# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | AzureWave Technologies, Inc. |
| EQUIPMENT | : | IEEE 802.11 2x2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module |
| BRAND NAME | : | AzureWave |
| MODEL NAME | : | AW-CM389NF |
| FCC ID | : | TLZ-CM389NF |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

**The product was installed into ChromeBook (Brand Name: Hisense, CTL, POIN2, BITLAND, edugear; Model Name: C11, C12, J2, J4, LT0101-01, B800, K2, K4) during test.**

**The product was received on Mar. 03, 2015 and testing was completed on Apr. 02, 2015. We, SPORTON INTERNATIONAL (SHENZHEN) 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.**

**Reviewed by: Joseph Lin / Supervisor**

**Approved by: Jones Tsai / Manager**

***SPORTON INTERNATIONAL (SHENZHEN) INC.***

***1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China***

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**APPENDIX A. CONDUCTED TEST RESULTS**

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR530302-01C | Rev. 01 | This project is a C2PC application, the detail difference with original application FCC ID: TLZ-CM389NF which the grant issued on 04/09/2015 list as below:<br>1. Added three samples, the difference can refer section 1.3<br>2. Added adapter 3 and adapter 4 just different brand name.<br>3. Added two batteries.<br>Since the test result is not affected, all the test cases were quoted from original report (Sporton Report Number FR530302C). | Jul. 10, 2015 |
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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 2.54 dB at 4924.000 MHz |
| 3.6 | 15.207 | RSS-Gen 7.2.4 | AC Conducted Emission | 15.207(a) | Pass | Under limit 12.20 dB at 0.180 MHz |
| 3.7 | 15.203 & 15.247(b) | RSS-210 A8.4 | Antenna Requirement | N/A | Pass | - |

# 1 General Description

## 1.1 Applicant

**AzureWave Technologies, Inc.**
8F., No.94, Baozhong Rd., Xindian, Taipei, Taiwan 231

## 1.2 Manufacturer

**AzureWave Technologies, Inc..**
8F., No.94, Baozhong Rd., Xindian, Taipei, Taiwan 231

## 1.3 Product Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | IEEE 802.11 2x2 MIMO a/b/g/n/ac Wireless LAN + Bluetooth + NFC NGFF Module |
| **Brand Name** | AzureWave |
| **Model Name** | AW-CM389NF |
| **FCC ID** | TLZ-CM389NF |
| **EUT supports Radios application** | WLAN 11a/b/g/n HT20/HT40<br>WLAN 11ac VHT20/VHT40/VHT80<br>Bluetooth v2.1 + EDR/Bluetooth v4.0 LE |

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

| Host Feature & Specification | |
|---|---|
| **Host** | ChromeBook |
| **Brand Name** | Hisense, CTL, POIN2, BITLAND, edugear |
| **Model Name** | C11, C12, J2, J4, LT0101-01, B800, K2, K4 |
| **HW Version** | 1.3 |
| **SW Version** | google chrome |
| **EUT Stage** | Production Unit |

**Note:** There are four types of EUT sample 1, sample 2, sample 3 and sample 4, the difference between sample 1 and sample 2 is only for touch panel, and sample 1/2 with sample 3, sample 4 are with different EMMC, LCD panel and RAM can refer the list below. According to the difference, we evaluate is not affect RF performance, so only choose sample 1 to perform RF test.

| Component | Sample 1/Sample 2 | Sample 3 | Sample 4 |
|---|---|---|---|
| LCD Panel | IVO_M116NWR1 LCD 11.6" | Reyken_RK116IWX2T30 LCD 11.6" | Reyken_RK116IWX2T30 LCD 11.6" |
| EMMC | Sandisk 16G | Toshiba 16G | Sandisk 32G |
| RAM | Samsung 2G | Hynix 4G | Hynix 4G |

## 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 (Peak) Output Power to Antenna</td><td>802.11b : 21.62 dBm (0.1452 W)<br>802.11g : 26.38 dBm (0.4345 W)<br>802.11n HT20 : 26.16 dBm (0.4130 W)<br>802.11n HT40 : 23.21 dBm (0.2094 W)</td></tr>
<tr><td>99% Occupied Bandwidth</td><td>802.11b : 13.65MHz<br>802.11g : 17.55MHz<br>802.11n HT20 : 18.35MHz<br>802.11n HT40 : 36.50MHz</td></tr>
<tr><td>Antenna Type</td><td>WLAN for Chain Port 0:<br>PIFA Antenna with gain 2.47 dBi<br>WLAN for Chain Port 1:<br>PIFA Antenna with gain 1.81 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 Port 0</th><th>Chain Port 1</th></tr>
<tr><td>802.11 b/g/n SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 b/g/n MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
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## 1.5 Modification of EUT

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

## 1.6 Testing Location

| | | |
|---|---|---|
| **Test Site** | SPORTON INTERNATIONAL (SHENZHEN) INC. | |
| **Test Site Location** | 1F & 2F,Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China<br>TEL: +86-755-8637-9589<br>FAX: +86-755-8637-9595 | |
| **Test Site No.** | **Sporton Site No.** | |
| | TH01-SZ | CO01-SZ |

| | | |
|---|---|---|
| **Test Site** | SPORTON INTERNATIONAL (SHENZHEN) INC. | |
| **Test Site Location** | No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China<br>TEL: +86-755- 3320-2398 | |
| **Test Site No.** | **Sporton Site No.** | **FCC Registration No.** |
| | 03CH02-SZ | 831040 |

**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 v03r02
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 4
- NOTICE 2012-DRS0126

**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 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.
4. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

# 2 Test Configuration of Equipment Under Test

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

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

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

## 2.1 Carrier Frequency Channel

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

## 2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

| WLAN 2.4GHz 802.11b Peak Power (dBm) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Power vs. Channel | | | | Power vs. Data Rate | | | |
| Channel | Frequency (MHz) | Chain Port | Data Rate 1Mbps | Channel | 2Mbps | 5.5Mbps | 11Mbps |
| CH 01 | 2412 | 0 | **20.78** | CH 01 | 20.74 | 20.73 | 20.71 |
| CH 06 | 2437 | 0 | 20.72 | | | | |
| CH 11 | 2462 | 0 | 20.68 | | | | |
| CH 01 | 2412 | 1 | 19.60 | CH 06 | 19.82 | 19.84 | 19.85 |
| CH 06 | 2437 | 1 | **19.87** | | | | |
| CH 11 | 2462 | 1 | 19.78 | | | | |
| CH 01 | 2412 | 0+1(0) | **18.95** | CH 01 | 18.94 | 18.92 | 18.90 |
| CH 06 | 2437 | 0+1(0) | 18.94 | | | | |
| CH 11 | 2462 | 0+1(0) | 18.93 | | | | |
| CH 01 | 2412 | 0+1(1) | **18.25** | CH 01 | 18.12 | 18.06 | 18.07 |
| CH 06 | 2437 | 0+1(1) | 18.10 | | | | |
| CH 11 | 2462 | 0+1(1) | 18.04 | | | | |
| CH 01 | 2412 | 0+1 | **21.62** | CH 01 | 21.56 | 21.52 | 21.52 |
| CH 06 | 2437 | 0+1 | 21.55 | | | | |
| CH 11 | 2462 | 0+1 | 21.52 | | | | |

| WLAN 2.4GHz 802.11g Peak Power (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Power vs. Channel | | | | Power vs. Data Rate | | | | | | | |
| Channel | Frequency (MHz) | Chain Port | Data Rate 6Mbps | Channel | 9Mbps | 12Mbps | 18Mbps | 24Mbps | 36Mbps | 48Mbps | 54Mbps |
| CH 01 | 2412 | 0 | **25.56** | CH 01 | 25.52 | 25.53 | 25.44 | 25.46 | 25.47 | 25.41 | 25.43 |
| CH 06 | 2437 | 0 | 25.32 | | | | | | | | |
| CH 11 | 2462 | 0 | 25.40 | | | | | | | | |
| CH 01 | 2412 | 1 | 24.87 | CH 11 | 25.11 | 24.98 | 24.96 | 25.03 | 24.99 | 25.01 | 25.07 |
| CH 06 | 2437 | 1 | 24.84 | | | | | | | | |
| CH 11 | 2462 | 1 | **25.12** | | | | | | | | |
| CH 01 | 2412 | 0+1(0) | **23.72** | CH 01 | 23.71 | 23.68 | 23.69 | 23.67 | 23.70 | 23.65 | 23.66 |
| CH 06 | 2437 | 0+1(0) | 23.54 | | | | | | | | |
| CH 11 | 2462 | 0+1(0) | 23.62 | | | | | | | | |
| CH 01 | 2412 | 0+1(1) | **22.98** | CH 01 | 22.88 | 22.86 | 22.87 | 22.83 | 22.94 | 22.93 | 22.89 |
| CH 06 | 2437 | 0+1(1) | 22.75 | | | | | | | | |
| CH 11 | 2462 | 0+1(1) | 22.69 | | | | | | | | |
| CH 01 | 2412 | 0+1 | **26.38** | CH 01 | 26.33 | 26.30 | 26.31 | 26.28 | 26.35 | 26.32 | 26.30 |
| CH 06 | 2437 | 0+1 | 26.17 | | | | | | | | |
| CH 11 | 2462 | 0+1 | 26.19 | | | | | | | | |

| WLAN 2.4GHz 802.11n HT20 Peak Power (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Power vs. Channel | | | | Power vs. Data Rate | | | | | | | |
| Channel | Frequency (MHz) | Chain Port | Data Rate MCS0 | Channel | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| CH 01 | 2412 | 0 | **25.23** | CH 01 | 25.21 | 23.41 | 23.39 | 23.55 | 23.52 | 23.59 | 23.58 |
| CH 06 | 2437 | 0 | 24.69 | | | | | | | | |
| CH 11 | 2462 | 0 | 24.58 | | | | | | | | |
| CH 01 | 2412 | 1 | **24.56** | CH 01 | 24.55 | 24.54 | 24.53 | 24.53 | 24.51 | 24.52 | 24.55 |
| CH 06 | 2437 | 1 | 24.45 | | | | | | | | |
| CH 11 | 2462 | 1 | 24.23 | | | | | | | | |
| CH 01 | 2412 | 0+1(0) | **23.32** | CH 01 | 23.25 | 23.28 | 23.26 | 23.30 | 23.31 | 23.32 | 23.28 |
| CH 06 | 2437 | 0+1(0) | 23.24 | | | | | | | | |
| CH 11 | 2462 | 0+1(0) | 23.15 | | | | | | | | |
| CH 01 | 2412 | 0+1(1) | **22.98** | CH 01 | 22.97 | 22.98 | 22.96 | 22.95 | 22.94 | 22.96 | 22.95 |
| CH 06 | 2437 | 0+1(1) | 22.84 | | | | | | | | |
| CH 11 | 2462 | 0+1(1) | 22.69 | | | | | | | | |
| CH 01 | 2412 | 0+1 | **26.16** | CH 01 | 26.12 | 26.14 | 26.12 | 26.14 | 26.14 | 26.15 | 26.13 |
| CH 06 | 2437 | 0+1 | 26.05 | | | | | | | | |
| CH 11 | 2462 | 0+1 | 25.94 | | | | | | | | |

| WLAN 2.4GHz 802.11n HT40 Peak Power (dBm) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Power vs. Channel | | | | Power vs. Data Rate | | | | | | | |
| Channel | Frequency (MHz) | Chain Port | Data Rate MCS0 | Channel | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| CH 03 | 2422 | 0 | **23.21** | CH 03 | 23.20 | 23.18 | 23.19 | 23.20 | 23.18 | 23.19 | 23.20 |
| CH 06 | 2437 | 0 | 22.88 | | | | | | | | |
| CH 09 | 2452 | 0 | 22.94 | | | | | | | | |
| CH 03 | 2422 | 1 | **22.87** | CH 03 | 22.84 | 22.86 | 22.85 | 22.83 | 22.86 | 22.85 | 22.86 |
| CH 06 | 2437 | 1 | 22.53 | | | | | | | | |
| CH 09 | 2452 | 1 | 22.43 | | | | | | | | |
| CH 03 | 2422 | 0+1(0) | **20.32** | CH 03 | 20.31 | 20.30 | 20.19 | 20.18 | 20.22 | 20.23 | 20.17 |
| CH 06 | 2437 | 0+1(0) | 19.75 | | | | | | | | |
| CH 09 | 2452 | 0+1(0) | 17.32 | | | | | | | | |
| CH 03 | 2422 | 0+1(1) | **19.78** | CH 03 | 19.77 | 19.76 | 19.76 | 19.75 | 19.74 | 19.75 | 19.76 |
| CH 06 | 2437 | 0+1(1) | 19.71 | | | | | | | | |
| CH 09 | 2452 | 0+1(1) | 19.68 | | | | | | | | |
| CH 03 | 2422 | 0+1 | **23.07** | CH 03 | 23.06 | 23.05 | 22.99 | 22.98 | 23.00 | 23.01 | 22.98 |
| CH 06 | 2437 | 0+1 | 22.74 | | | | | | | | |
| CH 09 | 2452 | 0+1 | 21.67 | | | | | | | | |

## 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.**

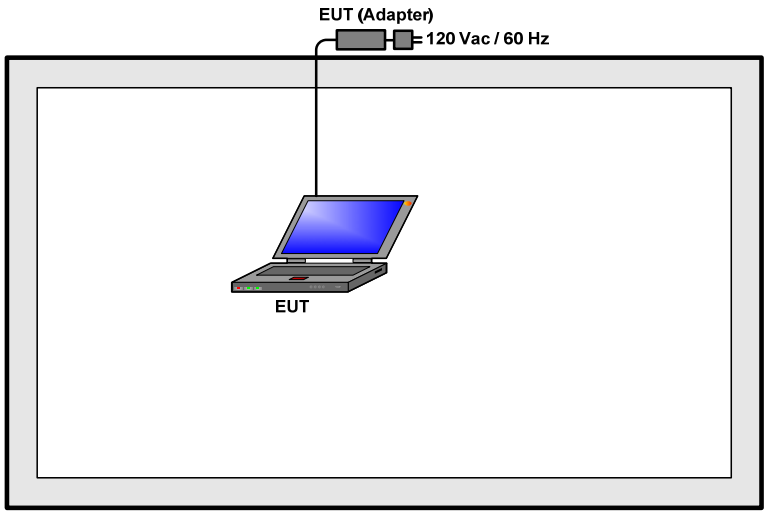
**<2.4GHz>**

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

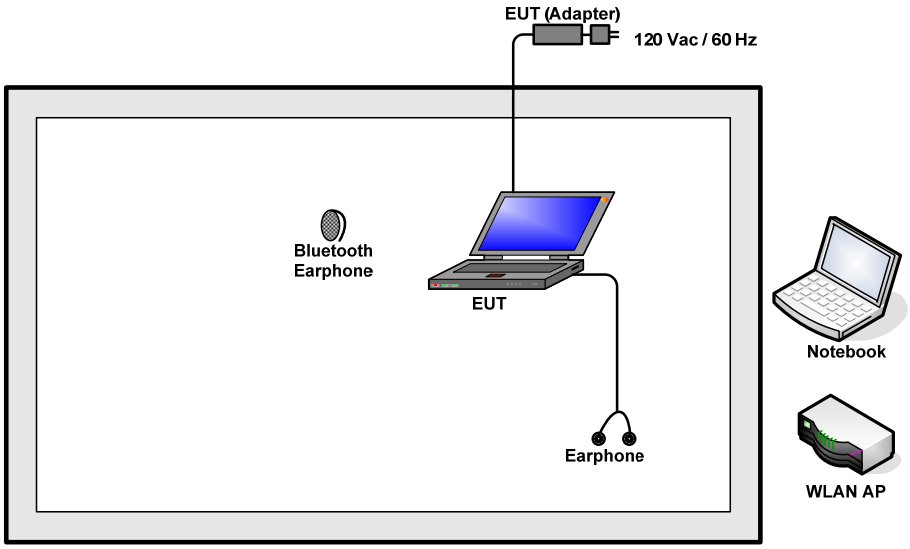
| Test Cases | |
|---|---|
| AC Conducted Emission | Mode 1 : Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + Adapter 2 |
| **Remark:** For Radiated TCs, The tests were performance with Adapter1, Battery, and USB Cable. | |

## 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-815 | KA2IR815A1 | N/A | Unshielded, 1.8 m |
| 2. | Bluetooth Earphone | Nokia | BH-108 | PYAHS-107W | N/A | N/A |
| 3. | Earphone | Lenovo | SH100 | N/A | N/A | N/A |
| 4. | Notebook | Lenovo | G480 | N/A | N/A | Unshielded, 1.8 m |

## 2.6 EUT Operation Test Setup

For WLAN function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

## 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 5 dB and 10dB attenuator.

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

= 5 + 10 = 15 (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.

