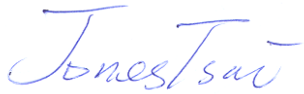
# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | Texas Instruments Incorporated |
| EQUIPMENT | : | WiFi and Bluetooth Module |
| BRAND NAME | : | Texas Instruments |
| MODEL NAME | : | WL18MODGB |
| MARKETING NAME | : | WL18xxMOD WiLink™ 8 Single-Band Combo Module –Wi-Fi®, Bluetooth®, and Bluetooth Low Energy (LE) |
| FCC ID | : | Z64-WL18SBMOD |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

**This is a variant report. The product was received on Apr. 13, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor**



**Approved by: Jones Tsai / Manager**

***SPORTON INTERNATIONAL INC.***
***No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.***

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR741320C | Rev. 01 | Initial issue of report | Feb. 07, 2018 |
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# 1 General Description

## 1.1 Applicant

**Texas Instruments Incorporated**
12500 TI BLVD., Dallas Texas, 75243

## 1.2 Manufacturer

**Texas Instruments Incorporated**
12500 TI BLVD., Dallas Texas, 75243

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | WiFi and Bluetooth Module |
| **Brand Name** | Texas Instruments |
| **Model Name** | WL18MODGB |
| **Marketing Name** | WL18xxMOD WiLink™ 8 Single-Band Combo Module – Wi-Fi®, Bluetooth®, and Bluetooth Low Energy (LE) |
| **FCC ID** | Z64-WL18SBMOD |
| **EUT supports Radios application** | WLAN 11b/g/n HT20/HT40<br>Bluetooth BR/EDR/LE v4.2 |
| **EUT Stage** | Identical Prototype |

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report by adding antenna in antenna information. All the test cases were performed on the Sporton variant report, FR4O2349C.
3. The EUT module has performed with the WL18MODGB Test grade 35 placed on the WL1837MODCOM8I evaluation board. It is verified that an additional 1dB cable loss was included in the measurements and it has shown no measurement difference in output power as the original configuration (original: WL18MODGB placed on the WL1835MOCOM8B evaluation board). Hence, the change does not degrade any EMC parameters. This is also described in the operational description document.

## 1.4 Product Specification subjective to this standard

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><td></td><td>Chain<br>Port 0<br>Ant. 1</td><td>Chain<br>Port 1<br>Ant. 2</td></tr>
<tr><td>802.11 b</td><td>V</td><td>-</td></tr>
<tr><td>802.11 g</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n<br>SISO</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n<br>MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

| Antenna information | | | | |
|---|---|---|---|---|
| | **Brand** | **Antenna Type** | **Model** | **2.4GHz ~2.5GHz Gain** |
| **1** | Ethertronics | PCB | 1000423 | -0.6dBi |
| **2** | LSR | Rubber Whip / Dipole | 001-0012 | 2dBi |
| **3** | | | 080-0013 | 2dBi |
| **4** | | | 080-0014 | 2dBi |
| **5** | | PIFA | 001-0016 | 2.5dBi |
| **6** | | | 001-0021 | 2.5dBi |
| **7** | Laird | PCB | CAF94504 | 2dBi |
| **8** | | | CAF94505 | 2dBi |
| **9** | Pulse | Chip | W3006 | 3.2dBi |
| **10** | TDK | CHIP | ANT016008 | 2.4dBi |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

# Appendix A. Original Report

Please refer to Sporton report number FR4O2349C as below.

# Variant FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | Texas Instruments Incorporated |
| EQUIPMENT | : | WiFi and Bluetooth Module |
| BRAND NAME | : | Texas Instruments |
| MODEL NAME | : | WL18MODGB |
| FCC ID | : | Z64-WL18SBMOD |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

**The product was received on Oct. 23, 2014 and testing was completed on Aug. 14, 2015. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in 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: Joseph Lin / Supervisor**

**Approved by: Jones Tsai / Manager**

***SPORTON INTERNATIONAL INC.***
***No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.***

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR4O2349C | Rev. 01 | This is a variant report by adding 6 new antennas.<br>All the test cases were performed on original report which can be referred to Sporton Report Number FR3N2752-01CTX. Based on the original report, only the peak output power and conducted spurious emission and cabinet radiation were performed. | Sep. 04, 2015 |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|
| 3.1 | 15.247(b) | Power Output Measurement | ≤ 30dBm | Pass | - |
| 3.2 | 15.247(d) | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass | Under limit 4.02 dB at 51.330 MHz |
| 3.3 | 15.203 & 15.247(b) | Antenna Requirement | N/A | Pass | - |

# 1 General Description

## 1.1 Applicant

**Texas Instruments Incorporated**
12500 TI Boulevard, M/S 8751, Dallas, TX 75243, USA

## 1.2 Manufacturer

**Jorjin Technologies Inc**
17F, No.239, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | WiFi and Bluetooth Module |
| **Brand Name** | Texas Instruments |
| **Model Name** | WL18MODGB |
| **FCC ID** | Z64-WL18SBMOD |
| **EUT supports Radios application** | WLAN 11b/g/n HT20/HT40<br>Bluetooth v4.0 EDR/LE |
| **EUT Stage** | Identical Prototype |

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

## 1.4 Product Specification subjective to this standard

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output Power to antenna</td><td><Ant. 1><br>802.11b : 17.93 dBm (0.0607 W)<br>802.11g : 20.58 dBm (0.1143 W)<br>802.11n HT40 : 20.18 dBm (0.1042 W)<br>SISO<Ant. 1><br>802.11n HT20 : 20.55 dBm (0.1135 W)<br>MIMO<Ant. 1 + 2><br>802.11n HT20 : 23.52 dBm (0.2249 W)</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
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</table>
</td></tr>
</table>

| Antenna Information | | |
|---|---|---|
| **Antenna Type** | **Brand** | **2.4GHz~2.5GHz** |
| PCB | Ethertronics | -0.6 |
| Dipole | LSR | 2 |
| PCB | Laird | 2 |
| Chip | Pulse | 3.2 |
| PIFA | LSR | 2 |
| Chip | TDK | 2.4 |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

| | |
|---|---|
| **Test Site** | SPORTON INTERNATIONAL INC. |
| **Test Site Location** | No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |
| **Test Site No.** | **Sporton Site No.** |
| | TH05-HY |

| | |
|---|---|
| **Test Site** | SPORTON INTERNATIONAL INC. |
| **Test Site Location** | No. 58 , Aly. 75, Ln. 564, Wenhua 3rd Rd.,<br>Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.<br>TEL: +886-3-327-0855 |
| **Test Site No.** | **Sporton Site No.** |
| | 03CH10 |

**Note:** The test site complies with ANSI C63.4 2009 requirement.

## 1.7 Applicable 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 v03r03
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2009

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table for frequency above 1GHz as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

# 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: 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 and 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 data rate associated with the highest power were chosen for full test shown in the following tables.

**<Ant. 1>**

| 802.11b | | | |
|---|---|---|---|
| Data Rate (MHz) | 1M bps | | |
| Channel | CH 01 | CH 06 | CH 11 |
| Peak Power (dBm) | **17.93** | 17.73 | 17.51 |

| 802.11g | | | |
|---|---|---|---|
| Data Rate (MHz) | 6Mbps | | |
| Channel | CH 01 | CH 06 | CH 11 |
| Peak Power (dBm) | 20.17 | **20.58** | 19.82 |

| 2.4GHz 802.11n HT40 | | | |
|---|---|---|---|
| Data Rate (MHz) | MCS0 | | |
| Channel | CH 03 | CH 06 | CH 09 |
| Peak Power (dBm) | 19.21 | **20.18** | 18.91 |

**SISO<Ant. 1>**

| 2.4GHz 802.11n HT20 | | | |
|---|---|---|---|
| Data Rate (MHz) | MCS0 | | |
| Channel | CH 01 | CH 06 | CH 11 |
| Peak Power (dBm) | 20.15 | **20.55** | 19.66 |

**MIMO<Ant. 1 + 2>**

| 2.4GHz 802.11n HT20 | | | |
|---|---|---|---|
| Data Rate (MHz) | MCS12 | | |
| Channel | CH 01 | CH 06 | CH 11 |
| Peak Power (dBm) | 23.33 | **23.52** | 23.14 |

**Note:** MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

## 2.3 Test Mode

**Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.**

**Single Antenna**

**<2.4GHz>**

| Modulation | Data Rate |
|---|---|
| 802.11b | 1 Mbps |
| 802.11g | 6 Mbps |
| 802.11n HT20 | MCS0 |
| 802.11n HT40 | MCS0 |

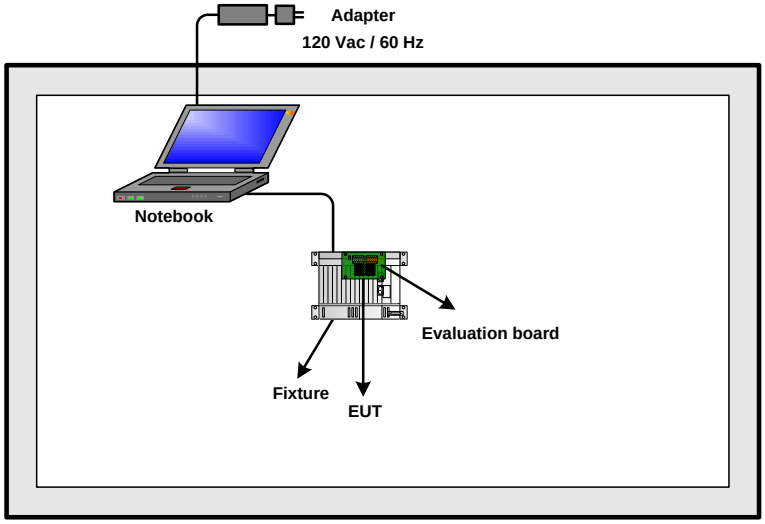
**MIMO Antenna**

**<2.4GHz>**

| Modulation | Data Rate |
|---|---|
| 802.11n HT20 | MCS12 |

## 2.4 Connection Diagram of Test System

**<WLAN Tx Mode>**




## 2.5 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | Notebook | Lenovo | E335 (with WiFi module TP00034A) | FCC DoC/ Contains FCC ID:QDS-BRCM1058 | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |

## 2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “Rttt” installed in the EUT make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.

## 2.7 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
*Offset = RF cable loss + attenuator factor.*
Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*
= 4.2 + 10 = 14.2 (dB)

# 3 Test Result

## 3.1 Peak Output Power Measurement

### 3.1.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is 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.

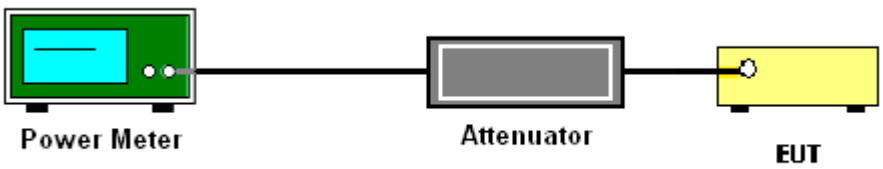
### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 v03r03 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter 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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

### 3.1.4 Test Setup



### 3.1.5 Test Result of Peak Output Power

Please refer to Appendix A.

### 3.1.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

## 3.2 Radiated Band Edges and Spurious Emission Measurement

### 3.2.1 Limit of Radiated band edge and Spurious Emission Measurement

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 (MHz) | Field Strength (microvolts/meter) | Measurement Distance (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 |

### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

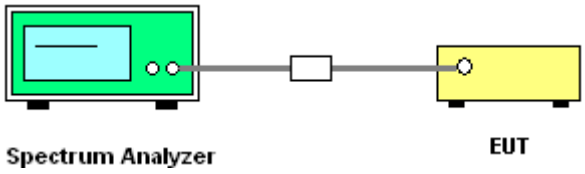
### 3.2.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03.
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 for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively 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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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.

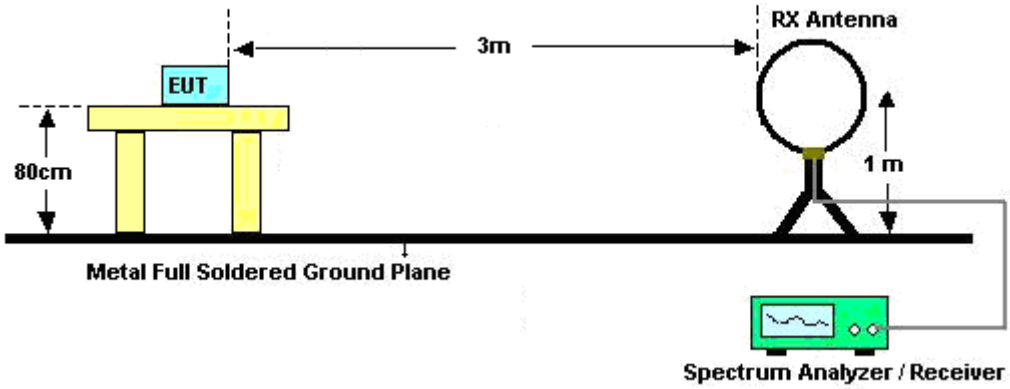
| Antenna | Band | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting |
|---|---|---|---|---|---|
| 1 | 802.11b | 40.76 | 640 | 1.5625 | 3kHz |
| 1 | 802.11g | 32.69 | 340 | 2.94 | 3kHz |
| 1 | 2.4GHz 802.11n HT20 | 33.02 | 350 | 2.86 | 3kHz |
| 1 | 2.4GHz 802.11n HT40 | 30.39 | 310 | 3.23 | 10kHz |
| 1+2 | 2.4GHz 802.11n HT20 for Ant 1 | 30.88 | 210 | 4.76 | 10kHz |
| 1+2 | 2.4GHz 802.11n HT20 for Ant 2 | 30.88 | 210 | 4.76 | 10kHz |

### 3.2.4 Test Setup

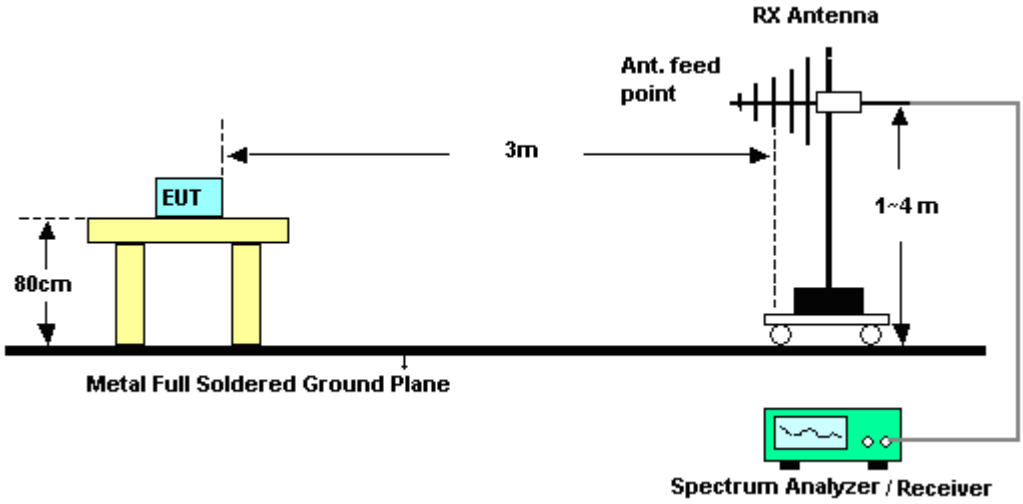
**For Conducted Measurement Setup:**



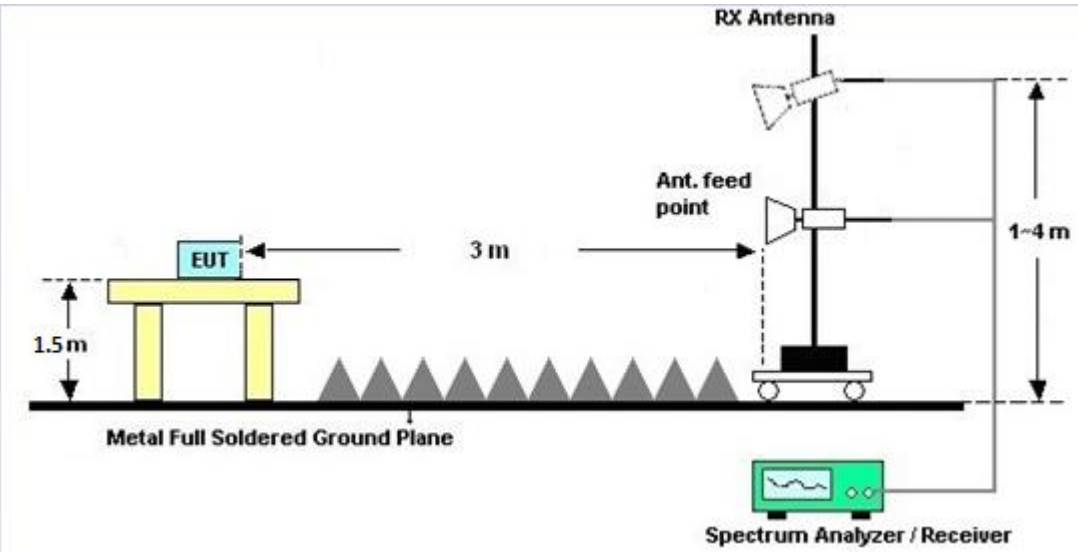

**For radiated emissions below 30MHz**




**For radiated emissions from 30MHz to 1GHz**



**For radiated emissions above 1GHz**




### 3.2.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

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.

### 3.2.6 Test Result of Conducted Spurious at Band Edges in the Restricted Band

Please refer to Appendix B.

### 3.2.7 Test Result of Conducted Spurious Emission in the Restricted Band

Please refer to Appendix B.

### 3.2.8 Test Result of Cabinet Radiated Spurious at Band Edges

Please refer to Appendix C.

### 3.2.9 Test Result of Cabinet Radiated Spurious Emission (30MHz ~ 10$^{th}$ Harmonic)

Please refer to Appendix C.

## 3.3 Antenna Requirements

### 3.3.1 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.

### 3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

### 3.3.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

For CDD transmissions, directional gain is calculated as

Directional gain = $G_{ANT}$ + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log($N_{ANT}/N_{SS}$=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

The EUT supports only MCS 12-15 for MIMO mode, hence Nss=2.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

| | | | DG for Power | DG for PSD | Power Limit Reduction | PSD Limit Reduction |
|---|---|---|---|---|---|---|
| | Ant. 1 (dBi) | Ant. 2 (dBi) | (dBi) | (dBi) | (dB) | (dB) |
| **2.4 GHz** | 3.20 | 3.20 | 3.20 | 3.20 | 0.00 | 0.00 |

*Power Limit Reduction = DG(Power) – 6dBi, ( min = 0 )*

*PSD Limit Reduction = DG(PSD) – 6dBi, ( min = 0 )*

# 4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Power Meter | Anritsu | ML2495A | 1218006 | 300MHz~40GHz | Oct. 18, 2014 | Aug. 07, 2015~ Aug. 13, 2015 | Oct. 17, 2015 | Conducted (TH05-HY) |
| Power Sensor | Anritsu | MA2411B | 1126017 | 300MHz~40GHz | Oct. 18, 2014 | Aug. 07, 2015~ Aug. 13, 2015 | Oct. 17, 2015 | Conducted (TH05-HY) |
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100055 | 9kHz-40GHz | Jun. 18, 2015 | Aug. 07, 2015~ Aug. 13, 2015 | Jun. 17, 2016 | Conducted (TH05-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170584 | 18GHz- 40GHz | Nov. 03, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Nov. 02, 2015 | Radiation (03CH10-HY) |
| Loop Antenna | TESEQ | HLA 6120 | 31244 | 9kHZ~30MHz | Feb. 02, 2015 | Aug. 13, 2015~ Aug. 14, 2015 | Feb. 01, 2016 | Radiation (03CH10-HY) |
| Amplifier | SONOMA | 310N | 187311 | 9kHz~1GHz | Nov. 24, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Nov. 23, 2015 | Radiation (03CH10-HY) |
| Bilog Antenna | TESEQ | CBL 6111D | 35413 | 30MHz~1GHz | Oct. 24, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Oct. 23, 2015 | Radiation (03CH10-HY) |
| EMI Test Receiver | Keysight | N9038A | MY54130085 | 20Hz ~ 8.4GHz | Nov. 05, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Nov. 04, 2015 | Radiation (03CH10-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9120 D | 9120D-1325 | 1GHz ~ 18GHz | Oct. 03, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Oct. 02, 2015 | Radiation (03CH10-HY) |
| Preamplifier | Keysight | 83017A | MY53270078 | 1GHz~26.5GHz | Nov. 20, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Nov. 19, 2015 | Radiation (03CH10-HY) |
| Spectrum Analyzer | Keysight | N9010A | MY54200485 | 10Hz ~ 44GHZ | Oct. 14, 2014 | Aug. 13, 2015~ Aug. 14, 2015 | Oct. 13, 2015 | Radiation (03CH10-HY) |
| Controller | EMEC | EM 1000 | N/A | Control Turn table & Ant Mast | N/A | Aug. 13, 2015~ Aug. 14, 2015 | N/A | Radiation (03CH10-HY) |
| Antenna Mast | EMEC | AM-BS-4500-B | N/A | 1~4m | N/A | Aug. 13, 2015~ Aug. 14, 2015 | N/A | Radiation (03CH10-HY) |
| Turn Table | EMEC | TT 2200 | N/A | 0-360 degree | N/A | Aug. 13, 2015~ Aug. 14, 2015 | N/A | Radiation (03CH10-HY) |
| Preamplifier | MITEQ | JS44-18004000-33-8P | 1840917 | 18GHz ~ 40GHz | Jun. 02, 2015 | Aug. 13, 2015~ Aug. 14, 2015 | Jun. 01, 2016 | Radiation (03CH10-HY) |

# 5 Uncertainty of Evaluation

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.90** |

# APPENDIX A. TEST RESULT OF CONDUCTED POWER

Report Number : FR4O2349C

| | | | | |
|---|---|---|---|---|
| Test Engineer: | Bill Kuo | Temperature: | 21~25 | °C |
| Test Date: | 2015/8/12 | Relative Humidity: | 51~54 | % |

Report Number : FR4O2349C

## ***TEST RESULTS DATA***
## ***Peak Output Power***

| 2.4GHz Band | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | Peak Conducted Power (dBm) | | | Conducted Power Limit (dBm) | | DG (dBi) | | EIRP Power (dBm) | | EIRP Power Limit (dBm) | | Pass /Fail |
| | | | | | Ant 1 | Ant 2 | SUM | Ant 1 | Ant 2 | Ant 1 | Ant 2 | Ant 1 | Ant 2 | Ant 1 | Ant 2 | |
| 11b | 1Mbps | 1 | 1 | 2412 | 17.93 | | | 30.00 | 30.00 | 3.20 | 3.20 | 21.13 | | 36.00 | 36.00 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | 17.73 | | | 30.00 | 30.00 | 3.20 | 3.20 | 20.93 | | 36.00 | 36.00 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | 17.51 | | | 30.00 | 30.00 | 3.20 | 3.20 | 20.71 | | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | 20.17 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.37 | | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | 20.58 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.78 | | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | 19.82 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.02 | | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | 20.15 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.35 | | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | 20.55 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.75 | | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | 19.66 | | | 30.00 | 30.00 | 3.20 | 3.20 | 22.86 | | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | 19.21 | | | 30.00 | 30.00 | 3.20 | 3.20 | 22.41 | | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | 20.18 | | | 30.00 | 30.00 | 3.20 | 3.20 | 23.38 | | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | 18.91 | | | 30.00 | 30.00 | 3.20 | 3.20 | 22.11 | | 36.00 | 36.00 | Pass |
| HT20 | MCS12 | 2 | 1 | 2412 | 19.89 | 20.71 | 23.33 | 30.00 | | 3.20 | | 26.53 | | 36.00 | | Pass |
| HT20 | MCS12 | 2 | 6 | 2437 | 20.12 | 20.87 | 23.52 | 30.00 | | 3.20 | | 26.72 | | 36.00 | | Pass |
| HT20 | MCS12 | 2 | 11 | 2462 | 19.48 | 20.69 | 23.14 | 30.00 | | 3.20 | | 26.34 | | 36.00 | | Pass |

Note: Measured power (dBm) has offset with cable loss.

## *TEST RESULTS DATA*
## *Average Output Power*

| 2.4GHz Band | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | Duty Factor (dB) | | Average Conducted Power (dBm) | | |
| | | | | | Ant 1 | Ant 2 | Ant 1 | Ant 2 | SUM |
| 11b | 1Mbps | 1 | 1 | 2412 | 3.90 | | 16.01 | | |
| 11b | 1Mbps | 1 | 6 | 2437 | 3.90 | | 15.92 | | |
| 11b | 1Mbps | 1 | 11 | 2462 | 3.90 | | 15.69 | | |
| 11g | 6Mbps | 1 | 1 | 2412 | 4.86 | | 12.01 | | |
| 11g | 6Mbps | 1 | 6 | 2437 | 4.86 | | 16.48 | | |
| 11g | 6Mbps | 1 | 11 | 2462 | 4.86 | | 11.81 | | |
| HT20 | MCS0 | 1 | 1 | 2412 | 4.81 | | 12.22 | | |
| HT20 | MCS0 | 1 | 6 | 2437 | 4.81 | | 15.71 | | |
| HT20 | MCS0 | 1 | 11 | 2462 | 4.81 | | 11.72 | | |
| HT40 | MCS0 | 1 | 3 | 2422 | 5.17 | | 10.22 | | |
| HT40 | MCS0 | 1 | 6 | 2437 | 5.17 | | 14.33 | | |
| HT40 | MCS0 | 1 | 9 | 2452 | 5.17 | | 9.89 | | |
| HT20 | MCS12 | 2 | 1 | 2412 | 5.10 | 5.10 | 11.82 | 12.91 | 15.41 |
| HT20 | MCS12 | 2 | 6 | 2437 | 5.10 | 5.10 | 13.35 | 13.55 | 16.46 |
| HT20 | MCS12 | 2 | 11 | 2462 | 5.10 | 5.10 | 11.35 | 12.78 | 15.14 |

Note: Measured power (dBm) has offset with cable loss.

