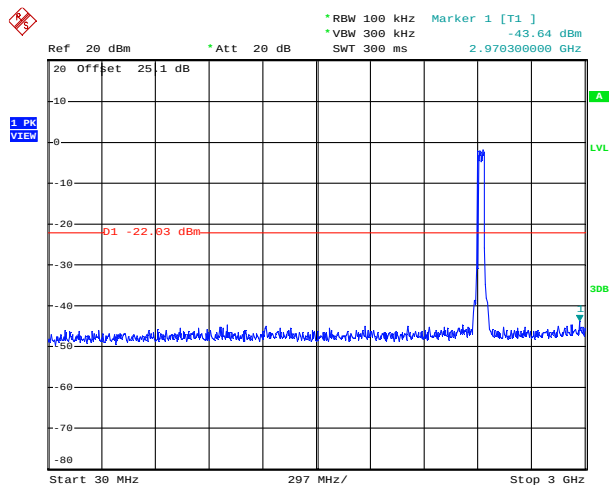
Date: 22.OCT.2012 23:44:27

**802.11n HT20 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 11**


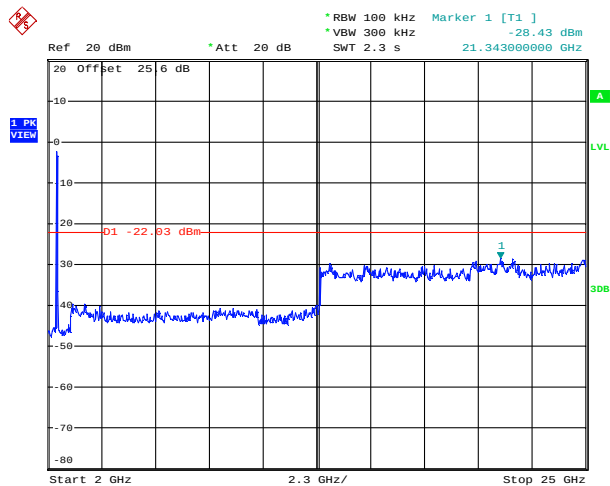
201701 15C Spurious 802.11g\_N20 2462 (ch11)

Date: 22.OCT.2012 23:44:44

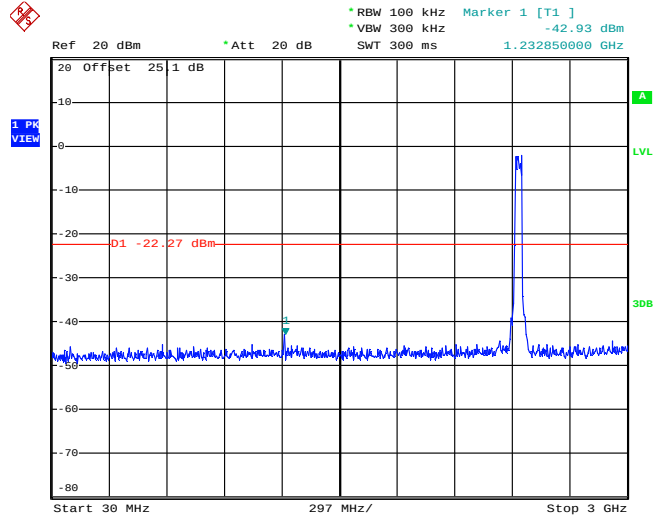
|                       |                         |                            |          |
|-----------------------|-------------------------|----------------------------|----------|
| <b>Test Mode :</b>    | 802.11n HT40            | <b>Temperature :</b>       | 24~26    |
| <b>Test Band :</b>    | 30MHz-3GHz and 2G-25GHz | <b>Relative Humidity :</b> | 50~53    |
| <b>Test Channel :</b> | 03, 06, 09              | <b>Test Engineer :</b>     | Bill Kuo |

**802.11n HT40 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 01**


201701 15C Spurious 802.11g\_N40 2422 (ch03)  
Date: 22.OCT.2012 23:58:13

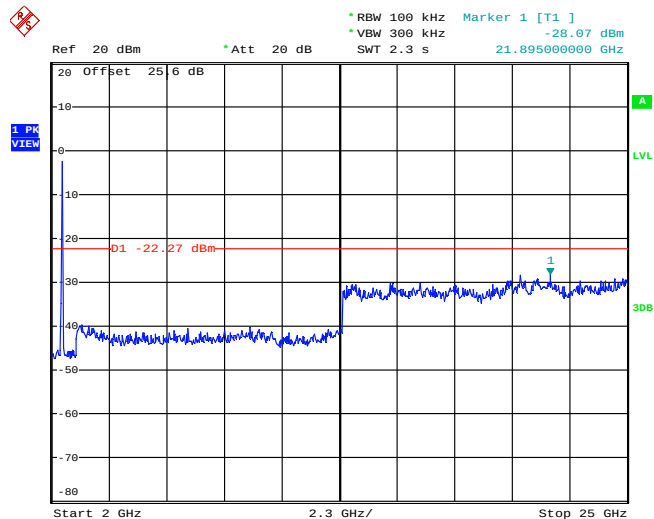
**802.11n HT40 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 01**


201701 15C Spurious 802.11g\_N40 2422 (ch03)  
Date: 22.OCT.2012 23:58:31

**802.11n HT40 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 06**


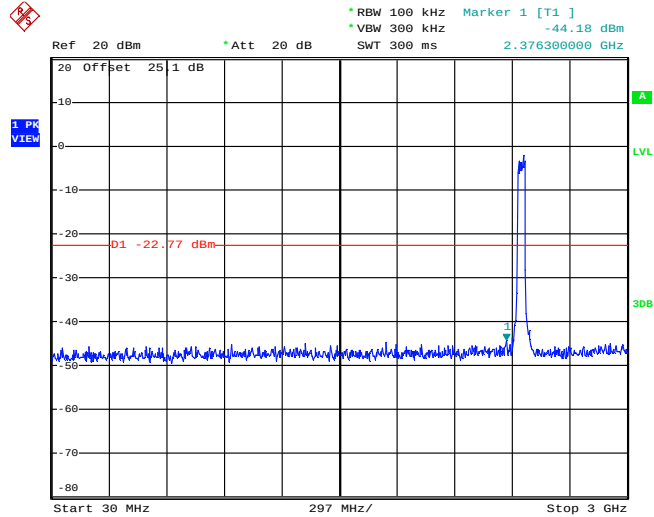
201701 15C Spurious 802.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:55:20

**802.11n HT40 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 06**


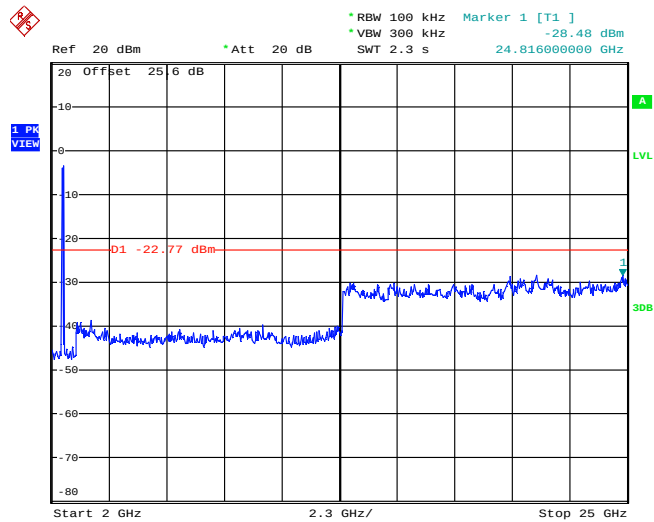
201701 15C Spurious 802.11g\_N40 2437 (ch06)