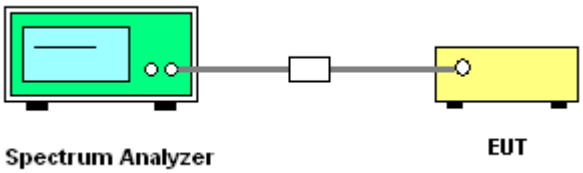
### 3.1.2 Measuring Instruments

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

### 3.1.3 Test Procedures

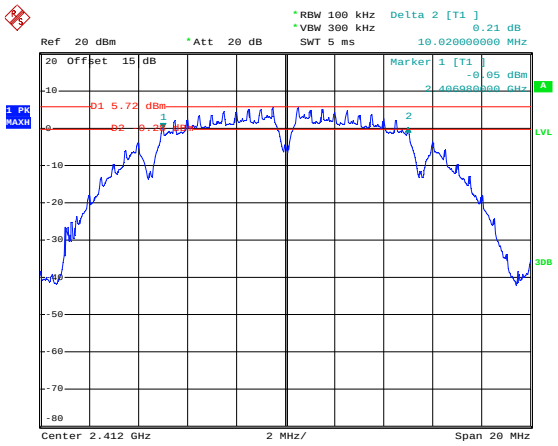
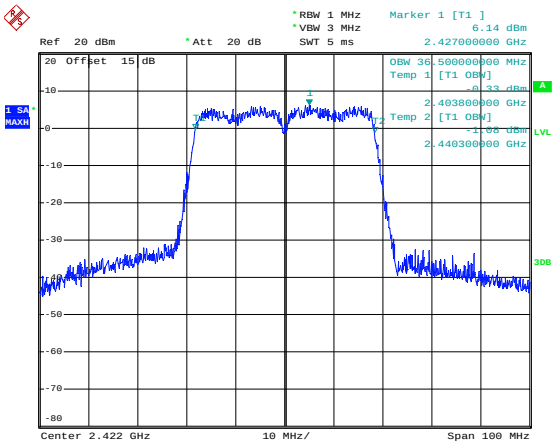
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit 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

Please refer to Appendix A of this test report.

| Minimum 6dB Bandwidth | Maximum 99% Occupied Bandwidth |
|---|---|
|  |  |





Note : The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

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

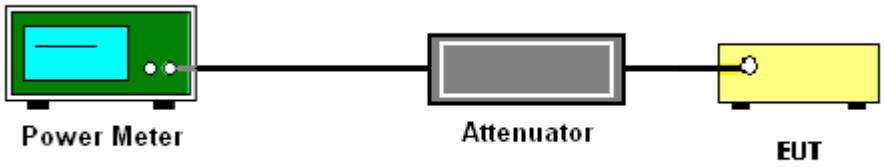
### 3.2.2 Measuring Instruments

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 v03r02.
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

Please refer to Appendix A of this test report.

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

Please refer to Appendix A of this test report.

## 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 v03r02
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.

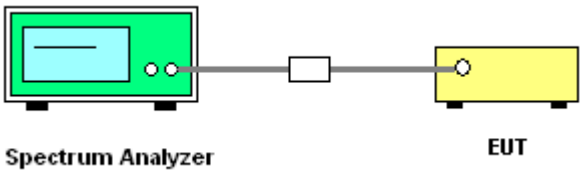
   If measurements performed using method (2) plus 10 log (N) exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

   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)

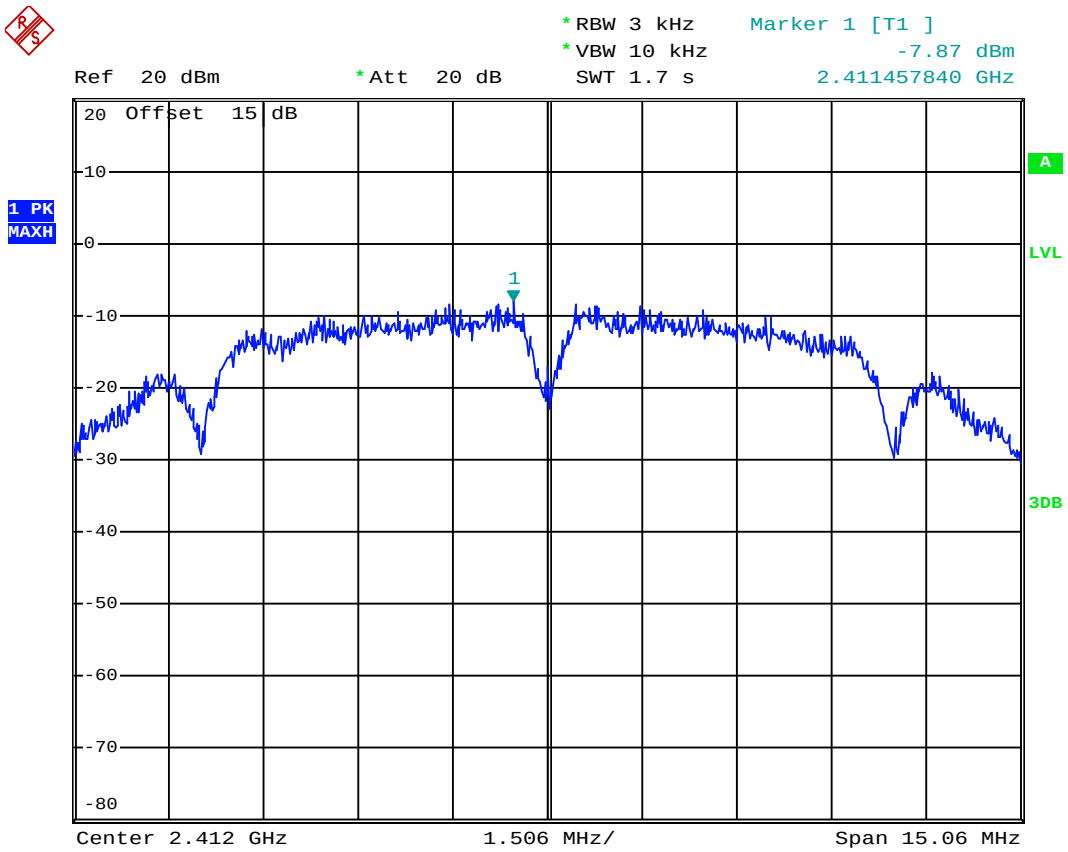
### 3.3.4 Test Setup




### 3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A of this test report.

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




Date: 1.APR.2015 23:05:40

# 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).

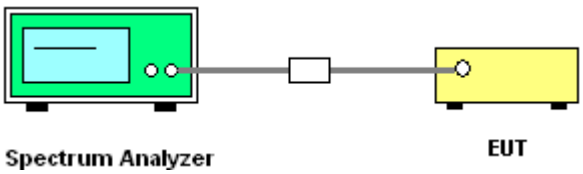
## 3.4.2 Measuring Instruments

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 v03r02.
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



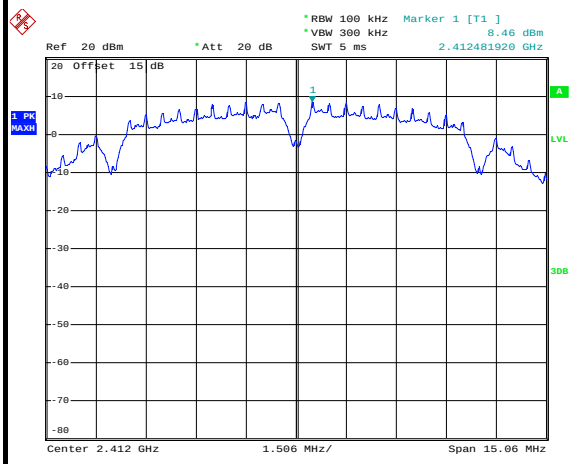
## 3.4.5 Test Result of Conducted Band Edges and Spurious Emission