# Appendix B. Test Result of Conducted Spurious

## Test Result of Conducted Spurious at Band Edges in the Restricted Band

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11b (Band Edge @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11b CH 01 2412MHz | | 2389.94 | -44.12 | -22.92 | -21.2 | -48.59 | 3.2 | 1.27 | 0 | P |
| | | 2389.96 | -50.90 | -9.7 | -41.2 | -55.37 | 3.2 | 1.27 | 0 | A |
| | * | 2413.277 | 13.70 | - | - | 9.23 | 3.2 | 1.27 | 0 | P |
| | * | 2411.272 | 9.73 | - | - | 5.26 | 3.2 | 1.27 | 0 | A |
| 802.11b CH 06 2437MHz | | 2389.54 | -48.47 | -27.27 | -21.2 | -52.94 | 3.2 | 1.27 | 0 | P |
| | | 2389.66 | -55.60 | -14.4 | -41.2 | -60.07 | 3.2 | 1.27 | 0 | A |
| | * | 2438.326 | 13.30 | - | - | 8.82 | 3.2 | 1.28 | 0 | P |
| | * | 2436.323 | 9.42 | - | - | 4.94 | 3.2 | 1.28 | 0 | A |
| | | 2484.60 | -47.37 | -26.17 | -21.2 | -51.85 | 3.2 | 1.28 | 0 | P |
| | | 2484.96 | -54.85 | -13.65 | -41.2 | -59.33 | 3.2 | 1.28 | 0 | A |
| 802.11b CH 11 2462MHz | * | 2460.872 | 13.3 | - | - | 8.82 | 3.2 | 1.28 | 0 | P |
| | * | 2461.289 | 9.40 | - | - | 4.92 | 3.2 | 1.28 | 0 | A |
| | | 2483.72 | -43.01 | -21.81 | -21.2 | -47.49 | 3.2 | 1.28 | 0 | P |
| | | 2483.84 | -50.73 | -9.53 | -41.2 | -55.21 | 3.2 | 1.28 | 0 | A |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11g (Band Edge @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11g CH 01 2412MHz | | 2389.92 | -29.96 | -8.76 | -21.2 | -34.43 | 3.2 | 1.27 | 0 | P |
| | | 2389.66 | -48.13 | -6.93 | -41.2 | -52.6 | 3.2 | 1.27 | 0 | A |
| | * | 2410.521 | 15.8 | - | - | 11.33 | 3.2 | 1.27 | 0 | P |
| | * | 2413.611 | 6.34 | - | - | 1.87 | 3.2 | 1.27 | 0 | A |
| 802.11g CH 06 2437MHz | | 2389.48 | -38.28 | -17.08 | -21.2 | -42.75 | 3.2 | 1.27 | 0 | P |
| | | 2389.38 | -51.67 | -10.47 | -41.2 | -56.14 | 3.2 | 1.27 | 0 | A |
| | * | 2435.571 | 20.06 | - | - | 15.58 | 3.2 | 1.28 | 0 | P |
| | * | 2435.154 | 11.05 | - | - | 6.57 | 3.2 | 1.28 | 0 | A |
| | | 2485.28 | -40.64 | -19.44 | -21.2 | -45.12 | 3.2 | 1.28 | 0 | P |
| | | 2483.52 | -53.66 | -12.46 | -41.2 | -58.14 | 3.2 | 1.28 | 0 | A |
| 802.11g CH 11 2462MHz | * | 2460.287 | 15.4 | - | - | 10.92 | 3.2 | 1.28 | 0 | P |
| | * | 2460.872 | 6.09 | - | - | 1.61 | 3.2 | 1.28 | 0 | A |
| | | 2483.56 | -33.19 | -11.99 | -21.2 | -37.67 | 3.2 | 1.28 | 0 | P |
| | | 2483.54 | -47.97 | -6.77 | -41.2 | -52.45 | 3.2 | 1.28 | 0 | A |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Band Edge @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11n | | 2390.00 | -33.65 | -12.45 | -21.2 | -38.12 | 3.2 | 1.27 | 0 | P |
| HT20 | | 2389.96 | -45.96 | -4.76 | -41.2 | -50.43 | 3.2 | 1.27 | 0 | A |
| CH 01 | * | 2413.444 | 12.64 | - | - | 8.17 | 3.2 | 1.27 | 0 | P |
| 2412MHz | * | 2413.861 | 3.56 | - | - | -0.91 | 3.2 | 1.27 | 0 | A |
| | | 2389.74 | -37.35 | -16.15 | -21.2 | -41.82 | 3.2 | 1.27 | 0 | P |
| 802.11n | | 2390.00 | -54.28 | -13.08 | -41.2 | -58.75 | 3.2 | 1.27 | 0 | A |
| HT20 | * | 2438.41 | 16.06 | - | - | 11.58 | 3.2 | 1.28 | 0 | P |
| CH 06 | * | 2438.94 | 7.24 | - | - | 2.76 | 3.2 | 1.28 | 0 | A |
| 2437MHz | | 2483.54 | -39.78 | -18.58 | -21.2 | -44.26 | 3.2 | 1.28 | 0 | P |
| | | 2483.52 | -53.87 | -12.67 | -41.2 | -58.35 | 3.2 | 1.28 | 0 | A |
| 802.11n | * | 2460.287 | 13.41 | - | - | 8.93 | 3.2 | 1.28 | 0 | P |
| HT20 | * | 2460.872 | 3.5 | - | - | -0.98 | 3.2 | 1.28 | 0 | A |
| CH 11 | | 2483.54 | -31.24 | -10.04 | -21.2 | -35.72 | 3.2 | 1.28 | 0 | P |
| 2462MHz | | 2483.50 | -47.07 | -5.87 | -41.2 | -51.55 | 3.2 | 1.28 | 0 | A |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT40 (Band Edge @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11n | | 2389.92 | -27.55 | -6.35 | -21.2 | -32.02 | 3.2 | 1.27 | 0 | P |
| HT40 | | 2389.72 | -43.88 | -2.68 | -41.2 | -48.35 | 3.2 | 1.27 | 0 | A |
| CH 03 | * | 2409.853 | 8.66 | - | - | 4.19 | 3.2 | 1.27 | 0 | P |
| 2422MHz | * | 2413.945 | -1.33 | - | - | -5.8 | 3.2 | 1.27 | 0 | A |
| | | 2389.82 | -24.37 | -3.17 | -21.2 | -28.84 | 3.2 | 1.27 | 0 | P |
| 802.11n | | 2389.88 | -41.4 | -0.20 | -41.2 | -45.87 | 3.2 | 1.27 | 0 | A |
| HT40 | * | 2424.96 | 13.08 | - | - | 8.6 | 3.2 | 1.27 | 0 | P |
| CH 06 | * | 2425.46 | 2.92 | - | - | -1.56 | 3.2 | 1.27 | 0 | A |
| 2437MHz | | 2483.62 | -24.85 | -3.65 | -21.2 | -29.33 | 3.2 | 1.28 | 0 | P |
| | | 2483.52 | -41.96 | -0.76 | -41.2 | -46.44 | 3.2 | 1.28 | 0 | A |
| 802.11n | * | 2444.673 | 8.69 | - | - | 4.21 | 3.2 | 1.28 | 0 | P |
| HT40 | * | 2444.088 | -0.93 | - | - | -5.41 | 3.2 | 1.28 | 0 | A |
| CH 09 | | 2484.16 | -29.37 | -8.17 | -21.2 | -33.85 | 3.2 | 1.28 | 0 | P |
| 2452MHz | | 2483.54 | -44.42 | -3.22 | -41.2 | -48.9 | 3.2 | 1.28 | 0 | A |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 MIMO (Band Edge @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | MIMO | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Factor | Avg |
| 1+2(1) | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (dB) | (P/A) |
| 802.11n | | 2389.86 | -24.03 | -2.83 | -21.2 | -31.51 | 3.2 | 1.27 | 0 | 3.01 | P |
| HT20 | | 2390.00 | -44.11 | -2.91 | -41.2 | -51.59 | 3.2 | 1.27 | 0 | 3.01 | A |
| CH 01 | * | 2413.11 | 16.08 | - | - | 8.6 | 3.2 | 1.27 | 0 | 3.01 | P |
| 2412MHz | * | 2410.68 | 6.66 | - | - | -0.82 | 3.2 | 1.27 | 0 | 3.01 | A |
| | | 2389.78 | -24.2 | -3 | -21.2 | -31.68 | 3.2 | 1.27 | 0 | 3.01 | P |
| 802.11n | | 2390.00 | -44.19 | -2.99 | -41.2 | -51.67 | 3.2 | 1.27 | 0 | 3.01 | A |
| HT20 | * | 2434.15 | 17.69 | - | - | 10.2 | 3.2 | 1.27 | 0 | 3.01 | P |
| CH 06 | * | 2435.82 | 7.19 | - | - | -0.3 | 3.2 | 1.27 | 0 | 3.01 | A |
| 2437MHz | | 2483.56 | -41.91 | -20.71 | -21.2 | -49.4 | 3.2 | 1.28 | 0 | 3.01 | P |
| | | 2483.56 | -53.79 | -12.59 | -41.2 | -61.28 | 3.2 | 1.28 | 0 | 3.01 | A |
| 802.11n | * | 2463.126 | 16.55 | - | - | 9.06 | 3.2 | 1.28 | 0 | 3.01 | P |
| HT20 | * | 2461.039 | 5.52 | - | - | -1.97 | 3.2 | 1.28 | 0 | 3.01 | A |
| CH 11 | | 2483.58 | -26.09 | -4.89 | -21.2 | -33.58 | 3.2 | 1.28 | 0 | 3.01 | P |
| 2462MHz | | 2483.52 | -43.8 | -2.6 | -41.2 | -51.29 | 3.2 | 1.28 | 0 | 3.01 | A |
| 1+2(2) | | | | | | | | | | | |
| 802.11n | | 2389.62 | -25.33 | -4.13 | -21.2 | -32.81 | 3.2 | 1.27 | 0 | 3.01 | P |
| HT20 | | 2389.94 | -42.06 | -0.86 | -41.2 | -49.54 | 3.2 | 1.27 | 0 | 3.01 | A |
| CH 01 | * | 2412.00 | 15.98 | - | - | 8.5 | 3.2 | 1.27 | 0 | 3.01 | P |
| 2412MHz | * | 2411.00 | 5.89 | - | - | -1.59 | 3.2 | 1.27 | 0 | 3.01 | A |
| | | 2389.92 | -41.96 | -20.76 | -21.2 | -49.44 | 3.2 | 1.27 | 0 | 3.01 | P |
| 802.11n | | 2389.98 | -54.32 | -13.12 | -41.2 | -61.8 | 3.2 | 1.27 | 0 | 3.01 | A |
| HT20 | * | 2435.00 | 18.08 | - | - | 10.59 | 3.2 | 1.27 | 0 | 3.01 | P |
| CH 06 | * | 2436.00 | 7.98 | - | - | 0.49 | 3.2 | 1.27 | 0 | 3.01 | A |
| 2437MHz | | 2483.66 | -42.14 | -20.94 | -21.2 | -49.63 | 3.2 | 1.28 | 0 | 3.01 | P |
| | | 2483.50 | -54.8 | -13.6 | -41.2 | -62.29 | 3.2 | 1.28 | 0 | 3.01 | A |
| 802.11n | * | 2463.00 | 18.46 | - | - | 10.97 | 3.2 | 1.28 | 0 | 3.01 | P |
| HT20 | * | 2462.00 | 5.99 | - | - | -1.5 | 3.2 | 1.28 | 0 | 3.01 | A |
| CH 11 | | 2483.94 | -22.38 | -1.18 | -21.2 | -29.87 | 3.2 | 1.28 | 0 | 3.01 | P |
| 2462MHz | | 2483.60 | -41.6 | -0.40 | -41.2 | -49.09 | 3.2 | 1.28 | 0 | 3.01 | A |

### 1.1.1 Test Result of Conducted Spurious Emission in the Restricted Band

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11b (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11b CH 01 2412MHz | | 105.66 | -80.91 | -29.21 | -51.7 | -89.03 | 3.2 | 0.22 | 4.7 | P |
| | | 213.33 | -80.47 | -28.77 | -51.7 | -88.72 | 3.2 | 0.35 | 4.7 | P |
| | | 281.23 | -80.92 | -31.72 | -49.2 | -89.21 | 3.2 | 0.39 | 4.7 | P |
| | | 396.66 | -81.13 | -31.93 | -49.2 | -89.46 | 3.2 | 0.43 | 4.7 | P |
| | | 631.4 | -80.12 | -30.92 | -49.2 | -88.55 | 3.2 | 0.53 | 4.7 | P |
| | | 846.74 | -79.57 | -30.37 | -49.2 | -88.07 | 3.2 | 0.6 | 4.7 | P |
| | | 4826 | -68.5 | -47.3 | -21.2 | -73.37 | 3.2 | 1.67 | 0 | P |
| | | 7246 | -65.41 | -44.21 | -21.2 | -70.66 | 3.2 | 2.05 | 0 | P |
| 802.11b CH 06 2437MHz | | 173.56 | -80.47 | -28.77 | -51.7 | -88.67 | 3.2 | 0.3 | 4.7 | P |
| | | 242.43 | -80.95 | -31.75 | -49.2 | -89.23 | 3.2 | 0.38 | 4.7 | P |
| | | 473.29 | -80.3 | -31.1 | -49.2 | -88.67 | 3.2 | 0.47 | 4.7 | P |
| | | 634.31 | -80.76 | -31.56 | -49.2 | -89.19 | 3.2 | 0.53 | 4.7 | P |
| | | 755.56 | -80.34 | -31.14 | -49.2 | -88.83 | 3.2 | 0.59 | 4.7 | P |
| | | 980.6 | -80.77 | -39.57 | -41.2 | -89.33 | 3.2 | 0.66 | 4.7 | P |
| | | 4892 | -67.99 | -46.79 | -21.2 | -72.88 | 3.2 | 1.69 | 0 | P |
| | | 7312 | -66.19 | -44.99 | -21.2 | -71.38 | 3.2 | 1.99 | 0 | P |
| 802.11b CH 11 2462MHz | | 44.55 | -80.44 | -25.24 | -55.2 | -88.53 | 3.2 | 0.19 | 4.7 | P |
| | | 246.31 | -80.69 | -31.49 | -49.2 | -88.97 | 3.2 | 0.38 | 4.7 | P |
| | | 418.97 | -80.3 | -31.1 | -49.2 | -88.63 | 3.2 | 0.43 | 4.7 | P |
| | | 580.96 | -80.24 | -31.04 | -49.2 | -88.65 | 3.2 | 0.51 | 4.7 | P |
| | | 712.88 | -80.88 | -31.68 | -49.2 | -89.35 | 3.2 | 0.57 | 4.7 | P |
| | | 981.57 | -80.12 | -38.92 | -41.2 | -88.68 | 3.2 | 0.66 | 4.7 | P |
| | | 4936 | -64.58 | -43.38 | -21.2 | -72.49 | 3.2 | 1.7 | 0 | P |
| | | 7400 | -68.27 | -47.07 | -21.2 | -76.41 | 3.2 | 1.93 | 0 | P |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11g (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11g CH 01 2412MHz | | 34.85 | -80.38 | -25.18 | -55.2 | -88.45 | 3.2 | 0.17 | 4.7 | P |
| | | 216.24 | -80.72 | -31.52 | -49.2 | -88.97 | 3.2 | 0.35 | 4.7 | P |
| | | 450.98 | -80.34 | -31.14 | -49.2 | -88.68 | 3.2 | 0.44 | 4.7 | P |
| | | 644.01 | -80.26 | -31.06 | -49.2 | -88.7 | 3.2 | 0.54 | 4.7 | P |
| | | 782.72 | -81.19 | -31.99 | -49.2 | -89.67 | 3.2 | 0.58 | 4.7 | P |
| | | 991.27 | -79.89 | -38.69 | -41.2 | -88.48 | 3.2 | 0.69 | 4.7 | P |
| | | 4738 | -72.99 | -51.79 | -21.2 | -77.85 | 3.2 | 1.66 | 0 | P |
| | | 7246 | -67.74 | -46.54 | -21.2 | -72.99 | 3.2 | 2.05 | 0 | P |
| 802.11g CH 06 2437MHz | | 74.62 | -80.02 | -24.82 | -55.2 | -88.13 | 3.2 | 0.21 | 4.7 | P |
| | | 217.21 | -80.78 | -31.58 | -49.2 | -89.03 | 3.2 | 0.35 | 4.7 | P |
| | | 409.27 | -80.6 | -31.4 | -49.2 | -88.93 | 3.2 | 0.43 | 4.7 | P |
| | | 529.55 | -79.5 | -30.3 | -49.2 | -87.87 | 3.2 | 0.47 | 4.7 | P |
| | | 787.57 | -79.75 | -30.55 | -49.2 | -88.22 | 3.2 | 0.57 | 4.7 | P |
| | | 925.31 | -80.57 | -39.37 | -41.2 | -89.1 | 3.2 | 0.63 | 4.7 | P |
| | | 4870 | -68.01 | -46.81 | -21.2 | -72.89 | 3.2 | 1.68 | 0 | P |
| | | 7312 | -60.76 | -39.56 | -21.2 | -65.95 | 3.2 | 1.99 | 0 | P |
| 802.11g CH 11 2462MHz | | 76.56 | -79.68 | -24.48 | -55.2 | -87.79 | 3.2 | 0.21 | 4.7 | P |
| | | 296.75 | -80.44 | -31.24 | -49.2 | -88.73 | 3.2 | 0.39 | 4.7 | P |
| | | 527.61 | -80.67 | -31.47 | -49.2 | -89.04 | 3.2 | 0.47 | 4.7 | P |
| | | 599.39 | -80.31 | -31.11 | -49.2 | -88.74 | 3.2 | 0.53 | 4.7 | P |
| | | 787.57 | -80.42 | -31.22 | -49.2 | -88.89 | 3.2 | 0.57 | 4.7 | P |
| | | 996.12 | -80.79 | -39.59 | -41.2 | -89.38 | 3.2 | 0.69 | 4.7 | P |
| | | 4936 | -70.75 | -49.55 | -21.2 | -75.65 | 3.2 | 1.7 | 0 | P |
| | | 7400 | -72.08 | -50.88 | -21.2 | -77.21 | 3.2 | 1.93 | 0 | P |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11n HT20 CH 01 2412MHz | | 41.64 | -80.01 | -24.81 | -55.2 | -88.1 | 3.2 | 0.19 | 4.7 | P |
| | | 352.04 | -79.77 | -30.57 | -49.2 | -88.06 | 3.2 | 0.39 | 4.7 | P |
| | | 518.88 | -80.35 | -31.15 | -49.2 | -88.72 | 3.2 | 0.47 | 4.7 | P |
| | | 727.43 | -80.55 | -31.35 | -49.2 | -89.02 | 3.2 | 0.57 | 4.7 | P |
| | | 831.22 | -79.69 | -30.49 | -49.2 | -88.18 | 3.2 | 0.59 | 4.7 | P |
| | | 935.98 | -79.8 | -38.6 | -41.2 | -88.33 | 3.2 | 0.63 | 4.7 | P |
| | | 4298 | -72.99 | -51.79 | -21.2 | -77.84 | 3.2 | 1.65 | 0 | P |
| | | 7246 | -70.1 | -48.9 | -21.2 | -75.35 | 3.2 | 2.05 | 0 | P |
| 802.11n HT20 CH 06 2437MHz | | 166.77 | -80.14 | -28.44 | -51.7 | -88.34 | 3.2 | 0.3 | 4.7 | P |
| | | 296.75 | -80.85 | -31.65 | -49.2 | -89.14 | 3.2 | 0.39 | 4.7 | P |
| | | 496.57 | -79.69 | -30.49 | -49.2 | -88.03 | 3.2 | 0.44 | 4.7 | P |
| | | 699.3 | -79.77 | -30.57 | -49.2 | -88.22 | 3.2 | 0.55 | 4.7 | P |
| | | 850.62 | -80.53 | -31.33 | -49.2 | -89.03 | 3.2 | 0.6 | 4.7 | P |
| | | 959.26 | -81.05 | -39.85 | -41.2 | -89.58 | 3.2 | 0.63 | 4.7 | P |
| | | 4892 | -70.15 | -48.95 | -21.2 | -75.04 | 3.2 | 1.69 | 0 | P |
| | | 7312 | -63.04 | -41.84 | -21.2 | -68.23 | 3.2 | 1.99 | 0 | P |
| 802.11n HT20 CH 11 2462MHz | | 142.52 | -80.64 | -28.94 | -51.7 | -88.81 | 3.2 | 0.27 | 4.7 | P |
| | | 307.42 | -80.2 | -31 | -49.2 | -88.49 | 3.2 | 0.39 | 4.7 | P |
| | | 438.37 | -79.65 | -30.45 | -49.2 | -87.99 | 3.2 | 0.44 | 4.7 | P |
| | | 648.86 | -80.94 | -31.74 | -49.2 | -89.38 | 3.2 | 0.54 | 4.7 | P |
| | | 741.01 | -81.09 | -31.89 | -49.2 | -89.58 | 3.2 | 0.59 | 4.7 | P |
| | | 988.36 | -80.15 | -38.95 | -41.2 | -88.74 | 3.2 | 0.69 | 4.7 | P |
| | | 4936 | -70.93 | -49.73 | -21.2 | -75.83 | 3.2 | 1.7 | 0 | P |
| | | 7400 | -69.56 | -48.36 | -21.2 | -74.69 | 3.2 | 1.93 | 0 | P |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT40 (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | Peak |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Avg |
| 1 | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (P/A) |
| 802.11n HT40 CH 03 2422MHz | | 124.09 | -70.51 | -18.81 | -51.7 | -78.67 | 3.2 | 0.26 | 4.7 | P |
| | | 324.88 | -70.36 | -21.16 | -49.2 | -78.64 | 3.2 | 0.38 | 4.7 | P |
| | | 428.67 | -71.39 | -22.19 | -49.2 | -79.72 | 3.2 | 0.43 | 4.7 | P |
| | | 592.6 | -71.75 | -22.55 | -49.2 | -80.18 | 3.2 | 0.53 | 4.7 | P |
| | | 715.79 | -71.83 | -22.63 | -49.2 | -80.3 | 3.2 | 0.57 | 4.7 | P |
| | | 892.33 | -71.33 | -22.13 | -49.2 | -79.86 | 3.2 | 0.63 | 4.7 | P |
| | | 4826 | -72.92 | -51.72 | -21.2 | -77.79 | 3.2 | 1.67 | 0 | P |
| | | 7026 | -70.18 | -48.98 | -21.2 | -75.5 | 3.2 | 2.12 | 0 | P |
| 802.11n HT40 CH 06 2437MHz | | 127.97 | -70.8 | -19.1 | -51.7 | -78.96 | 3.2 | 0.26 | 4.7 | P |
| | | 214.3 | -70.84 | -21.64 | -49.2 | -79.09 | 3.2 | 0.35 | 4.7 | P |
| | | 471.35 | -71.15 | -21.95 | -49.2 | -79.52 | 3.2 | 0.47 | 4.7 | P |
| | | 604.24 | -71.87 | -22.67 | -49.2 | -80.3 | 3.2 | 0.53 | 4.7 | P |
| | | 771.08 | -71.17 | -21.97 | -49.2 | -79.65 | 3.2 | 0.58 | 4.7 | P |
| | | 913.67 | -71.35 | -22.15 | -49.2 | -79.88 | 3.2 | 0.63 | 4.7 | P |
| | | 4870 | -73.17 | -51.97 | -21.2 | -78.05 | 3.2 | 1.68 | 0 | P |
| | | 7290 | -66.88 | -45.68 | -21.2 | -72.09 | 3.2 | 2.01 | 0 | P |
| 802.11n HT40 CH 09 2452MHz | | 167.74 | -70.89 | -19.19 | -51.7 | -79.09 | 3.2 | 0.3 | 4.7 | P |
| | | 350.1 | -71.08 | -21.88 | -49.2 | -79.37 | 3.2 | 0.39 | 4.7 | P |
| | | 417.03 | -70.83 | -21.63 | -49.2 | -79.16 | 3.2 | 0.43 | 4.7 | P |
| | | 662.44 | -71.4 | -22.2 | -49.2 | -79.85 | 3.2 | 0.55 | 4.7 | P |
| | | 870.99 | -71.31 | -22.11 | -49.2 | -79.83 | 3.2 | 0.62 | 4.7 | P |
| | | 908.82 | -70.94 | -21.74 | -49.2 | -79.47 | 3.2 | 0.63 | 4.7 | P |
| | | 4826 | -72.5 | -51.3 | -21.2 | -77.37 | 3.2 | 1.67 | 0 | P |
| | | 7312 | -71.99 | -50.79 | -21.2 | -77.18 | 3.2 | 1.99 | 0 | P |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 MIMO (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | MIMO | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Factor | Avg |
| 1+2(1) | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (dB) | (P/A) |
| 802.11n HT20 CH 01 2412MHz | | 44.85 | -58.61 | -3.41 | -55.2 | -65.01 | 3.2 | 0.19 | 4.7 | 3.01 | P |
| | | 171.48 | -59.28 | -7.58 | -51.7 | -65.88 | 3.2 | 0.39 | 4.7 | 3.01 | P |
| | | 226.02 | -58.54 | -9.34 | -49.2 | -65.22 | 3.2 | 0.47 | 4.7 | 3.01 | P |
| | | 421.1 | -58.2 | -9 | -49.2 | -64.98 | 3.2 | 0.57 | 4.7 | 3.01 | P |
| | | 741 | -56.91 | -7.71 | -49.2 | -63.71 | 3.2 | 0.59 | 4.7 | 3.01 | P |
| | | 871.9 | -57.48 | -8.28 | -49.2 | -64.32 | 3.2 | 0.63 | 4.7 | 3.01 | P |
| | | 4824 | -38.88 | -17.68 | -21.2 | -46.74 | 3.2 | 1.65 | 0 | 3.01 | P |
| | | 4824 | -42.47 | -1.27 | -41.2 | -50.33 | 3.2 | 1.65 | 0 | 3.01 | A |
| 802.11n HT20 CH 06 2437MHz | | 97.5 | -59.61 | -7.91 | -51.7 | -66.12 | 3.2 | 0.3 | 4.7 | 3.01 | P |
| | | 152.58 | -59.54 | -7.84 | -51.7 | -66.14 | 3.2 | 0.39 | 4.7 | 3.01 | P |
| | | 206.31 | -59.15 | -7.45 | -51.7 | -65.8 | 3.2 | 0.44 | 4.7 | 3.01 | P |
| | | 367.2 | -57.89 | -8.69 | -49.2 | -64.65 | 3.2 | 0.55 | 4.7 | 3.01 | P |
| | | 627.6 | -56.02 | -6.82 | -49.2 | -62.83 | 3.2 | 0.6 | 4.7 | 3.01 | P |
| | | 799.8 | -56.22 | -7.02 | -49.2 | -63.06 | 3.2 | 0.63 | 4.7 | 3.01 | P |
| | | 4875 | -39.47 | -18.27 | -21.2 | -47.37 | 3.2 | 1.69 | 0 | 3.01 | P |
| | | 4875 | -45.12 | -3.92 | -41.2 | -53.02 | 3.2 | 1.69 | 0 | 3.01 | A |
| | | 7311 | -53.69 | -32.49 | -21.2 | -61.89 | 3.2 | 1.99 | 0 | 3.01 | P |
| 802.11n HT20 CH 11 2462MHz | | 78.33 | -59.49 | -4.29 | -55.2 | -65.97 | 3.2 | 0.27 | 4.7 | 3.01 | P |
| | | 118.29 | -60.22 | -8.52 | -51.7 | -66.82 | 3.2 | 0.39 | 4.7 | 3.01 | P |
| | | 170.94 | -59.68 | -7.98 | -51.7 | -66.33 | 3.2 | 0.44 | 4.7 | 3.01 | P |
| | | 462.4 | -58.42 | -9.22 | -49.2 | -65.17 | 3.2 | 0.54 | 4.7 | 3.01 | P |
| | | 618.5 | -57.4 | -8.2 | -49.2 | -64.2 | 3.2 | 0.59 | 4.7 | 3.01 | P |
| | | 779.5 | -57.77 | -8.57 | -49.2 | -64.67 | 3.2 | 0.69 | 4.7 | 3.01 | P |
| | | 4926 | -42.09 | -20.89 | -21.2 | -50 | 3.2 | 1.7 | 0 | 3.01 | P |
| | | 7386 | -54.07 | -32.87 | -21.2 | -62.21 | 3.2 | 1.93 | 0 | 3.01 | P |