Date: 22.OCT.2012 23:55:37

**802.11n HT40 30 MHz~3 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11g\_N40 2452 (ch09)

Date: 22.OCT.2012 23:52:24

**802.11n HT40 2 GHz~25 GHz**
**Conducted Spurious Emission Plot on Channel 11**


201701 15C Spurious 802.11g\_N40 2452 (ch09)

Date: 22.OCT.2012 23:52:42

### 3.5 Radiated Emission Measurement

#### 3.5.1 Limit of Radiated Emission

In any 100 KHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 0.009 – 0.490      | 2400/F(KHz)                          | 300                              |
| 0.490 – 1.705      | 24000/F(KHz)                         | 30                               |
| 1.705 – 30.0       | 30                                   | 30                               |
| 30 – 88            | 100                                  | 3                                |
| 88 – 216           | 150                                  | 3                                |
| 216 - 960          | 200                                  | 3                                |
| Above 960          | 500                                  | 3                                |

#### 3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

1. The testing follows the guidelines in ANSI C63. 10-2009
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 KHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.

For average measurement:

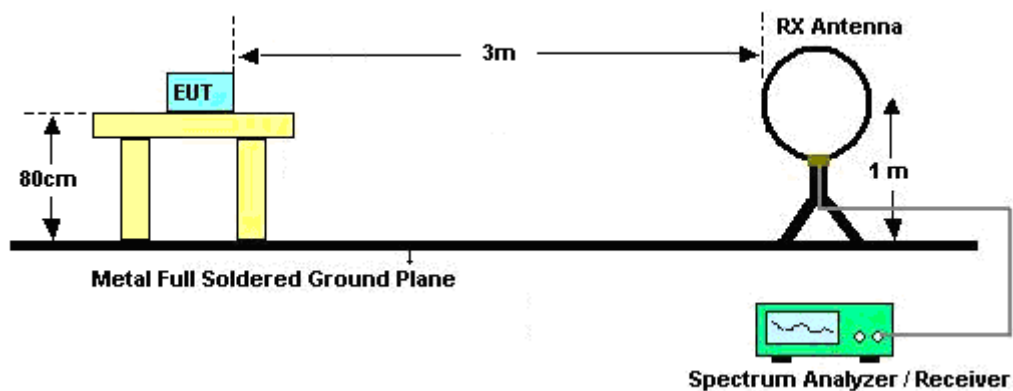
  - VBW = 10 Hz, when duty cycle is no less than 98 percent.
  - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Band         | Duty Cycle(%) | T(us)  | 1/T(KHz) | VBW Setting |
|--------------|---------------|--------|----------|-------------|
| 802.11b      | 100           | -      | -        | 10Hz        |
| 802.11g      | 92.26         | 620.00 | 1.613    | 3KHz        |
| 802.11n HT20 | 91.16         | 536.00 | 1.866    | 3KHz        |
| 802.11n HT40 | 87.97         | 278.00 | 3.597    | 10KHz       |

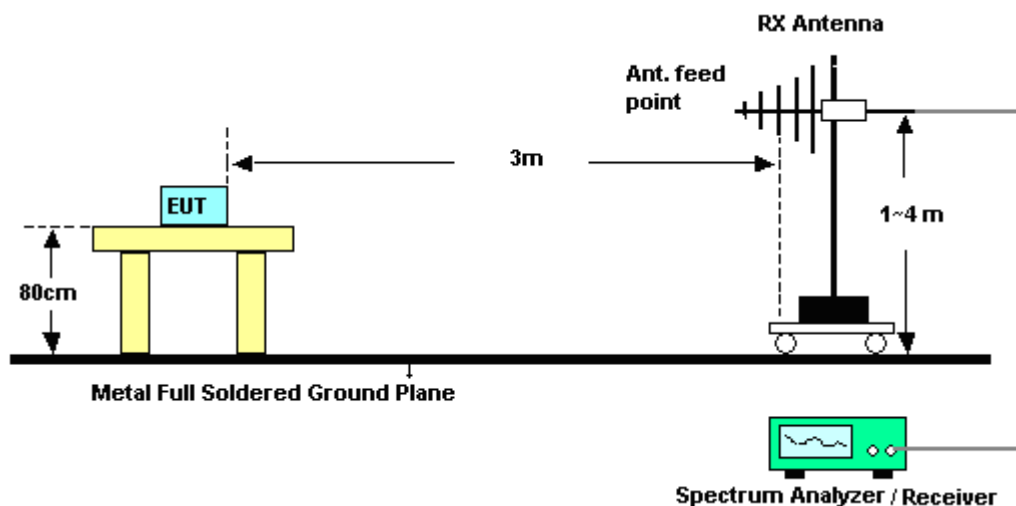
**Note:** For average measurement with duty cycle  $< 98\%$ , use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

### 3.5.4 Test Setup

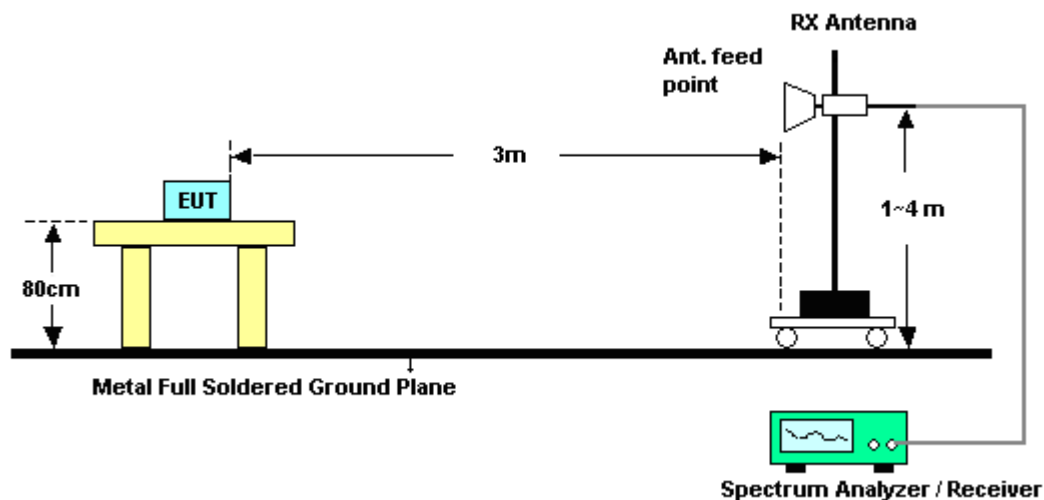
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.5.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

The low frequency, which started from 9 KHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