**Number of TX = 1, Chain Port 0 (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

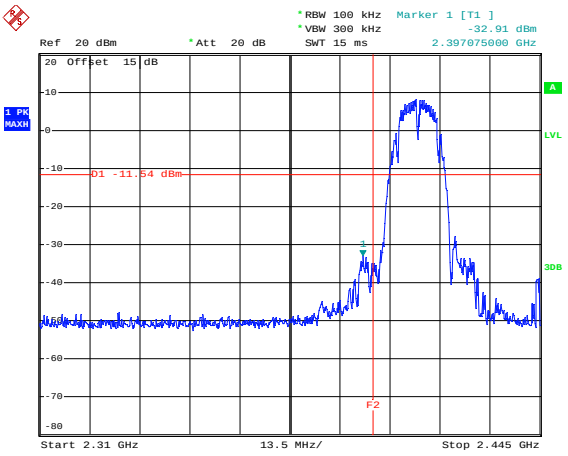
**WLAN 802.11b Channel 01**

**100kHz PSD reference Level**



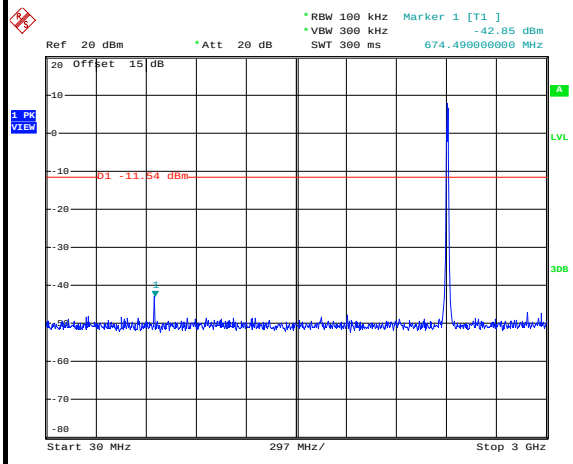

Date: 1.APR.2015 18:29:28

**Low Channel Plot**



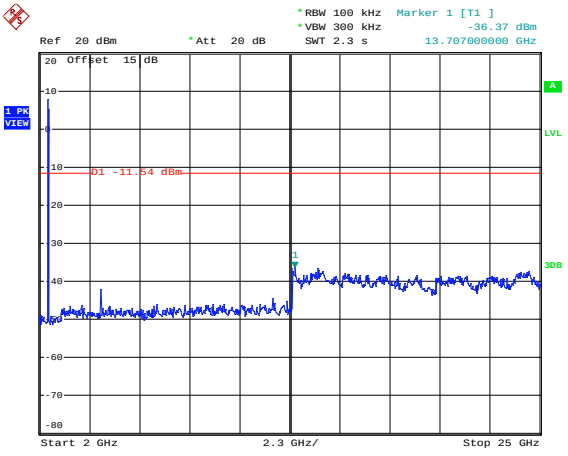

Date: 1.APR.2015 18:30:19

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 18:30:53

**Spurious Emission 2GHz~25GHz**

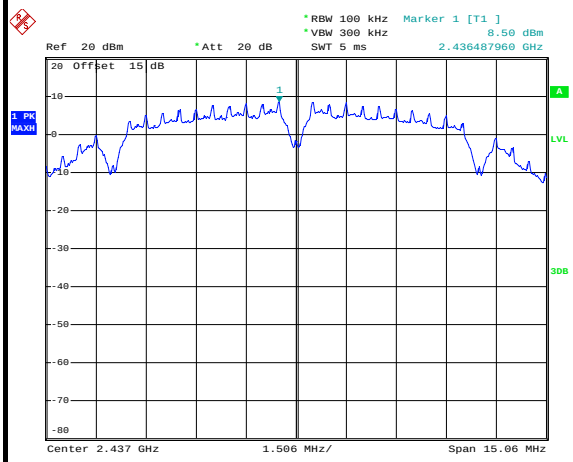



Date: 1.APR.2015 18:31:10

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

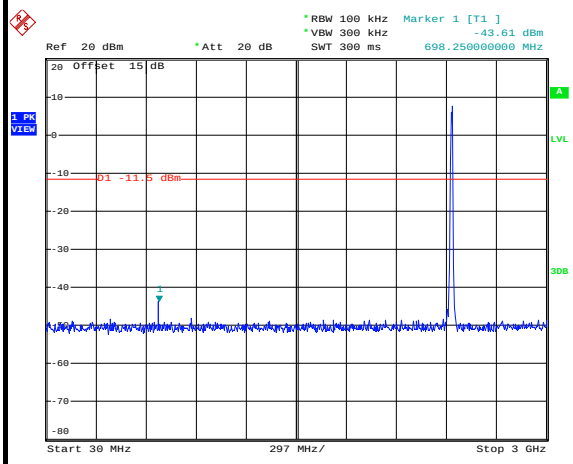
**WLAN 802.11b Channel 06**

**100kHz PSD reference Level**



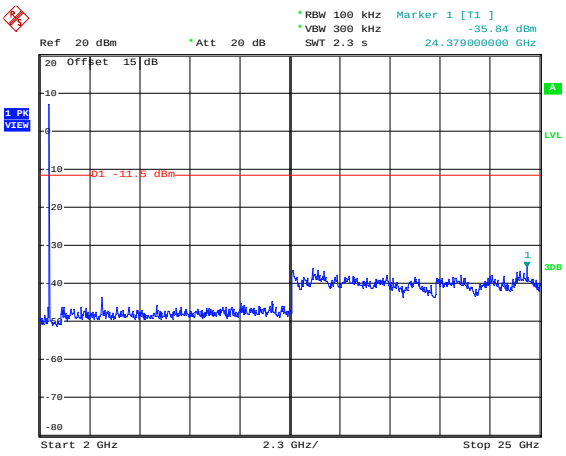

Date: 1.APR.2015 18:36:59

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 18:38:02

**Spurious Emission 2GHz~25GHz**

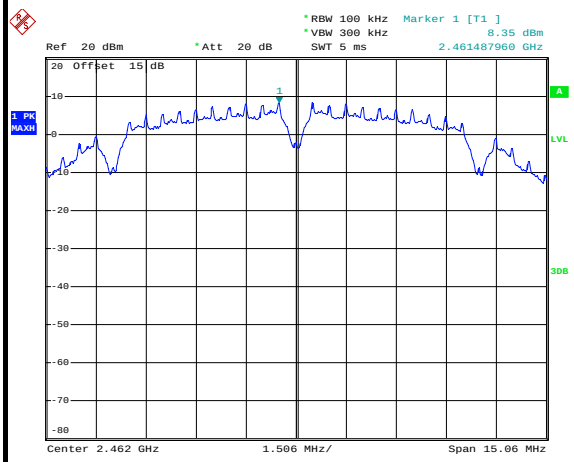



Date: 1.APR.2015 18:38:20

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

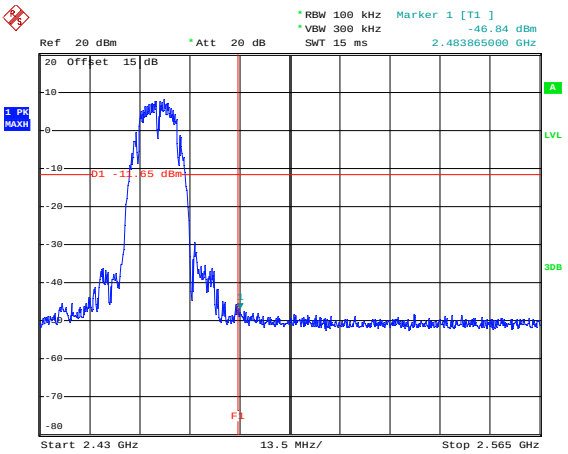
**WLAN 802.11b Channel 11**

**100kHz PSD reference Level**



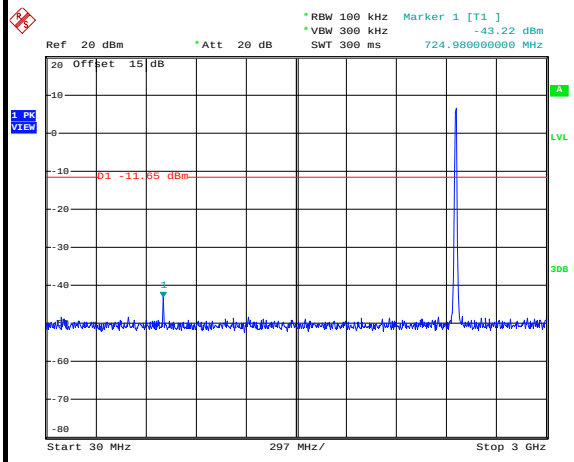

Date: 1.APR.2015 18:43:12

**High Channel Plot**



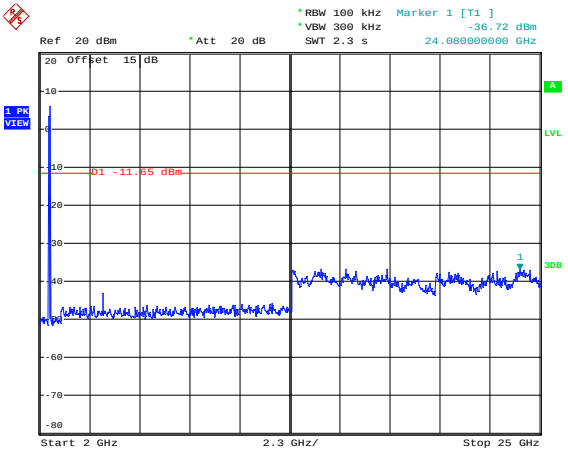

Date: 1.APR.2015 18:46:53

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 18:47:19

**Spurious Emission 2GHz~25GHz**

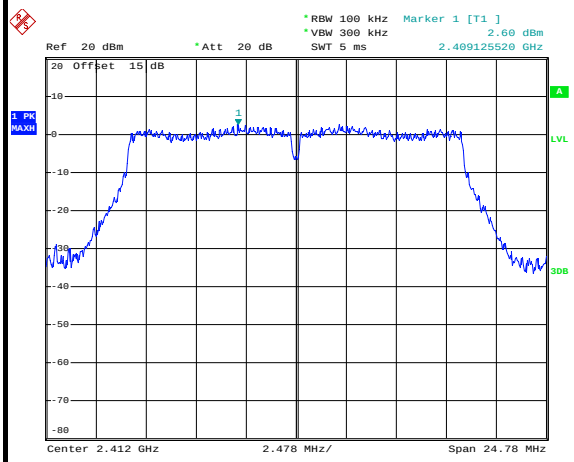



Date: 1.APR.2015 18:47:37

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

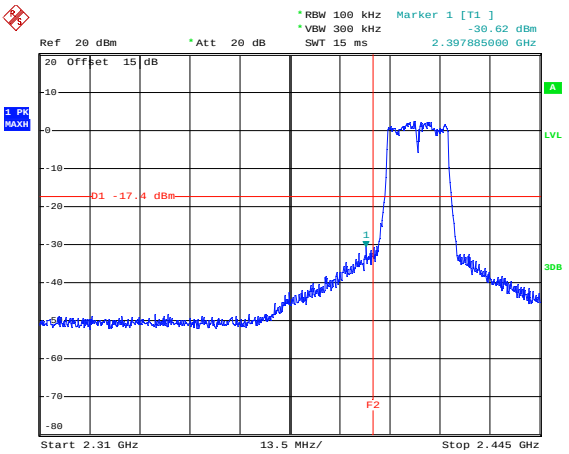
**WLAN 802.11g Channel 01**

**100kHz PSD reference Level**



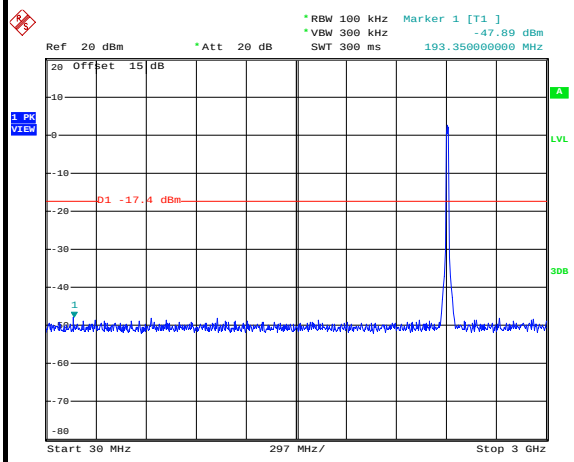

Date: 1.APR.2015 20:04:26

**Low Channel Plot**



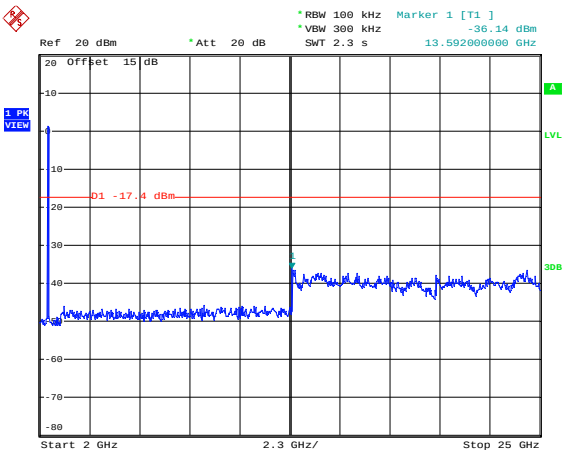

Date: 1.APR.2015 20:06:09

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 20:08:12

**Spurious Emission 2GHz~25GHz**

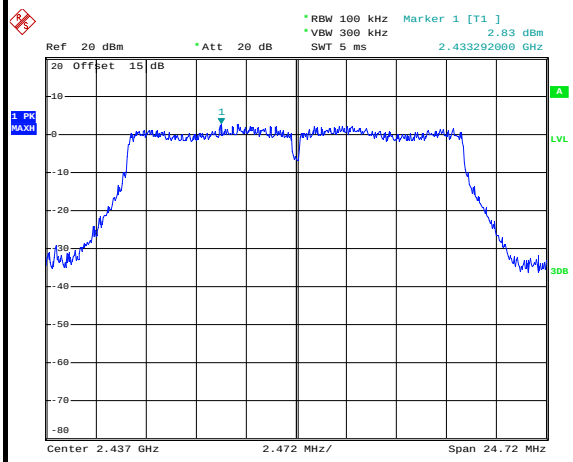



Date: 1.APR.2015 20:08:30

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

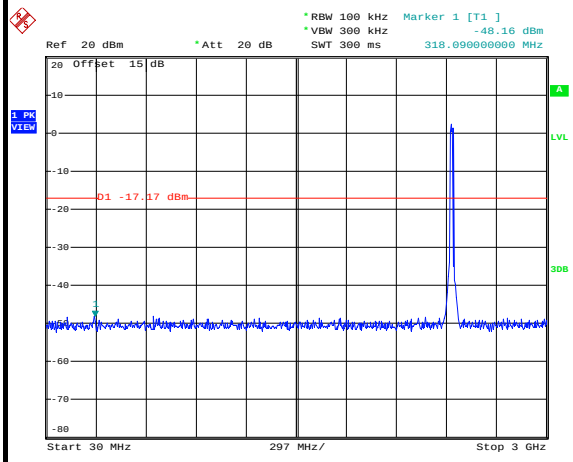
**WLAN 802.11g Channel 06**

**100kHz PSD reference Level**



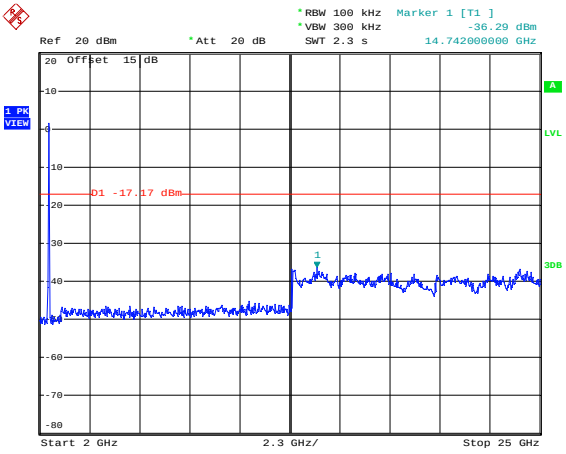

Date: 1.APR.2015 19:56:55

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 19:57:49

**Spurious Emission 2GHz~25GHz**

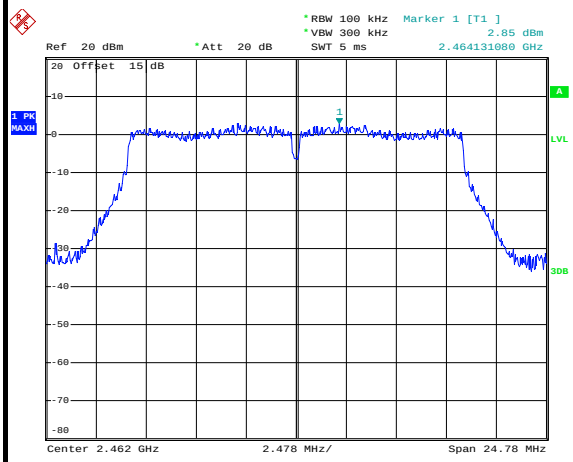



Date: 1.APR.2015 19:58:07

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

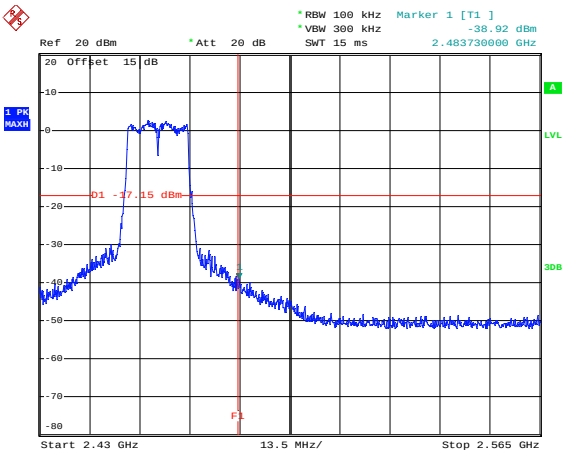
## WLAN 802.11g Channel 11

### 100kHz PSD reference Level



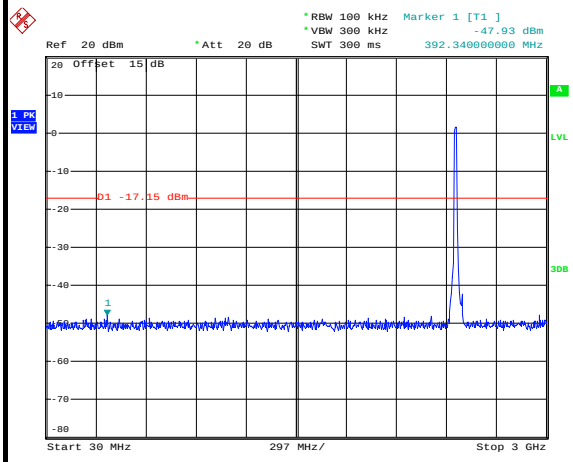

Date: 1.APR.2015 20:14:48

### High Channel Plot



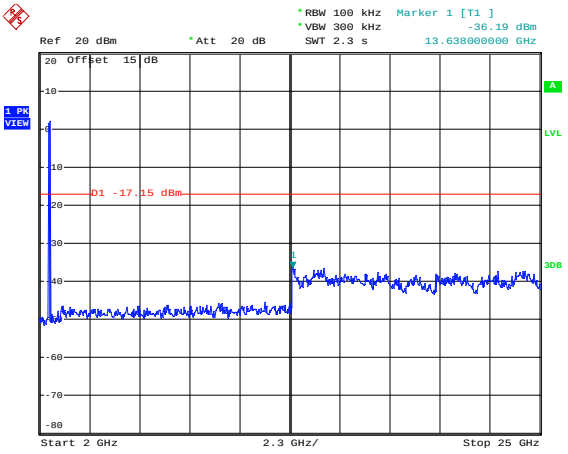

Date: 1.APR.2015 20:15:53

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 20:17:37

### Spurious Emission 2GHz~25GHz

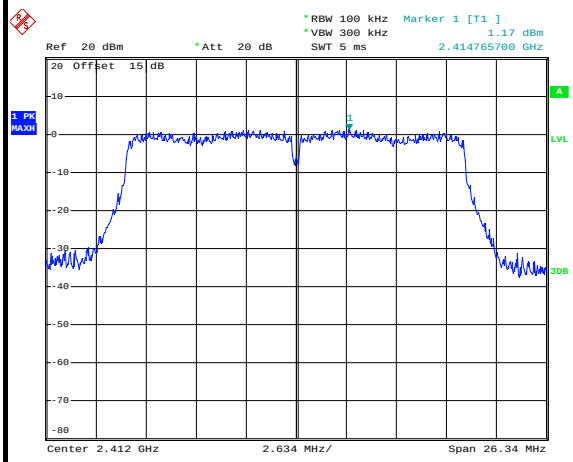



Date: 1.APR.2015 20:17:55

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

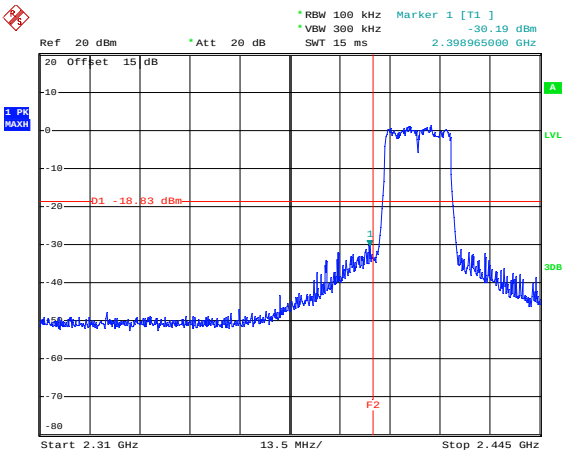
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