**15C 2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 MIMO (Harmonic @ 3m)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Grounding | MIMO | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Gain | Loss | Factor | Factor | Avg |
| 1+2(2) | | ( MHz ) | ( dBm ) | ( dB ) | ( dBm ) | ( dBm ) | ( dBi ) | ( dB ) | ( dB ) | (dB) | (P/A) |
| 802.11n HT20 CH 01 2412MHz | | 78.6 | -61.56 | -6.36 | -55.2 | -68.04 | 3.2 | 0.27 | 4.7 | 3.01 | P |
| | | 105.33 | -61.16 | -9.46 | -51.7 | -67.73 | 3.2 | 0.36 | 4.7 | 3.01 | P |
| | | 291.63 | -60.62 | -11.42 | -49.2 | -67.3 | 3.2 | 0.47 | 4.7 | 3.01 | P |
| | | 332.9 | -58.68 | -9.48 | -49.2 | -65.46 | 3.2 | 0.57 | 4.7 | 3.01 | P |
| | | 517.7 | -58.25 | -9.05 | -49.2 | -65.05 | 3.2 | 0.59 | 4.7 | 3.01 | P |
| | | 643.7 | -57.6 | -8.4 | -49.2 | -64.44 | 3.2 | 0.63 | 4.7 | 3.01 | P |
| | | 4824 | -37.69 | -16.49 | -21.2 | -45.55 | 3.2 | 1.65 | 0 | 3.01 | P |
| | | 4824 | -41.59 | -0.39 | -41.2 | -49.45 | 3.2 | 1.65 | 0 | 3.01 | A |
| 802.11n HT20 CH 06 2437MHz | | 47.55 | -60.06 | -4.86 | -55.2 | -66.46 | 3.2 | 0.19 | 4.7 | 3.01 | P |
| | | 152.58 | -59.54 | -7.84 | -51.7 | -66.14 | 3.2 | 0.39 | 4.7 | 3.01 | P |
| | | 252.75 | -59.09 | -9.89 | -49.2 | -65.77 | 3.2 | 0.47 | 4.7 | 3.01 | P |
| | | 472.9 | -58.99 | -9.79 | -49.2 | -65.77 | 3.2 | 0.57 | 4.7 | 3.01 | P |
| | | 513.5 | -58.87 | -9.67 | -49.2 | -65.67 | 3.2 | 0.59 | 4.7 | 3.01 | P |
| | | 949.6 | -58.74 | -9.54 | -49.2 | -65.68 | 3.2 | 0.73 | 4.7 | 3.01 | P |
| | | 4875 | -38.01 | -16.81 | -21.2 | -45.91 | 3.2 | 1.69 | 0 | 3.01 | P |
| | | 4875 | -44.89 | -3.69 | -41.2 | -52.79 | 3.2 | 1.69 | 0 | 3.01 | A |
| | | 7311 | -52.99 | -31.79 | -21.2 | -61.19 | 3.2 | 1.99 | 0 | 3.01 | P |
| 802.11n HT20 CH 11 2462MHz | | 46.47 | -60.24 | -5.04 | -55.2 | -66.64 | 3.2 | 0.19 | 4.7 | 3.01 | P |
| | | 154.74 | -59.82 | -8.12 | -51.7 | -66.42 | 3.2 | 0.39 | 4.7 | 3.01 | P |
| | | 270.57 | -60.28 | -11.08 | -49.2 | -66.93 | 3.2 | 0.44 | 4.7 | 3.01 | P |
| | | 345.5 | -59.72 | -10.52 | -49.2 | -66.47 | 3.2 | 0.54 | 4.7 | 3.01 | P |
| | | 534.5 | -58.74 | -9.54 | -49.2 | -65.54 | 3.2 | 0.59 | 4.7 | 3.01 | P |
| | | 826.4 | -58.17 | -8.97 | -49.2 | -65.07 | 3.2 | 0.69 | 4.7 | 3.01 | P |
| | | 4924 | -41.85 | -20.65 | -21.2 | -49.76 | 3.2 | 1.7 | 0 | 3.01 | P |
| | | 7386 | -53.89 | -32.69 | -21.2 | -62.03 | 3.2 | 1.93 | 0 | 3.01 | P |

# Appendix C. Radiated Spurious Emission

**<For Ant. 1>**

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11b (Band Edge @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level ( dBµV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11b CH 01 2412MHz | | 2334.48 | 53.45 | -20.55 | 74 | 54.33 | 27.05 | 5.33 | 33.26 | 142 | 229 | P | H |
| | | 2385.96 | 43.76 | -10.24 | 54 | 44.38 | 27.23 | 5.39 | 33.24 | 142 | 229 | A | H |
| | * | 2410.688 | 94.5 | - | - | 95.02 | 27.28 | 5.42 | 33.22 | 142 | 229 | P | H |
| | * | 2410.855 | 91.89 | - | - | 92.41 | 27.28 | 5.42 | 33.22 | 142 | 229 | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 2344.29 | 53.09 | -20.91 | 74 | 53.91 | 27.1 | 5.33 | 33.25 | 345 | 360 | P | V |
| | | 2388.57 | 43.29 | -10.71 | 54 | 43.91 | 27.23 | 5.39 | 33.24 | 345 | 360 | A | V |
| | * | 2413.193 | 91.79 | - | - | 92.31 | 27.28 | 5.42 | 33.22 | 345 | 360 | P | V |
| | * | 2413.277 | 89.11 | - | - | 89.63 | 27.28 | 5.42 | 33.22 | 345 | 360 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11b CH 06 2437MHz | | 2381.82 | 53.06 | -20.94 | 74 | 53.72 | 27.19 | 5.39 | 33.24 | 117 | 211 | P | H |
| | | 2359.05 | 43.35 | -10.65 | 54 | 44.13 | 27.14 | 5.33 | 33.25 | 117 | 211 | A | H |
| | * | 2435.738 | 90.84 | - | - | 91.31 | 27.32 | 5.42 | 33.21 | 117 | 211 | P | H |
| | * | 2435.822 | 88.31 | - | - | 88.78 | 27.32 | 5.42 | 33.21 | 117 | 211 | A | H |
| | | 2487.64 | 53.33 | -20.67 | 74 | 53.55 | 27.5 | 5.46 | 33.18 | 117 | 211 | P | H |
| | | 2489.8 | 43.53 | -10.47 | 54 | 43.75 | 27.5 | 5.46 | 33.18 | 117 | 211 | A | H |
| | | 2389.38 | 53.52 | -20.48 | 74 | 54.14 | 27.23 | 5.39 | 33.24 | 337 | 331 | P | V |
| | | 2388.57 | 43.28 | -10.72 | 54 | 43.9 | 27.23 | 5.39 | 33.24 | 337 | 331 | A | V |
| | * | 2435.655 | 89.23 | - | - | 89.7 | 27.32 | 5.42 | 33.21 | 337 | 331 | P | V |
| | * | 2435.905 | 86.62 | - | - | 87.09 | 27.32 | 5.42 | 33.21 | 337 | 331 | A | V |
| | | 2491.44 | 53.69 | -20.31 | 74 | 53.91 | 27.5 | 5.46 | 33.18 | 337 | 331 | P | V |
| | | 2499.68 | 43.37 | -10.63 | 54 | 43.58 | 27.5 | 5.46 | 33.17 | 337 | 331 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **802.11b CH 11 2462MHz** | * | 2460.621 | 89.66 | - | - | 90.01 | 27.41 | 5.44 | 33.2 | 144 | 210 | P | H |
| | * | 2460.872 | 87.06 | - | - | 87.41 | 27.41 | 5.44 | 33.2 | 144 | 210 | A | H |
| | | 2485.08 | 53.42 | -20.58 | 74 | 53.68 | 27.46 | 5.46 | 33.18 | 144 | 210 | P | H |
| | | 2488.4 | 43.6 | -10.4 | 54 | 43.82 | 27.5 | 5.46 | 33.18 | 144 | 210 | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | * | 2460.872 | 86.76 | - | - | 87.11 | 27.41 | 5.44 | 33.2 | 369 | 360 | P | V |
| | * | 2460.788 | 84.19 | - | - | 84.54 | 27.41 | 5.44 | 33.2 | 369 | 360 | A | V |
| | | 2485.08 | 53.27 | -20.73 | 74 | 53.53 | 27.46 | 5.46 | 33.18 | 369 | 360 | P | V |
| | | 2488.64 | 43.52 | -10.48 | 54 | 43.74 | 27.5 | 5.46 | 33.18 | 369 | 360 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11b (Harmonic @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11b CH 01 2412MHz | | 4824 | 44.33 | -29.67 | 74 | 65.9 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4824 | 46.94 | -27.06 | 74 | 68.51 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11b CH 06 2437MHz | | 4872 | 42.95 | -31.05 | 74 | 64.21 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | H |
| | | 7308 | 45.28 | -28.72 | 74 | 60.54 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4872 | 46.48 | -27.52 | 74 | 67.74 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | V |
| | | 7308 | 44.42 | -29.58 | 74 | 59.68 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11b CH 11 2462MHz | | 4926 | 47.24 | -26.76 | 74 | 68.07 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | H |
| | | 7386 | 42.7 | -31.3 | 74 | 57.99 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4926 | 50.07 | -23.93 | 74 | 70.9 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | V |
| | | 7386 | 43.87 | -30.13 | 74 | 59.16 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11g (Band Edge @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11g CH 01 2412MHz | | 2361.57 | 53.31 | -20.69 | 74 | 54.09 | 27.14 | 5.33 | 33.25 | 147 | 207 | P | H |
| | | 2365.35 | 43.32 | -10.68 | 54 | 44.03 | 27.14 | 5.39 | 33.24 | 147 | 207 | A | H |
| | * | 2410.35 | 80.03 | - | - | 80.55 | 27.28 | 5.42 | 33.22 | 147 | 207 | P | H |
| | * | 2410.27 | 72.84 | - | - | 73.36 | 27.28 | 5.42 | 33.22 | 147 | 207 | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 2327.28 | 53.8 | -20.2 | 74 | 54.68 | 27.05 | 5.33 | 33.26 | 105 | 154 | P | V |
| | | 2359.59 | 43.29 | -10.71 | 54 | 44.07 | 27.14 | 5.33 | 33.25 | 105 | 154 | A | V |
| | * | 2410.1 | 75.69 | - | - | 76.21 | 27.28 | 5.42 | 33.22 | 105 | 154 | P | V |
| | * | 2410.35 | 67.89 | - | - | 68.41 | 27.28 | 5.42 | 33.22 | 105 | 154 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11g CH 06 2437MHz | | 2372.19 | 53.92 | -20.08 | 74 | 54.58 | 27.19 | 5.39 | 33.24 | 116 | 228 | P | H |
| | | 2361.93 | 43.22 | -10.78 | 54 | 44 | 27.14 | 5.33 | 33.25 | 116 | 228 | A | H |
| | * | 2435.4 | 77.15 | - | - | 77.62 | 27.32 | 5.42 | 33.21 | 116 | 228 | P | H |
| | * | 2435.49 | 69.99 | - | - | 70.46 | 27.32 | 5.42 | 33.21 | 116 | 228 | A | H |
| | | 2497.4 | 52.88 | -21.12 | 74 | 53.09 | 27.5 | 5.46 | 33.17 | 116 | 228 | P | H |
| | | 2484.08 | 43.58 | -10.42 | 54 | 43.84 | 27.46 | 5.46 | 33.18 | 116 | 228 | A | H |
| | | 2345.28 | 52.97 | -21.03 | 74 | 53.79 | 27.1 | 5.33 | 33.25 | 100 | 156 | P | V |
| | | 2387.76 | 43.37 | -10.63 | 54 | 43.99 | 27.23 | 5.39 | 33.24 | 100 | 156 | A | V |
| | * | 2435.4 | 72.74 | - | - | 73.21 | 27.32 | 5.42 | 33.21 | 100 | 156 | P | V |
| | * | 2435.07 | 65.49 | - | - | 65.96 | 27.32 | 5.42 | 33.21 | 100 | 156 | A | V |
| | | 2487.2 | 53.19 | -20.81 | 74 | 53.45 | 27.46 | 5.46 | 33.18 | 100 | 156 | P | V |
| | | 2486.84 | 43.57 | -10.43 | 54 | 43.83 | 27.46 | 5.46 | 33.18 | 100 | 156 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **802.11g CH 11 2462MHz** | * | 2460.2 | 77.1 | - | - | 77.45 | 27.41 | 5.44 | 33.2 | 164 | 43 | P | H |
| | * | 2460.45 | 69.86 | - | - | 70.21 | 27.41 | 5.44 | 33.2 | 164 | 43 | A | H |
| | | 2489.44 | 53.26 | -20.74 | 74 | 53.48 | 27.5 | 5.46 | 33.18 | 164 | 43 | P | H |
| | | 2483.72 | 43.63 | -10.37 | 54 | 43.89 | 27.46 | 5.46 | 33.18 | 164 | 43 | A | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | * | 2460.54 | 73.24 | - | - | 73.59 | 27.41 | 5.44 | 33.2 | 227 | 191 | P | V |
| | * | 2460.79 | 65.13 | - | - | 65.48 | 27.41 | 5.44 | 33.2 | 227 | 191 | A | V |
| | | 2491.16 | 52.91 | -21.09 | 74 | 53.13 | 27.5 | 5.46 | 33.18 | 227 | 191 | P | V |
| | | 2487.2 | 43.7 | -10.3 | 54 | 43.96 | 27.46 | 5.46 | 33.18 | 227 | 191 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11g (Harmonic @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11g CH 01 2412MHz | | 4824 | 38.95 | -35.05 | 74 | 60.52 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4824 | 39.44 | -34.56 | 74 | 61.01 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11g CH 06 2437MHz | | 4874 | 38.08 | -35.92 | 74 | 59.34 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | H |
| | | 7311 | 42.32 | -31.68 | 74 | 57.58 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4874 | 39.69 | -34.31 | 74 | 60.95 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | V |
| | | 7311 | 42.61 | -31.39 | 74 | 57.87 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| 802.11g CH 11 2462MHz | | 4924 | 38.95 | -35.05 | 74 | 59.78 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | H |
| | | 7386 | 41.43 | -32.57 | 74 | 56.72 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 4924 | 41.64 | -32.36 | 74 | 62.47 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | V |
| | | 7386 | 41.2 | -32.8 | 74 | 56.49 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Band Edge @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level ( dBµV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11n HT20 CH 06 2437MHz | | 2375.97 | 53.69 | -20.31 | 74 | 54.35 | 27.19 | 5.39 | 33.24 | 201 | 56 | P | H |
| | | 2385.87 | 43.79 | -10.21 | 54 | 44.41 | 27.23 | 5.39 | 33.24 | 201 | 56 | A | H |
| | * | 2435.404 | 93.88 | - | - | 94.35 | 27.32 | 5.42 | 33.21 | 201 | 56 | P | H |
| | * | 2435.488 | 86.66 | - | - | 87.13 | 27.32 | 5.42 | 33.21 | 201 | 56 | A | H |
| | | 2494.52 | 53.77 | -20.23 | 74 | 53.98 | 27.5 | 5.46 | 33.17 | 201 | 56 | P | H |
| | | 2483.72 | 44.04 | -9.96 | 54 | 44.3 | 27.46 | 5.46 | 33.18 | 201 | 56 | A | H |
| | | 2355.27 | 53.41 | -20.59 | 74 | 54.19 | 27.14 | 5.33 | 33.25 | 375 | 331 | P | V |
| | | 2360.49 | 43.6 | -10.4 | 54 | 44.38 | 27.14 | 5.33 | 33.25 | 375 | 331 | A | V |
| | * | 2435.404 | 91.89 | - | - | 92.36 | 27.32 | 5.42 | 33.21 | 375 | 331 | P | V |
| | * | 2435.655 | 84.72 | - | - | 85.19 | 27.32 | 5.42 | 33.21 | 375 | 331 | A | V |
| | | 2491.96 | 54.61 | -19.39 | 74 | 54.82 | 27.5 | 5.46 | 33.17 | 375 | 331 | P | V |
| | | 2486.52 | 43.99 | -10.01 | 54 | 44.25 | 27.46 | 5.46 | 33.18 | 375 | 331 | A | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Harmonic @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level ( dBµV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4872 | 39.38 | -34.62 | 74 | 60.64 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | H |
| | | 7308 | 44.44 | -29.56 | 74 | 59.7 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | | | | | | | | | | | | H |
| CH 06 | | 4878 | 45.35 | -28.65 | 74 | 66.61 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | V |
| 2437MHz | | 7308 | 46.34 | -27.66 | 74 | 61.6 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT40 (Band Edge @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2327.82 | 53.04 | -20.96 | 74 | 53.92 | 27.05 | 5.33 | 33.26 | 125 | 228 | P | H |
| | | 2386.86 | 43.83 | -10.17 | 54 | 44.45 | 27.23 | 5.39 | 33.24 | 125 | 228 | A | H |
| | * | 2419.7 | 75.18 | - | - | 75.65 | 27.32 | 5.42 | 33.21 | 125 | 228 | P | H |
| | * | 2419.62 | 68.14 | - | - | 68.61 | 27.32 | 5.42 | 33.21 | 125 | 228 | A | H |
| 802.11n | | 2489.2 | 53.81 | -20.19 | 74 | 54.03 | 27.5 | 5.46 | 33.18 | 125 | 228 | P | H |
| HT40 | | 2495.76 | 44.07 | -9.93 | 54 | 44.28 | 27.5 | 5.46 | 33.17 | 125 | 228 | A | H |
| CH 03 | | 2332.41 | 53.05 | -20.95 | 74 | 53.93 | 27.05 | 5.33 | 33.26 | 113 | 156 | P | V |
| 2422MHz | | 2364.45 | 43.8 | -10.2 | 54 | 44.51 | 27.14 | 5.39 | 33.24 | 113 | 156 | A | V |
| | * | 2419.12 | 70.43 | - | - | 70.94 | 27.28 | 5.42 | 33.21 | 113 | 156 | P | V |
| | * | 2419.46 | 63.15 | - | - | 63.66 | 27.28 | 5.42 | 33.21 | 113 | 156 | A | V |
| | | 2499.72 | 52.9 | -21.1 | 74 | 53.11 | 27.5 | 5.46 | 33.17 | 113 | 156 | P | V |
| | | 2488 | 44.18 | -9.82 | 54 | 44.4 | 27.5 | 5.46 | 33.18 | 113 | 156 | A | V |
| | | 2386.59 | 53.33 | -20.67 | 74 | 53.95 | 27.23 | 5.39 | 33.24 | 115 | 227 | P | H |
| | | 2387.85 | 43.83 | -10.17 | 54 | 44.45 | 27.23 | 5.39 | 33.24 | 115 | 227 | A | H |
| | * | 2434.98 | 73.78 | - | - | 74.25 | 27.32 | 5.42 | 33.21 | 115 | 227 | P | H |
| | * | 2434.57 | 66.42 | - | - | 66.89 | 27.32 | 5.42 | 33.21 | 115 | 227 | A | H |
| 802.11n | | 2496.96 | 53.51 | -20.49 | 74 | 53.72 | 27.5 | 5.46 | 33.17 | 115 | 227 | P | H |
| HT40 | | 2498.32 | 44.28 | -9.72 | 54 | 44.49 | 27.5 | 5.46 | 33.17 | 115 | 227 | A | H |
| CH 06 | | 2317.47 | 53.26 | -20.74 | 74 | 54.24 | 27.01 | 5.27 | 33.26 | 100 | 156 | P | V |
| 2437MHz | | 2389.38 | 43.61 | -10.39 | 54 | 44.23 | 27.23 | 5.39 | 33.24 | 100 | 156 | A | V |
| | * | 2434.15 | 68.94 | - | - | 69.41 | 27.32 | 5.42 | 33.21 | 100 | 156 | P | V |
| | * | 2434.4 | 61.78 | - | - | 62.25 | 27.32 | 5.42 | 33.21 | 100 | 156 | A | V |
| | | 2499.96 | 53.64 | -20.36 | 74 | 53.85 | 27.5 | 5.46 | 33.17 | 100 | 156 | P | V |
| | | 2483.76 | 44.01 | -9.99 | 54 | 44.27 | 27.46 | 5.46 | 33.18 | 100 | 156 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2325.12 | 52.68 | -21.32 | 74 | 53.56 | 27.05 | 5.33 | 33.26 | 108 | 210 | P | H |
| | | 2371.11 | 43.76 | -10.24 | 54 | 44.42 | 27.19 | 5.39 | 33.24 | 108 | 210 | A | H |
| | * | 2450.02 | 72.69 | - | - | 73.08 | 27.37 | 5.44 | 33.2 | 108 | 210 | P | H |
| | * | 2453.94 | 65.74 | - | - | 66.09 | 27.41 | 5.44 | 33.2 | 108 | 210 | A | H |
| **802.11n** | | 2494 | 52.93 | -21.07 | 74 | 53.14 | 27.5 | 5.46 | 33.17 | 108 | 210 | P | H |
| **HT40** | | 2484.32 | 44.14 | -9.86 | 54 | 44.4 | 27.46 | 5.46 | 33.18 | 108 | 210 | A | H |
| **CH 09** | | 2334.39 | 53.01 | -20.99 | 74 | 53.89 | 27.05 | 5.33 | 33.26 | 170 | 190 | P | V |
| **2452MHz** | | 2382.36 | 43.92 | -10.08 | 54 | 44.58 | 27.19 | 5.39 | 33.24 | 170 | 190 | A | V |
| | * | 2449.85 | 67.54 | - | - | 67.93 | 27.37 | 5.44 | 33.2 | 170 | 190 | P | V |
| | * | 2449.01 | 60.12 | - | - | 60.51 | 27.37 | 5.44 | 33.2 | 170 | 190 | A | V |
| | | 2498 | 53.23 | -20.77 | 74 | 53.44 | 27.5 | 5.46 | 33.17 | 170 | 190 | P | V |
| | | 2491.56 | 44.08 | -9.92 | 54 | 44.3 | 27.5 | 5.46 | 33.18 | 170 | 190 | A | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT40 (Harmonic @ 3m)**

| WIFI Ant. 1 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4824 | 37.88 | -36.12 | 74 | 59.45 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| 802.11n | | | | | | | | | | | | | H |
| HT40 | | | | | | | | | | | | | H |
| CH 03 | | 4824 | 38.23 | -35.77 | 74 | 59.8 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | V |
| 2422MHz | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | 4874 | 37.96 | -36.04 | 74 | 59.22 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | H |
| | | 7311 | 41.87 | -32.13 | 74 | 57.13 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | H |
| 802.11n | | | | | | | | | | | | | H |
| HT40 | | | | | | | | | | | | | H |
| CH 06 | | 4874 | 38.51 | -35.49 | 74 | 59.77 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | V |
| 2437MHz | | 7311 | 41.6 | -32.4 | 74 | 56.86 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | 4904 | 39.12 | -34.88 | 74 | 60.13 | 31.63 | 7.82 | 60.46 | 100 | 0 | P | H |
| | | 7356 | 41.75 | -32.25 | 74 | 57.03 | 36.3 | 9.51 | 61.09 | 100 | 0 | P | H |
| 802.11n | | | | | | | | | | | | | H |
| HT40 | | | | | | | | | | | | | H |
| CH 09 | | 4904 | 38.98 | -35.02 | 74 | 59.99 | 31.63 | 7.82 | 60.46 | 100 | 0 | P | V |
| 2452MHz | | 7356 | 41.15 | -32.85 | 74 | 56.43 | 36.3 | 9.51 | 61.09 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |

**Remark**

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

**Emission below 1GHz**

**2.4GHz WIFI 802.11b (LF)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 1 | | ( MHz ) | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 2.4GHz 802.11b LF | | 108.03 | 28.53 | -14.97 | 43.5 | 48.83 | 11.2 | 1.14 | 32.64 | | | P | H |
| | | 192.81 | 37.83 | -5.67 | 43.5 | 59.46 | 9.61 | 1.48 | 32.72 | 100 | 326 | P | H |
| | | 241.14 | 32.4 | -13.6 | 46 | 51.45 | 12.06 | 1.62 | 32.73 | | | P | H |
| | | 385.4 | 31.48 | -14.52 | 46 | 46.05 | 16.12 | 2.13 | 32.82 | | | P | H |
| | | 602.4 | 34.91 | -11.09 | 46 | 45.75 | 19.62 | 2.57 | 33.03 | | | P | H |
| | | 825 | 29.88 | -16.12 | 46 | 37.25 | 22.3 | 3.07 | 32.74 | | | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | 51.06 | 31.71 | -8.29 | 40 | 54.67 | 8.89 | 0.93 | 32.78 | 114 | 2 | P | V |
| | | 99.66 | 23.2 | -20.3 | 43.5 | 44.29 | 10.4 | 1.14 | 32.63 | | | P | V |
| | | 192.81 | 30.39 | -13.11 | 43.5 | 52.02 | 9.61 | 1.48 | 32.72 | | | P | V |
| | | 400.1 | 25.7 | -20.3 | 46 | 39.89 | 16.52 | 2.13 | 32.84 | | | P | V |
| | | 506.5 | 28.9 | -17.1 | 46 | 41.24 | 18.26 | 2.33 | 32.93 | | | P | V |
| | | 699 | 28.53 | -17.47 | 46 | 38.11 | 20.59 | 2.82 | 32.99 | | | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against limit line. | | | | | | | | | | | | |

**<For MIMO Ant. 1 + 2>**

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Band Edge @ 3m)**

| WIFI Ant. 1+2 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2387.04 | 53.34 | -20.66 | 74 | 53.96 | 27.23 | 5.39 | 33.24 | 115 | 315 | P | H |
| | | 2365.35 | 43.66 | -10.34 | 54 | 44.37 | 27.14 | 5.39 | 33.24 | 115 | 315 | A | H |
| | * | 2410.1 | 87.04 | - | - | 87.56 | 27.28 | 5.42 | 33.22 | 115 | 315 | P | H |
| | * | 2413.95 | 80.09 | - | - | 80.61 | 27.28 | 5.42 | 33.22 | 115 | 315 | A | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | | | | | | | | | | | | H |
| CH 01 | | 2387.31 | 52.88 | -21.12 | 74 | 53.5 | 27.23 | 5.39 | 33.24 | 361 | 269 | P | V |
| 2412MHz | | 2389.92 | 43.91 | -10.09 | 54 | 44.51 | 27.23 | 5.39 | 33.22 | 361 | 269 | A | V |
| | * | 2410.35 | 86.18 | - | - | 86.7 | 27.28 | 5.42 | 33.22 | 361 | 269 | P | V |
| | * | 2413.86 | 79.17 | - | - | 79.69 | 27.28 | 5.42 | 33.22 | 361 | 269 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | 2389.47 | 53.57 | -20.43 | 74 | 54.19 | 27.23 | 5.39 | 33.24 | 225 | 315 | P | H |
| | | 2379.93 | 43.65 | -10.35 | 54 | 44.31 | 27.19 | 5.39 | 33.24 | 225 | 315 | A | H |
| | * | 2435.15 | 87.2 | - | - | 87.67 | 27.32 | 5.42 | 33.21 | 225 | 315 | P | H |
| | * | 2435.49 | 79.85 | - | - | 80.32 | 27.32 | 5.42 | 33.21 | 225 | 315 | A | H |
| 802.11n | | 2485.56 | 53.16 | -20.84 | 74 | 53.42 | 27.46 | 5.46 | 33.18 | 225 | 315 | P | H |
| HT20 | | 2489 | 44 | -10 | 54 | 44.22 | 27.5 | 5.46 | 33.18 | 225 | 315 | A | H |
| CH 06 | | 2389.74 | 52.84 | -21.16 | 74 | 53.46 | 27.23 | 5.39 | 33.24 | 370 | 269 | P | V |
| 2437MHz | | 2389.56 | 43.88 | -10.12 | 54 | 44.5 | 27.23 | 5.39 | 33.24 | 370 | 269 | A | V |
| | * | 2435.32 | 87.97 | - | - | 88.44 | 27.32 | 5.42 | 33.21 | 370 | 269 | P | V |
| | * | 2435.74 | 80.65 | - | - | 81.12 | 27.32 | 5.42 | 33.21 | 370 | 269 | A | V |
| | | 2491.48 | 53.59 | -20.41 | 74 | 53.81 | 27.5 | 5.46 | 33.18 | 370 | 269 | P | V |
| | | 2487.32 | 44.2 | -9.8 | 54 | 44.46 | 27.46 | 5.46 | 33.18 | 370 | 269 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | * | 2463.54 | 88.07 | - | - | 88.42 | 27.41 | 5.44 | 33.2 | 136 | 312 | P | H |
| | * | 2463.54 | 79.73 | - | - | 80.08 | 27.41 | 5.44 | 33.2 | 136 | 312 | A | H |
| | | 2499.4 | 53.01 | -20.99 | 74 | 53.22 | 27.5 | 5.46 | 33.17 | 136 | 312 | P | H |
| | | 2484.44 | 44.15 | -9.85 | 54 | 44.41 | 27.46 | 5.46 | 33.18 | 136 | 312 | A | H |
| **802.11n** | | | | | | | | | | | | | H |
| **HT20** | | | | | | | | | | | | | H |
| **CH 11** | * | 2460.45 | 87.48 | - | - | 87.83 | 27.41 | 5.44 | 33.2 | 351 | 266 | P | V |
| **2462MHz** | * | 2460.87 | 80.32 | - | - | 80.67 | 27.41 | 5.44 | 33.2 | 351 | 266 | A | V |
| | | 2485.72 | 53.37 | -20.63 | 74 | 53.63 | 27.46 | 5.46 | 33.18 | 351 | 266 | P | V |
| | | 2484.8 | 44.12 | -9.88 | 54 | 44.38 | 27.46 | 5.46 | 33.18 | 351 | 266 | A | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |

| | |
|---|---|
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |

**2.4GHz 2400~2483.5MHz**

**WIFI 802.11n HT20 (Harmonic @ 3m)**

| WIFI Ant. 1+2 | Note | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4824 | 38.81 | -35.19 | 74 | 60.38 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | H |
| | | | | | | | | | | | | | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | | | | | | | | | | | | H |
| CH 01 | | 4824 | 38.42 | -35.58 | 74 | 59.99 | 31.46 | 7.58 | 60.61 | 100 | 0 | P | V |
| 2412MHz | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | 4874 | 38.72 | -35.28 | 74 | 59.98 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | H |
| | | 7311 | 43.02 | -30.98 | 74 | 58.28 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | | | | | | | | | | | | H |
| CH 06 | | 4874 | 38.1 | -35.9 | 74 | 59.36 | 31.56 | 7.7 | 60.52 | 100 | 0 | P | V |
| 2437MHz | | 7311 | 42.5 | -31.5 | 74 | 57.76 | 36.18 | 9.49 | 60.93 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | 4924 | 38.69 | -35.31 | 74 | 59.52 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | H |
| | | 7386 | 41.16 | -32.84 | 74 | 56.45 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | | | | | | | | | | | | H |
| CH 11 | | 4924 | 39.08 | -34.92 | 74 | 59.91 | 31.66 | 7.93 | 60.42 | 100 | 0 | P | V |
| 2462MHz | | 7386 | 41.79 | -32.21 | 74 | 57.08 | 36.37 | 9.53 | 61.19 | 100 | 0 | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| **Remark** | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. | | | | | | | | | | | | |