### 3.5.6 Test Result of Radiated Band Edges

|                       |         |                            |                             |
|-----------------------|---------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11b | <b>Temperature :</b>       | 24~25℃                      |
| <b>Test Band :</b>    | Low     | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 01      | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2325.21                       | 65.18               | -8.82                   | 74                          | 61.14                     | 32.26                       | 6.35                    | 34.57                      | 116                  | 226                     | Peak    |
| 2327.64                       | 47.88               | -6.12                   | 54                          | 43.84                     | 32.26                       | 6.35                    | 34.57                      | 116                  | 226                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2324.49                     | 62.09               | -11.91                  | 74                          | 58.05                     | 32.26                       | 6.35                    | 34.57                      | 178                  | 101                     | Peak    |
| 2386.32                     | 46.19               | -7.81                   | 54                          | 41.94                     | 32.36                       | 6.45                    | 34.56                      | 178                  | 101                     | Average |

|                       |         |                            |                             |
|-----------------------|---------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11b | <b>Temperature :</b>       | 24~25℃                      |
| <b>Test Band :</b>    | High    | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 11      | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2484.92                       | 58.57               | -15.43                  | 74                          | 54.05                     | 32.48                       | 6.59                    | 34.55                      | 140                  | 241                     | Peak    |
| 2487.58                       | 46.47               | -7.53                   | 54                          | 41.93                     | 32.5                        | 6.59                    | 34.55                      | 140                  | 241                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2487.34                     | 54.89               | -19.11                  | 74                          | 50.37                     | 32.48                       | 6.59                    | 34.55                      | 170                  | 108                     | Peak    |
| 2487.76                     | 43                  | -11                     | 54                          | 38.46                     | 32.5                        | 6.59                    | 34.55                      | 170                  | 108                     | Average |



|                |         |                     |                             |
|----------------|---------|---------------------|-----------------------------|
| Test Mode :    | 802.11g | Temperature :       | 24~25°C                     |
| Test Band :    | Low     | Relative Humidity : | 46~47%                      |
| Test Channel : | 01      | Test Engineer :     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2389.65                       | 73.33               | -0.67                   | 74                          | 69.08                     | 32.36                       | 6.45                    | 34.56                      | 115                  | 2                       | Peak    |
| 2390.00                       | 52.58               | -1.42                   | 54                          | 48.33                     | 32.36                       | 6.45                    | 34.56                      | 115                  | 2                       | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2390.00                     | 71.46               | -2.54                   | 74                          | 67.21                     | 32.36                       | 6.45                    | 34.56                      | 170                  | 92                      | Peak    |
| 2390.00                     | 50.12               | -3.88                   | 54                          | 45.87                     | 32.36                       | 6.45                    | 34.56                      | 170                  | 92                      | Average |

|                |         |                     |                             |
|----------------|---------|---------------------|-----------------------------|
| Test Mode :    | 802.11g | Temperature :       | 24~25°C                     |
| Test Band :    | High    | Relative Humidity : | 46~47%                      |
| Test Channel : | 11      | Test Engineer :     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.52                       | 73.74               | -0.26                   | 74                          | 69.22                     | 32.48                       | 6.59                    | 34.55                      | 109                  | 57                      | Peak    |
| 2483.52                       | 51.4                | -2.6                    | 54                          | 46.88                     | 32.48                       | 6.59                    | 34.55                      | 109                  | 57                      | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.68                     | 72.71               | -1.29                   | 74                          | 68.19                     | 32.48                       | 6.59                    | 34.55                      | 108                  | 59                      | Peak    |
| 2483.52                     | 51.47               | -2.53                   | 54                          | 46.95                     | 32.48                       | 6.59                    | 34.55                      | 108                  | 59                      | Average |



|                       |              |                            |                             |
|-----------------------|--------------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11n HT20 | <b>Temperature :</b>       | 24~25°C                     |
| <b>Test Band :</b>    | Low          | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 01           | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2390.00                       | 73.03               | -0.97                   | 74                          | 68.78                     | 32.36                       | 6.45                    | 34.56                      | 116                  | 2                       | Peak    |
| 2389.92                       | 52.97               | -1.03                   | 54                          | 48.72                     | 32.36                       | 6.45                    | 34.56                      | 116                  | 2                       | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2389.38                     | 72.13               | -1.87                   | 74                          | 67.88                     | 32.36                       | 6.45                    | 34.56                      | 168                  | 88                      | Peak    |
| 2389.83                     | 51.03               | -2.97                   | 54                          | 46.78                     | 32.36                       | 6.45                    | 34.56                      | 168                  | 88                      | Average |

|                       |              |                            |                             |
|-----------------------|--------------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11n HT20 | <b>Temperature :</b>       | 24~25°C                     |
| <b>Test Band :</b>    | High         | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 11           | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.98                       | 70.37               | -3.63                   | 74                          | 65.85                     | 32.48                       | 6.59                    | 34.55                      | 110                  | 62                      | Peak    |
| 2483.64                       | 50.38               | -3.62                   | 54                          | 45.86                     | 32.48                       | 6.59                    | 34.55                      | 110                  | 62                      | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2483.74                     | 69.53               | -4.47                   | 74                          | 65.01                     | 32.48                       | 6.59                    | 34.55                      | 199                  | 89                      | Peak    |
| 2483.54                     | 49.09               | -4.91                   | 54                          | 44.57                     | 32.48                       | 6.59                    | 34.55                      | 199                  | 89                      | Average |

|                       |              |                            |                             |
|-----------------------|--------------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11n HT40 | <b>Temperature :</b>       | 24~25°C                     |
| <b>Test Band :</b>    | Low          | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 03           | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2389.74                       | 70.81               | -3.19                   | 74                          | 66.56                     | 32.36                       | 6.45                    | 34.56                      | 110                  | 8                       | Peak    |
| 2384.88                       | 53.33               | -0.67                   | 54                          | 49.11                     | 32.33                       | 6.45                    | 34.56                      | 110                  | 8                       | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2390.01                     | 69.06               | -4.94                   | 74                          | 64.81                     | 32.36                       | 6.45                    | 34.56                      | 100                  | 289                     | Peak    |
| 2384.97                     | 51.98               | -2.02                   | 54                          | 47.76                     | 32.33                       | 6.45                    | 34.56                      | 100                  | 289                     | Average |

|                       |              |                            |                             |
|-----------------------|--------------|----------------------------|-----------------------------|
| <b>Test Mode :</b>    | 802.11n HT40 | <b>Temperature :</b>       | 24~25°C                     |
| <b>Test Band :</b>    | High         | <b>Relative Humidity :</b> | 46~47%                      |
| <b>Test Channel :</b> | 09           | <b>Test Engineer :</b>     | Kai Wang and Timberland Lin |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2484.58                       | 71.74               | -2.26                   | 74                          | 67.22                     | 32.48                       | 6.59                    | 34.55                      | 109                  | 8                       | Peak    |
| 2484.64                       | 52.35               | -1.65                   | 54                          | 47.83                     | 32.48                       | 6.59                    | 34.55                      | 109                  | 8                       | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 2486.34                     | 65.75               | -8.25                   | 74                          | 61.23                     | 32.48                       | 6.59                    | 34.55                      | 101                  | 242                     | Peak    |
| 2484.14                     | 48.85               | -5.15                   | 54                          | 44.33                     | 32.48                       | 6.59                    | 34.55                      | 101                  | 242                     | Average |