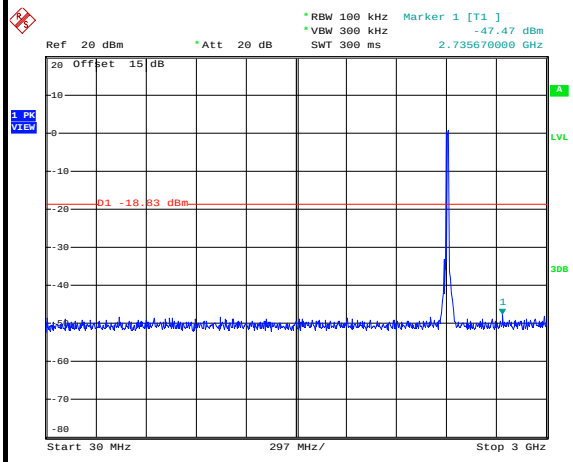

Date: 1.APR.2015 20:25:18

**Low Channel Plot**



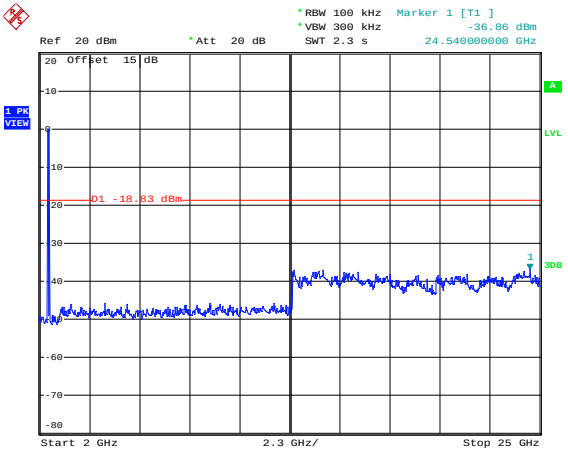

Date: 1.APR.2015 20:29:09

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 20:27:38

**Spurious Emission 2GHz~25GHz**

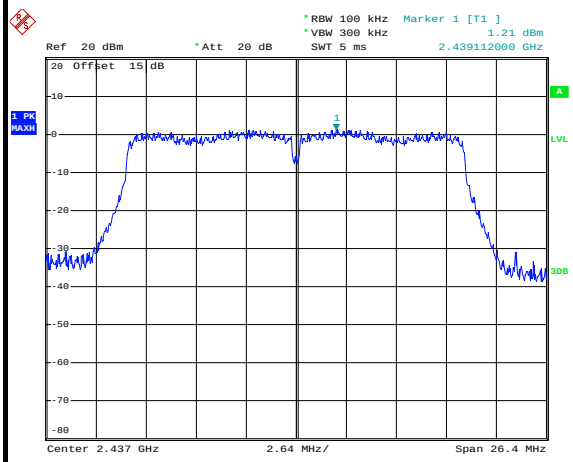



Date: 1.APR.2015 20:27:56

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

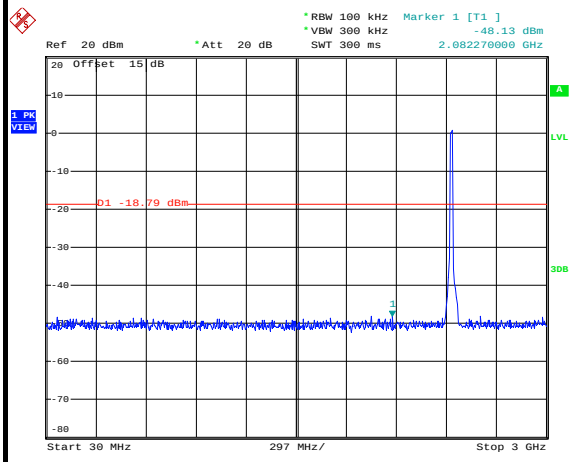
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



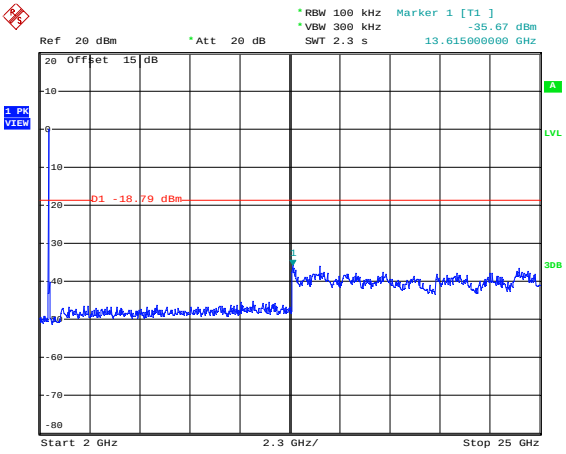

Date: 1.APR.2015 20:40:53

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 20:43:01

**Spurious Emission 2GHz~25GHz**

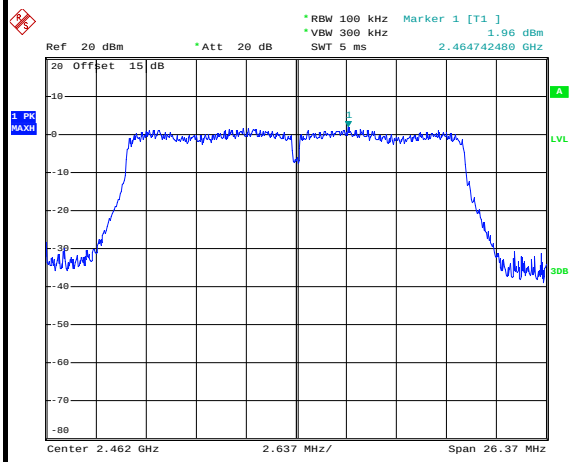



Date: 1.APR.2015 20:43:19

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

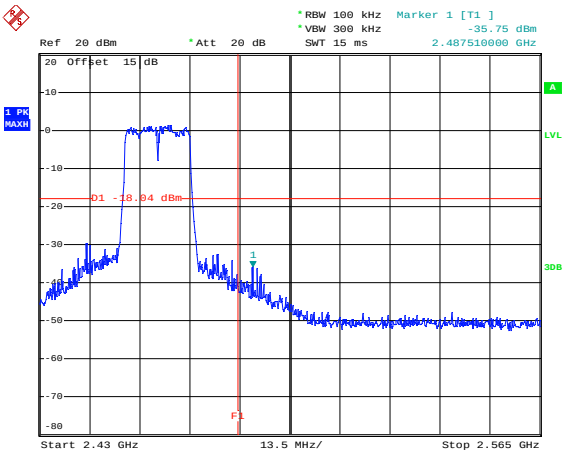
## WLAN 802.11n HT20 Channel 11

### 100kHz PSD reference Level



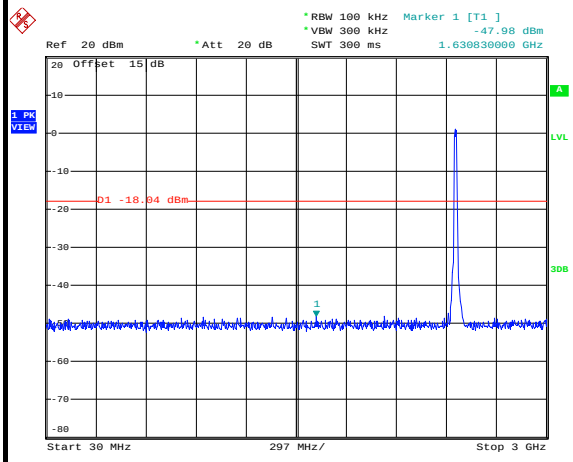

Date: 1.APR.2015 20:59:23

### High Channel Plot



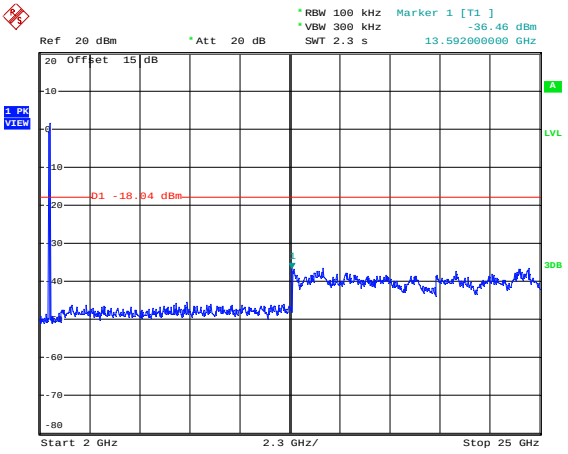

Date: 1.APR.2015 21:00:05

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 21:06:13

### Spurious Emission 2GHz~25GHz

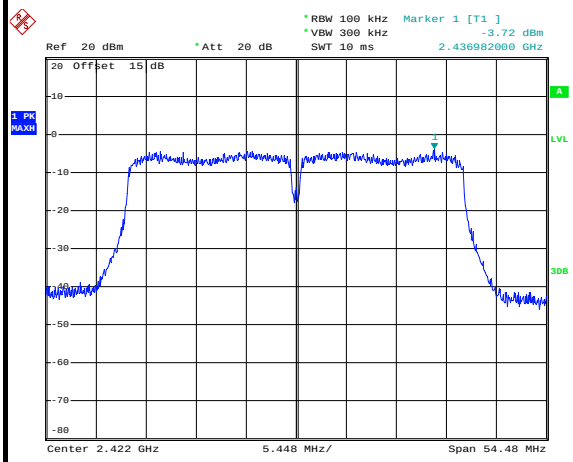



Date: 1.APR.2015 21:06:31

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 03 | **Test Engineer :** | Tiny You |

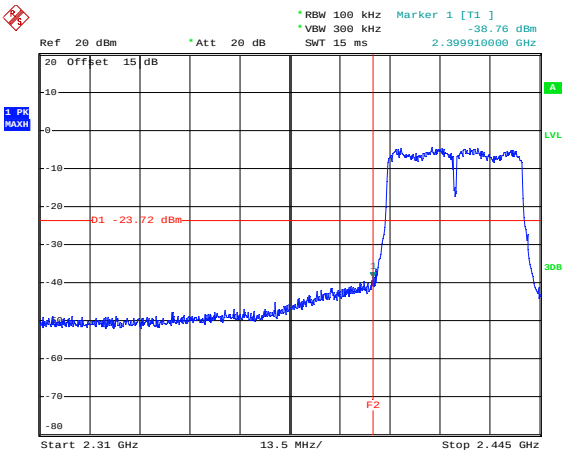
**WLAN 802.11n HT40 Channel 03**

**100kHz PSD reference Level**



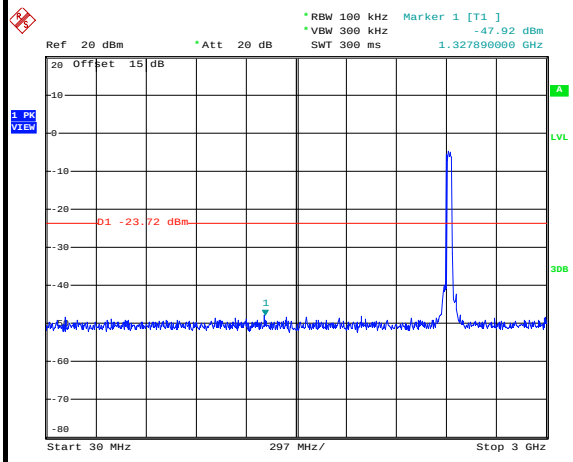

Date: 1.APR.2015 21:25:21

**Low Channel Plot**



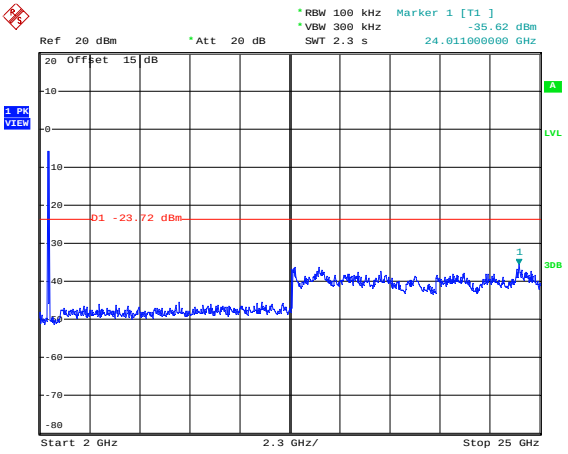

Date: 1.APR.2015 21:26:11

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 21:27:14

**Spurious Emission 2GHz~25GHz**

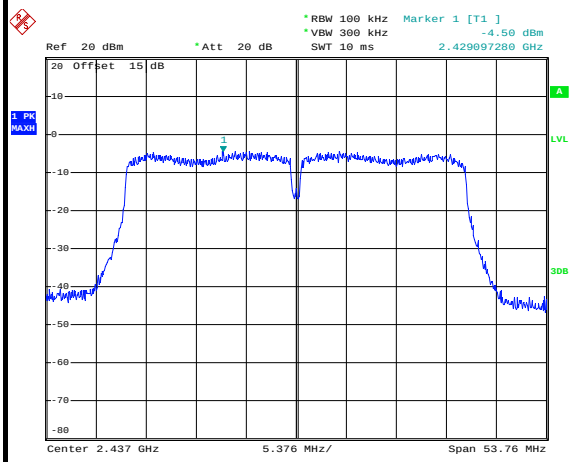



Date: 1.APR.2015 21:27:32

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

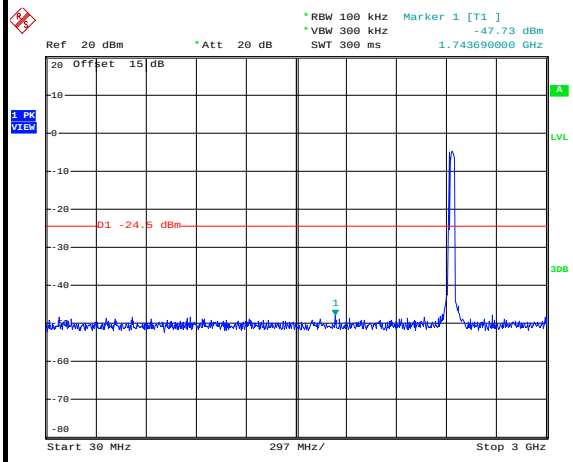
**WLAN 802.11n HT40 Channel 06**

**100kHz PSD reference Level**



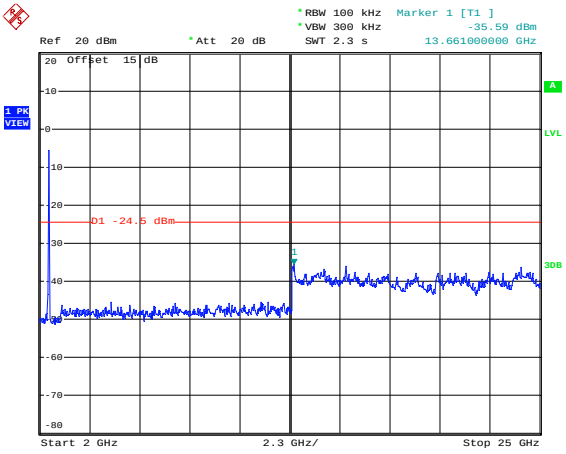

Date: 1.APR.2015 21:31:25

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 21:32:55

**Spurious Emission 2GHz~25GHz**

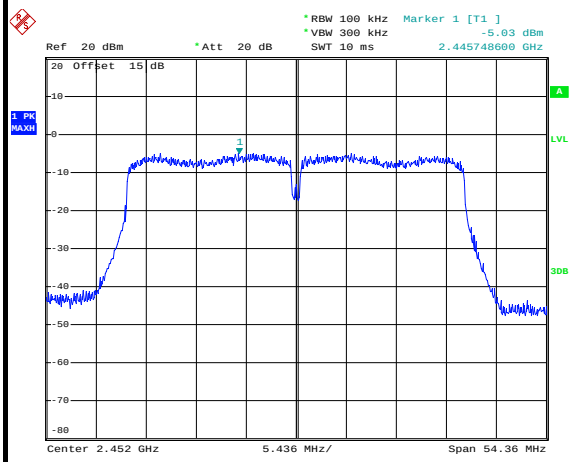



Date: 1.APR.2015 21:33:13

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 0 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 09 | **Test Engineer :** | Tiny You |