**Emission below 1GHz**

**2.4GHz WIFI 802.11n HT20 (LF)**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 1+2 | | ( MHz ) | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| | | 99.66 | 23.31 | -20.19 | 43.5 | 44.4 | 10.4 | 1.14 | 32.63 | | | P | H |
| | | 192.81 | 36.15 | -7.35 | 43.5 | 57.78 | 9.61 | 1.48 | 32.72 | 163 | 174 | P | H |
| | | 216.84 | 34.25 | -11.75 | 46 | 55.1 | 10.26 | 1.62 | 32.73 | | | P | H |
| | | 433.7 | 29.15 | -16.85 | 46 | 42.82 | 17.04 | 2.16 | 32.87 | | | P | H |
| | | 626.9 | 32.14 | -13.86 | 46 | 42.62 | 19.92 | 2.62 | 33.02 | | | P | H |
| | | 795.6 | 30.92 | -15.08 | 46 | 38.78 | 22.05 | 2.97 | 32.88 | | | P | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| | | | | | | | | | | | | | H |
| 2.4GHz | | | | | | | | | | | | | H |
| 802.11n | | | | | | | | | | | | | H |
| HT20 | | 51.33 | 35.98 | -4.02 | 40 | 58.94 | 8.89 | 0.93 | 32.78 | 199 | 221 | P | V |
| LF | | 86.43 | 19.4 | -20.6 | 40 | 42.21 | 8.72 | 1.14 | 32.67 | | | P | V |
| | | 192.81 | 26.5 | -17 | 43.5 | 48.13 | 9.61 | 1.48 | 32.72 | | | P | V |
| | | 398.7 | 27.95 | -18.05 | 46 | 42.19 | 16.47 | 2.13 | 32.84 | | | P | V |
| | | 495.3 | 27.68 | -18.32 | 46 | 40.16 | 18.11 | 2.33 | 32.92 | | | P | V |
| | | 722.8 | 24.42 | -21.58 | 46 | 33.51 | 21.05 | 2.82 | 32.96 | | | P | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| | | | | | | | | | | | | | V |
| Remark | 1. No other spurious found.<br>2. All results are PASS against limit line. | | | | | | | | | | | | |

**Note symbol**

| | |
|---|---|
| * | **Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| ! | Test result is **over limit** line. |
| P/A | **P**eak or **A**verage |
| H/V | **H**orizontal or **V**ertical |

**A calculation example for radiated spurious emission is shown as below:**

| WIFI | Note | Frequency | Level | Over | Limit | Read | Antenna | Cable | Preamp | Ant | Table | Peak | Pol. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant. | | | | Limit | Line | Level | Factor | Loss | Factor | Pos | Pos | Avg. | |
| 1 | | ( MHz ) | ( dBµV/m ) | ( dB ) | ( dBµV/m ) | ( dBµV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 802.11b CH 01 2412MHz | | 2390 | 55.45 | -18.55 | 74 | 54.51 | 32.22 | 4.58 | 35.86 | 103 | 308 | P | H |
| | | 2390 | 43.54 | -10.46 | 54 | 42.6 | 32.22 | 4.58 | 35.86 | 103 | 308 | A | H |

1. Level(dBµV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBµV/m) – Limit Line(dBµV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBµV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBµV) – 35.86 (dB)

= 55.45 (dBµV/m)

2. Over Limit(dB)

= Level(dBµV/m) – Limit Line(dBµV/m)

= 55.45(dBµV/m) – 74(dBµV/m)

= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBµV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBµV) – 35.86 (dB)

= 43.54 (dBµV/m)

2. Over Limit(dB)

= Level(dBµV/m) – Limit Line(dBµV/m)

= 43.54(dBµV/m) – 54(dBµV/m)

= -10.46(dB)

**Both peak and average measured complies with the limit line, so test result is "PASS".**

# Appendix D. Setup Photographs

## <Radiated Emission>

**LF**

**HF**

# Appendix B. Original Report of FR4O2349C

Please refer to Sporton report number FR3N2752-01C as below.

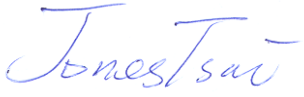
# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | Texas Instruments Incorporated |
| EQUIPMENT | : | WiFi and Bluetooth Module |
| BRAND NAME | : | Texas Instruments |
| MODEL NAME | : | WL18MODGB |
| FCC ID | : | Z64-WL18SBMOD |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

**The product was received on Nov. 27, 2013 and testing was completed on Dec. 20, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant 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: Joseph Lin / Supervisor**



**Approved by: Jones Tsai / Manager**

***SPORTON INTERNATIONAL INC.***
***No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.***

# TABLE OF CONTENTS

# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR3N2752-01C | Rev. 01 | Initial issue of report | Jan. 27, 2014 |
| | | | |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | IC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|---|
| 3.1 | 15.247(a)(2) | RSS-210 A8.2(a) | 6dB Bandwidth | ≥ 0.5MHz | Pass | - |
| 3.1 | - | RSS-Gen 4.6.1 | 99% Bandwidth | - | Pass | - |
| 3.2 | 15.247(b) | RSS-210 A8.4 | Power Output Measurement | ≤ 30dBm | Pass | - |
| 3.3 | 15.247(e) | RSS-210 A8.2(b) | Power Spectral Density | ≤ 8dBm/3kHz | Pass | - |
| 3.4 | 15.247(d) | RSS-210 A8.5 | Conducted Band Edges | ≤ 20dBc | Pass | - |
| | | | Conducted Spurious Emission | | Pass | - |
| 3.5 | 15.247(d) | RSS-210 A8.5 | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass | Under limit 2.30 dB at 2483.950 MHz |
| 3.6 | 15.207 | RSS-Gen 7.2.4 | AC Conducted Emission | 15.207(a) | Pass | Under limit 8.50 dB at 0.350 MHz |
| 3.7 | 15.203 & 15.247(b) | RSS-210 A8.4 | Antenna Requirement | N/A | Pass | - |

# 1 General Description

## 1.1 Applicant

**Texas Instruments Incorporated**
12500 TI Boulevard, M/S 8751, Dallas, TX 75243, USA

## 1.2 Manufacturer

**Jorjin Technologies Inc.**
17F, No.239, Sec. 1, Datong Rd, Xizhi Dist. New Taipei City 221, Taiwan. R.O.C.

## 1.3 Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | WiFi and Bluetooth Module |
| **Brand Name** | Texas Instruments |
| **Model Name** | WL18MODGB |
| **FCC ID** | Z64-WL18SBMOD |
| **EUT supports Radios application** | WLAN 11b/g/n HT20/HT40<br>Bluetooth v3.0 + EDR<br>Bluetooth v4.0 + LE |
| **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.

## 1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Product Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Channel Frequency Range</td><td>802.11b/g/n : 2412 MHz ~ 2462 MHz</td></tr>
<tr><td>Maximum Output Power to antenna</td><td><Ant. 1><br>802.11b : 17.96 dBm (0.0625 W)<br>802.11g : 20.59 dBm (0.1146 W)<br>802.11n HT20 : 20.56 dBm (0.1138 W)<br>802.11n HT40 : 20.22 dBm (0.1052 W)<br><MIMO Ant. 1+2><br>802.11n HT20 : 23.87 dBm (0.2438 W)</td></tr>
<tr><td>99% Occupied Bandwidth</td><td><Ant. 1><br>802.11b : 14.90MHz<br>802.11g : 19.55MHz<br>802.11n HT20 : 19.55MHz<br>802.11n HT40 : 36.80MHz<br><MIMO Ant. 1+2><br>802.11n HT20 : 19.65MHz</td></tr>
<tr><td>Antenna Type</td><td><Ant 1><br>Chip Antenna type with gain -0.36 dBi<br><Ant 2><br>Chip Antenna type with gain 1.22 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function for Transmitter</td><td>
<table>
<tr><th></th><th>Chain<br>Ant. 1</th><th>Chain<br>Ant. 2</th></tr>
<tr><td>802.11 b</td><td>V</td><td>-</td></tr>
<tr><td>802.11 g</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n HT20<br>SISO</td><td>V</td><td>-</td></tr>
<tr><td>802.11 n HT20<br>MIMO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 n HT40<br>SISO</td><td>V</td><td>-</td></tr>
</table>
</td></tr>
</table>

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Site

| Test Site | SPORTON INTERNATIONAL INC. | | | |
|---|---|---|---|---|
| Test Site Location | No. 52, Hwa Ya 1st 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 | | | |
| Test Site No. | Sporton Site No. | | | FCC/IC Registration No. |
| | TH02-HY | CO05-HY | 03CH07-HY | 722060/4086B-1 |

**Note:** The test site complies with ANSI C63.4 2003 requirement.

## 1.7 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 v03r01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.4-2003

**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.

# 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 and 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 data rate associated with the highest power were chosen for full test shown in the following tables.

**<Ant. 1>**

| 802.11b | | | | |
|---|---|---|---|---|
| Data Rate (MHz) | 1M bps | 2M bps | 5.5M bps | 11M bps |
| Peak Power (dBm) | 17.96 | 17.95 | 17.93 | 17.95 |

| 802.11g | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | 6M bps | 9M bps | 12M bps | 18M bps | 24M bps | 36M bps | 48M bps | 54M bps |
| Peak Power (dBm) | 20.59 | 20.57 | 20.55 | 20.58 | 20.56 | 20.53 | 20.44 | 20.44 |

| 2.4GHz 802.11n HT20 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| Peak Power (dBm) | 20.56 | 20.42 | 20.43 | 20.46 | 20.32 | 20.38 | 20.33 | 20.17 |

| 2.4GHz 802.11n HT40 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| Peak Power (dBm) | 20.22 | 20.10 | 20.10 | 20.18 | 20.18 | 20.19 | 19.97 | 20.15 |

**MIMO <Ant. 1+2>**

| 2.4GHz 802.11n HT20 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | MCS8 | MCS9 | MCS10 | MCS11 | MCS12 | MCS13 | MCS14 | MCS15 |
| Peak Power (dBm) | 23.87 | 23.83 | 23.84 | 23.85 | 23.78 | 23.87 | 23.52 | 23.48 |

**Note:** MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

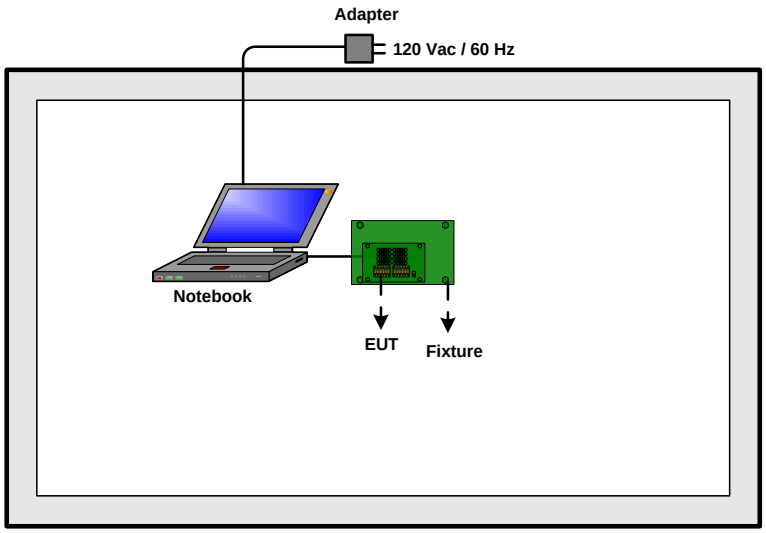
## 2.3 Test Mode

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

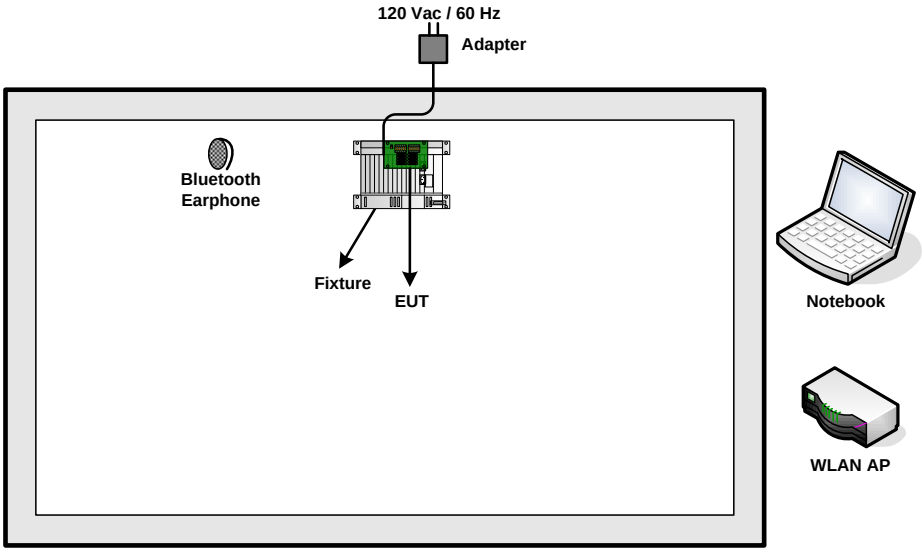
| Test Cases | | | | |
|---|---|---|---|---|
| | **Test Items** | **Mode** | **Data Rate** | **Test Channel** |
| **Conducted TCs** | **6dB and 99% BW Power Spectral Density** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **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 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 TCs** | **Radiated Band Edge** | **802.11b** | **1 Mbps** | **1/11** |
| | | **802.11g** | **6 Mbps** | **1/11** |
| | | **802.11n HT20 SISO** | **6.5 Mbps** | **11** |
| | | **802.11n HT20 MIMO** | **6.5 Mbps** | **1/11** |
| | | **802.11n HT40 SISO** | **13.5 Mbps** | **3/9** |
| | **Radiated Spurious Emission** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20 SISO** | **6.5 Mbps** | **11** |
| | | **802.11n HT20 MIMO** | **6.5 Mbps** | **1/6/11** |
| | | **802.11n HT40 SISO** | **13.5 Mbps** | **3/6/9** |
| **AC Conducted Emission** | **Mode 1** : WLAN Link + Bluetooth Link + Adapter | | | |

## 2.4 Connection Diagram of Test System

**<WLAN Tx Mode>**




**<AC Conducted Emission Mode>**



## 2.5 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | WLAN AP | D-Link | DIR-628 | KA2DIR628A2 | N/A | Unshielded, 1.8 m |
| 2. | Notebook | Lenovo | G480 | N/A | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 3. | Notebook | DELL | Latitude E6320 | FCC DoC | N/A | AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m |
| 4. | Bluetooth Earphone | Sony Ericsson | MW600 | PY7DDA-2029 | N/A | N/A |
| 5. | Fixture | N/A | WG7XXXT01 | N/A | N/A | N/A |
| 6. | Adapter | Aviv Energy | HK-IP15-A05 | N/A | N/A | Unshielded, 1.8 m |

## 2.6 EUT Operation Test Setup

For WLAN function, programmed RF utility, “HCT Tester” installed in the notebook make the EUT provides functions like channel selection and power level for continuous transmitting and receiving signals.

## 2.7 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

*Offset(dB) = RF cable loss(dB) + attenuator factor(dB).*

= 4.2 + 10 = 14.2 (dB)

# 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.

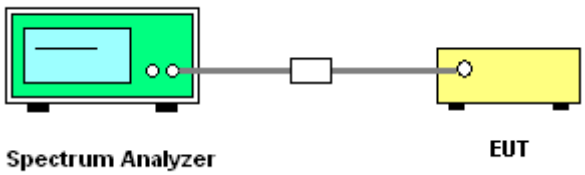
### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r01.
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) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.
6. Measure and record the results in the test report.

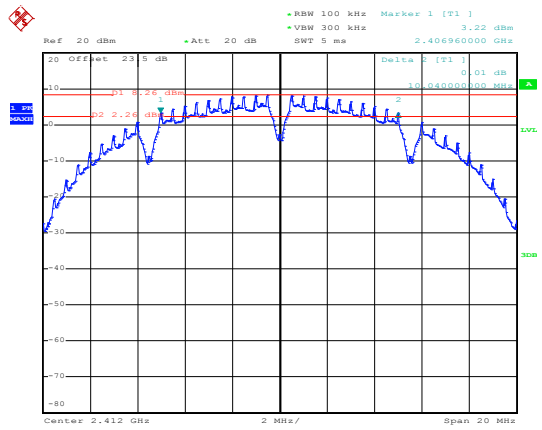
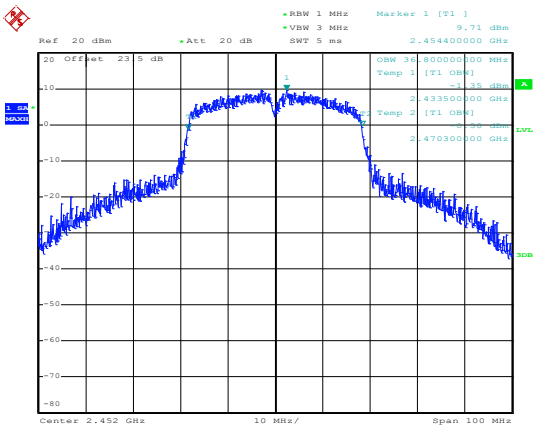
### 3.1.4 Test Setup



### 3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

| Test Band : | 2.4GHz | Temperature : | 21~25℃ |
|---|---|---|---|
| Test Engineer : | Alex Lee | Relative Humidity : | 51~54% |

| Mod. | Data Rate | $N_{TX}$ | Channel | Freq. (MHz) | 99% Bandwidth (MHz) | | 6dB Bandwidth (MHz) | | 6dB Bandwidth Min. Limit (MHz) | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ant. 1 | Ant. 2 | Ant. 1 | Ant. 2 | | |
| 11b | 1Mbps | 1 | 1 | 2412 | 14.90 | - | 10.04 | - | 0.5 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | 14.90 | - | 10.08 | - | 0.5 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | 14.90 | - | 10.04 | - | 0.5 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | 17.25 | - | 15.08 | - | 0.5 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | 19.55 | - | 15.08 | - | 0.5 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | 17.30 | - | 15.08 | - | 0.5 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | 18.35 | - | 15.12 | - | 0.5 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | 19.55 | - | 15.08 | - | 0.5 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | 18.20 | - | 15.08 | - | 0.5 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | 36.10 | - | 35.04 | - | 0.5 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | 36.70 | - | 35.04 | - | 0.5 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | 36.80 | - | 35.12 | - | 0.5 | Pass |
| HT20 | MCS8 | 2 | 1 | 2412 | 18.30 | 18.15 | 15.08 | 15.08 | 0.5 | Pass |
| HT20 | MCS8 | 2 | 6 | 2437 | 19.65 | 19.05 | 15.08 | 15.08 | 0.5 | Pass |
| HT20 | MCS8 | 2 | 11 | 2462 | 18.20 | 18.10 | 15.08 | 15.08 | 0.5 | Pass |

| Minimum 6dB Bandwidth | Maximum 99% Occupied Bandwidth |
|---|---|
|  |  |
| Date: 9.DEC.2013 20:48:13 | Date: 9.DEC.2013 21:49:04 |

## 3.2 Peak Output Power Measurement

### 3.2.1 Limit of Peak Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is 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.

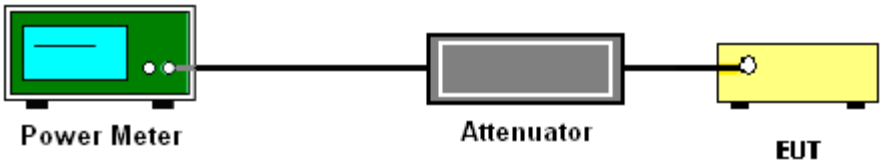
### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 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 v03r01.
2. The RF output of EUT was connected to the power meter 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.
5. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak Output Power

| Test Band : | 2.4GHz | Temperature : | 21~25℃ |
|---|---|---|---|
| Test Engineer : | Alex Lee | Relative Humidity : | 51~54% |

| Mod. | Data Rate | $N_{TX}$ | CH. | Freq. (MHz) | Peak Conducted Power (dBm) | | | Max. Limit (dBm) | | DG (dBi) | | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ant. 1 | Ant. 2 | SUM | Ant. 1 | Ant. 2 | Ant. 1 | Ant. 2 | |
| 11b | 1Mbps | 1 | 1 | 2412 | 17.58 | - | - | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | 17.96 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | 17.62 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | 20.23 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | 20.59 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | 19.92 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | 19.95 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | 20.56 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | 20.32 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | 19.98 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | 20.22 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | 19.98 | - | | 30.00 | 30.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS8 | 2 | 1 | 2412 | 19.82 | 21.06 | 23.49 | 30.00 | | 3.48 | | Pass |
| HT20 | MCS8 | 2 | 6 | 2437 | 19.95 | 21.61 | 23.87 | 30.00 | | 3.48 | | Pass |
| HT20 | MCS8 | 2 | 11 | 2462 | 19.55 | 21.46 | 23.62 | 30.00 | | 3.48 | | Pass |

**Note:** Measured power (dBm) has offset with cable loss.

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

| Test Band : | 2.4GHz | Temperature : | 21~25℃ |
|---|---|---|---|
| Test Engineer : | Alex Lee | Relative Humidity : | 51~54% |

| Mod. | Data Rate | $N_{TX}$ | Channel | Freq. (MHz) | Duty Factor (dB) | | Average Conducted Power (dBm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ant. 1 | Ant. 2 | Ant. 1 | Ant. 2 | Sum Power |
| 11b | 1Mbps | 1 | 1 | 2412 | 0.10 | - | 15.84 | - | - |
| 11b | 1Mbps | 1 | 6 | 2437 | 0.10 | - | 16.15 | - | |
| 11b | 1Mbps | 1 | 11 | 2462 | 0.10 | - | 15.92 | - | |
| 11g | 6Mbps | 1 | 1 | 2412 | 0.59 | - | 13.22 | - | |
| 11g | 6Mbps | 1 | 6 | 2437 | 0.59 | - | 16.22 | - | |
| 11g | 6Mbps | 1 | 11 | 2462 | 0.59 | - | 12.92 | - | |
| HT20 | MCS0 | 1 | 1 | 2412 | 0.64 | - | 13.02 | - | |
| HT20 | MCS0 | 1 | 6 | 2437 | 0.64 | - | 15.40 | - | |
| HT20 | MCS0 | 1 | 11 | 2462 | 0.64 | - | 13.59 | - | |
| HT40 | MCS0 | 1 | 3 | 2422 | 1.21 | - | 11.37 | - | |
| HT40 | MCS0 | 1 | 6 | 2437 | 1.21 | - | 13.99 | - | |
| HT40 | MCS0 | 1 | 9 | 2452 | 1.21 | - | 13.66 | - | |
| HT20 | MCS8 | 2 | 1 | 2412 | 1.15 | 1.17 | 12.52 | 13.76 | 16.19 |
| HT20 | MCS8 | 2 | 6 | 2437 | 1.15 | 1.17 | 14.76 | 16.49 | 18.72 |
| HT20 | MCS8 | 2 | 11 | 2462 | 1.15 | 1.17 | 12.45 | 13.90 | 16.24 |

**Note:** Measured power (dBm) has offset with cable loss and duty factor.

## 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

The measuring equipment is listed in the section 4 of this test report.

### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
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.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

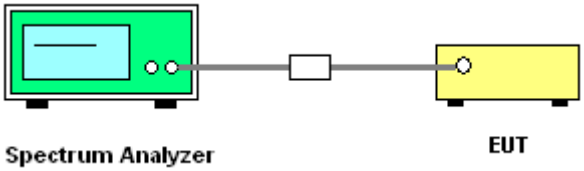
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   Method (1): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

   Method (2): Measure and add 10 log (N) dB, where N is the number of outputs. (N=2)

### 3.3.4 Test Setup



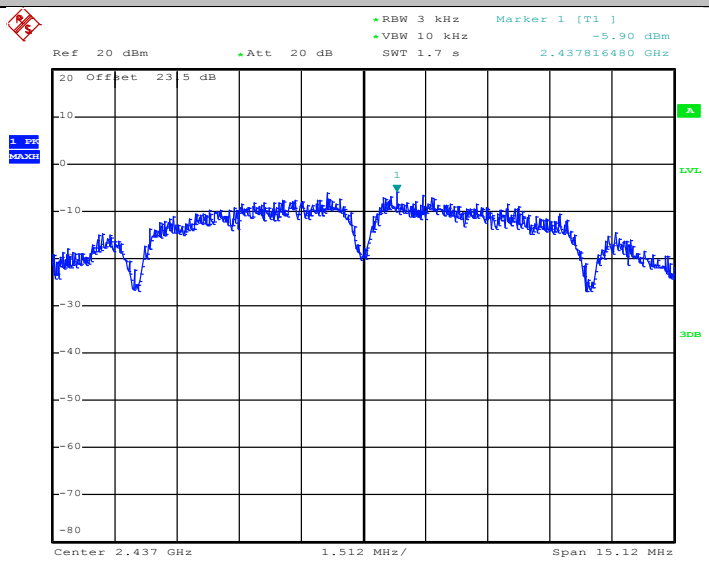

### 3.3.5 Test Result of Power Spectral Density

| Test Band : | 2.4GHz | Temperature : | 21~25℃ |
|---|---|---|---|
| Test Engineer : | Alex Lee | Relative Humidity : | 51~54% |

| Mod. | Data Rate | $N_{TX}$ | CH. | Freq. (MHz) | Peak Power Density (dBm/3kHz) | | | Max. Limit (dBm/3kHz) | | DG (dBi) | | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ant. 1 | Ant. 2 | Worst +10log(2) | Ant. 1 | Ant. 2 | Ant. 1 | Ant. 2 | |
| 11b | 1Mbps | 1 | 1 | 2412 | -5.97 | - | - | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | -5.90 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | -6.29 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | -11.06 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | -7.54 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | -10.64 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | -10.43 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | -8.07 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | -9.16 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | -15.33 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | -12.61 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | -12.62 | - | | 8.00 | 8.00 | -0.36 | 1.22 | Pass |
| HT20 | MCS8 | 2 | 1 | 2412 | -12.82 | -11.74 | -8.73 | 8.00 | | 3.48 | | Pass |
| HT20 | MCS8 | 2 | 6 | 2437 | -10.69 | -9.07 | -6.06 | 8.00 | | 3.48 | | Pass |
| HT20 | MCS8 | 2 | 11 | 2462 | -12.75 | -10.26 | -7.25 | 8.00 | | 3.48 | | Pass |

**Note:** Measured power density (dBm) has offset with cable loss.

## Worst Case Power Density (dBm/3kHz)



# 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

The measuring equipment is listed in the section 4 of this test report.