**3.5.7 Test Result of Radiated Emission (30 MHz ~ 10<sup>th</sup> Harmonic)**

|                        |                                                                                                                                                                                                                        |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                                                                                | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 01                                                                                                                                                                                                                     | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                                                                            | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. 9648 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 110.04 dBuV/m - 20dB = 90.04 dBuV/m. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 30                   | 17.7                | -22.3                   | 40                          | 517.7                   | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 130.44               | 22.92               | -20.58                  | 43.5                        | 522.92                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 280.56               | 21.51               | -24.49                  | 46                          | 521.51                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 399.4                | 42.59               | -3.41                   | 46                          | 542.59                  | -500                        | -500                    | -500                       | 122                  | 326                     | Peak    |
| 601                  | 31.42               | -14.58                  | 46                          | 531.42                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 881                  | 34.33               | -11.67                  | 46                          | 534.33                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 2412                 | 105.36              | -                       | -                           | 101.05                  | 32.38                       | 6.49                    | 34.56                      | 116                  | 226                     | Average |
| 2412                 | 110.04              | -                       | -                           | 105.73                  | 32.38                       | 6.49                    | 34.56                      | 116                  | 226                     | Peak    |
| 4824                 | 48.94               | -5.06                   | 54                          | 59.49                   | 34.87                       | 10.17                   | 55.59                      | 100                  | 123                     | Average |
| 4824                 | 52.6                | -21.4                   | 74                          | 63.15                   | 34.87                       | 10.17                   | 55.59                      | 100                  | 123                     | Peak    |
| 9648                 | 49.75               | -40.29                  | 90.04                       | 58.28                   | 36.92                       | 10.56                   | 56.01                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                                   |                            |          |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                                           | <b>Temperature :</b>       | 24~25℃   |
| <b>Test Channel :</b>  | 01                                                                                                                                                                                | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                                       | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. 3216MHz and 9648 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 52.95                | 27.15               | -12.85                  | 40                          | 527.15                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 121.26               | 28.49               | -15.01                  | 43.5                        | 528.49                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 143.94               | 21.06               | -22.44                  | 43.5                        | 521.06                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 399.4                | 38.61               | -7.39                   | 46                          | 538.61                  | -500                        | -500                    | -500                       | 112                  | 321                     | Peak    |
| 601                  | 31.16               | -14.84                  | 46                          | 531.16                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 914.6                | 31.34               | -14.66                  | 46                          | 531.34                  | -500                        | -500                    | -500                       | -                    | -                       | Peak    |
| 2412                 | 103.97              | -                       | -                           | 99.66                   | 32.38                       | 6.49                    | 34.56                      | 178                  | 101                     | Average |
| 2412                 | 108.67              | -                       | -                           | 104.36                  | 32.38                       | 6.49                    | 34.56                      | 178                  | 101                     | Peak    |
| 3216                 | 48.76               | -39.91                  | 88.67                       | 61.92                   | 33.1                        | 7.78                    | 54.04                      | 100                  | 0                       | Peak    |
| 4824                 | 53.83               | -0.17                   | 54                          | 64.38                   | 34.87                       | 10.17                   | 55.59                      | 110                  | 25                      | Average |
| 4824                 | 56.25               | -17.75                  | 74                          | 66.8                    | 34.87                       | 10.17                   | 55.59                      | 110                  | 25                      | Peak    |
| 9648                 | 50.77               | -37.9                   | 88.67                       | 59.3                    | 36.92                       | 10.56                   | 56.01                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                                    |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                                            | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 06                                                                                                                                                                                 | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                                        | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 3249 MHz and 9748 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 106.54              | -                       | -                           | 102.18                  | 32.4                        | 6.52                    | 34.56                      | 179                  | 235                     | Average |
| 2437                 | 111.41              | -                       | -                           | 107.05                  | 32.4                        | 6.52                    | 34.56                      | 179                  | 235                     | Peak    |
| 3249                 | 48.62               | -42.79                  | 91.41                       | 61.75                   | 33.1                        | 7.82                    | 54.05                      | 100                  | 0                       | Peak    |
| 4874                 | 50.58               | -23.42                  | 74                          | 61.23                   | 34.85                       | 10.18                   | 55.68                      | 100                  | 0                       | Peak    |
| 9748                 | 49.63               | -41.78                  | 91.41                       | 57.95                   | 37.06                       | 10.56                   | 55.94                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                      |                            |          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                              | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 06                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 9748 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 103.93              | -                       | -                           | 99.57                   | 32.4                        | 6.52                    | 34.56                      | 171                  | 98                      | Average |
| 2437                 | 109.06              | -                       | -                           | 104.7                   | 32.4                        | 6.52                    | 34.56                      | 171                  | 98                      | Peak    |
| 4874                 | 55.04               | -18.96                  | 74                          | 65.69                   | 34.85                       | 10.18                   | 55.68                      | 100                  | 23                      | Peak    |
| 4874                 | 53.26               | -0.74                   | 54                          | 63.91                   | 34.85                       | 10.18                   | 55.68                      | 100                  | 23                      | Average |
| 9748                 | 49.55               | -39.51                  | 89.06                       | 57.91                   | 37.04                       | 10.56                   | 55.96                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                                   |                            |            |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                                           | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 11                                                                                                                                                                                | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                                       | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. 3282MHz and 9848 MHz are not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2462                 | 106.74              | -                       | -                           | 102.29                  | 32.45                       | 6.56                    | 34.56                      | 140                  | 241                     | Average |
| 2462                 | 111.45              | -                       | -                           | 107                     | 32.45                       | 6.56                    | 34.56                      | 140                  | 241                     | Peak    |
| 3282                 | 49.51               | -41.94                  | 91.45                       | 62.63                   | 33.1                        | 7.84                    | 54.06                      | 100                  | 0                       | Peak    |
| 4924                 | 49.16               | -24.84                  | 74                          | 59.91                   | 34.83                       | 10.2                    | 55.78                      | 100                  | 0                       | Peak    |
| 9848                 | 51.1                | -40.35                  | 91.45                       | 59.24                   | 37.18                       | 10.57                   | 55.89                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                      |                            |          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11b                                                                                                                                                              | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 11                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. 9848 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2462                 | 104.29              | -                       | -                           | 99.84                   | 32.45                       | 6.56                    | 34.56                      | 170                  | 108                     | Average |
| 2462                 | 109.03              | -                       | -                           | 104.58                  | 32.45                       | 6.56                    | 34.56                      | 170                  | 108                     | Peak    |
| 4924                 | 46.29               | -7.71                   | 54                          | 57.04                   | 34.83                       | 10.2                    | 55.78                      | 100                  | 24                      | Average |
| 4924                 | 52.64               | -21.36                  | 74                          | 63.39                   | 34.83                       | 10.2                    | 55.78                      | 100                  | 24                      | Peak    |
| 9848                 | 49.86               | -39.17                  | 89.03                       | 57.96                   | 37.21                       | 10.57                   | 55.88                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                                              | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 01                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. 3216 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2412                 | 99.7                | -                       | -                           | 95.39                   | 32.38                       | 6.49                    | 34.56                      | 115                  | 2                       | Average |
| 2412                 | 109.42              | -                       | -                           | 105.11                  | 32.38                       | 6.49                    | 34.56                      | 115                  | 2                       | Peak    |
| 3216                 | 48.88               | -40.54                  | 89.42                       | 62.04                   | 33.1                        | 7.78                    | 54.04                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                              | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 01                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2412                 | 97.83               | -                       | -                           | 93.52                   | 32.38                       | 6.49                    | 34.56                      | 170                  | 92                      | Average |
| 2412                 | 107.7               | -                       | -                           | 103.39                  | 32.38                       | 6.49                    | 34.56                      | 170                  | 92                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                                              | <b>Temperature :</b>       | 24~25℃     |
| <b>Test Channel :</b>  | 06                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 3249 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 99.68               | -                       | -                           | 95.29                   | 32.43                       | 6.52                    | 34.56                      | 139                  | 60                      | Average |
| 2437                 | 109.43              | -                       | -                           | 105.07                  | 32.4                        | 6.52                    | 34.56                      | 139                  | 60                      | Peak    |
| 3249                 | 48.72               | -40.71                  | 89.43                       | 61.85                   | 33.1                        | 7.82                    | 54.05                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                              | <b>Temperature :</b>       | 24~25℃   |
| <b>Test Channel :</b>  | 06                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 98.05               | -                       | -                           | 93.66                   | 32.43                       | 6.52                    | 34.56                      | 199                  | 89                      | Average |
| 2437                 | 107.85              | -                       | -                           | 103.49                  | 32.4                        | 6.52                    | 34.56                      | 199                  | 89                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                                              | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 11                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. 3282 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 51.06                | 16.23               | -23.77                  | 40                          | 39.4                    | 7.88                        | 0.65                    | 31.7                       | -                    | -                       | Peak    |
| 78.06                | 16.62               | -23.38                  | 40                          | 40.6                    | 6.8                         | 0.92                    | 31.7                       | -                    | -                       | Peak    |
| 144.75               | 21.84               | -21.66                  | 43.5                        | 41.52                   | 10.57                       | 1.45                    | 31.7                       | -                    | -                       | Peak    |
| 399.4                | 42.34               | -3.66                   | 46                          | 56.06                   | 15.7                        | 2.37                    | 31.79                      | 100                  | 215                     | Peak    |