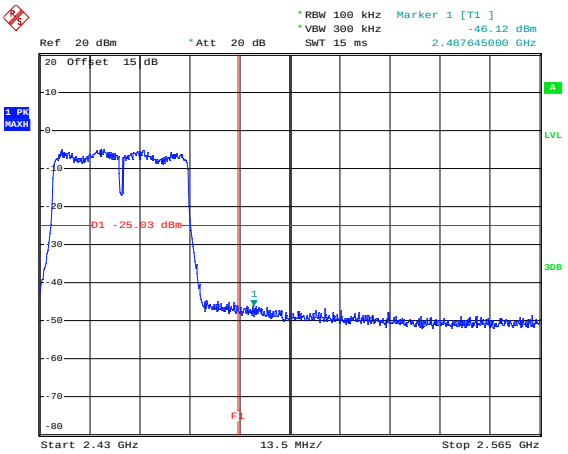
## WLAN 802.11n HT40 Channel 09

### 100kHz PSD reference Level



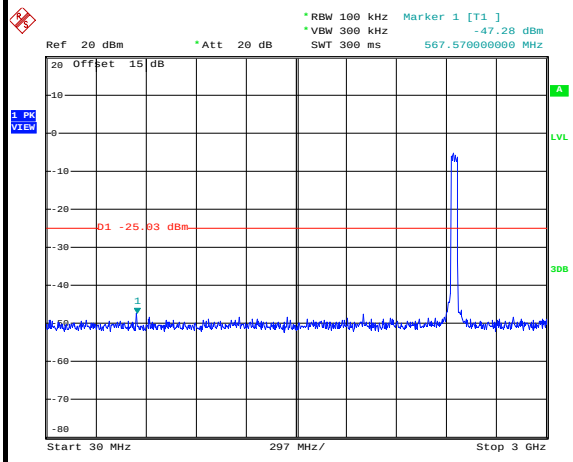

Date: 1.APR.2015 21:39:58

### High Channel Plot



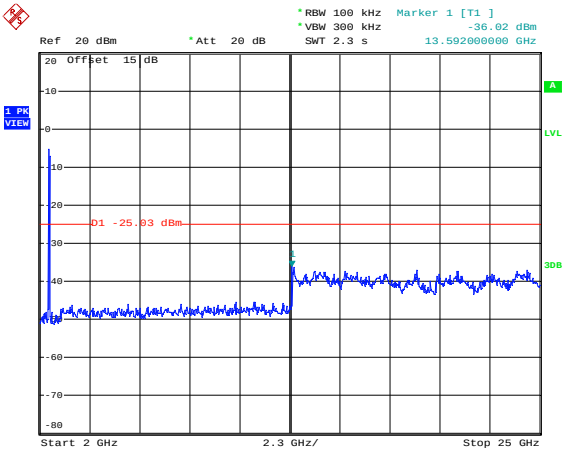

Date: 1.APR.2015 21:40:17

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 21:42:27

### Spurious Emission 2GHz~25GHz



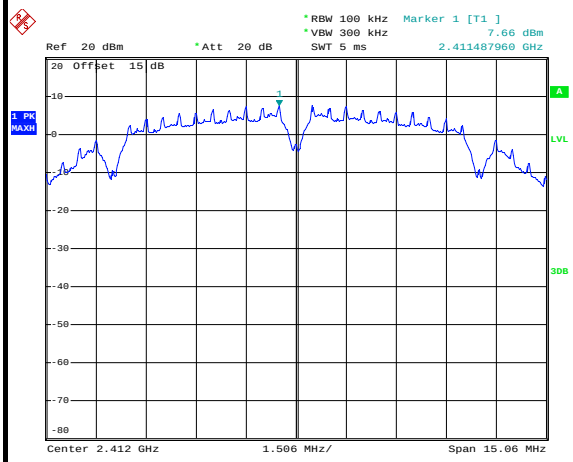

Date: 1.APR.2015 21:42:45

**Number of TX = 1, Chain Port 1 (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

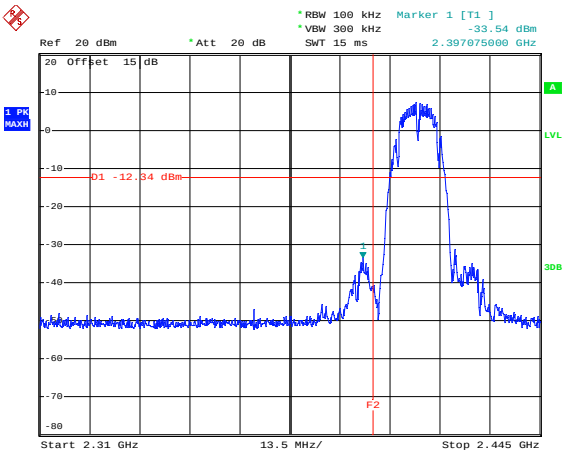
**WLAN 802.11b Channel 01**

**100kHz PSD reference Level**



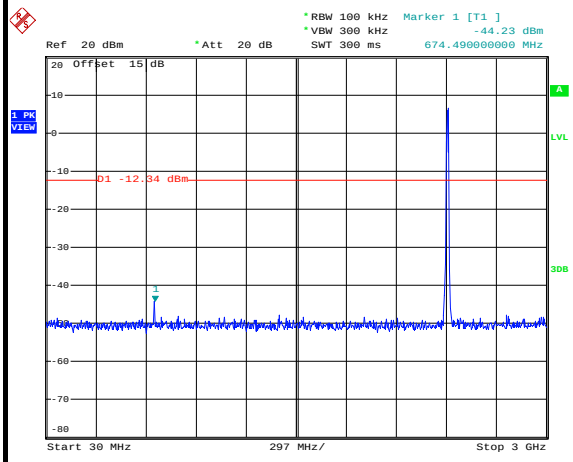

Date: 2.APR.2015 10:21:58

**Low Channel Plot**



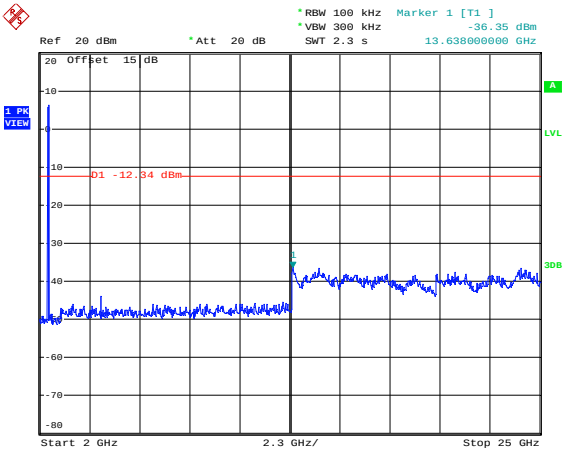

Date: 2.APR.2015 10:22:45

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 10:38:43

**Spurious Emission 2GHz~25GHz**

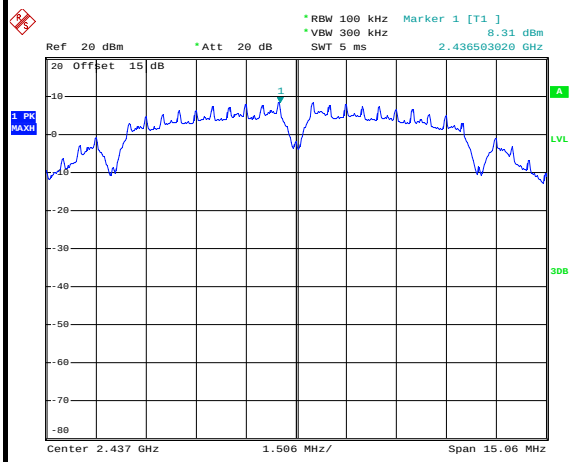



Date: 2.APR.2015 10:23:31

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

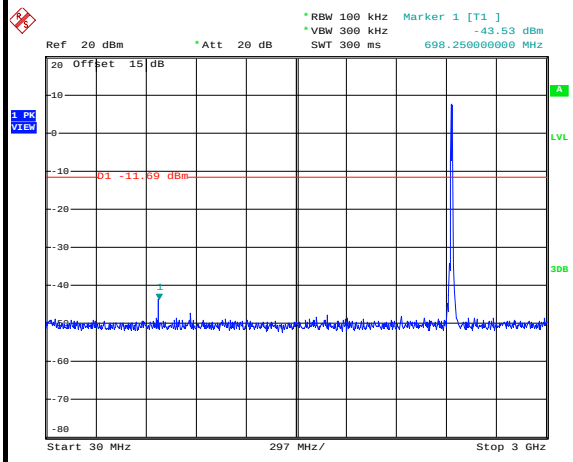
## WLAN 802.11b Channel 06

### 100kHz PSD reference Level



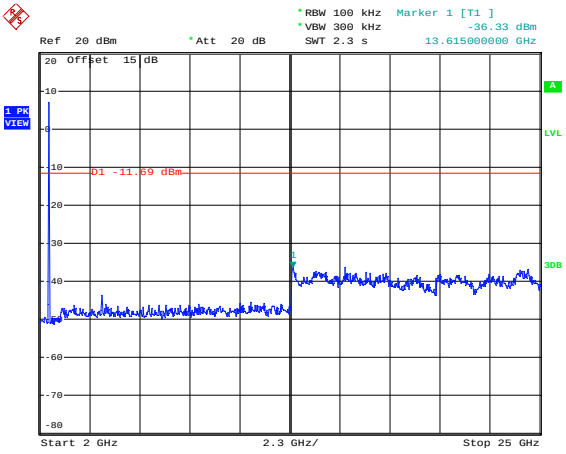

Date: 2.APR.2015 10:46:23

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 10:46:50

### Spurious Emission 2GHz~25GHz

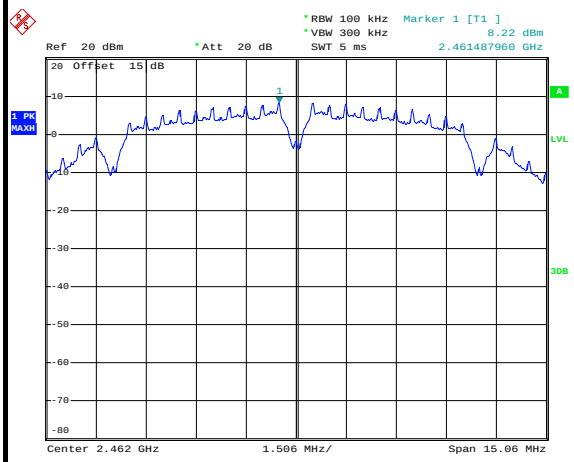



Date: 2.APR.2015 10:47:08

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

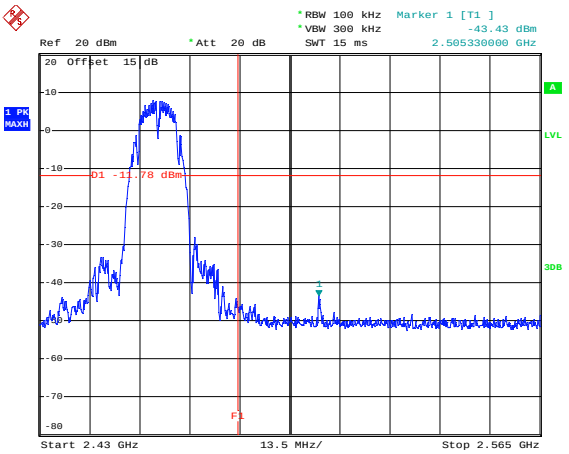
**WLAN 802.11b Channel 11**

**100kHz PSD reference Level**



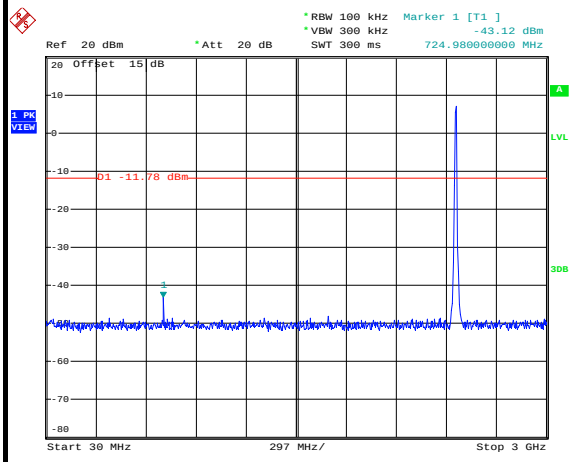

Date: 2.APR.2015 10:52:41

**High Channel Plot**



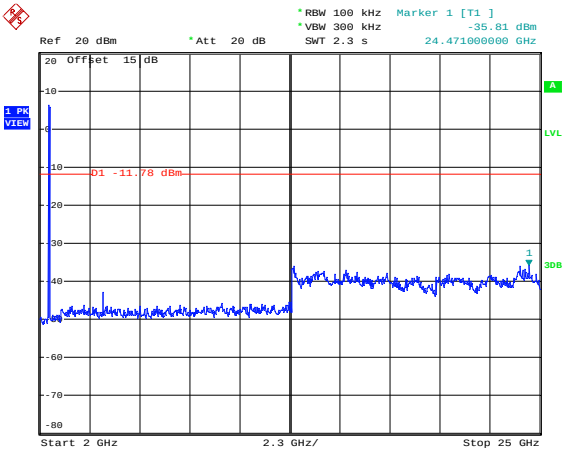

Date: 2.APR.2015 11:01:53

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 11:02:18

**Spurious Emission 2GHz~25GHz**

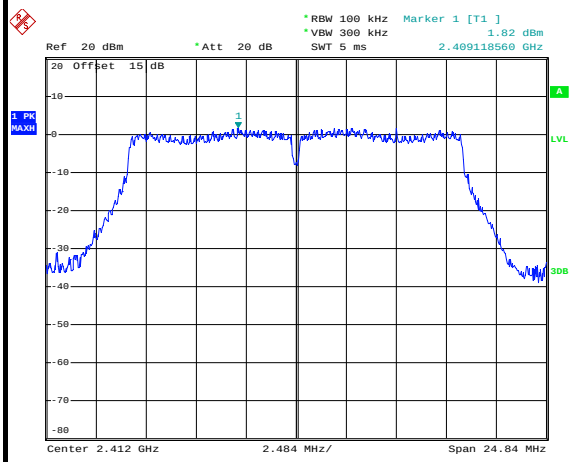



Date: 2.APR.2015 11:02:35

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

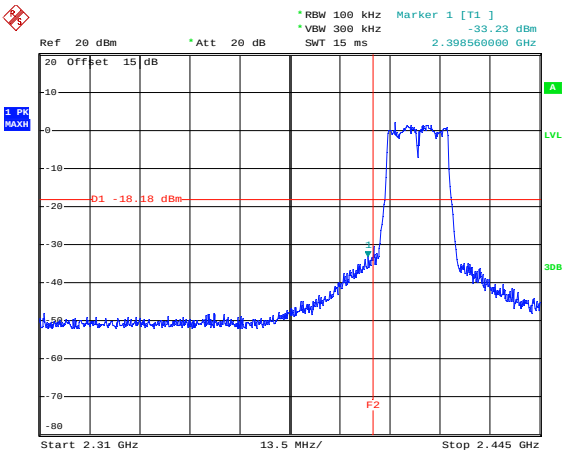