## 3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

## 3.4.4 Test Setup

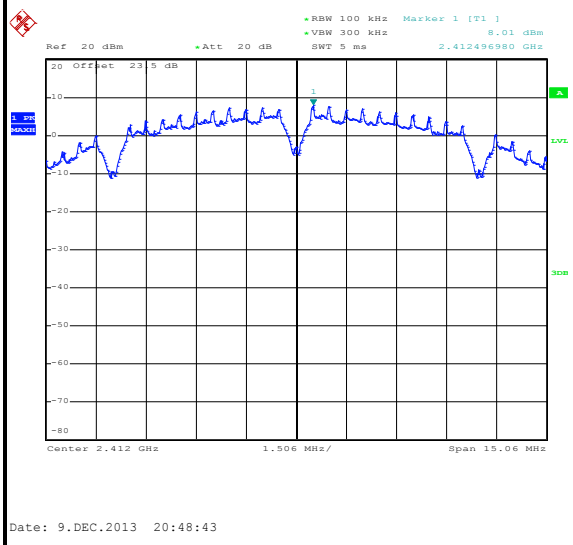
## 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

**Number of TX = 1, Ant. 1 (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Alex Lee |

**WLAN 802.11b Channel 01**

**100kHz PSD reference Level**

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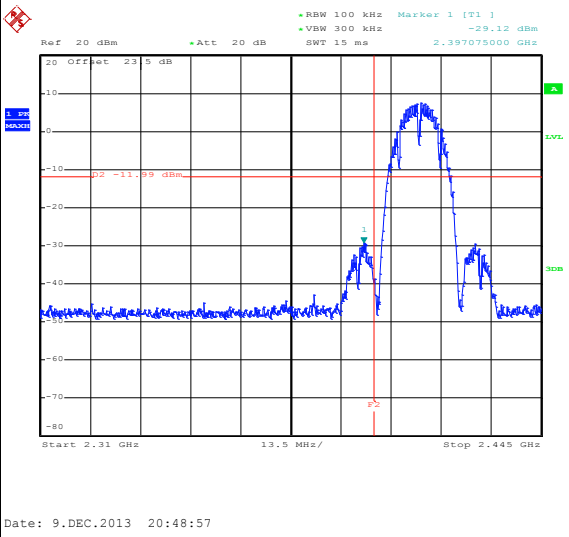
**Low Channel Plot**

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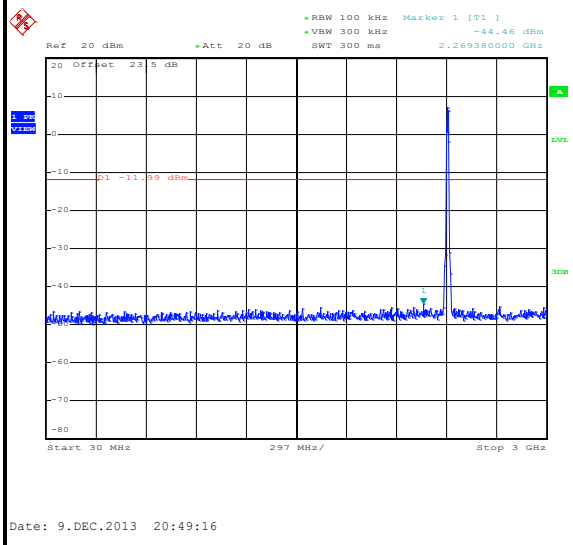
**Spurious Emission 30MHz~3GHz**

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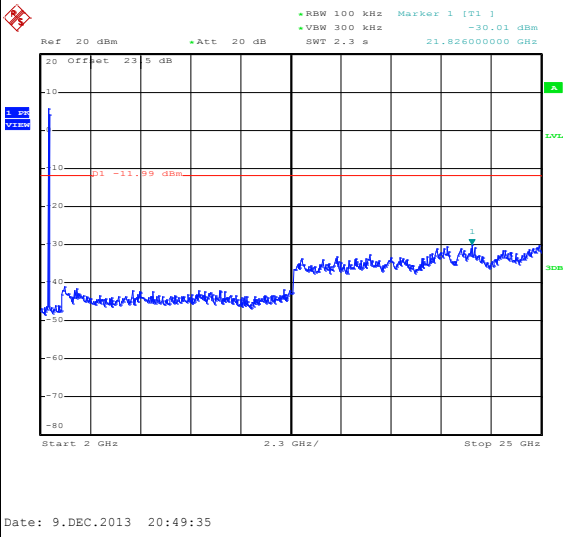
**Spurious Emission 2GHz~25GHz**

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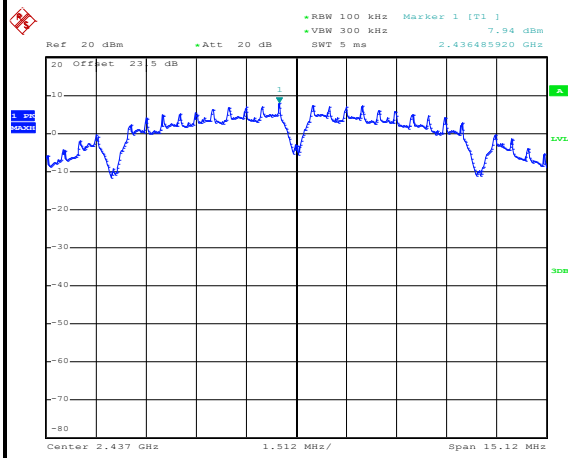
| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

**WLAN 802.11b Channel 06**

**100kHz PSD reference Level**

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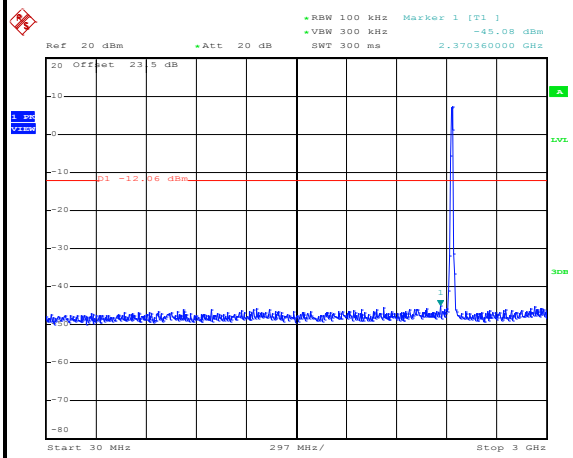
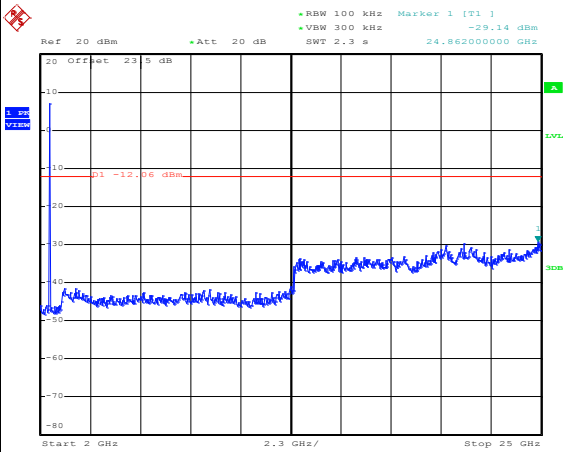
**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:16:04

**Spurious Emission 2GHz~25GHz**

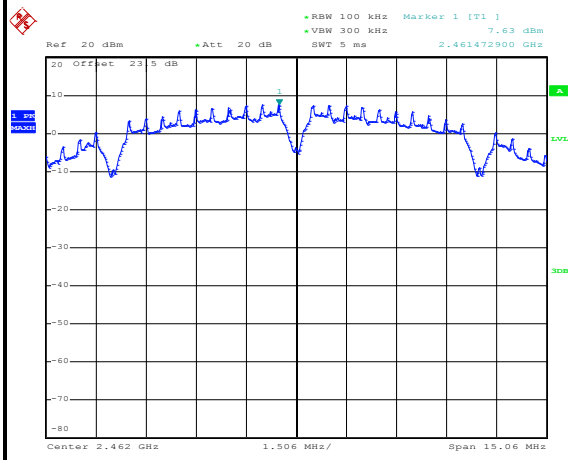



Date: 9.DEC.2013 21:16:23

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Alex Lee |

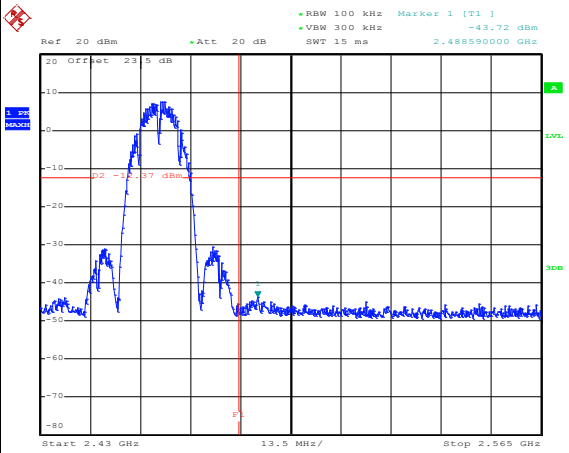
**WLAN 802.11b Channel 11**

**100kHz PSD reference Level**



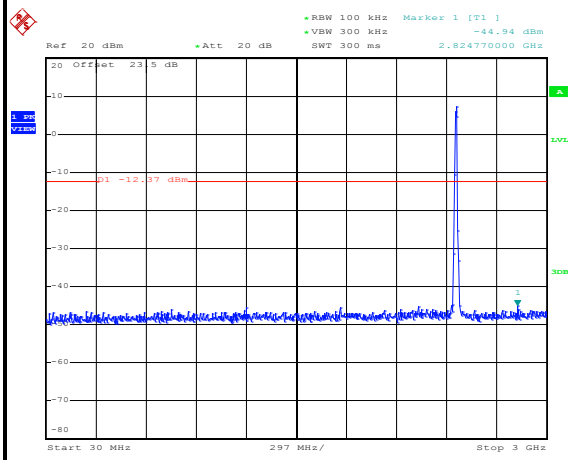

Date: 9.DEC.2013 20:55:01

**High Channel Plot**



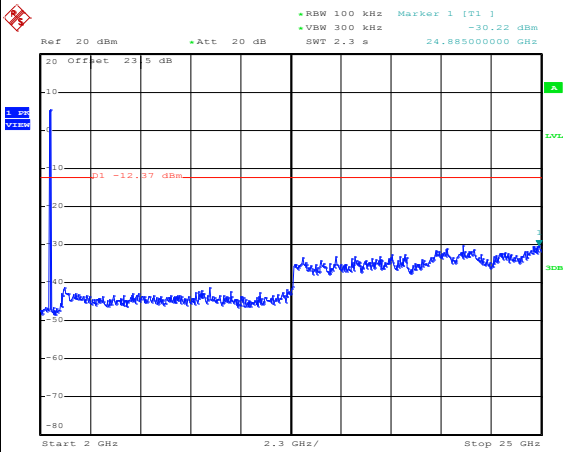

Date: 9.DEC.2013 20:55:15

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 20:55:34

**Spurious Emission 2GHz~25GHz**

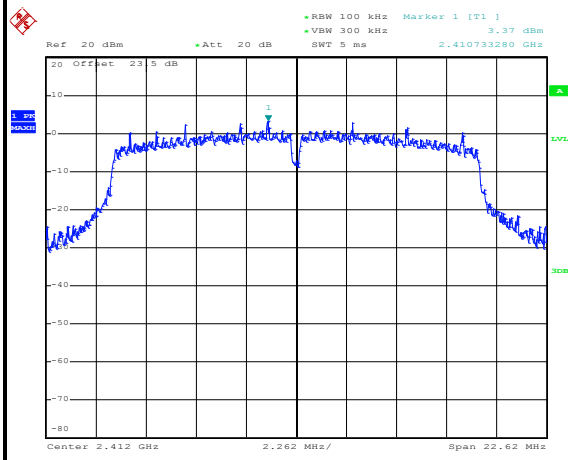



Date: 9.DEC.2013 20:55:53

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Alex Lee |

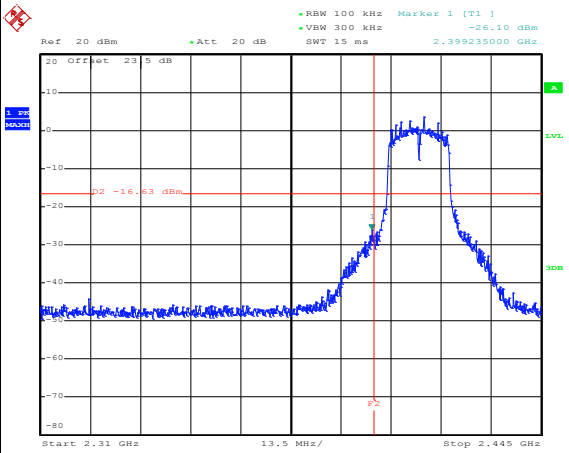
**WLAN 802.11g Channel 01**

**100kHz PSD reference Level**



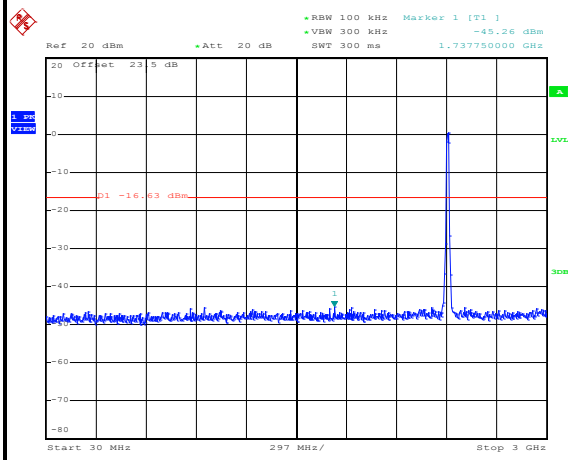

Date: 9.DEC.2013 21:10:50

**Low Channel Plot**



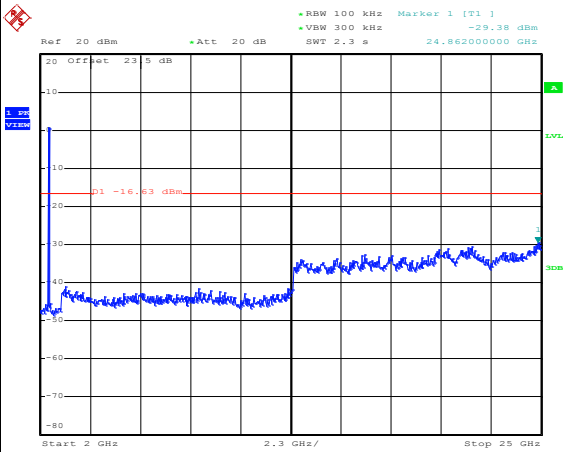

Date: 9.DEC.2013 21:11:04

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:11:23

**Spurious Emission 2GHz~25GHz**

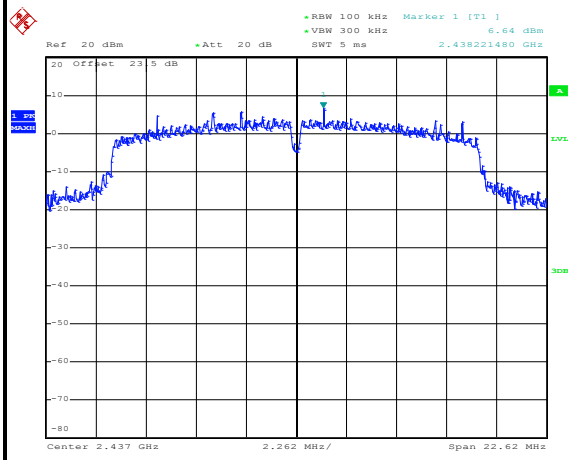



Date: 9.DEC.2013 21:11:42

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

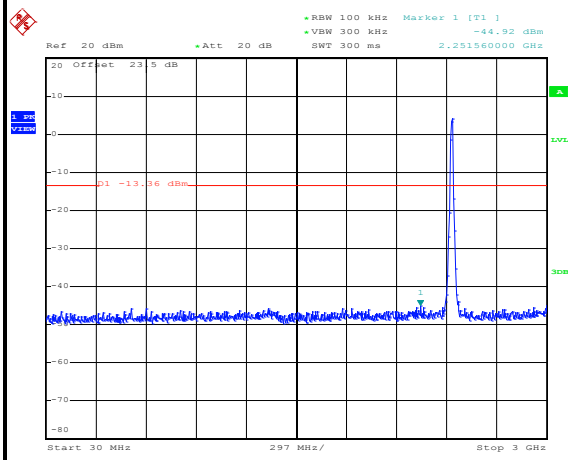
**WLAN 802.11g Channel 06**

**100kHz PSD reference Level**



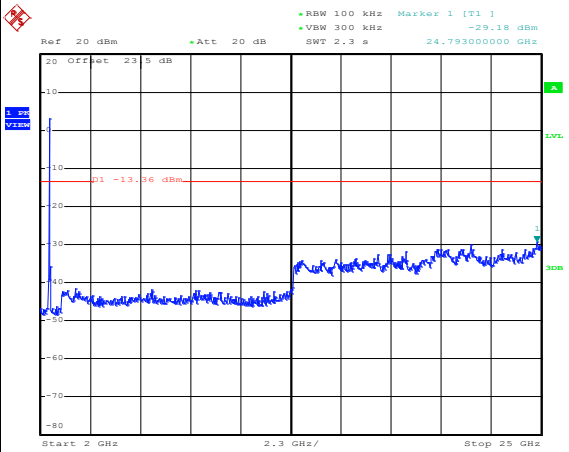

Date: 9.DEC.2013 21:06:51

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:07:10

**Spurious Emission 2GHz~25GHz**

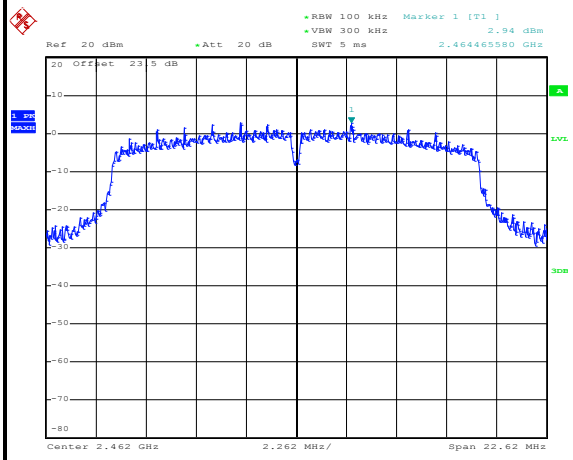



Date: 9.DEC.2013 21:07:29

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Alex Lee |

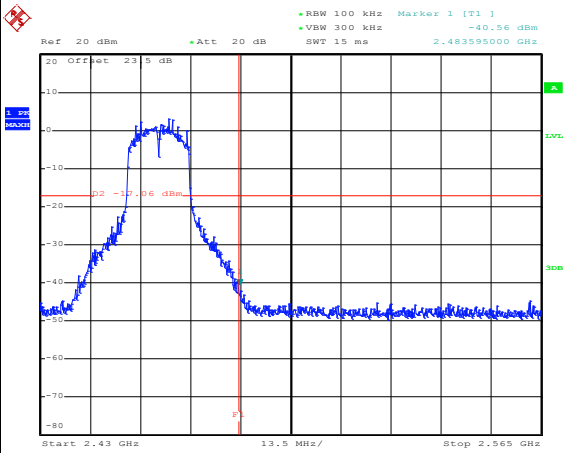
**WLAN 802.11g Channel 11**

**100kHz PSD reference Level**



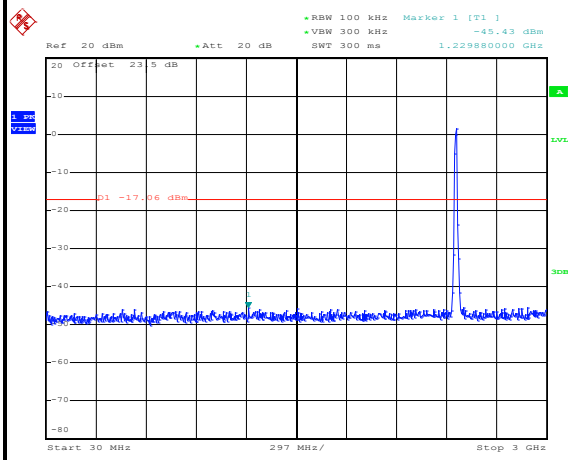

Date: 9.DEC.2013 21:00:53

**High Channel Plot**



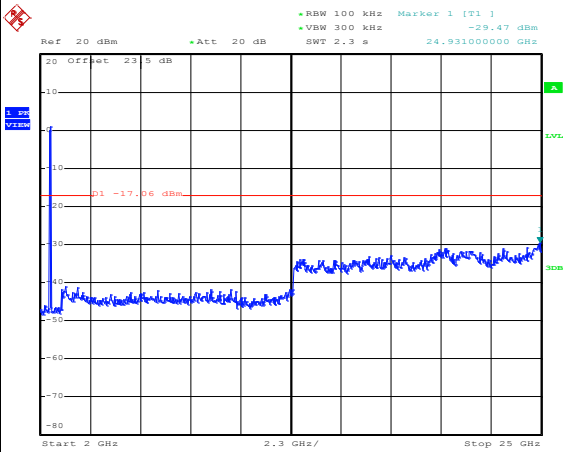

Date: 9.DEC.2013 21:01:07

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:01:26

**Spurious Emission 2GHz~25GHz**

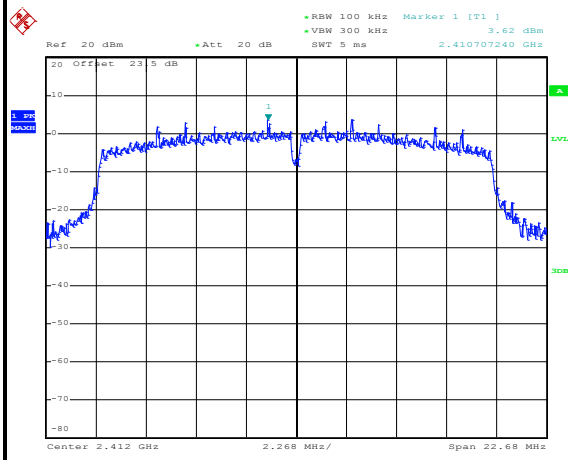



Date: 9.DEC.2013 21:01:45

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Alex Lee |

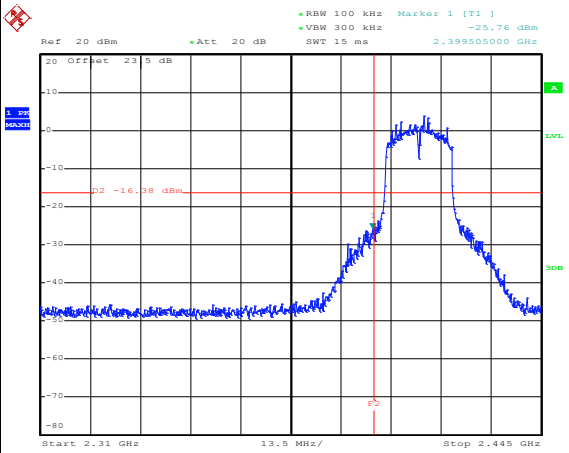
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



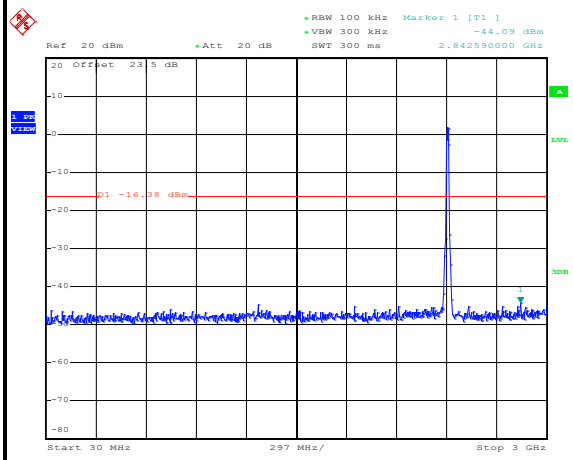

Date: 9.DEC.2013 21:23:15

**Low Channel Plot**



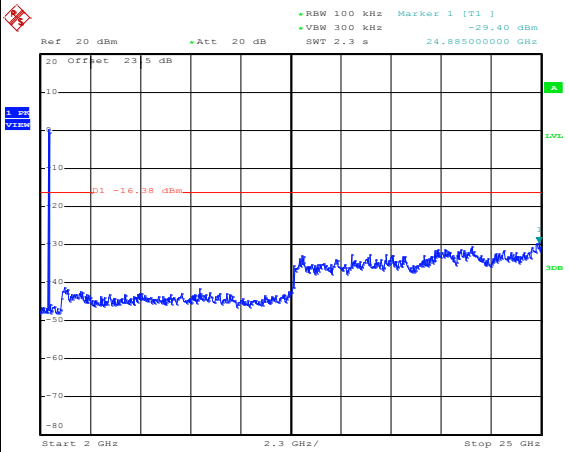

Date: 9.DEC.2013 21:23:29

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:23:48

**Spurious Emission 2GHz~25GHz**

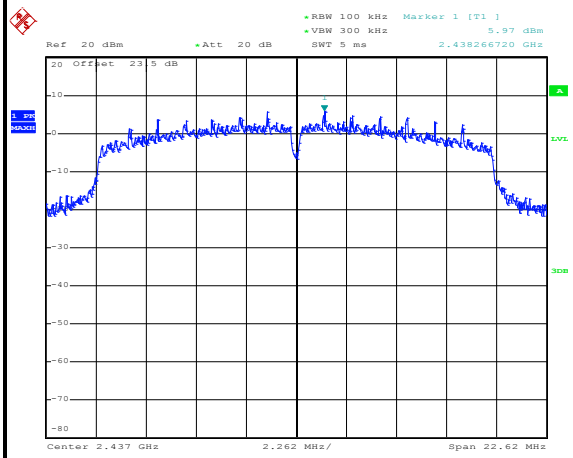



Date: 9.DEC.2013 21:24:06

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

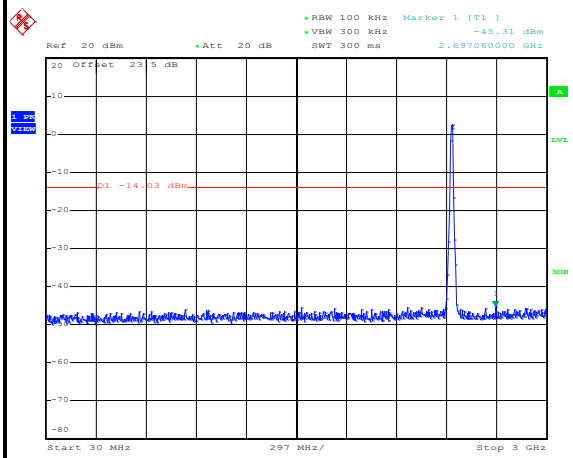
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