| 601                  | 32.13               | -13.87                  | 46                          | 42.41                   | 18.81                       | 3.04                    | 32.13                      | -                    | -                       | Peak    |
| 881                  | 35.61               | -10.39                  | 46                          | 43.02                   | 20.5                        | 3.81                    | 31.72                      | -                    | -                       | Peak    |
| 2462                 | 99.08               | -                       | -                           | 94.63                   | 32.45                       | 6.56                    | 34.56                      | 109                  | 57                      | Average |
| 2462                 | 108.93              | -                       | -                           | 104.48                  | 32.45                       | 6.56                    | 34.56                      | 109                  | 57                      | Peak    |
| 3282                 | 48.69               | -40.24                  | 88.93                       | 61.81                   | 33.1                        | 7.84                    | 54.06                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11g                                                                                                                                              | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 11                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 37.56                | 20.06               | -19.94                  | 40                          | 37.17                   | 14.12                       | 0.47                    | 31.7                       | -                    | -                       | Peak    |
| 51.6                 | 28.45               | -11.55                  | 40                          | 51.62                   | 7.88                        | 0.65                    | 31.7                       | -                    | -                       | Peak    |
| 122.34               | 26.92               | -16.58                  | 43.5                        | 44.98                   | 12.32                       | 1.33                    | 31.71                      | -                    | -                       | Peak    |
| 399.4                | 40.14               | -5.86                   | 46                          | 53.86                   | 15.7                        | 2.37                    | 31.79                      | 115                  | 315                     | Peak    |
| 601                  | 30.65               | -15.35                  | 46                          | 40.93                   | 18.81                       | 3.04                    | 32.13                      | -                    | -                       | Peak    |
| 881                  | 30.02               | -15.98                  | 46                          | 37.43                   | 20.5                        | 3.81                    | 31.72                      | -                    | -                       | Peak    |
| 2462                 | 98.29               | -                       | -                           | 93.84                   | 32.45                       | 6.56                    | 34.56                      | 108                  | 59                      | Average |
| 2462                 | 108.1               | -                       | -                           | 103.65                  | 32.45                       | 6.56                    | 34.56                      | 108                  | 59                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                                         | <b>Temperature :</b>       | 24~25℃     |
| <b>Test Channel :</b>  | 01                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. 3216 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 130.44               | 23.32               | -20.18                  | 43.5                        | 41.83                   | 11.8                        | 1.39                    | 31.7                       | -                    | -                       | Peak    |
| 144.75               | 21.84               | -21.66                  | 43.5                        | 41.52                   | 10.57                       | 1.45                    | 31.7                       | -                    | -                       | Peak    |
| 282.45               | 21.14               | -24.86                  | 46                          | 37.81                   | 12.84                       | 2.2                     | 31.71                      | -                    | -                       | Peak    |
| 399.4                | 41.34               | -4.66                   | 46                          | 55.06                   | 15.7                        | 2.37                    | 31.79                      | 123                  | 256                     | Peak    |
| 800.5                | 32.56               | -13.44                  | 46                          | 41.29                   | 19.8                        | 3.44                    | 31.97                      | -                    | -                       | Peak    |
| 881                  | 35.61               | -10.39                  | 46                          | 43.02                   | 20.5                        | 3.81                    | 31.72                      | -                    | -                       | Peak    |
| 2412                 | 98.43               | -                       | -                           | 94.12                   | 32.38                       | 6.49                    | 34.56                      | 116                  | 2                       | Average |
| 2412                 | 108.79              | -                       | -                           | 104.48                  | 32.38                       | 6.49                    | 34.56                      | 116                  | 2                       | Peak    |
| 3216                 | 48.8                | -39.99                  | 88.79                       | 61.96                   | 33.1                        | 7.78                    | 54.04                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                         | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 01                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 51.6                 | 28.45               | -11.55                  | 40                          | 51.62                   | 7.88                        | 0.65                    | 31.7                       | -                    | -                       | Peak    |
| 71.85                | 19.29               | -20.71                  | 40                          | 43.61                   | 6.6                         | 0.78                    | 31.7                       | -                    | -                       | Peak    |
| 144.75               | 22.6                | -20.9                   | 43.5                        | 42.28                   | 10.57                       | 1.45                    | 31.7                       | -                    | -                       | Peak    |
| 399.4                | 41.14               | -4.86                   | 46                          | 54.86                   | 15.7                        | 2.37                    | 31.79                      | 100                  | 216                     | Peak    |
| 601                  | 30.65               | -15.35                  | 46                          | 40.93                   | 18.81                       | 3.04                    | 32.13                      | -                    | -                       | Peak    |
| 912.5                | 28.29               | -17.71                  | 46                          | 35.37                   | 20.63                       | 3.77                    | 31.48                      | -                    | -                       | Peak    |
| 2412                 | 97.77               | -                       | -                           | 93.46                   | 32.38                       | 6.49                    | 34.56                      | 168                  | 88                      | Average |
| 2412                 | 108.12              | -                       | -                           | 103.81                  | 32.38                       | 6.49                    | 34.56                      | 168                  | 88                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                                         | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 06                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 3249 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 98.5                | -                       | -                           | 94.11                   | 32.43                       | 6.52                    | 34.56                      | 138                  | 58                      | Average |
| 2437                 | 109.16              | -                       | -                           | 104.8                   | 32.4                        | 6.52                    | 34.56                      | 138                  | 58                      | Peak    |
| 3249                 | 48.44               | -40.72                  | 89.16                       | 61.57                   | 33.1                        | 7.82                    | 54.05                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                         | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 06                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 97.91               | -                       | -                           | 93.52                   | 32.43                       | 6.52                    | 34.56                      | 199                  | 91                      | Average |
| 2437                 | 108.5               | -                       | -                           | 104.14                  | 32.4                        | 6.52                    | 34.56                      | 199                  | 91                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                                         | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 11                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. 3282 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2462                 | 97.7                | -                       | -                           | 93.25                   | 32.45                       | 6.56                    | 34.56                      | 110                  | 62                      | Average |
| 2462                 | 108.21              | -                       | -                           | 103.75                  | 32.45                       | 6.56                    | 34.55                      | 110                  | 62                      | Peak    |
| 3282                 | 49.44               | -38.77                  | 88.21                       | 62.56                   | 33.1                        | 7.84                    | 54.06                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                         | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 11                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2462                 | 97.16               | -                       | -                           | 92.71                   | 32.45                       | 6.56                    | 34.56                      | 199                  | 89                      | Average |
| 2462                 | 107.51              | -                       | -                           | 103.05                  | 32.45                       | 6.56                    | 34.55                      | 199                  | 89                      | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                                         | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 03                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2422 MHz is fundamental signal which can be ignored.<br>2. 3228 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 50.52                | 21.16               | -18.84                  | 40                          | 43.95                   | 8.2                         | 0.8                     | 31.79                      | -                    | -                       | Peak    |
| 144.75               | 25.89               | -17.61                  | 43.5                        | 45.27                   | 10.57                       | 1.32                    | 31.27                      | -                    | -                       | Peak    |
| 285.96               | 24.23               | -21.77                  | 46                          | 40.54                   | 12.92                       | 1.85                    | 31.08                      | -                    | -                       | Peak    |
| 400.1                | 40.92               | -5.08                   | 46                          | 54.82                   | 15.75                       | 2.19                    | 31.84                      | 100                  | 248                     | Peak    |
| 601.7                | 34.2                | -11.8                   | 46                          | 44.65                   | 18.81                       | 2.77                    | 32.03                      | -                    | -                       | Peak    |
| 800.5                | 29.93               | -16.07                  | 46                          | 39.04                   | 19.8                        | 3.06                    | 31.97                      | -                    | -                       | Peak    |
| 2422                 | 94.89               | -                       | -                           | 90.56                   | 32.4                        | 6.49                    | 34.56                      | 110                  | 8                       | Average |
| 2422                 | 105.14              | -                       | -                           | 100.78                  | 32.4                        | 6.52                    | 34.56                      | 110                  | 8                       | Peak    |
| 3228                 | 50.14               | -35                     | 85.14                       | 63.28                   | 33.1                        | 7.8                     | 54.04                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                         | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 03                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2422 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 35.94                | 31.27               | -8.73                   | 40                          | 47.04                   | 15.04                       | 0.7                     | 31.51                      | 100                  | 139                     | Peak    |
| 54.84                | 28.33               | -11.67                  | 40                          | 52.38                   | 6.6                         | 0.84                    | 31.49                      | -                    | -                       | Peak    |
| 71.85                | 27.8                | -12.2                   | 40                          | 51.64                   | 6.6                         | 0.95                    | 31.39                      | -                    | -                       | Peak    |
| 399.4                | 36.61               | -9.39                   | 46                          | 50.53                   | 15.7                        | 2.19                    | 31.81                      | -                    | -                       | Peak    |
| 601.7                | 32.98               | -13.02                  | 46                          | 43.43                   | 18.81                       | 2.77                    | 32.03                      | -                    | -                       | Peak    |
| 912.5                | 33.06               | -12.94                  | 46                          | 40.21                   | 20.63                       | 3.36                    | 31.14                      | -                    | -                       | Peak    |
| 2422                 | 93.56               | -                       | -                           | 89.23                   | 32.4                        | 6.49                    | 34.56                      | 100                  | 289                     | Average |
| 2422                 | 103.73              | -                       | -                           | 99.4                    | 32.4                        | 6.49                    | 34.56                      | 100                  | 289                     | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                                         | <b>Temperature :</b>       | 24~25℃     |
| <b>Test Channel :</b>  | 06                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 3249 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 96.9                | -                       | -                           | 92.51                   | 32.43                       | 6.52                    | 34.56                      | 111                  | 66                      | Average |
| 2437                 | 106.17              | -                       | -                           | 101.84                  | 32.4                        | 6.49                    | 34.56                      | 111                  | 66                      | Peak    |
| 3249                 | 49.4                | -36.77                  | 86.17                       | 62.53                   | 33.1                        | 7.82                    | 54.05                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                         | <b>Temperature :</b>       | 24~25℃   |
| <b>Test Channel :</b>  | 06                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2437                 | 95.76               | -                       | -                           | 91.37                   | 32.43                       | 6.52                    | 34.56                      | 100                  | 245                     | Average |
| 2437                 | 104.94              | -                       | -                           | 100.55                  | 32.43                       | 6.52                    | 34.56                      | 100                  | 245                     | Peak    |