## WLAN 802.11g Channel 01

### 100kHz PSD reference Level



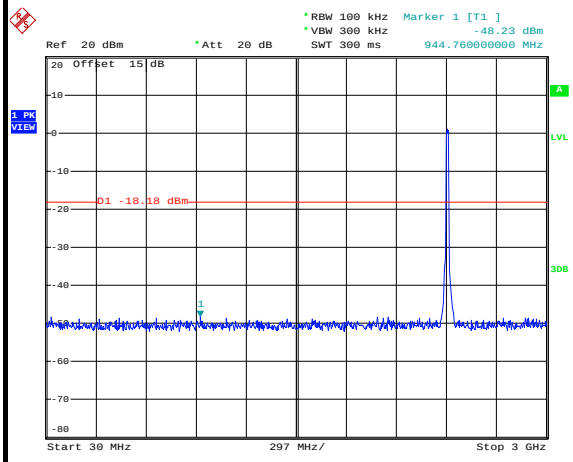

Date: 2.APR.2015 11:34:53

### Low Channel Plot



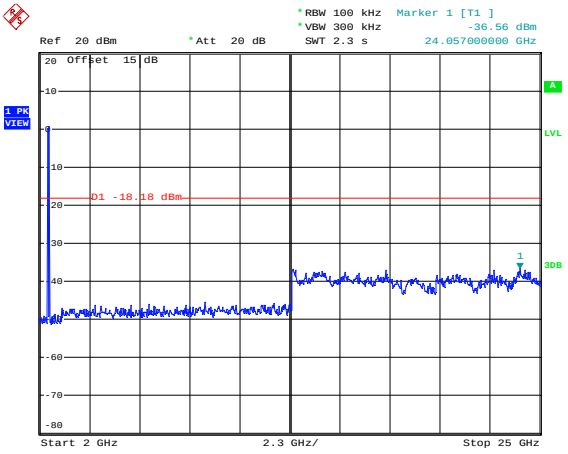

Date: 2.APR.2015 11:35:57

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 11:36:44

### Spurious Emission 2GHz~25GHz

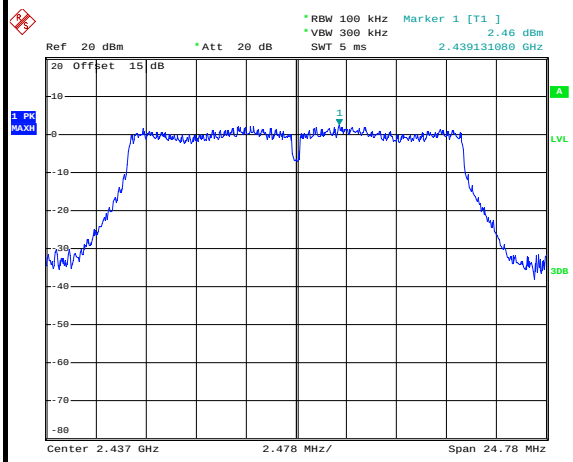



Date: 2.APR.2015 11:37:02

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

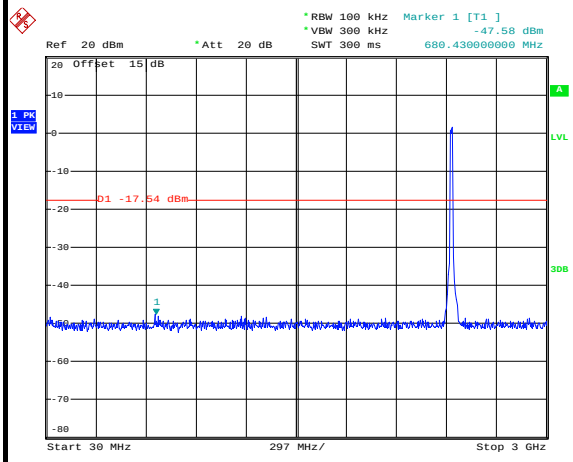
**WLAN 802.11g Channel 06**

**100kHz PSD reference Level**



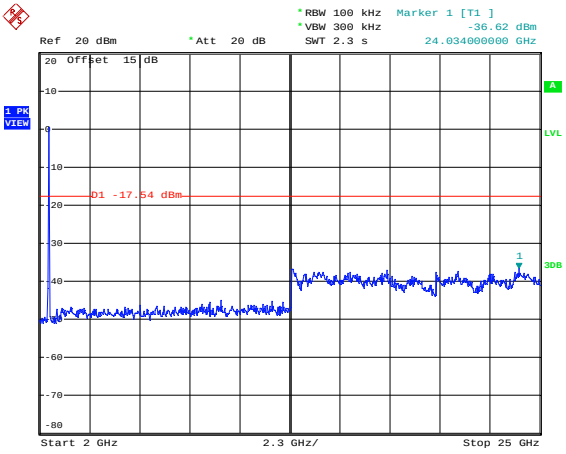

Date: 2.APR.2015 11:26:03

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 11:27:15

**Spurious Emission 2GHz~25GHz**

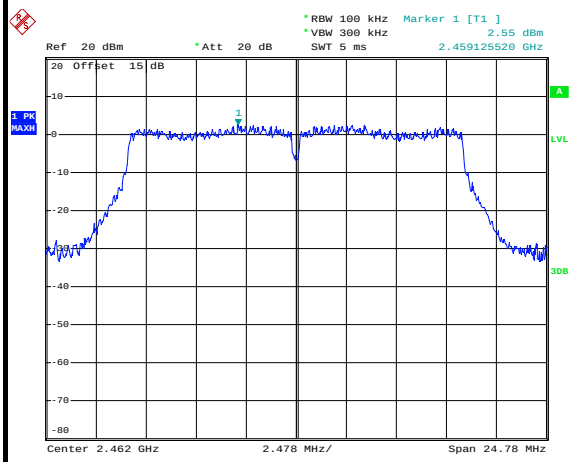



Date: 2.APR.2015 11:27:32

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

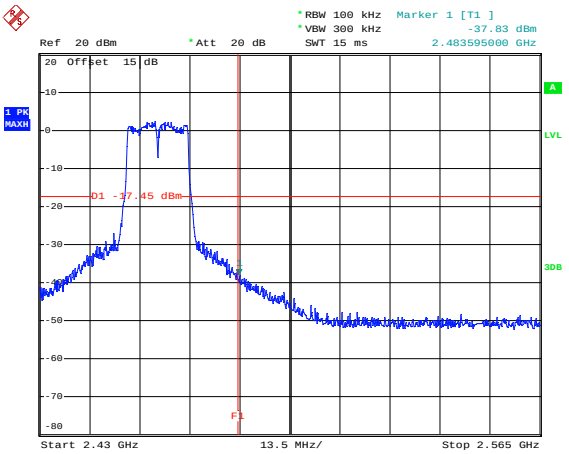
**WLAN 802.11g Channel 11**

**100kHz PSD reference Level**



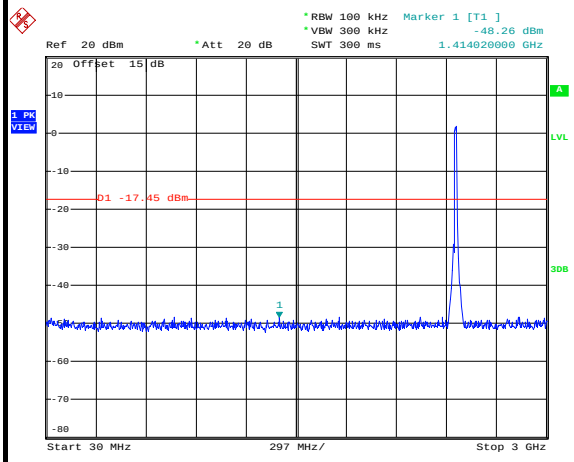

Date: 2.APR.2015 11:13:40

**High Channel Plot**



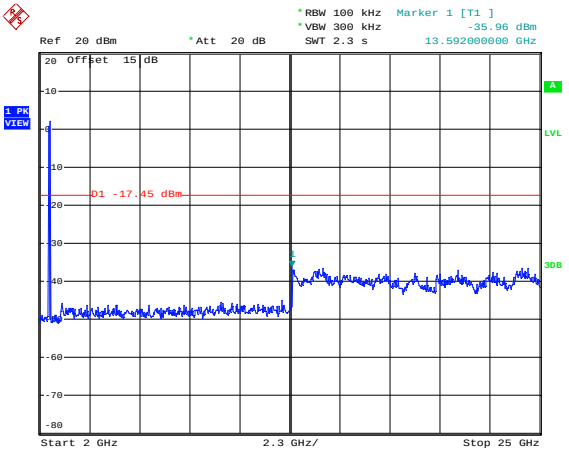

Date: 2.APR.2015 11:15:44

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 11:16:09

**Spurious Emission 2GHz~25GHz**

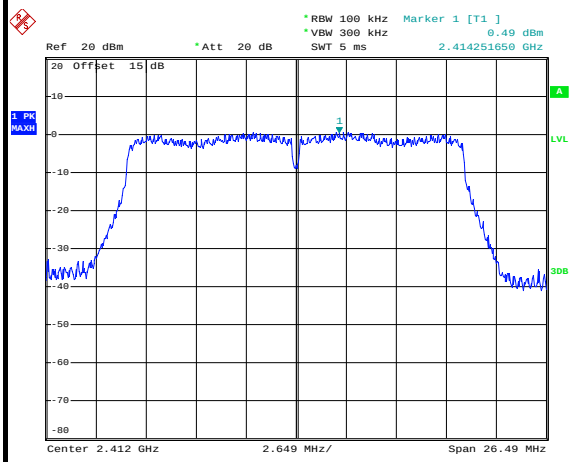



Date: 2.APR.2015 11:16:26

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

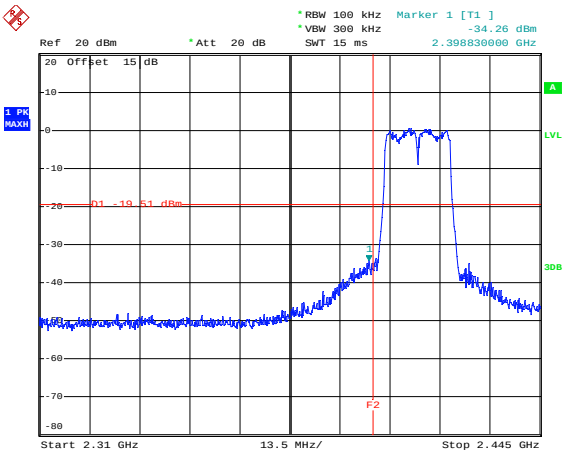
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



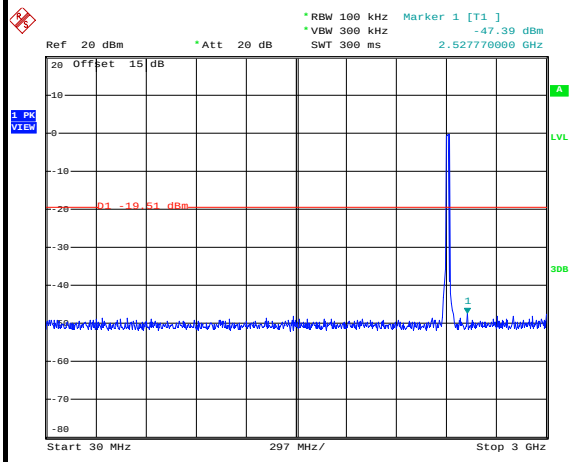

Date: 2.APR.2015 11:46:35

**Low Channel Plot**



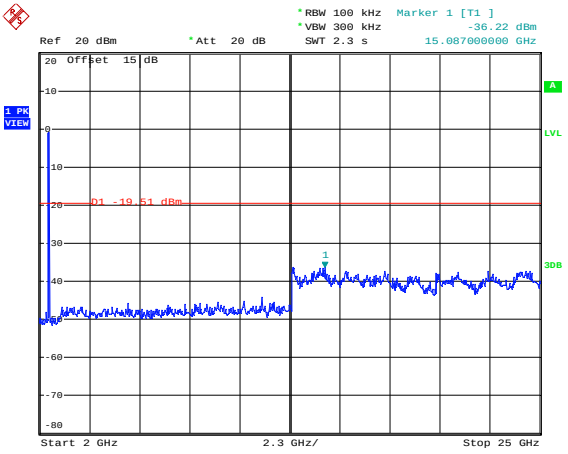

Date: 2.APR.2015 11:47:58

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 11:49:37

**Spurious Emission 2GHz~25GHz**

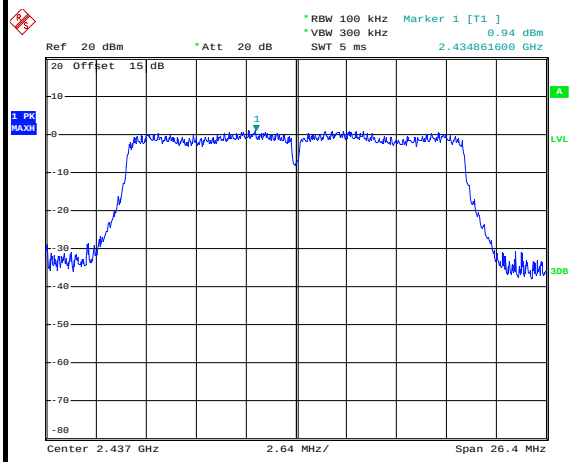



Date: 2.APR.2015 11:49:55

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

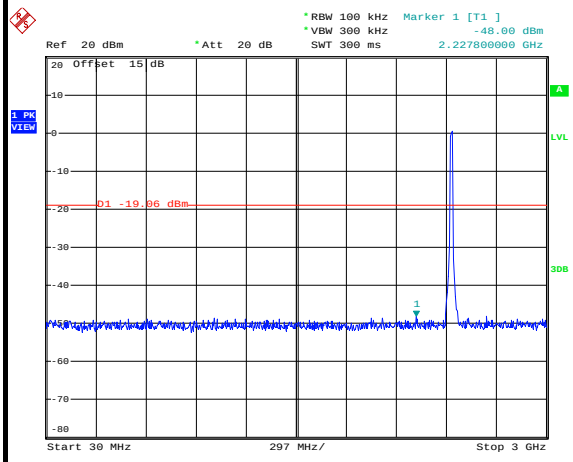
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