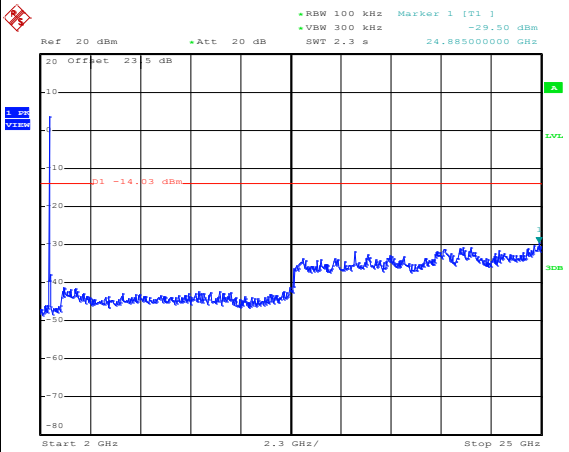

Date: 9.DEC.2013 21:27:41

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:28:01

**Spurious Emission 2GHz~25GHz**

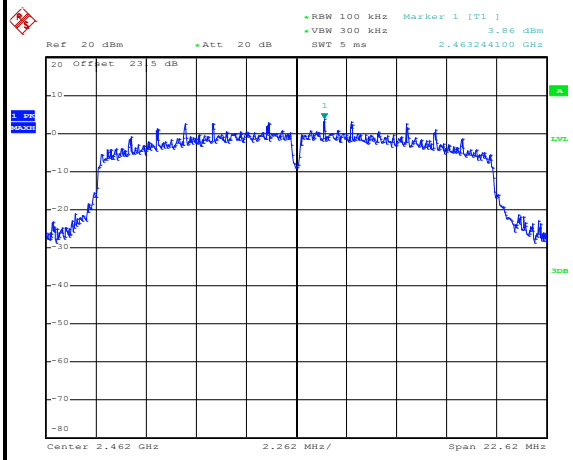



Date: 9.DEC.2013 21:28:20

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Alex Lee |

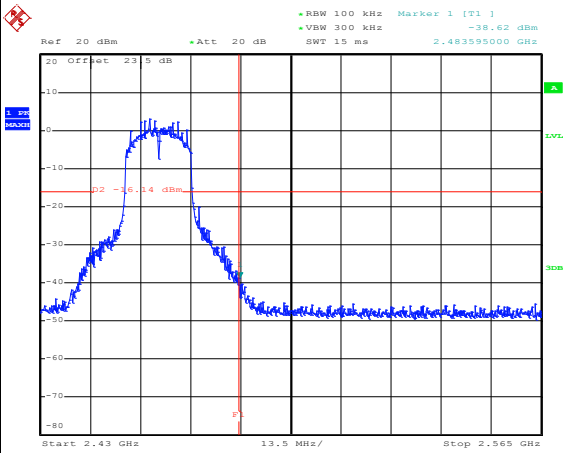
**WLAN 802.11n HT20 Channel 11**

**100kHz PSD reference Level**



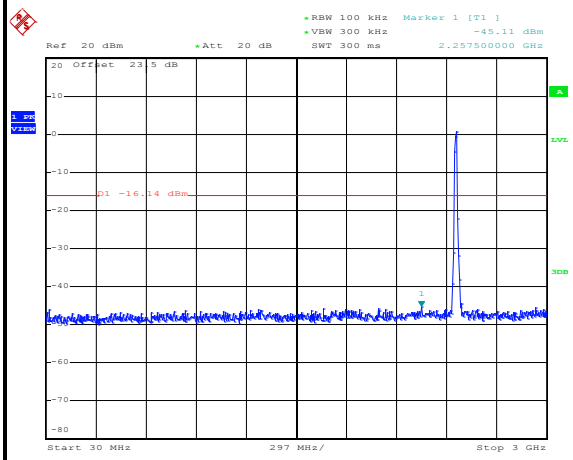

Date: 9.DEC.2013 21:31:45

**High Channel Plot**



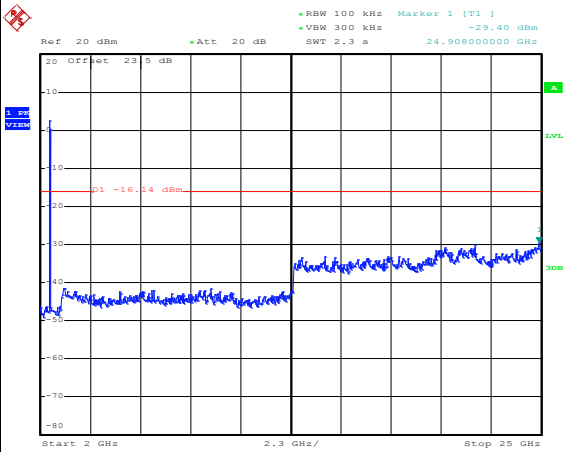

Date: 9.DEC.2013 21:31:59

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:32:19

**Spurious Emission 2GHz~25GHz**

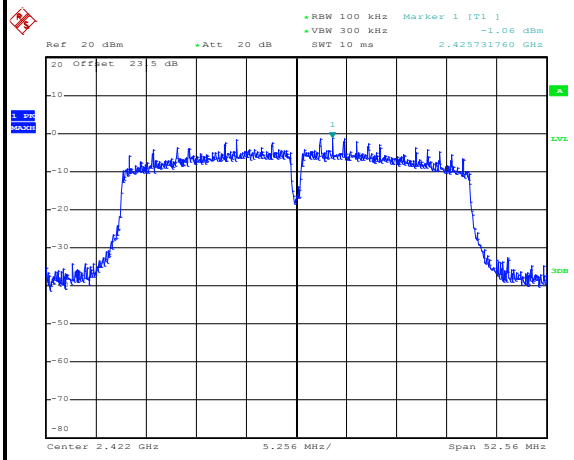



Date: 9.DEC.2013 21:32:37

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 03 | **Test Engineer :** | Alex Lee |

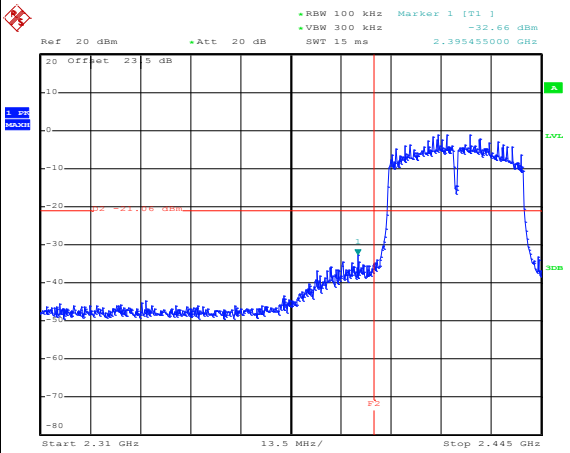
**WLAN 802.11n HT40 Channel 03**

**100kHz PSD reference Level**



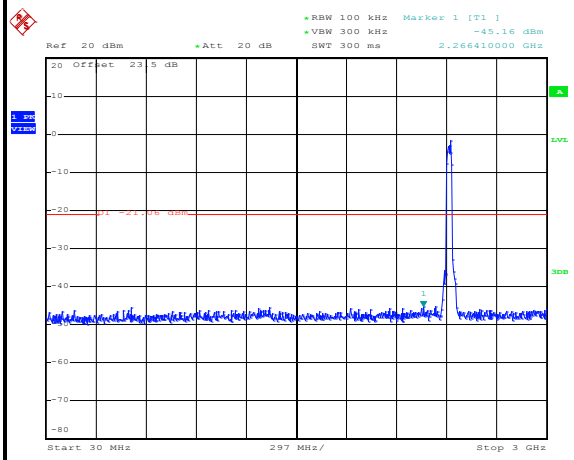

Date: 9.DEC.2013 21:38:58

**Low Channel Plot**



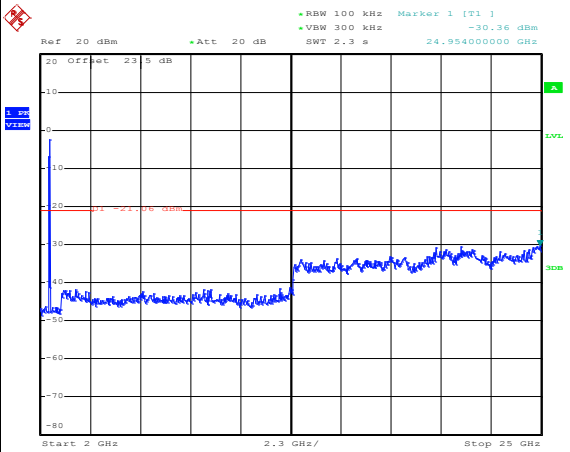

Date: 9.DEC.2013 21:39:12

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:39:31

**Spurious Emission 2GHz~25GHz**

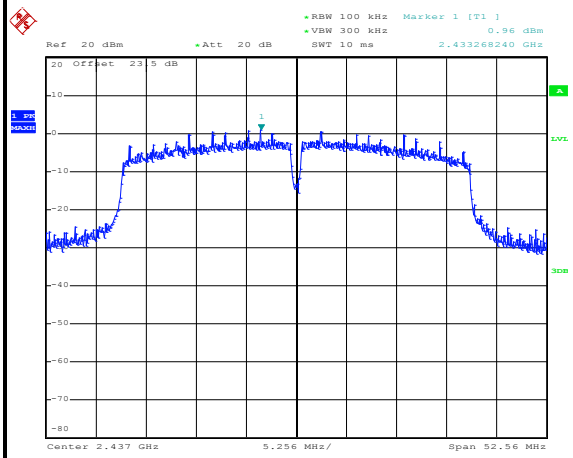



Date: 9.DEC.2013 21:39:50

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

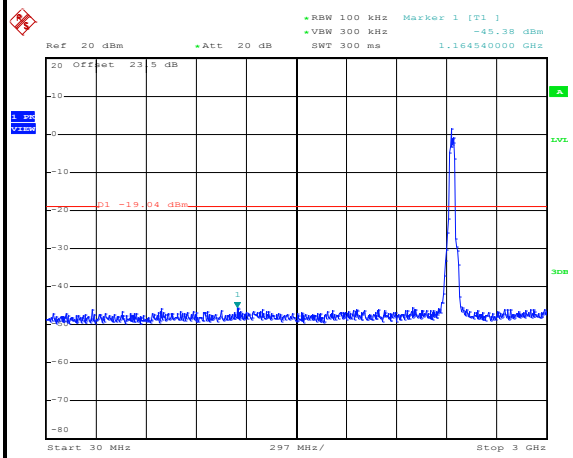
**WLAN 802.11n HT40 Channel 06**

**100kHz PSD reference Level**



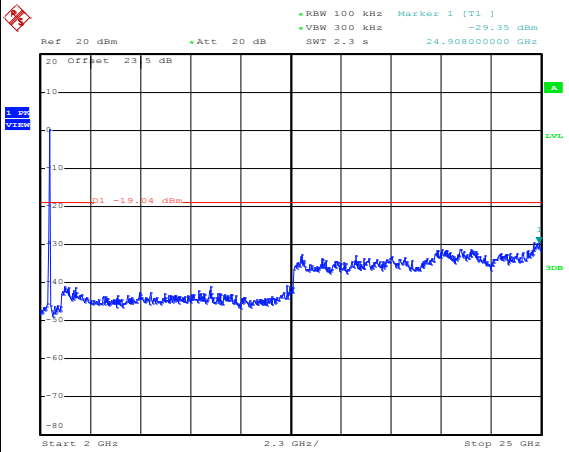

Date: 9.DEC.2013 21:44:15

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:45:31

**Spurious Emission 2GHz~25GHz**

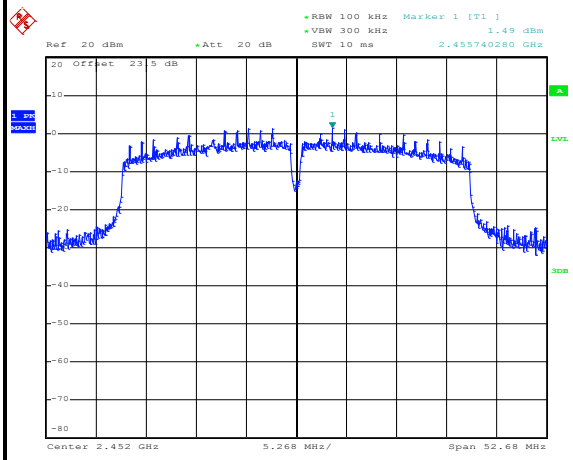



Date: 9.DEC.2013 21:45:50

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 09 | **Test Engineer :** | Alex Lee |

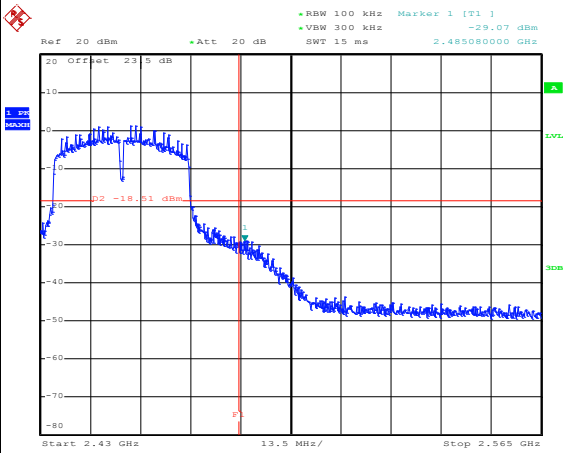
**WLAN 802.11n HT40 Channel 09**

**100kHz PSD reference Level**



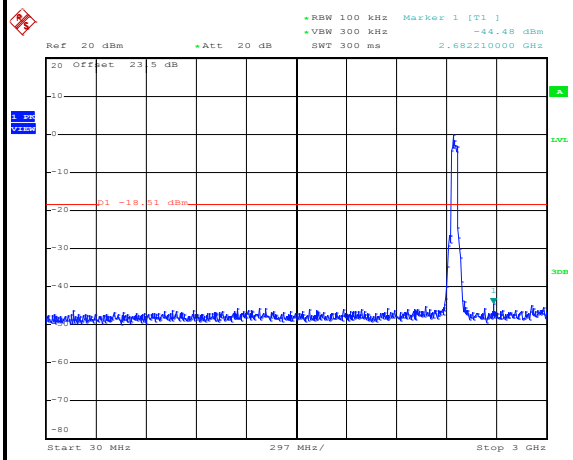

Date: 9.DEC.2013 21:48:02

**High Channel Plot**



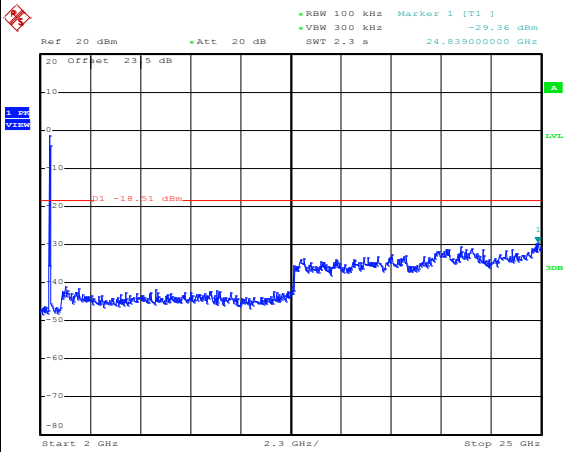

Date: 9.DEC.2013 21:48:16

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:49:33

**Spurious Emission 2GHz~25GHz**



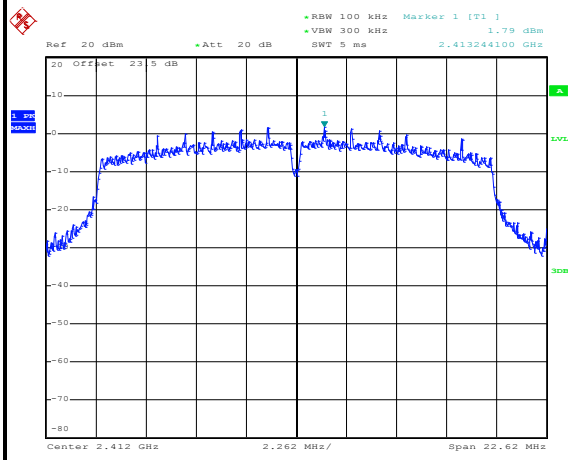

Date: 9.DEC.2013 21:49:52

**Number of TX = 2, Ant. 1 (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Alex Lee |

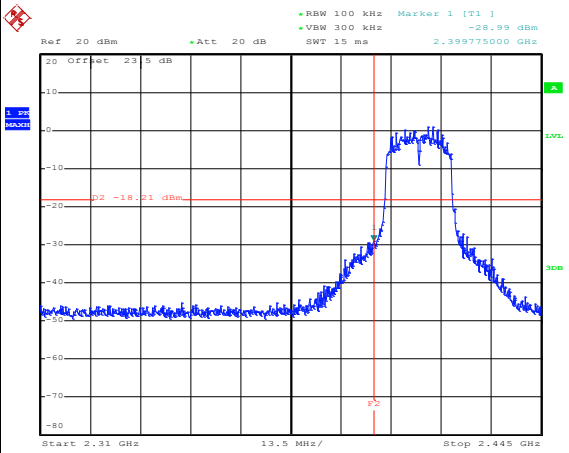
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



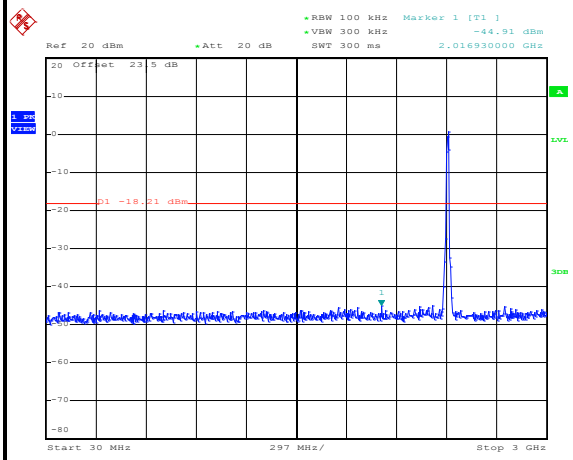

Date: 9.DEC.2013 21:56:25

**Low Channel Plot**



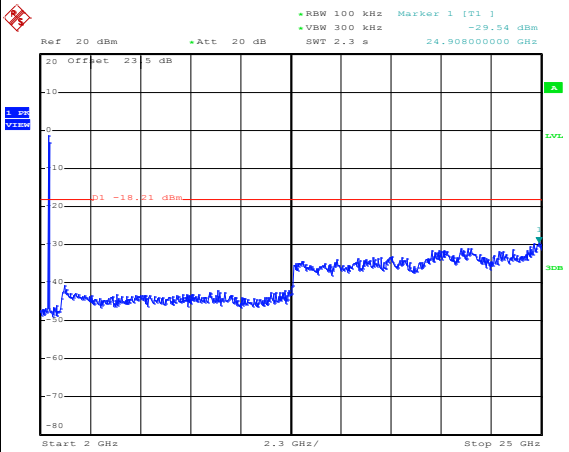

Date: 9.DEC.2013 21:56:39

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 21:56:58

**Spurious Emission 2GHz~25GHz**

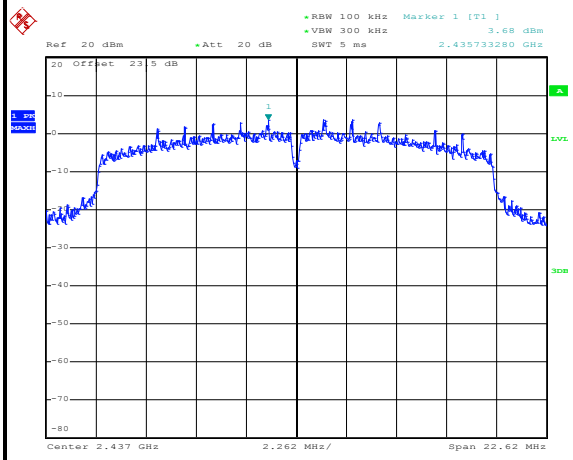



Date: 9.DEC.2013 21:57:17

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

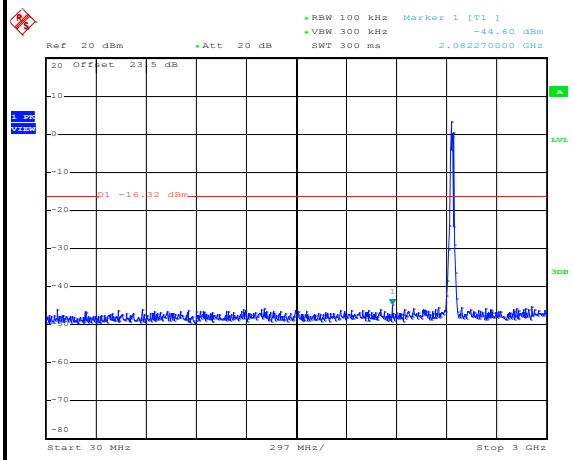
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



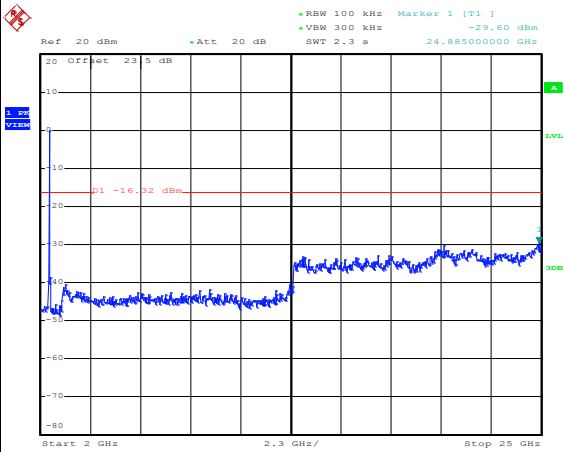

Date: 9.DEC.2013 21:59:44

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 22:00:04

**Spurious Emission 2GHz~25GHz**

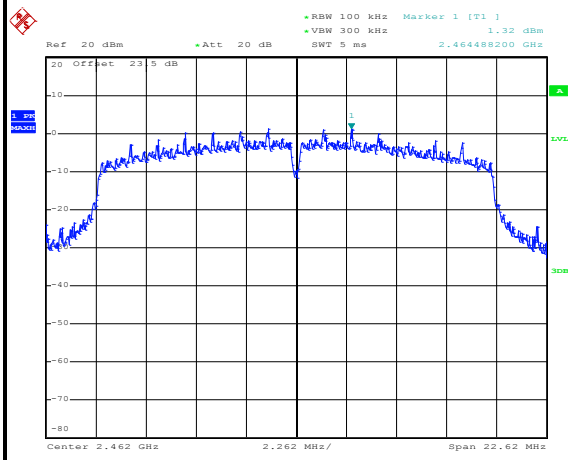



Date: 9.DEC.2013 22:00:23

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Alex Lee |

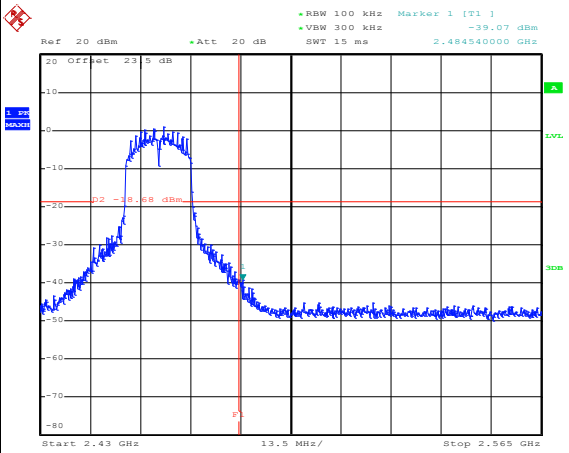
**WLAN 802.11n HT20 Channel 11**

**100kHz PSD reference Level**



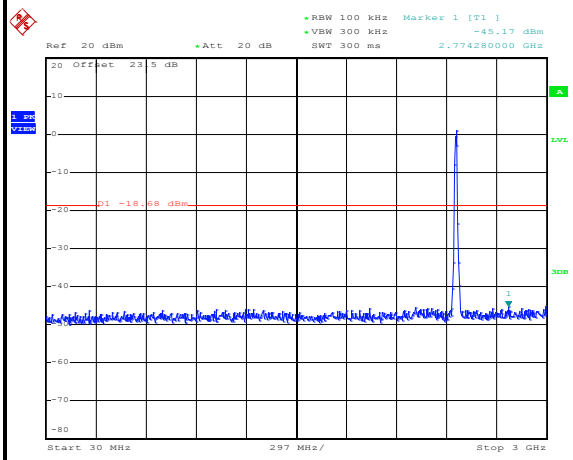

Date: 9.DEC.2013 22:03:19

**High Channel Plot**



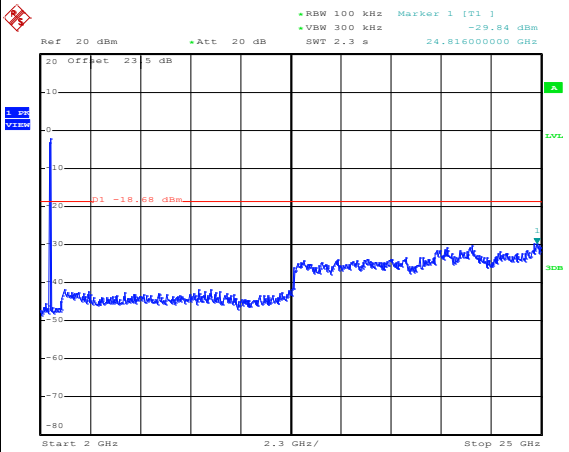

Date: 9.DEC.2013 22:03:32

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 22:03:52

**Spurious Emission 2GHz~25GHz**



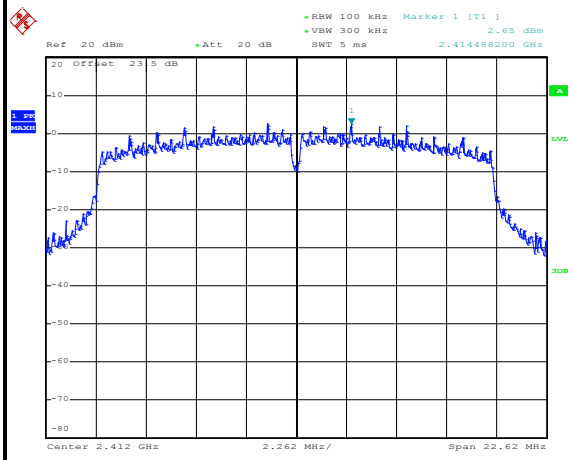

Date: 9.DEC.2013 22:04:10

**Number of TX = 2, Ant. 2 (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 2 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Alex Lee |

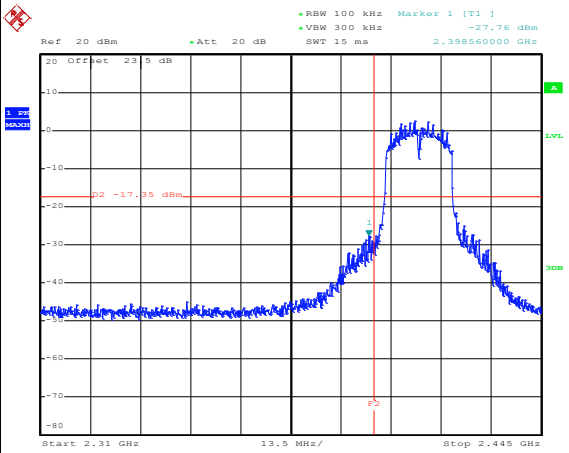
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