|                        |                                                                                                                                                                      |                            |            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                                         | <b>Temperature :</b>       | 24~25°C    |
| <b>Test Channel :</b>  | 09                                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%     |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 2452 MHz is fundamental signal which can be ignored.<br>2. 3270 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2452                 | 95.5                | -                       | -                           | 91.11                   | 32.43                       | 6.52                    | 34.56                      | 109                  | 8                       | Average |
| 2452                 | 105.42              | -                       | -                           | 101.06                  | 32.4                        | 6.52                    | 34.56                      | 109                  | 8                       | Peak    |
| 3270                 | 49.37               | -36.05                  | 85.42                       | 62.49                   | 33.1                        | 7.84                    | 54.06                      | 100                  | 0                       | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                         | <b>Temperature :</b>       | 24~25°C  |
| <b>Test Channel :</b>  | 09                                                                                                                                                   | <b>Relative Humidity :</b> | 46~47%   |
| <b>Test Engineer :</b> | Kai Wang and Timberland Lin                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 2452 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31 |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 2452                 | 94.47               | -                       | -                           | 90.08                   | 32.43                       | 6.52                    | 34.56                      | 101                  | 242                     | Average |
| 2452                 | 104.2               | -                       | -                           | 99.81                   | 32.43                       | 6.52                    | 34.56                      | 101                  | 242                     | Peak    |

## 3.6 AC Conducted Emission Measurement

### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission<br>(MHz) | Conducted Limit (dBuV) |           |
|--------------------------------|------------------------|-----------|
|                                | Quasi-Peak             | Average   |
| 0.15-0.5                       | 66 to 56*              | 56 to 46* |
| 0.5-5                          | 56                     | 46        |
| 5-30                           | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