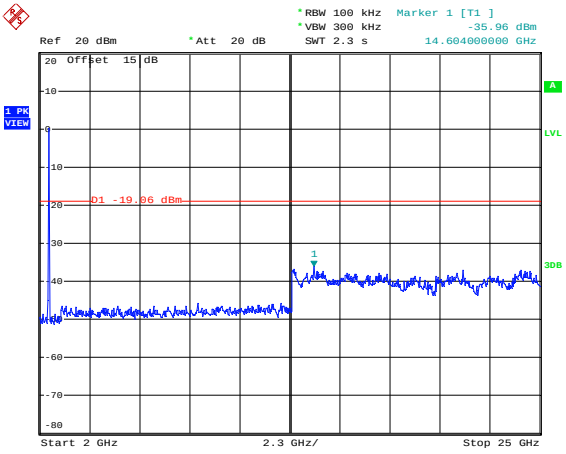

Date: 2.APR.2015 11:59:49

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 12:00:13

**Spurious Emission 2GHz~25GHz**

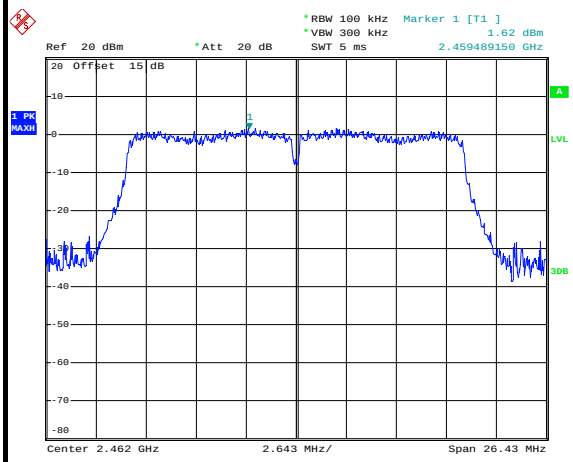



Date: 2.APR.2015 12:00:30

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

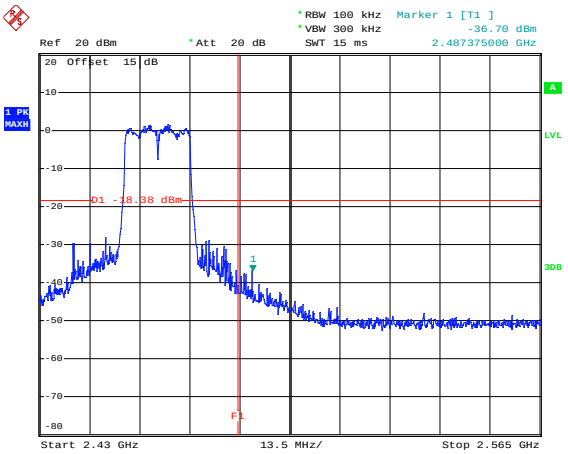
## WLAN 802.11n HT20 Channel 11

### 100kHz PSD reference Level



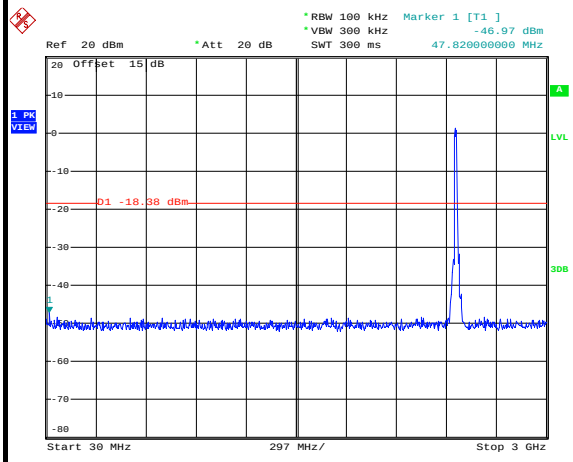

Date: 2.APR.2015 12:06:35

### High Channel Plot



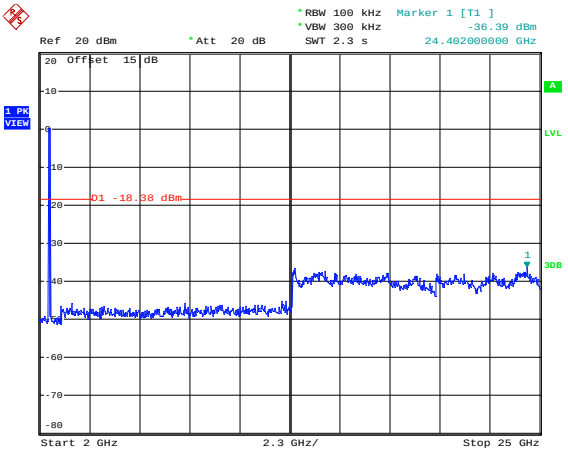

Date: 2.APR.2015 12:08:13

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 12:12:22

### Spurious Emission 2GHz~25GHz

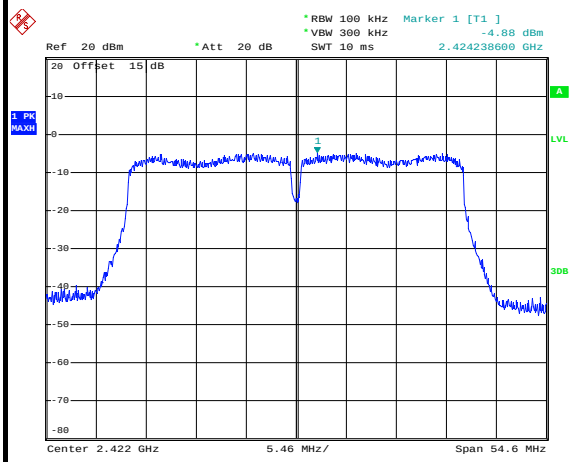



Date: 2.APR.2015 12:12:40

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 03 | **Test Engineer :** | Tiny You |

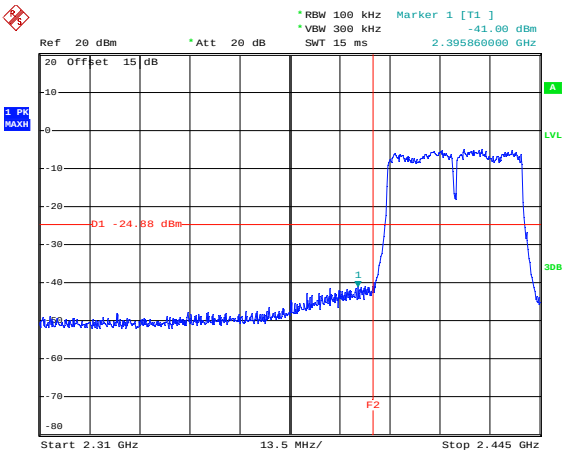
**WLAN 802.11n HT40 Channel 03**

**100kHz PSD reference Level**



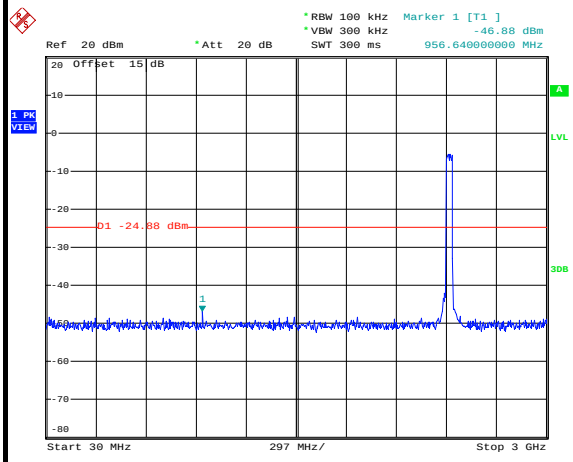

Date: 2.APR.2015 12:16:25

**Low Channel Plot**



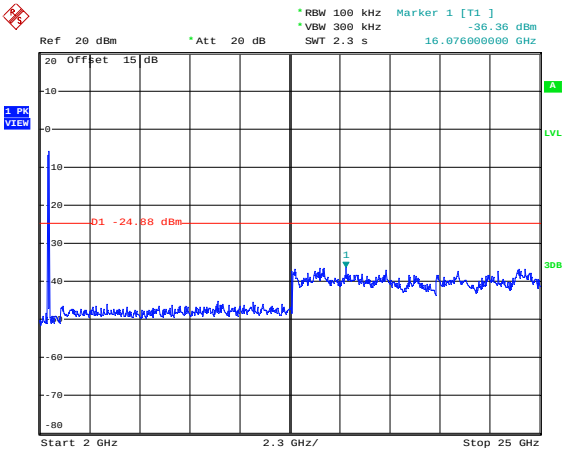

Date: 2.APR.2015 12:17:03

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 12:17:45

**Spurious Emission 2GHz~25GHz**

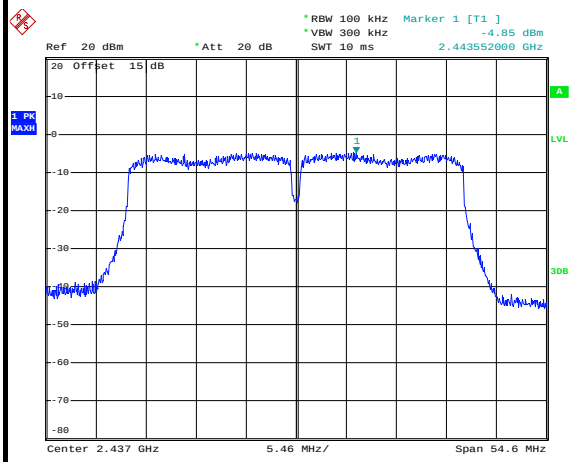



Date: 2.APR.2015 12:18:02

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

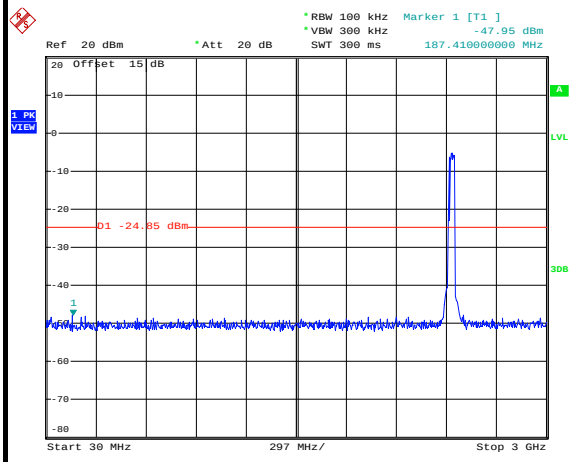
**WLAN 802.11n HT40 Channel 06**

**100kHz PSD reference Level**



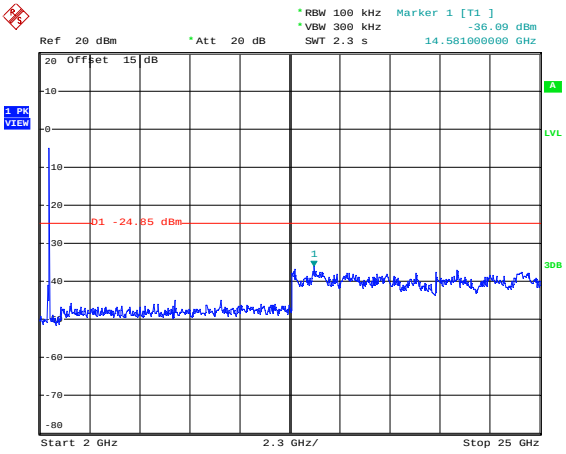

Date: 2.APR.2015 12:23:43

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 12:25:04

**Spurious Emission 2GHz~25GHz**

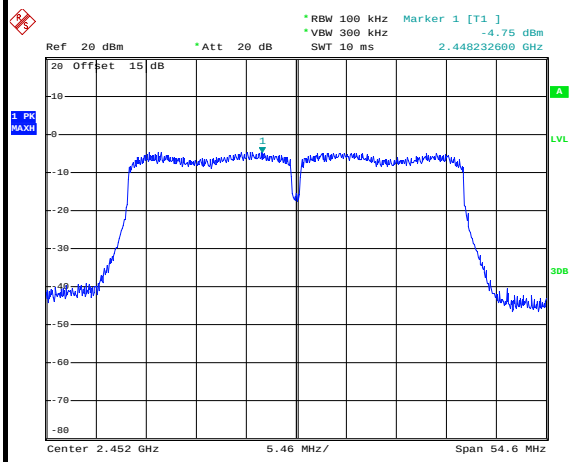



Date: 2.APR.2015 12:25:21

| | | | |
|---|---|---|---|
| **Number of TX :** | 1 | **Chain Port:** | 1 |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 09 | **Test Engineer :** | Tiny You |