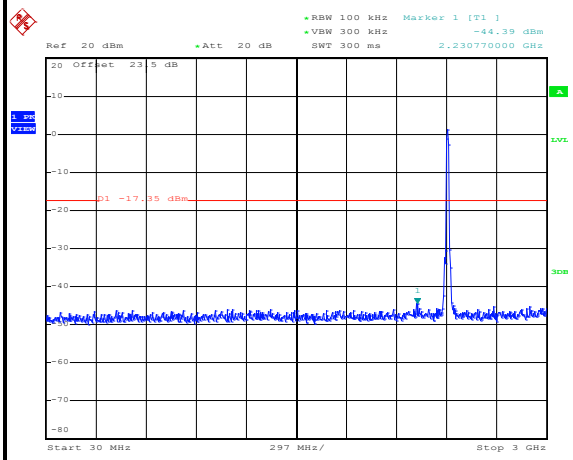

Date: 9.DEC.2013 22:18:47

**Low Channel Plot**



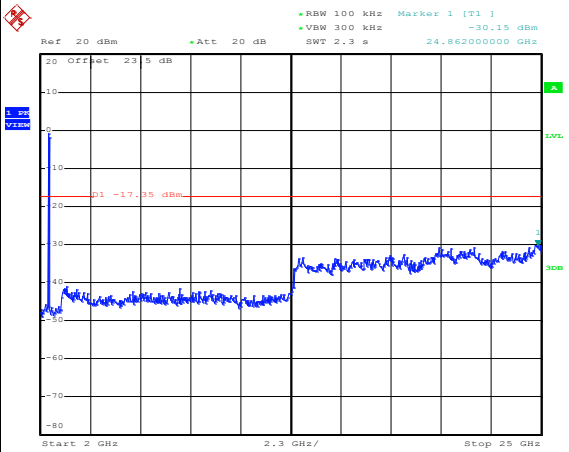

Date: 9.DEC.2013 22:19:01

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 22:19:21

**Spurious Emission 2GHz~25GHz**

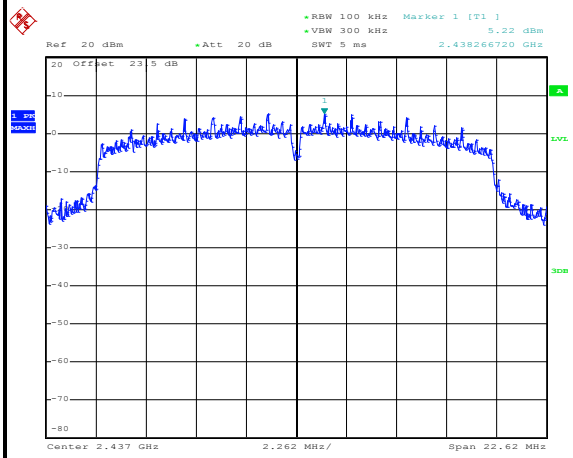



Date: 9.DEC.2013 22:19:39

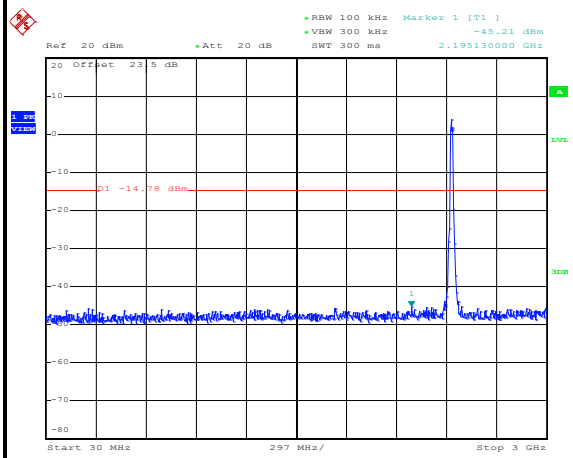
| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 2 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Alex Lee |

**WLAN 802.11n HT20 Channel 06**

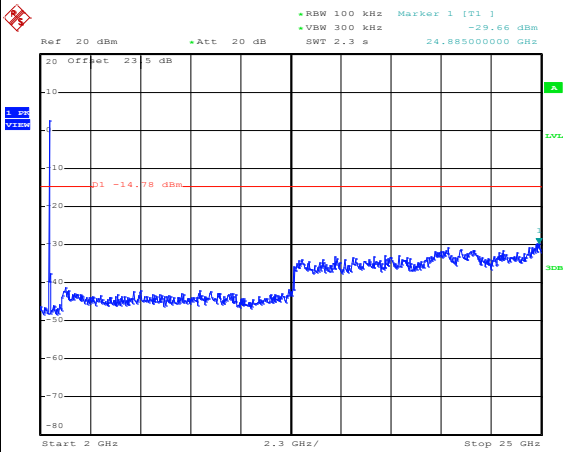
**100kHz PSD reference Level**




**Spurious Emission 30MHz~3GHz**



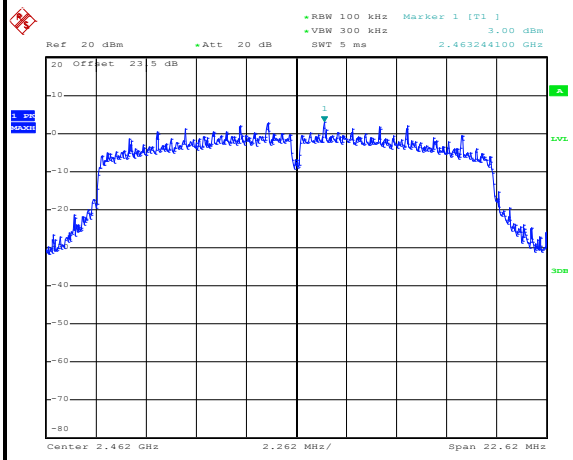

**Spurious Emission 2GHz~25GHz**



| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Ant. :** | 2 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Alex Lee |

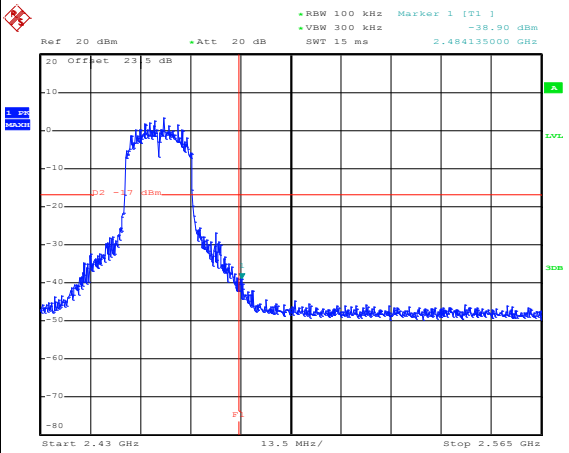
**WLAN 802.11n HT20 Channel 11**

**100kHz PSD reference Level**



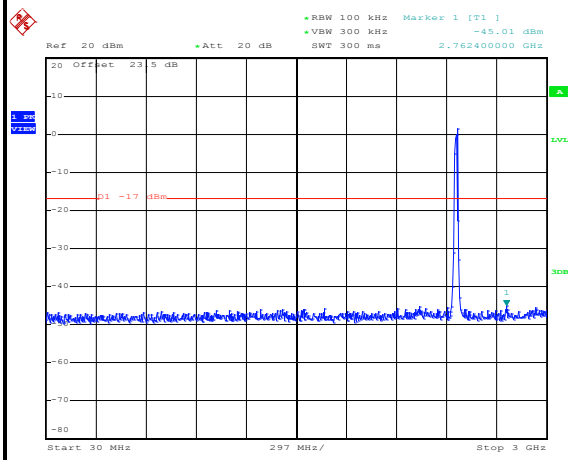

Date: 9.DEC.2013 22:07:36

**High Channel Plot**



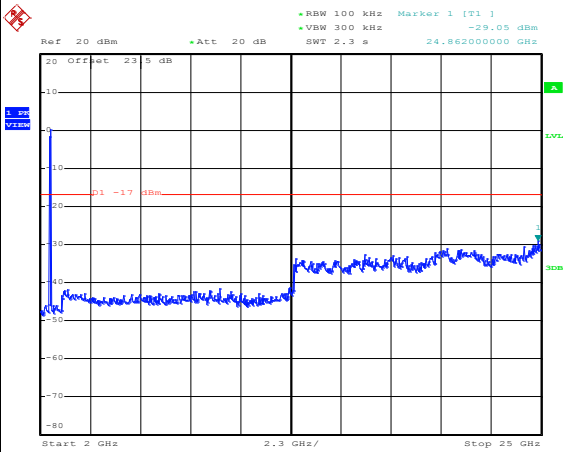

Date: 9.DEC.2013 22:07:50

**Spurious Emission 30MHz~3GHz**




Date: 9.DEC.2013 22:08:09

**Spurious Emission 2GHz~25GHz**




Date: 9.DEC.2013 22:08:28

# 3.5 Radiated Band Edges and Spurious Emission Measurement

## 3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

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 (MHz) | Field Strength (microvolts/meter) | Measurement Distance (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

The measuring equipment is listed in the section 4 of this test report.

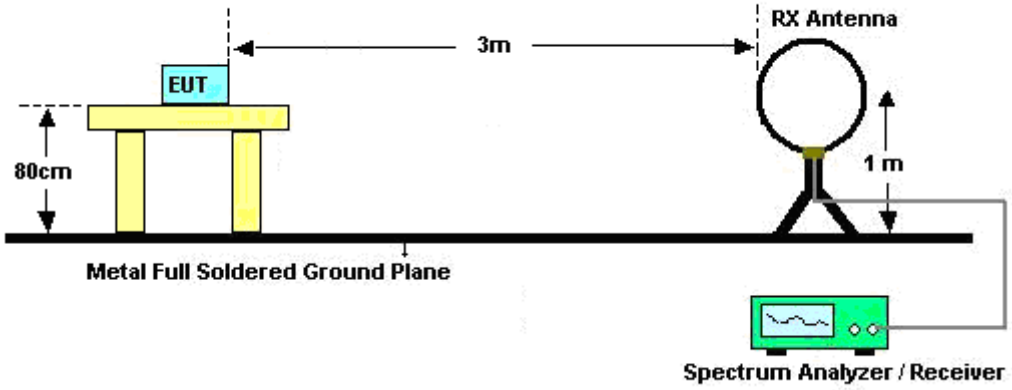
### 3.5.3 Test Procedure

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
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 ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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.

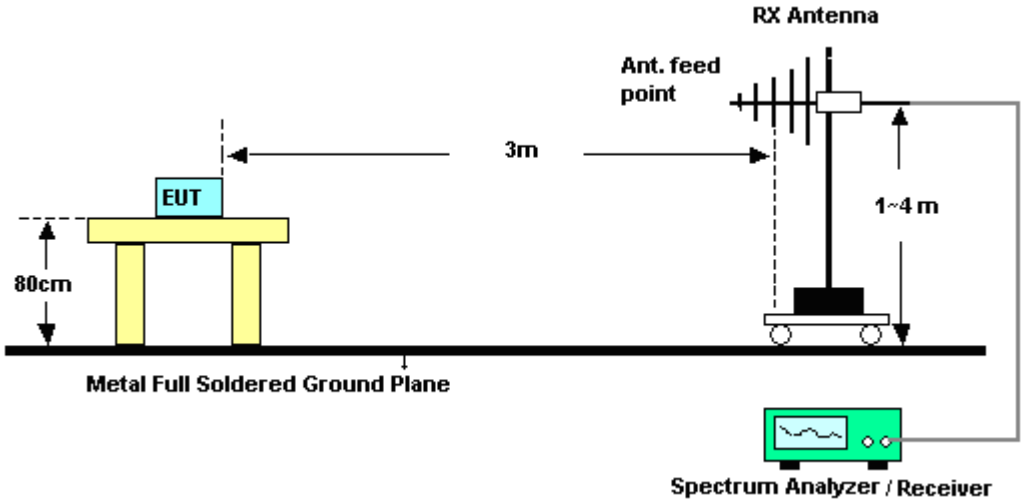
| Antenna | Band | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting |
|---|---|---|---|---|---|
| 1 | 802.11b | 97.62 | 16480 | 0.06 | 100Hz |
| 1 | 802.11g | 87.24 | 2736 | 0.37 | 1kHz |
| 1 | 2.4GHz 802.11n HT20 | 86.26 | 2548 | 0.39 | 1kHz |
| 1 | 2.4GHz 802.11n HT40 | 75.73 | 1248 | 0.80 | 1kHz |
| 1+2 | 2.4GHz 802.11n HT20 | 76.78 | 1296 | 0.77 | 1kHz |

### 3.5.4 Test Setup

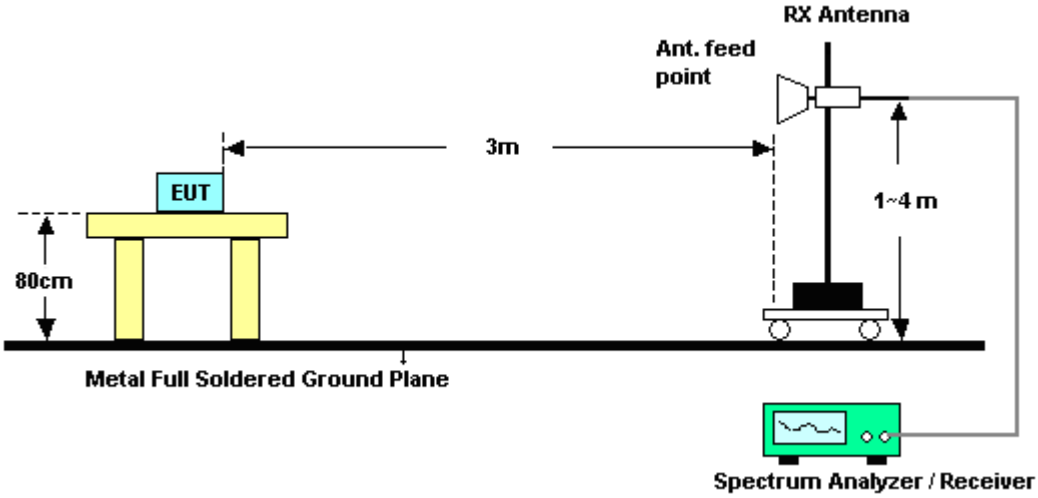
**For radiated emissions below 30MHz**




**For radiated emissions from 30MHz to 1GHz**



**For radiated emissions above 1GHz**




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

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 Spurious at Band Edges

**<Ant. 1>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 22~23°C |
| **Test Band :** | Low | **Relative Humidity :** | 52~53% |
| **Test Channel :** | 01 | **Test Engineer :** | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBµV/m )** | **Over Limit ( dB )** | **Limit Line ( dBµV/m )** | **Read Level (dBµV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2385.78 | 53.94 | -20.06 | 74 | 50.75 | 32.86 | 3.59 | 33.26 | 150 | 181 | Peak |
| 2386.86 | 46.57 | -7.43 | 54 | 43.38 | 32.86 | 3.59 | 33.26 | 150 | 181 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBµV/m )** | **Over Limit ( dB )** | **Limit Line ( dBµV/m )** | **Read Level (dBµV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2386.41 | 52.69 | -21.31 | 74 | 49.5 | 32.86 | 3.59 | 33.26 | 100 | 167 | Peak |
| 2386.86 | 43.64 | -10.36 | 54 | 40.45 | 32.86 | 3.59 | 33.26 | 100 | 167 | Average |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 22~23°C |
| **Test Band :** | High | **Relative Humidity :** | 52~53% |
| **Test Channel :** | 11 | **Test Engineer :** | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBµV/m )** | **Over Limit ( dB )** | **Limit Line ( dBµV/m )** | **Read Level (dBµV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2487.64 | 55.28 | -18.72 | 74 | 51.87 | 33.05 | 3.66 | 33.3 | 138 | 221 | Peak |
| 2490.31 | 47.66 | -6.34 | 54 | 44.25 | 33.05 | 3.66 | 33.3 | 138 | 221 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBµV/m )** | **Over Limit ( dB )** | **Limit Line ( dBµV/m )** | **Read Level (dBµV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2487.64 | 53.04 | -20.96 | 74 | 49.63 | 33.05 | 3.66 | 33.3 | 182 | 169 | Peak |
| 2488.69 | 44.84 | -9.16 | 54 | 41.43 | 33.05 | 3.66 | 33.3 | 182 | 169 | Average |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Band : | Low | Relative Humidity : | 52~53% |
| Test Channel : | 01 | Test Engineer : | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.74 | 63.45 | -10.55 | 74 | 60.26 | 32.86 | 3.59 | 33.26 | 180 | 189 | Peak |
| 2389.92 | 42.21 | -11.79 | 54 | 39.02 | 32.86 | 3.59 | 33.26 | 180 | 189 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.92 | 61.2 | -12.8 | 74 | 58.01 | 32.86 | 3.59 | 33.26 | 100 | 329 | Peak |
| 2389.92 | 40.26 | -13.74 | 54 | 37.07 | 32.86 | 3.59 | 33.26 | 100 | 329 | Average |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Band : | High | Relative Humidity : | 52~53% |
| Test Channel : | 11 | Test Engineer : | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.8 | 62.95 | -11.05 | 74 | 59.58 | 33.01 | 3.65 | 33.29 | 144 | 73 | Peak |
| 2483.5 | 40.89 | -13.11 | 54 | 37.52 | 33.01 | 3.65 | 33.29 | 144 | 73 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.56 | 67.22 | -6.78 | 74 | 63.85 | 33.01 | 3.65 | 33.29 | 125 | 328 | Peak |
| 2483.59 | 42.65 | -11.35 | 54 | 39.28 | 33.01 | 3.65 | 33.29 | 125 | 328 | Average |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Band : | High | Relative Humidity : | 52~53% |
| Test Channel : | 11 | Test Engineer : | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.74 | 65.08 | -8.92 | 74 | 61.71 | 33.01 | 3.65 | 33.29 | 117 | 348 | Peak |
| 2483.59 | 42.2 | -11.8 | 54 | 38.83 | 33.01 | 3.65 | 33.29 | 117 | 348 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.86 | 62.24 | -11.76 | 74 | 58.87 | 33.01 | 3.65 | 33.29 | 100 | 57 | Peak |
| 2483.5 | 42.59 | -11.41 | 54 | 39.22 | 33.01 | 3.65 | 33.29 | 100 | 57 | Average |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Band : | Low | Relative Humidity : | 52~53% |
| Test Channel : | 03 | Test Engineer : | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2387.31 | 66.55 | -7.45 | 74 | 63.36 | 32.86 | 3.59 | 33.26 | 119 | 296 | Peak |
| 2389.74 | 46.62 | -7.38 | 54 | 43.43 | 32.86 | 3.59 | 33.26 | 119 | 296 | Average |
| 2485.57 | 52.74 | -21.26 | 74 | 49.37 | 33.01 | 3.65 | 33.29 | 119 | 296 | Peak |
| 2488.15 | 35.09 | -18.91 | 54 | 31.68 | 33.05 | 3.66 | 33.3 | 119 | 296 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.2 | 65.51 | -8.49 | 74 | 62.32 | 32.86 | 3.59 | 33.26 | 186 | 238 | Peak |
| 2389.92 | 45.08 | -8.92 | 54 | 41.89 | 32.86 | 3.59 | 33.26 | 186 | 238 | Average |
| 2486.65 | 52.11 | -21.89 | 74 | 48.74 | 33.01 | 3.65 | 33.29 | 186 | 238 | Peak |
| 2489.47 | 34.59 | -19.41 | 54 | 31.18 | 33.05 | 3.66 | 33.3 | 186 | 238 | Average |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Band : | High | Relative Humidity : | 52~53% |
| Test Channel : | 09 | Test Engineer : | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2390 | 48.01 | -25.99 | 74 | 44.82 | 32.86 | 3.59 | 33.26 | 180 | 297 | Peak |
| 2390 | 36.34 | -17.66 | 54 | 33.15 | 32.86 | 3.59 | 33.26 | 180 | 297 | Average |
| 2485.84 | 64.28 | -9.72 | 74 | 60.91 | 33.01 | 3.65 | 33.29 | 145 | 223 | Peak |
| 2483.71 | 50.32 | -3.68 | 54 | 46.95 | 33.01 | 3.65 | 33.29 | 145 | 223 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.65 | 49.64 | -24.36 | 74 | 46.45 | 32.86 | 3.59 | 33.26 | 121 | 258 | Peak |
| 2389.92 | 36.72 | -17.28 | 54 | 33.53 | 32.86 | 3.59 | 33.26 | 121 | 258 | Average |
| 2483.95 | 71.7 | -2.3 | 74 | 68.33 | 33.01 | 3.65 | 33.29 | 121 | 258 | Peak |
| 2485.09 | 50.87 | -3.13 | 54 | 47.5 | 33.01 | 3.65 | 33.29 | 121 | 258 | Average |

**<MIMO Ant. 1+2>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 22~23°C |
| **Test Band :** | Low | **Relative Humidity :** | 52~53% |
| **Test Channel :** | 01 | **Test Engineer :** | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.29 | 63.48 | -10.52 | 74 | 60.29 | 32.86 | 3.59 | 33.26 | 180 | 186 | Peak |
| 2390 | 44.64 | -9.36 | 54 | 41.45 | 32.86 | 3.59 | 33.26 | 180 | 186 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.92 | 66.18 | -7.82 | 74 | 62.99 | 32.86 | 3.59 | 33.26 | 100 | 333 | Peak |
| 2389.92 | 45.04 | -8.96 | 54 | 41.85 | 32.86 | 3.59 | 33.26 | 100 | 333 | Average |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 22~23°C |
| **Test Band :** | High | **Relative Humidity :** | 52~53% |
| **Test Channel :** | 11 | **Test Engineer :** | Eric Shih |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.68 | 69.28 | -4.72 | 74 | 65.91 | 33.01 | 3.65 | 33.29 | 114 | 295 | Peak |
| 2483.56 | 44.64 | -9.36 | 54 | 41.27 | 33.01 | 3.65 | 33.29 | 114 | 295 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2484.13 | 64.57 | -9.43 | 74 | 61.2 | 33.01 | 3.65 | 33.29 | 100 | 286 | Peak |
| 2483.5 | 41.31 | -12.69 | 54 | 37.94 | 33.01 | 3.65 | 33.29 | 100 | 286 | Average |

### 3.5.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

**Note:** Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

**<Ant. 1>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 22~23°C |
| **Test Channel :** | 01 | **Relative Humidity :** | 52~53% |
| **Test Engineer :** | Eric Shih | **Polarization :** | Horizontal |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 99.3 | - | - | 96.07 | 32.89 | 3.61 | 33.27 | 116 | 318 | Peak |
| 2412 | 94.14 | - | - | 90.91 | 32.89 | 3.61 | 33.27 | 116 | 318 | Average |
| 4824 | 45.89 | -28.11 | 74 | 39.27 | 35.17 | 5.25 | 33.8 | 100 | 151 | Peak |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 22~23°C |
| **Test Channel :** | 01 | **Relative Humidity :** | 52~53% |
| **Test Engineer :** | Eric Shih | **Polarization :** | Vertical |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 98.84 | - | - | 95.61 | 32.89 | 3.61 | 33.27 | 100 | 333 | Peak |
| 2412 | 93.83 | - | - | 90.6 | 32.89 | 3.61 | 33.27 | 100 | 333 | Average |
| 4824 | 47.16 | -26.84 | 74 | 40.54 | 35.17 | 5.25 | 33.8 | 100 | 26 | Peak |

| Test Mode : | 802.11b | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is Fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 100.93 | - | - | 97.63 | 32.95 | 3.63 | 33.28 | 153 | 76 | Peak |
| 2437 | 96.31 | - | - | 93.01 | 32.95 | 3.63 | 33.28 | 153 | 76 | Average |
| 4874 | 45.93 | -28.07 | 74 | 39.27 | 35.18 | 5.28 | 33.8 | 100 | 26 | Peak |
| 7312 | 48.05 | -25.95 | 74 | 39.37 | 36.2 | 6.61 | 34.13 | 100 | 145 | Peak |

| Test Mode : | 802.11b | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is Fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 100.53 | - | - | 97.23 | 32.95 | 3.63 | 33.28 | 134 | 332 | Peak |
| 2437 | 95.42 | - | - | 92.12 | 32.95 | 3.63 | 33.28 | 134 | 332 | Average |
| 4874 | 47.3 | -26.7 | 74 | 40.64 | 35.18 | 5.28 | 33.8 | 100 | 169 | Peak |
| 7312 | 47.4 | -26.6 | 74 | 38.72 | 36.2 | 6.61 | 34.13 | 100 | 41 | Peak |

| Test Mode : | 802.11b | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 100.48 | - | - | 97.15 | 32.98 | 3.64 | 33.29 | 114 | 88 | Peak |
| 2462 | 95.5 | - | - | 92.17 | 32.98 | 3.64 | 33.29 | 114 | 88 | Average |
| 4924 | 46.11 | -27.89 | 74 | 39.41 | 35.19 | 5.31 | 33.8 | 100 | 18 | Peak |
| 7386 | 47.72 | -26.28 | 74 | 38.94 | 36.24 | 6.7 | 34.16 | 100 | 154 | Peak |

| Test Mode : | 802.11b | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 101.05 | - | - | 97.72 | 32.98 | 3.64 | 33.29 | 155 | 330 | Peak |
| 2462 | 96.21 | - | - | 92.88 | 32.98 | 3.64 | 33.29 | 155 | 330 | Average |
| 4924 | 46.59 | -27.41 | 74 | 39.89 | 35.19 | 5.31 | 33.8 | 100 | 26 | Peak |
| 7386 | 48.71 | -25.29 | 74 | 39.93 | 36.24 | 6.7 | 34.16 | 100 | 92 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 99.6 | - | - | 96.37 | 32.89 | 3.61 | 33.27 | 147 | 78 | Peak |
| 2412 | 88.45 | - | - | 85.22 | 32.89 | 3.61 | 33.27 | 147 | 78 | Average |
| 4824 | 46.6 | -27.4 | 74 | 39.98 | 35.17 | 5.25 | 33.8 | 100 | 48 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 99.63 | - | - | 96.4 | 32.89 | 3.61 | 33.27 | 100 | 334 | Peak |
| 2412 | 88.21 | - | - | 84.98 | 32.89 | 3.61 | 33.27 | 100 | 334 | Average |
| 4824 | 46.27 | -27.73 | 74 | 39.65 | 35.17 | 5.25 | 33.8 | 100 | 29 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 103.4 | - | - | 100.1 | 32.95 | 3.63 | 33.28 | 155 | 79 | Peak |
| 2437 | 92.35 | - | - | 89.05 | 32.95 | 3.63 | 33.28 | 155 | 79 | Average |
| 4874 | 47.4 | -26.6 | 74 | 40.74 | 35.18 | 5.28 | 33.8 | 100 | 145 | Peak |
| 7312 | 49.56 | -24.44 | 74 | 40.88 | 36.2 | 6.61 | 34.13 | 100 | 51 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 102.74 | - | - | 99.44 | 32.95 | 3.63 | 33.28 | 134 | 333 | Peak |
| 2437 | 92.26 | - | - | 88.96 | 32.95 | 3.63 | 33.28 | 134 | 333 | Average |
| 4874 | 47.85 | -26.15 | 74 | 41.19 | 35.18 | 5.28 | 33.8 | 100 | 81 | Peak |
| 7312 | 49.05 | -24.95 | 74 | 40.37 | 36.2 | 6.61 | 34.13 | 100 | 59 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 101.15 | - | - | 97.82 | 32.98 | 3.64 | 33.29 | 116 | 86 | Peak |
| 2462 | 90.19 | - | - | 86.86 | 32.98 | 3.64 | 33.29 | 116 | 86 | Average |
| 4924 | 44.99 | -29.01 | 74 | 38.29 | 35.19 | 5.31 | 33.8 | 100 | 85 | Peak |
| 7386 | 47 | -27 | 74 | 38.22 | 36.24 | 6.7 | 34.16 | 100 | 8 | Peak |