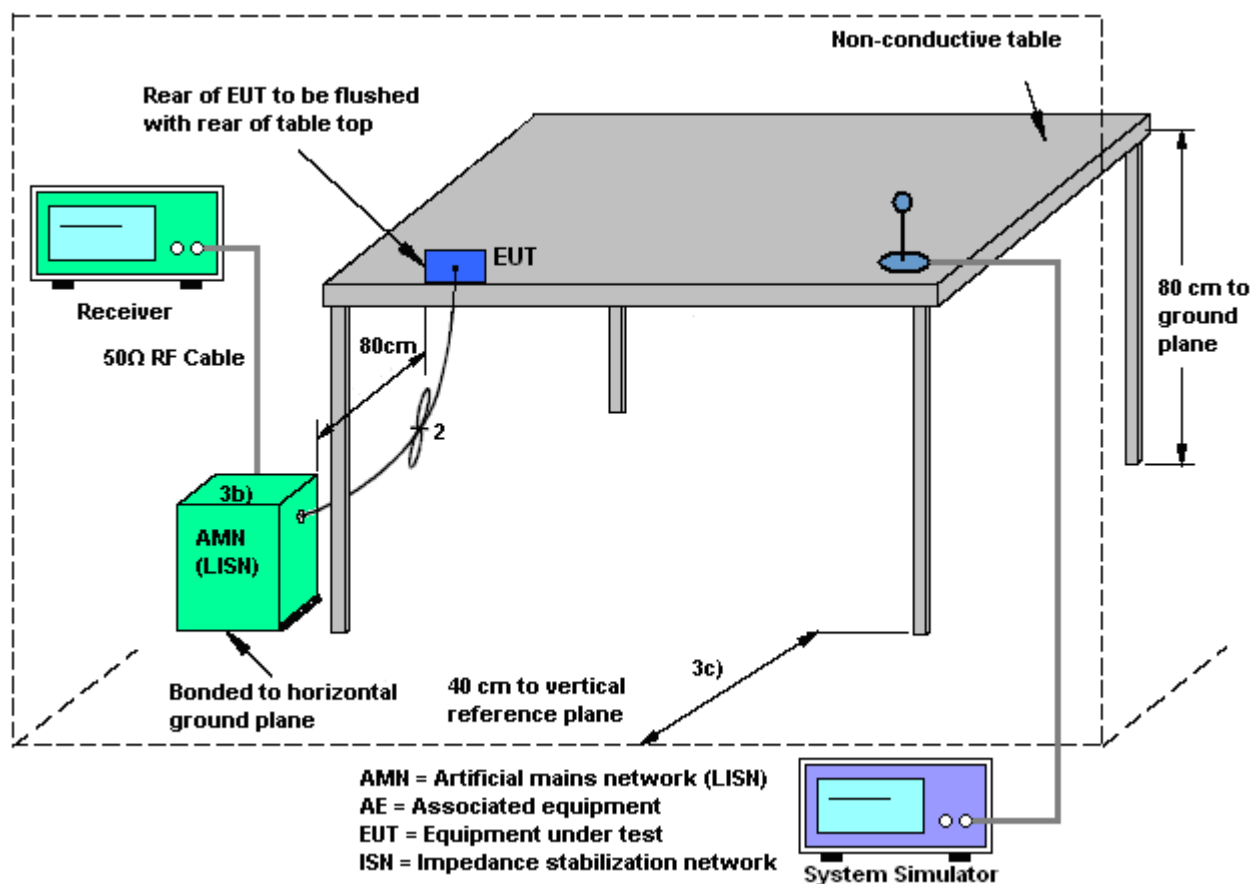
### 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.6.3 Test Procedures

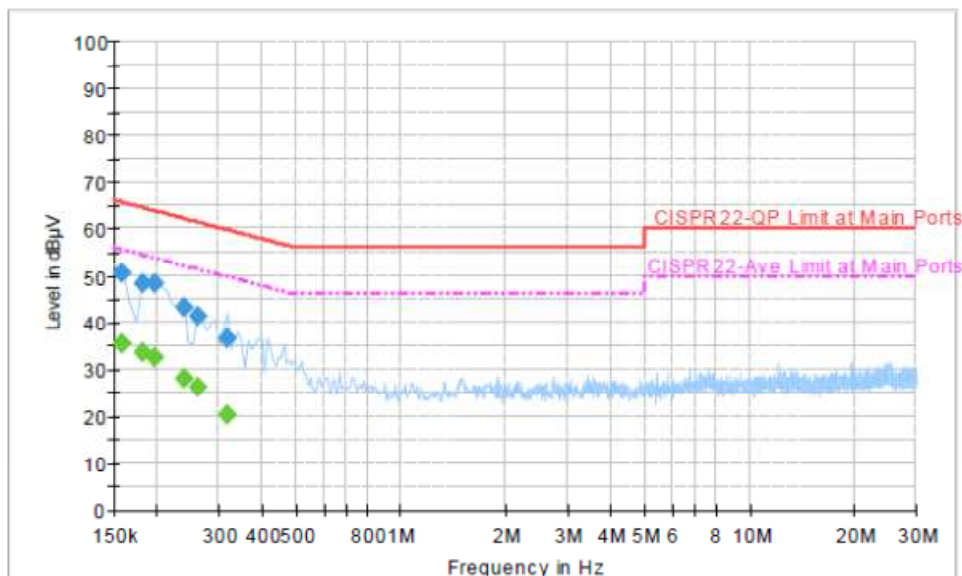
1. The testing follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 KHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

|                        |                                                                                 |                            |         |
|------------------------|---------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 1                                                                          | <b>Temperature :</b>       | 20~22°C |
| <b>Test Engineer :</b> | Slash Huang                                                                     | <b>Relative Humidity :</b> | 45~47%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                   | <b>Phase :</b>             | Line    |
| <b>Function Type :</b> | WLAN Link + TC                                                                  |                            |         |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit. |                            |         |



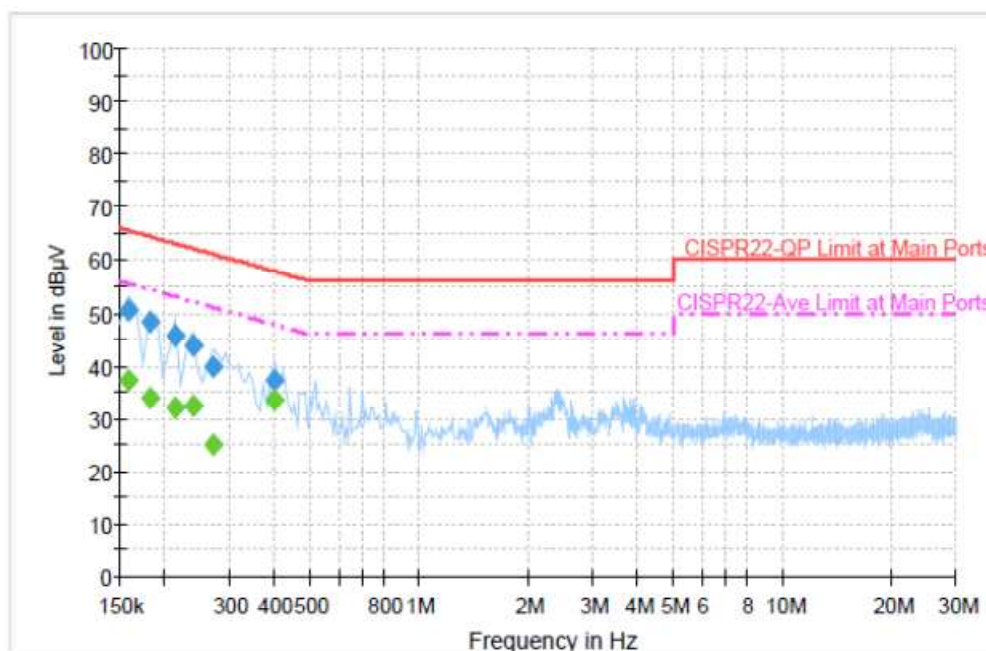
#### Final Result : Quasi-Peak

| Frequency (MHz) | Quasi-Peak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|-------------------|--------|------|------------|-------------|--------------|
| 0.158000        | 50.5              | Off    | L1   | 19.3       | 15.1        | 65.6         |
| 0.182000        | 48.3              | Off    | L1   | 19.4       | 16.1        | 64.4         |
| 0.198000        | 48.3              | Off    | L1   | 19.3       | 15.4        | 63.7         |
| 0.238000        | 43.2              | Off    | L1   | 19.5       | 19.0        | 62.2         |
| 0.262000        | 41.2              | Off    | L1   | 19.4       | 20.2        | 61.4         |
| 0.318000        | 36.4              | Off    | L1   | 19.4       | 23.4        | 59.8         |