| Test Mode : | 802.11g | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 101.46 | - | - | 98.13 | 32.98 | 3.64 | 33.29 | 154 | 330 | Peak |
| 2462 | 90.29 | - | - | 86.96 | 32.98 | 3.64 | 33.29 | 154 | 330 | Average |
| 4924 | 45.72 | -28.28 | 74 | 39.02 | 35.19 | 5.31 | 33.8 | 100 | 41 | Peak |
| 7386 | 48.07 | -25.93 | 74 | 39.29 | 36.24 | 6.7 | 34.16 | 100 | 263 | Peak |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 96.2 | - | - | 92.87 | 32.98 | 3.64 | 33.29 | 117 | 348 | Peak |
| 2462 | 84.98 | - | - | 81.65 | 32.98 | 3.64 | 33.29 | 117 | 348 | Average |
| 4924 | 49.71 | -24.29 | 74 | 43.01 | 35.19 | 5.31 | 33.8 | 100 | 252 | Peak |
| 7386 | 48.74 | -25.26 | 74 | 39.96 | 36.24 | 6.7 | 34.16 | 100 | 152 | Peak |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 96.49 | - | - | 93.16 | 32.98 | 3.64 | 33.29 | 100 | 57 | Peak |
| 2462 | 85.11 | - | - | 81.78 | 32.98 | 3.64 | 33.29 | 100 | 57 | Average |
| 4924 | 60.21 | -13.79 | 74 | 53.51 | 35.19 | 5.31 | 33.8 | 100 | 329 | Peak |
| 4924 | 44.98 | -9.02 | 54 | 38.28 | 35.19 | 5.31 | 33.8 | 100 | 329 | Average |
| 7386 | 49.89 | -24.11 | 74 | 41.11 | 36.24 | 6.7 | 34.16 | 100 | 26 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 03 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2422 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2422 | 96.06 | - | - | 92.8 | 32.92 | 3.62 | 33.28 | 119 | 296 | Peak |
| 2422 | 84.88 | - | - | 81.62 | 32.92 | 3.62 | 33.28 | 119 | 296 | Average |
| 4844 | 47.43 | -26.57 | 74 | 40.79 | 35.18 | 5.26 | 33.8 | 100 | 195 | Peak |
| 7266 | 48.67 | -25.33 | 74 | 40.03 | 36.19 | 6.56 | 34.11 | 100 | 16 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 03 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2422 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2422 | 94.94 | - | - | 91.68 | 32.92 | 3.62 | 33.28 | 186 | 238 | Peak |
| 2422 | 84.56 | - | - | 81.3 | 32.92 | 3.62 | 33.28 | 186 | 238 | Average |
| 4844 | 46.55 | -27.45 | 74 | 39.91 | 35.18 | 5.26 | 33.8 | 100 | 26 | Peak |
| 7266 | 49.03 | -24.97 | 74 | 40.39 | 36.19 | 6.56 | 34.11 | 100 | 82 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 100.03 | - | - | 96.73 | 32.95 | 3.63 | 33.28 | 115 | 301 | Peak |
| 2437 | 89.68 | - | - | 86.38 | 32.95 | 3.63 | 33.28 | 115 | 301 | Average |
| 4874 | 47.68 | -26.32 | 74 | 41.02 | 35.18 | 5.28 | 33.8 | 100 | 26 | Peak |
| 7312 | 48.43 | -25.57 | 74 | 39.75 | 36.2 | 6.61 | 34.13 | 100 | 256 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 99.23 | - | - | 95.93 | 32.95 | 3.63 | 33.28 | 154 | 259 | Peak |
| 2437 | 88.94 | - | - | 85.64 | 32.95 | 3.63 | 33.28 | 154 | 259 | Average |
| 4874 | 45.92 | -28.08 | 74 | 39.26 | 35.18 | 5.28 | 33.8 | 100 | 21 | Peak |
| 7312 | 49.05 | -24.95 | 74 | 40.37 | 36.2 | 6.61 | 34.13 | 100 | 41 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 09 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2452 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2452 | 97.93 | - | - | 94.63 | 32.95 | 3.63 | 33.28 | 100 | 297 | Peak |
| 2452 | 86.48 | - | - | 83.18 | 32.95 | 3.63 | 33.28 | 100 | 297 | Average |
| 4924 | 45.8 | -28.2 | 74 | 39.1 | 35.19 | 5.31 | 33.8 | 100 | 296 | Peak |
| 7386 | 49.03 | -24.97 | 74 | 40.25 | 36.24 | 6.7 | 34.16 | 100 | 25 | Peak |

| Test Mode : | 802.11n HT40 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 09 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2452 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2452 | 97.48 | - | - | 94.18 | 32.95 | 3.63 | 33.28 | 186 | 257 | Peak |
| 2452 | 86.64 | - | - | 83.34 | 32.95 | 3.63 | 33.28 | 186 | 257 | Average |
| 4924 | 46.49 | -27.51 | 74 | 39.79 | 35.19 | 5.31 | 33.8 | 100 | 195 | Peak |
| 7386 | 49.69 | -24.31 | 74 | 40.91 | 36.24 | 6.7 | 34.16 | 100 | 52 | Peak |

**<MIMO Ant. 1+2>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 22~23°C |
| **Test Channel :** | 01 | **Relative Humidity :** | 52~53% |
| **Test Engineer :** | Eric Shih | **Polarization :** | Horizontal |
| **Remark :** | 2412 MHz is fundamental signal which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 100 | - | - | 96.77 | 32.89 | 3.61 | 33.27 | 148 | 72 | Peak |
| 2412 | 88.53 | - | - | 85.3 | 32.89 | 3.61 | 33.27 | 148 | 72 | Average |
| 4824 | 54.87 | -19.13 | 74 | 48.25 | 35.17 | 5.25 | 33.8 | 100 | 55 | Peak |
| 4824 | 40.4 | -13.6 | 54 | 33.78 | 35.17 | 5.25 | 33.8 | 100 | 55 | Average |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 22~23°C |
| **Test Channel :** | 01 | **Relative Humidity :** | 52~53% |
| **Test Engineer :** | Eric Shih | **Polarization :** | Vertical |
| **Remark :** | 2412 MHz is fundamental signal which can be ignored. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 101.47 | - | - | 98.24 | 32.89 | 3.61 | 33.27 | 100 | 336 | Peak |
| 2412 | 89.17 | - | - | 85.94 | 32.89 | 3.61 | 33.27 | 100 | 336 | Average |
| 4824 | 58.01 | -15.99 | 74 | 51.39 | 35.17 | 5.25 | 33.8 | 100 | 261 | Peak |
| 4824 | 41.36 | -12.64 | 54 | 34.74 | 35.17 | 5.25 | 33.8 | 100 | 261 | Average |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 103.66 | - | - | 100.36 | 32.95 | 3.63 | 33.28 | 119 | 298 | Peak |
| 2437 | 92.42 | - | - | 89.12 | 32.95 | 3.63 | 33.28 | 119 | 298 | Average |
| 4874 | 56.28 | -17.72 | 74 | 49.62 | 35.18 | 5.28 | 33.8 | 100 | 313 | Peak |
| 4874 | 39.01 | -14.99 | 54 | 32.35 | 35.18 | 5.28 | 33.8 | 100 | 313 | Average |
| 7312 | 48.79 | -25.21 | 74 | 40.11 | 36.2 | 6.61 | 34.13 | 100 | 200 | Peak |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 103.91 | - | - | 100.61 | 32.95 | 3.63 | 33.28 | 180 | 255 | Peak |
| 2437 | 91.99 | - | - | 88.69 | 32.95 | 3.63 | 33.28 | 180 | 255 | Average |
| 4874 | 60.21 | -13.79 | 74 | 53.55 | 35.18 | 5.28 | 33.8 | 100 | 327 | Peak |
| 4874 | 41.16 | -12.84 | 54 | 34.5 | 35.18 | 5.28 | 33.8 | 100 | 327 | Average |
| 7312 | 49.25 | -24.75 | 74 | 40.57 | 36.2 | 6.61 | 34.13 | 121 | 156 | Peak |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 103.19 | - | - | 99.86 | 32.98 | 3.64 | 33.29 | 114 | 295 | Peak |
| 2462 | 91.08 | - | - | 87.75 | 32.98 | 3.64 | 33.29 | 114 | 295 | Average |
| 4924 | 49.13 | -24.87 | 74 | 42.43 | 35.19 | 5.31 | 33.8 | 135 | 263 | Peak |
| 7386 | 49.46 | -24.54 | 74 | 40.68 | 36.24 | 6.7 | 34.16 | 100 | 145 | Peak |

| Test Mode : | 802.11n HT20 | Temperature : | 22~23°C |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 52~53% |
| Test Engineer : | Eric Shih | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 99.55 | - | - | 96.22 | 32.98 | 3.64 | 33.29 | 100 | 286 | Peak |
| 2462 | 87.3 | - | - | 83.97 | 32.98 | 3.64 | 33.29 | 100 | 286 | Average |
| 4924 | 59.96 | -14.04 | 74 | 53.26 | 35.19 | 5.31 | 33.8 | 100 | 330 | Peak |
| 4924 | 40.77 | -13.23 | 54 | 34.07 | 35.19 | 5.31 | 33.8 | 100 | 330 | Average |
| 7386 | 48.73 | -25.27 | 74 | 39.95 | 36.24 | 6.7 | 34.16 | 151 | 298 | 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 (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | 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.

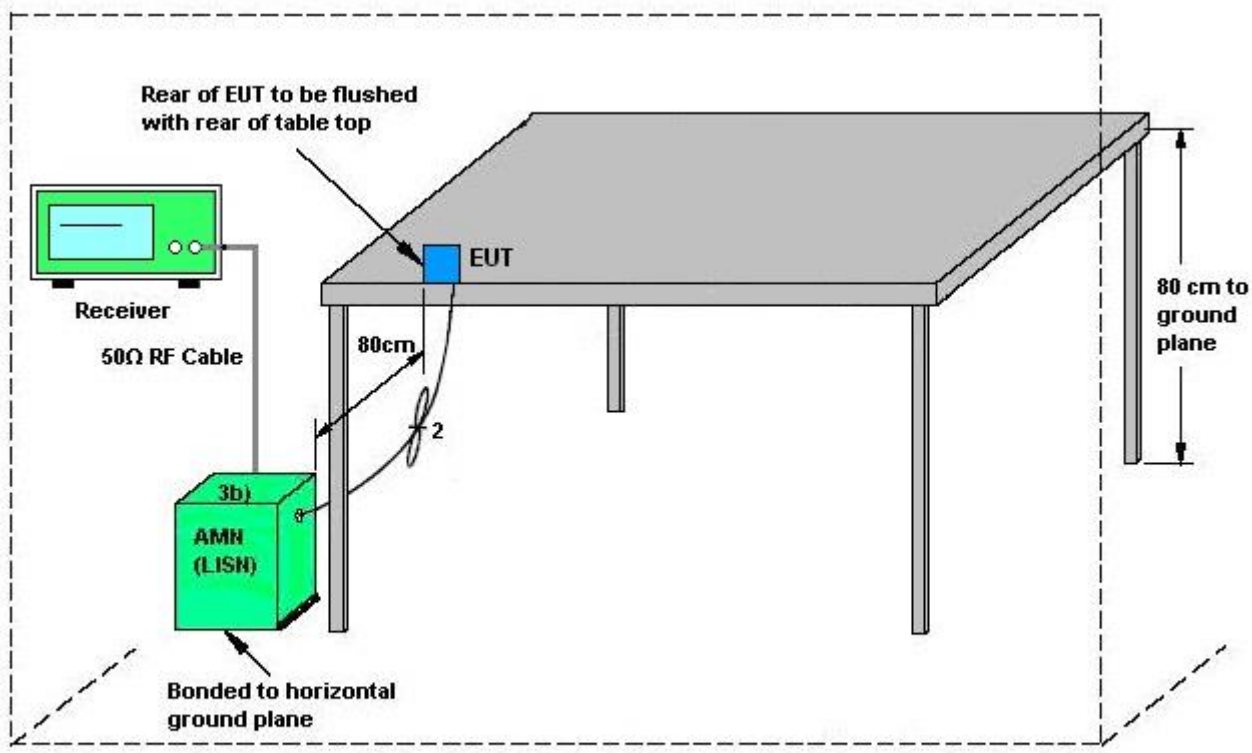
## 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

## 3.6.3 Test Procedures

1. 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.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

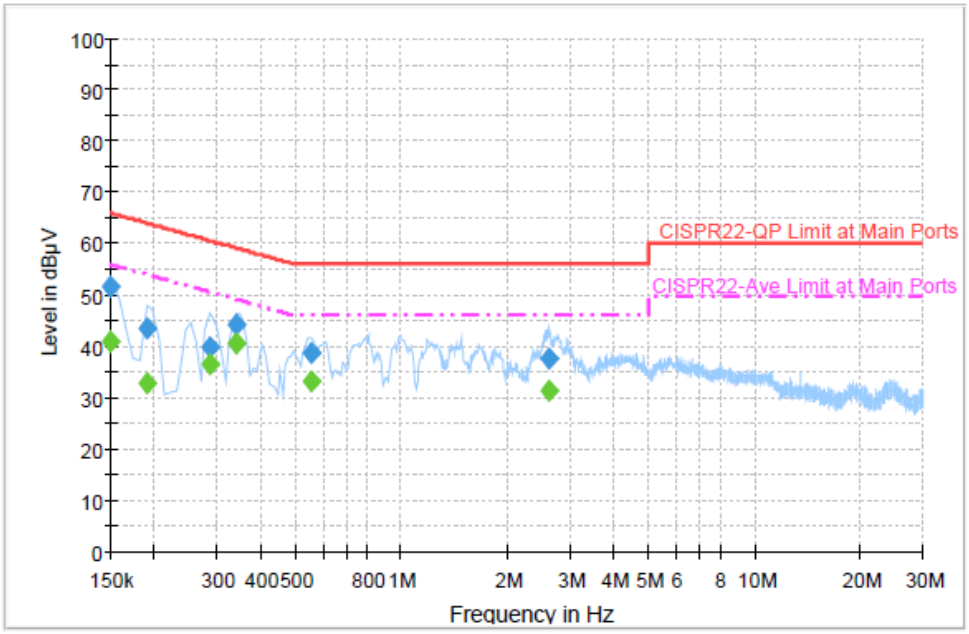
### 3.6.4 Test Setup




AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

### 3.6.5 Test Result of AC Conducted Emission

| Test Mode : | Mode 1 | Temperature : | 20~22℃ |
|---|---|---|---|
| Test Engineer : | Cosmo Xu | Relative Humidity : | 45~47% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Line |
| Function Type : | WLAN Link + Bluetooth Link + Adapter | | |



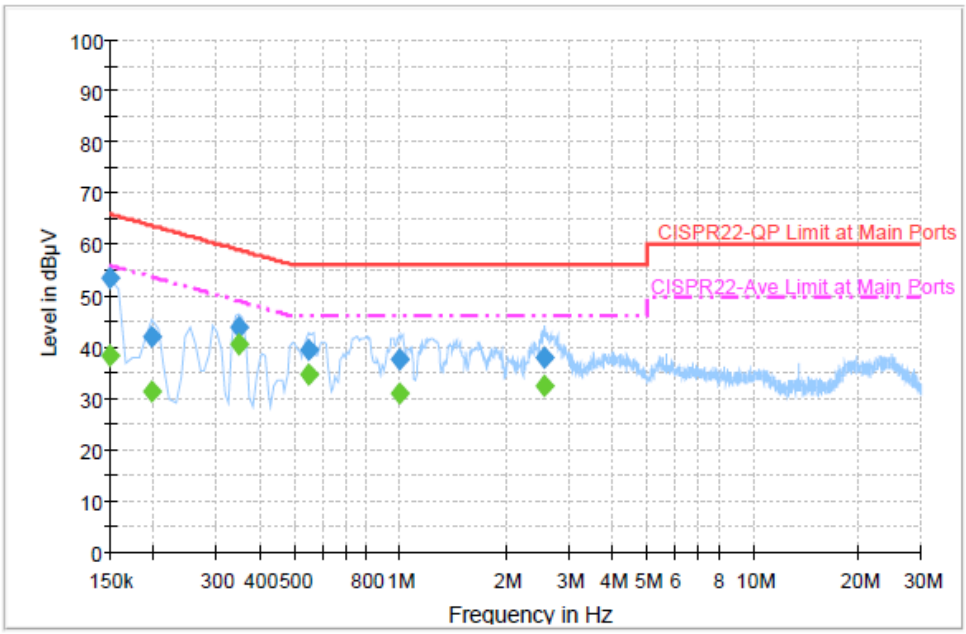

**Final Result : QuasiPeak**

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 51.8 | Off | L1 | 19.4 | 14.2 | 66.0 |
| 0.190000 | 43.4 | Off | L1 | 19.4 | 20.6 | 64.0 |
| 0.286000 | 40.0 | Off | L1 | 19.4 | 20.6 | 60.6 |
| 0.342000 | 44.2 | Off | L1 | 19.4 | 15.0 | 59.2 |
| 0.558000 | 38.7 | Off | L1 | 19.4 | 17.3 | 56.0 |
| 2.630000 | 37.5 | Off | L1 | 19.6 | 18.5 | 56.0 |

**Final Result : Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 41.1 | Off | L1 | 19.4 | 14.9 | 56.0 |
| 0.190000 | 32.8 | Off | L1 | 19.4 | 21.2 | 54.0 |
| 0.286000 | 36.5 | Off | L1 | 19.4 | 14.1 | 50.6 |
| 0.342000 | 40.5 | Off | L1 | 19.4 | 8.7 | 49.2 |
| 0.558000 | 33.2 | Off | L1 | 19.4 | 12.8 | 46.0 |
| 2.630000 | 31.4 | Off | L1 | 19.6 | 14.6 | 46.0 |

| Test Mode : | Mode 1 | Temperature : | 20~22℃ |
|---|---|---|---|
| Test Engineer : | Cosmo Xu | Relative Humidity : | 45~47% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Neutral |
| Function Type : | WLAN Link + Bluetooth Link + Adapter | | |




**Final Result : QuasiPeak**

| Frequency (MHz) | QuasiPeak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 53.5 | Off | N | 19.4 | 12.5 | 66.0 |
| 0.198000 | 42.2 | Off | N | 19.3 | 21.5 | 63.7 |
| 0.350000 | 43.8 | Off | N | 19.4 | 15.2 | 59.0 |
| 0.550000 | 39.7 | Off | N | 19.4 | 16.3 | 56.0 |
| 0.990000 | 37.8 | Off | N | 19.4 | 18.2 | 56.0 |
| 2.574000 | 38.2 | Off | N | 19.6 | 17.8 | 56.0 |

**Final Result : Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 38.4 | Off | N | 19.4 | 17.6 | 56.0 |
| 0.198000 | 31.5 | Off | N | 19.3 | 22.2 | 53.7 |
| 0.350000 | 40.5 | Off | N | 19.4 | 8.5 | 49.0 |
| 0.550000 | 34.9 | Off | N | 19.4 | 11.1 | 46.0 |
| 0.990000 | 30.9 | Off | N | 19.4 | 15.1 | 46.0 |
| 2.574000 | 32.6 | Off | N | 19.6 | 13.4 | 46.0 |

## 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 Anti-Replacement Construction

Non-standard antenna connector is used.

### 3.7.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

*where*

Each antenna is driven by no more than one spatial stream;

$N_{SS}$ = the number of independent spatial streams of data;

$N_{ANT}$ = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the $k$th antenna is being fed by spatial stream $j$, or zero if it is not;

$G_k$ is the gain in dBi of the kth antenna.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

| | Ant. 1 (dBi) | Ant. 2 (dBi) | DG for Power (dBi) | DG for PSD (dBi) | Power Limit Reduction (dB) | PSD Limit Reduction (dB) |
|---|---|---|---|---|---|---|
| **2.4 GHz** | -0.36 | 1.22 | 3.48 | 3.48 | 0.00 | 0.00 |

*Power Limit Reduction = DG(Power) – 6dBi, ( min = 0 )*

*PSD Limit Reduction = DG(PSD) – 6dBi, ( min = 0 )*

# 4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | Rohde & Schwarz | FSP40 | 100055 | 9kHz~40GHz | Jun. 07, 2013 | Dec. 03, 2013 ~ Dec. 09, 2013 | Jun. 06, 2014 | Conducted (TH02-HY) |
| Power Meter | Anritsu | ML2495A | 1036004 | 300MHz~40GHz | Aug. 17, 2013 | Dec. 03, 2013 ~ Dec. 09, 2013 | Aug. 16, 2014 | Conducted (TH02-HY) |
| Power Sensor | Anritsu | MA2411B | 1027253 | 300MHz~40GHz | Aug. 17, 2013 | Dec. 03, 2013 ~ Dec. 09, 2013 | Aug. 16, 2014 | Conducted (TH02-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESCS 30 | 100356 | 9kHz ~ 2.75GHz | Nov. 15, 2013 | Dec. 10, 2013 | Nov. 14, 2014 | Conduction (CO05-HY) |
| Two-LISN (for auxiliary equipment) | Rohde & Schwarz | ENV216 | 100081 | 9kHz ~ 30MHz | Dec. 12, 2012 | Dec. 10, 2013 | Dec. 11, 2013 | Conduction (CO05-HY) |
| Two-LISN | Rohde & Schwarz | ENV216 | 100080 | 9kHz ~ 30MHz | Dec. 04, 2013 | Dec. 10, 2013 | Dec. 03, 2014 | Conduction (CO05-HY) |
| AC Power Source | APC | APC-1000 W | N/A | N/A | N/A | Dec. 10, 2013 | N/A | Conduction (CO05-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESCI 7 | 100724 | 9 kHz~7 GHz | Sep. 06, 2013 | Dec. 20, 2013 | Sep. 05, 2014 | Radiation (03CH07-HY) |
| Spectrum Analyzer | Rohde & Schwarz | FSP30 | 101067 | 9 kHz ~ 30 GHz | Nov. 20, 2013 | Dec. 20, 2013 | Nov. 19, 2014 | Radiation (03CH07-HY) |
| Loop Antenna | Rohde & Schwarz | HFH2-Z2 | 860004/0001 | 9 kHz~30 Mhz | Jul. 03, 2012 | Dec. 20, 2013 | Jul. 03, 2014 | Radiation (03CH07-HY) |
| Bilog Antenna | Schaffner | CBL6111C | 2726 | 30 MHz ~ 1 GHz | Oct. 10, 2013 | Dec. 20, 2013 | Oct. 09, 2014 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | ESCO | 3117 | 75962 | 1 GHz~18 GHz | Aug. 22, 2013 | Dec. 20, 2013 | Aug. 21, 2014 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170251 | 15 GHz- 40 GHz | Oct. 03, 2013 | Dec. 20, 2013 | Oct. 02, 2014 | Radiation (03CH07-HY) |
| Preamplifier | COM-POWER | PA-103A | 161241 | 30 MHz~1 GHz | Feb. 26, 2013 | Dec. 20, 2013 | Feb. 25, 2014 | Radiation (03CH07-HY) |
| Preamplifier | Agilent | 8449B | 3008A01917 | 1 GHz~26.5 GHz | Aug. 12, 2013 | Dec. 20, 2013 | Aug. 11, 2014 | Radiation (03CH07-HY) |
| Preamplifier | MITEQ | AMF-7D-00101800-30-10P | 159088 | DC~18 G High Gain | Feb. 27, 2013 | Dec. 20, 2013 | Feb. 26, 2014 | Radiation (03CH07-HY) |
| Turn Table | ChainTek | ChainTek 3000 | N/A | 0 ~ 360 degree | N/A | Dec. 20, 2013 | N/A | Radiation (03CH07-HY) |
| Antenna Mast | ChainTek | ChainTek 3000 | N/A | N/A | N/A | Dec. 20, 2013 | N/A | Radiation (03CH07-HY) |

# 5 Uncertainty of Evaluation

**Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)**

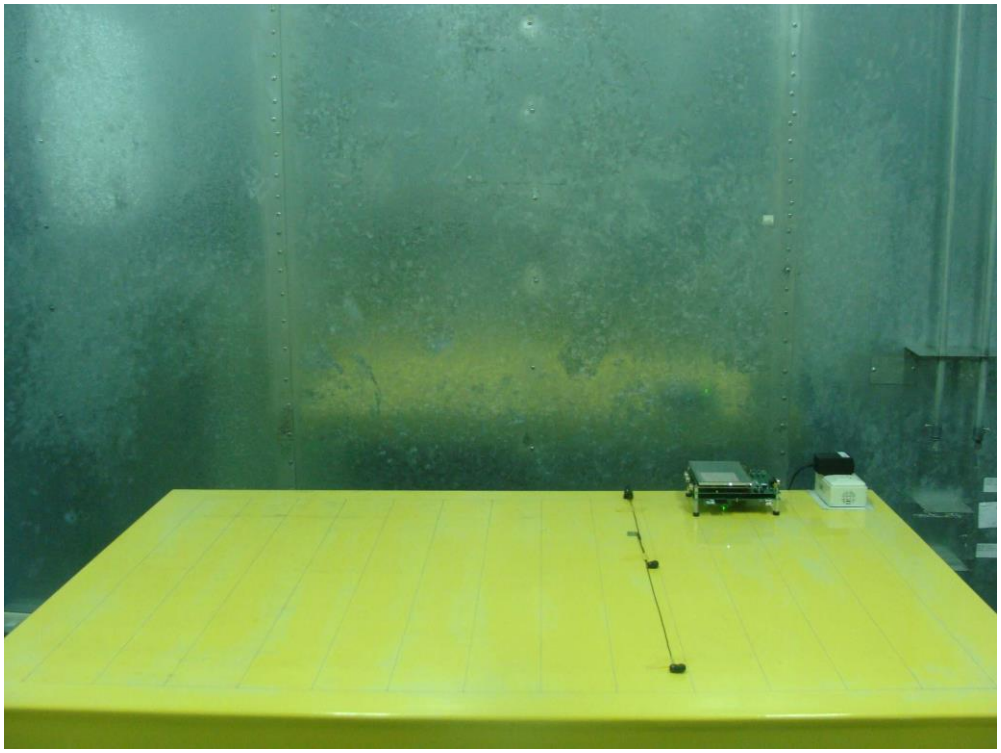
| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.26** |

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.50** |

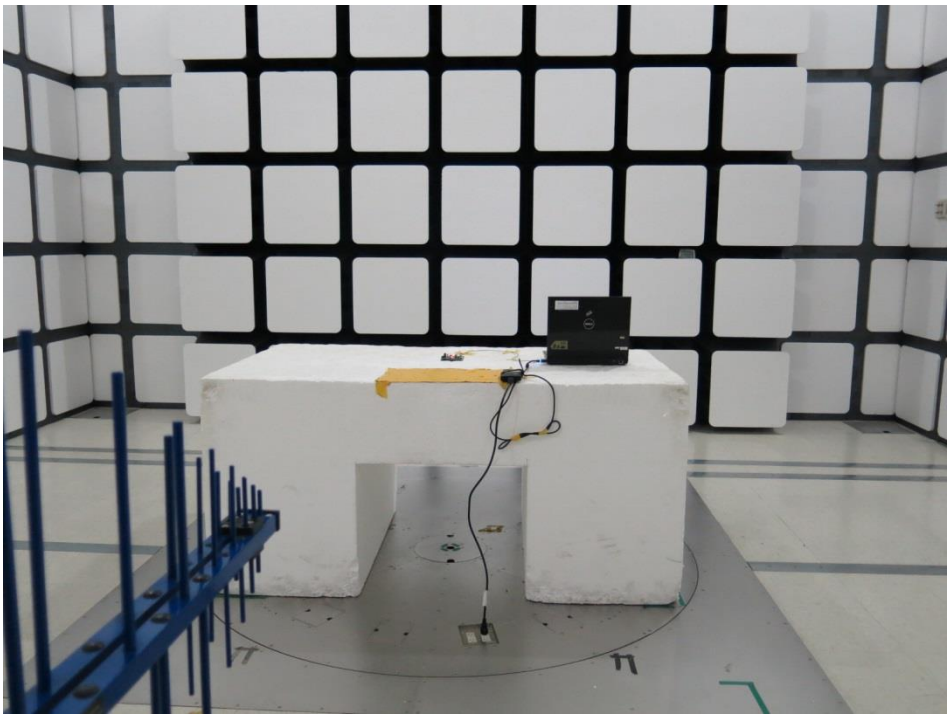
# Appendix A. Setup Photographs

## <Conducted Emission>



## <Radiated Emission>

**LF**



**HF**