#### Final Result : Average

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.158000        | 35.6           | Off    | L1   | 19.3       | 20.0        | 55.6         |
| 0.182000        | 33.5           | Off    | L1   | 19.4       | 20.9        | 54.4         |
| 0.198000        | 32.3           | Off    | L1   | 19.3       | 21.4        | 53.7         |
| 0.238000        | 28.0           | Off    | L1   | 19.5       | 24.2        | 52.2         |
| 0.262000        | 26.3           | Off    | L1   | 19.4       | 25.1        | 51.4         |
| 0.318000        | 20.2           | Off    | L1   | 19.4       | 29.6        | 49.8         |

|                        |                                                                                 |                            |         |
|------------------------|---------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Mode :</b>     | Mode 1                                                                          | <b>Temperature :</b>       | 20~22℃  |
| <b>Test Engineer :</b> | Slash Huang                                                                     | <b>Relative Humidity :</b> | 45~47%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                   | <b>Phase :</b>             | Neutral |
| <b>Function Type :</b> | WLAN Link + TC                                                                  |                            |         |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit. |                            |         |


**Final Result : Quasi-Peak**

| Frequency (MHz) | Quasi-Peak (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|-------------------|--------|------|------------|-------------|--------------|
| 0.158000        | 50.7              | Off    | N    | 19.3       | 14.9        | 65.6         |
| 0.182000        | 48.2              | Off    | N    | 19.4       | 16.2        | 64.4         |
| 0.214000        | 45.9              | Off    | N    | 19.4       | 17.1        | 63.0         |
| 0.238000        | 44.1              | Off    | N    | 19.5       | 18.1        | 62.2         |
| 0.270000        | 40.0              | Off    | N    | 19.4       | 21.1        | 61.1         |
| 0.398000        | 37.2              | Off    | N    | 19.5       | 20.7        | 57.9         |

**Final Result : Average**

| Frequency (MHz) | Average (dBμV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|----------------|--------|------|------------|-------------|--------------|
| 0.158000        | 37.2           | Off    | N    | 19.3       | 18.4        | 55.6         |
| 0.182000        | 34.0           | Off    | N    | 19.4       | 20.4        | 54.4         |
| 0.214000        | 32.0           | Off    | N    | 19.4       | 21.0        | 53.0         |
| 0.238000        | 32.4           | Off    | N    | 19.5       | 19.8        | 52.2         |
| 0.270000        | 25.2           | Off    | N    | 19.4       | 25.9        | 51.1         |
| 0.398000        | 33.5           | Off    | N    | 19.5       | 14.4        | 47.9         |

## 3.7 Antenna Requirements

### 3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

### 3.7.2 Antenna Connected Construction

Non-standard connector used.

### 3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 4 List of Measuring Equipment

| Instrument                | Manufacturer | Model No.              | Serial No.  | Characteristics | Calibration Date | Test Date                     | Due Date      | Remark                |
|---------------------------|--------------|------------------------|-------------|-----------------|------------------|-------------------------------|---------------|-----------------------|
| Spectrum Analyzer         | R&S          | FSP40                  | 100055      | 9kHz~40GHz      | Jun. 06, 2012    | Oct. 19, 2012 ~ Oct. 22, 2012 | Jun. 05, 2013 | Conducted (TH02-HY)   |
| Power Meter               | Anritsu      | ML2495A                | 1036004     | 300MHz~40GHz    | Sep. 08, 2012    | Oct. 19, 2012 ~ Oct. 22, 2012 | Sep. 07, 2013 | Conducted (TH02-HY)   |
| Power Sensor              | Anritsu      | MA2411B                | 1027253     | 300MHz~40GHz    | Sep. 08, 2012    | Oct. 19, 2012 ~ Oct. 22, 2012 | Sep. 07, 2013 | Conducted (TH02-HY)   |
| EMI Test Receiver         | R&S          | ESCI 7                 | 100724      | 9kHz~7GHz       | Sep. 03, 2012    | Oct. 22, 2012                 | Sep. 02, 2013 | Conduction (CO05-HY)  |
| Two-LISN                  | R&S          | ENV216                 | 11-100081   | 9KHz ~ 30MHz    | Dec. 09, 2011    | Oct. 22, 2012                 | Dec. 08, 2012 | Conduction (CO05-HY)  |
| Two-LISN                  | R&S          | ENV216                 | 11-100080   | 9KHz ~ 30MHz    | Dec. 06, 2011    | Oct. 22, 2012                 | Dec. 05, 2012 | Conduction (CO05-HY)  |
| AC Power Source           | APC          | APC-1000W              | N/A         | N/A             | N/A              | Oct. 22, 2012                 | N/A           | Conduction (CO05-HY)  |
| Spectrum Analyzer         | Agilent      | E4408B                 | MY44211030  | 9KHz ~ 26.5GHz  | Nov. 23, 2011    | Oct. 24, 2012 ~ Oct. 26, 2012 | Nov. 22, 2012 | Radiation (03CH06-HY) |
| Spectrum Analyzer         | R&S          | FSP30                  | 101352      | 9KHz~30GHz      | Nov. 03, 2011    | Oct. 24, 2012 ~ Oct. 26, 2012 | Nov. 02, 2012 | Radiation (03CH06-HY) |
| EMI Test Receiver         | R&S          | ESVS10                 | 834468/003  | 20MHz ~ 1000MHz | May 04, 2012     | Oct. 24, 2012 ~ Oct. 26, 2012 | May. 03, 2013 | Radiation (03CH06-HY) |
| Bilog Antenna             | SCHAFFNER    | CBL6112B               | 2885        | 30MHz ~ 2GHz    | Oct. 06, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Oct. 05, 2013 | Radiation (03CH06-HY) |
| Double Ridge Horn Antenna | EMCO         | 3117                   | 00066583    | 1GHz ~ 18GHz    | Aug. 01, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Jul. 31, 2013 | Radiation (03CH06-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK  | BBHA 9170              | BBHA9170251 | 15GHz ~ 40GHz   | Sep. 28, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Sep. 27, 2013 | Radiation (03CH06-HY) |
| Preamplifier              | Agilent      | 8449B                  | 3008A01917  | 1GHz ~ 26.5GHz  | Apr. 13, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Apr. 12, 2013 | Radiation (03CH06-HY) |
| Amplifier                 | Agilent      | 310N                   | 186713      | 9KHz ~ 1GHz     | Apr. 11, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Apr. 10, 2013 | Radiation (03CH06-HY) |
| Pre Amplifier             | EMCI         | EMC051845              | SN980048    | 1GHz ~ 18GHz    | Jul. 21, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Jul. 20, 2013 | Radiation (03CH06-HY) |
| Pre Amplifier             | MITEQ        | AMF-7D-00101800-30-10P | 159087      | 1GHz~18GHz      | Feb. 27, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Feb. 26, 2013 | Radiation (03CH06-HY) |
| Loop Antenna              | R&S          | HFH2-Z2                | 860004/001  | 9KHz ~ 30MHz    | Jul. 03, 2012    | Oct. 24, 2012 ~ Oct. 26, 2012 | Jul. 02, 2014 | Radiation (03CH06-HY) |

## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 KHz ~ 30 MHz)

|                                                                         |      |
|-------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 2.26 |
|-------------------------------------------------------------------------|------|

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                         |      |
|-------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 2.54 |
|-------------------------------------------------------------------------|------|

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

|                                                                         |      |
|-------------------------------------------------------------------------|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.72 |
|-------------------------------------------------------------------------|------|



## **Appendix A. Photographs of EUT**

Please refer to Sporton report number EP2O1701 as below.