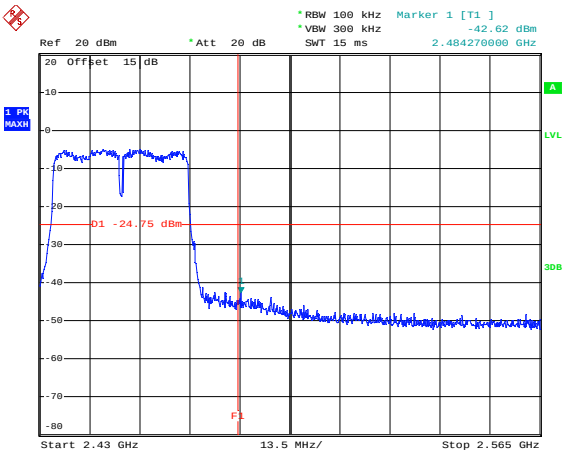
## WLAN 802.11n HT40 Channel 09

### 100kHz PSD reference Level



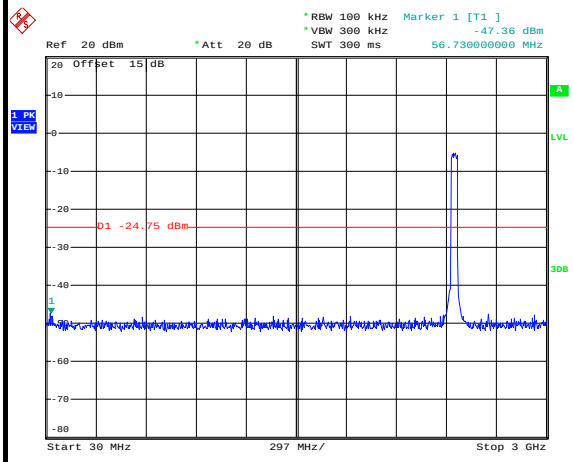

Date: 2.APR.2015 12:29:52

### High Channel Plot



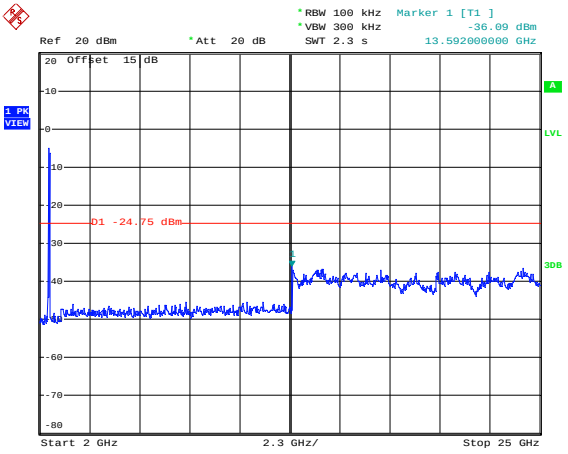

Date: 2.APR.2015 12:30:57

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 12:31:20

### Spurious Emission 2GHz~25GHz



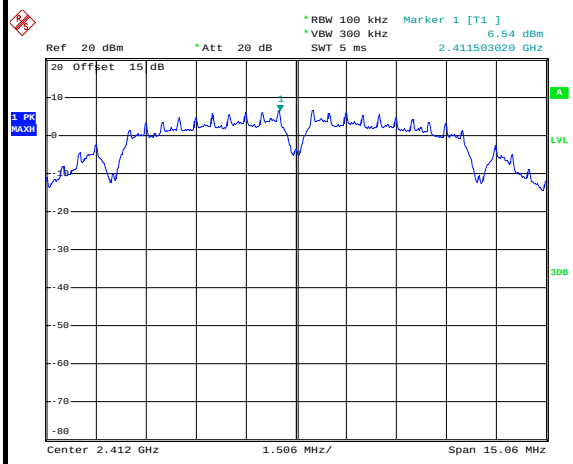

Date: 2.APR.2015 12:31:37

**Number of TX = 2, Chain Port 0+1(0) (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

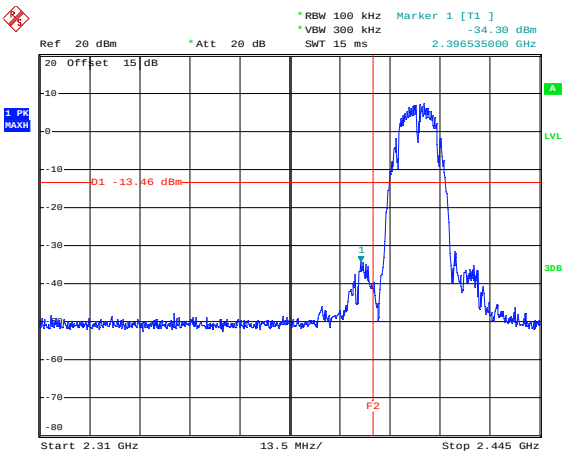
**WLAN 802.11b Channel 01**

**100kHz PSD reference Level**



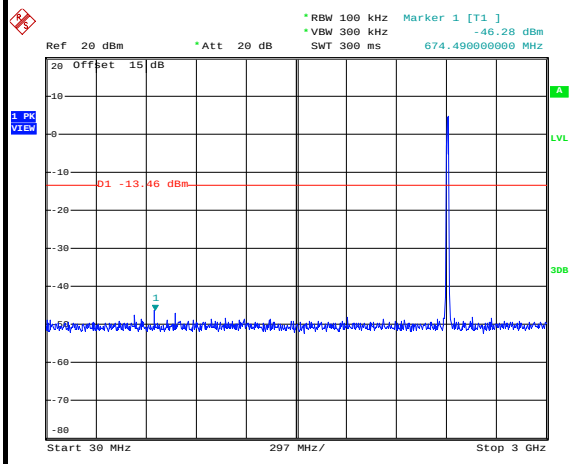

Date: 1.APR.2015 23:06:05

**Low Channel Plot**



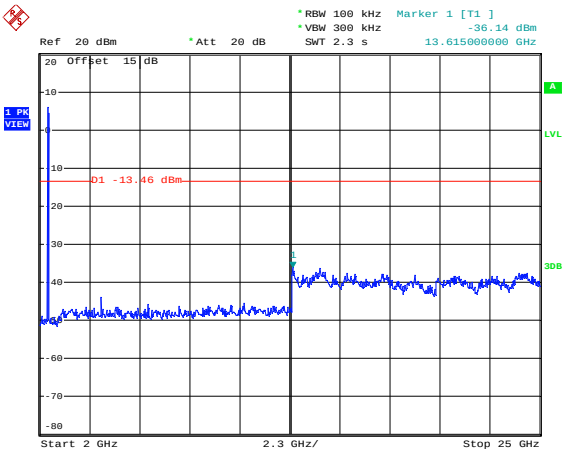

Date: 2.APR.2015 10:26:22

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 23:14:41

**Spurious Emission 2GHz~25GHz**

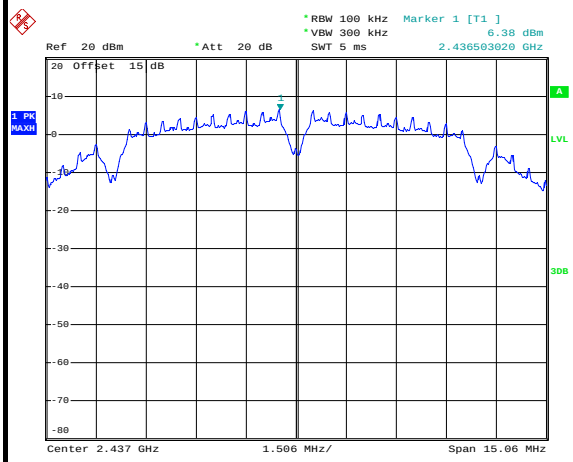



Date: 1.APR.2015 23:14:59

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

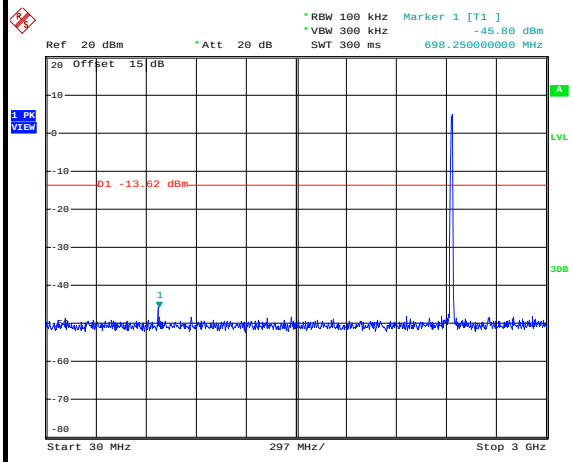
**WLAN 802.11b Channel 06**

**100kHz PSD reference Level**



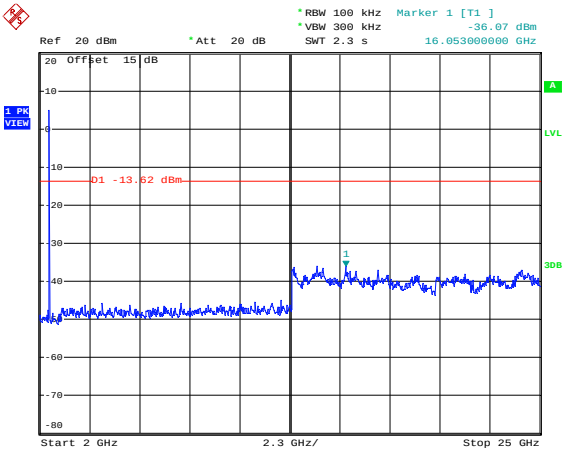

Date: 1.APR.2015 23:21:37

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 23:22:43

**Spurious Emission 2GHz~25GHz**

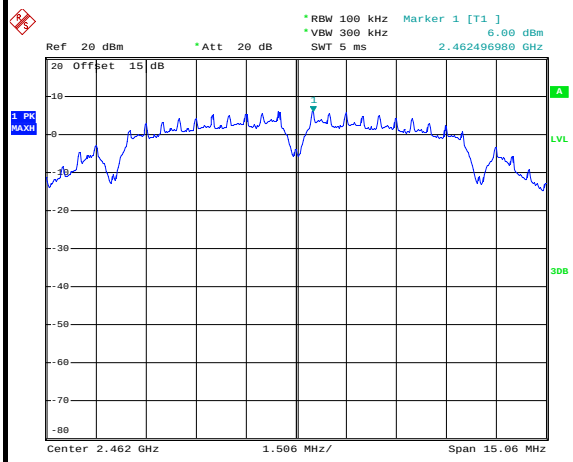



Date: 1.APR.2015 23:23:01

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

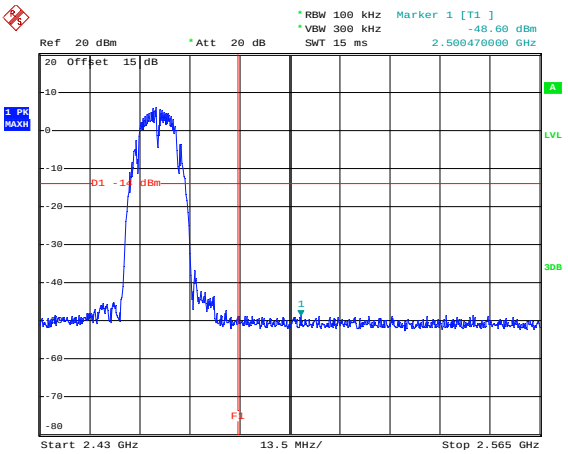
## WLAN 802.11b Channel 11

### 100kHz PSD reference Level



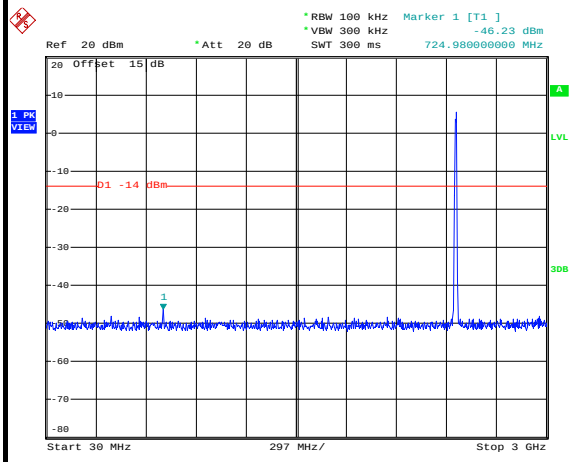

Date: 1.APR.2015 23:28:19

### High Channel Plot



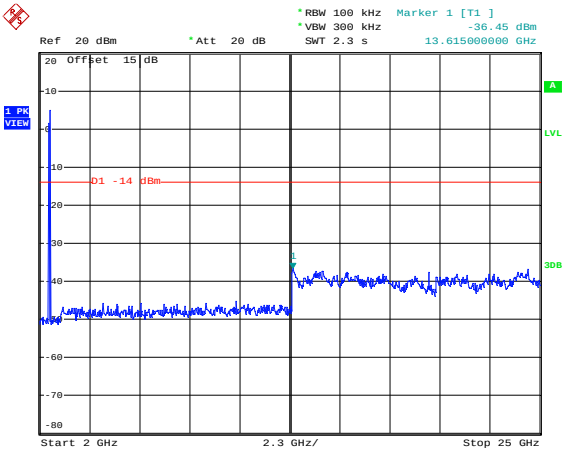

Date: 1.APR.2015 23:31:04

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 23:29:22

### Spurious Emission 2GHz~25GHz

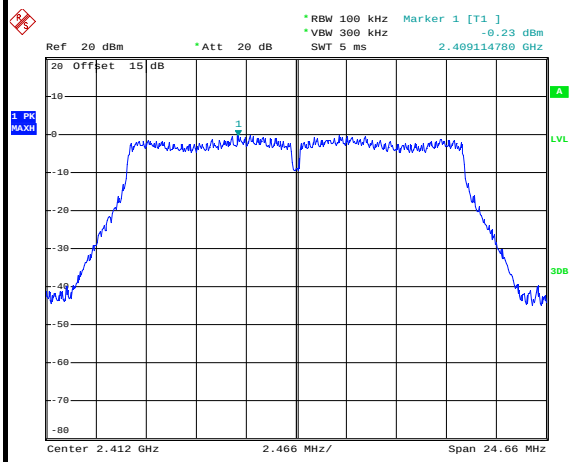



Date: 1.APR.2015 23:29:40

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

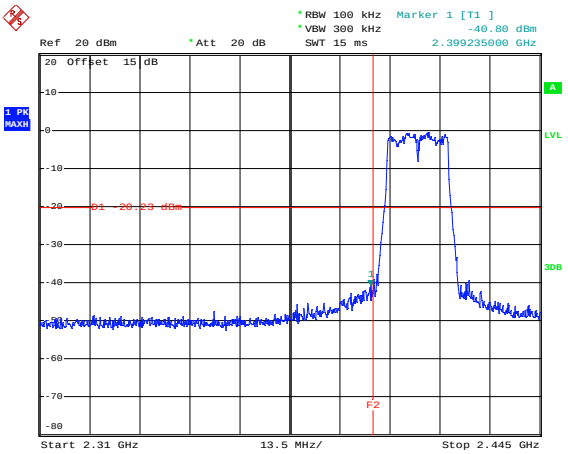
## WLAN 802.11g Channel 01

### 100kHz PSD reference Level



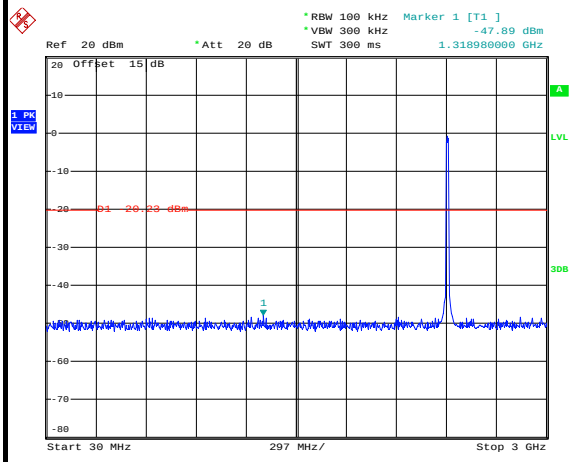

Date: 1.APR.2015 22:59:18

### Low Channel Plot



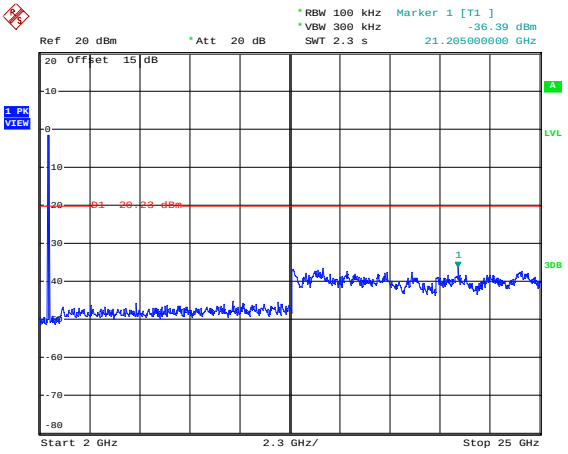

Date: 1.APR.2015 22:59:59

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 23:00:43

### Spurious Emission 2GHz~25GHz

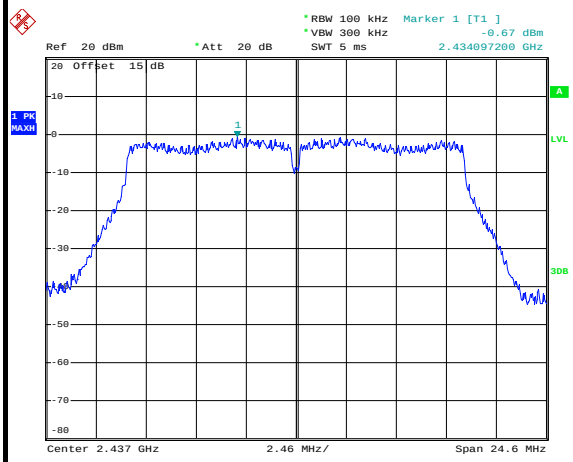



Date: 1.APR.2015 23:01:01

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

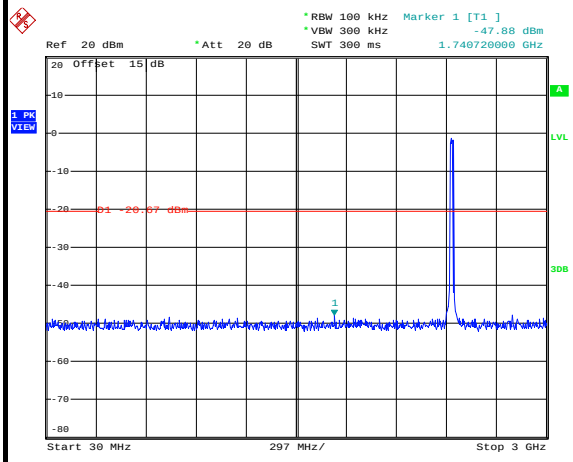
**WLAN 802.11g Channel 06**

**100kHz PSD reference Level**



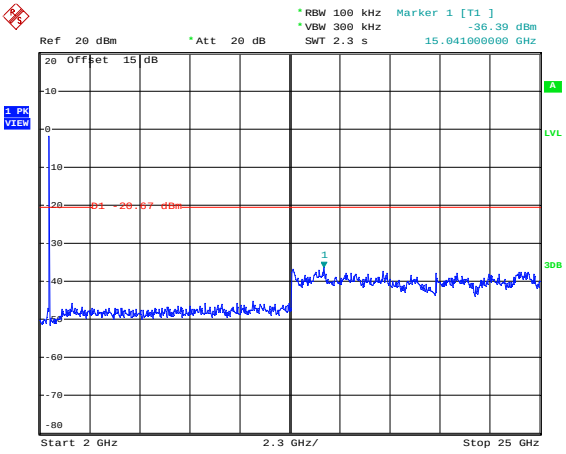

Date: 1.APR.2015 22:44:51

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 22:46:41

**Spurious Emission 2GHz~25GHz**

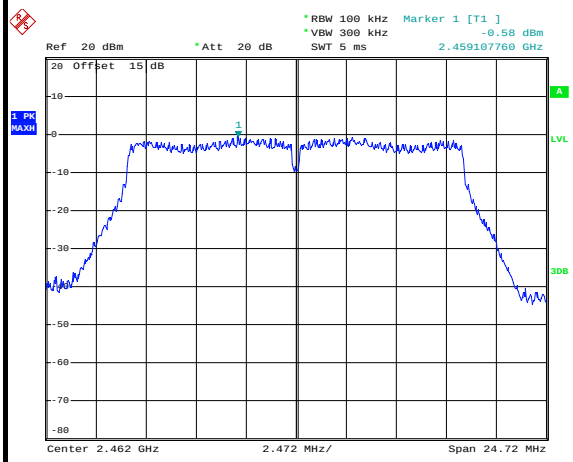



Date: 1.APR.2015 22:46:59

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

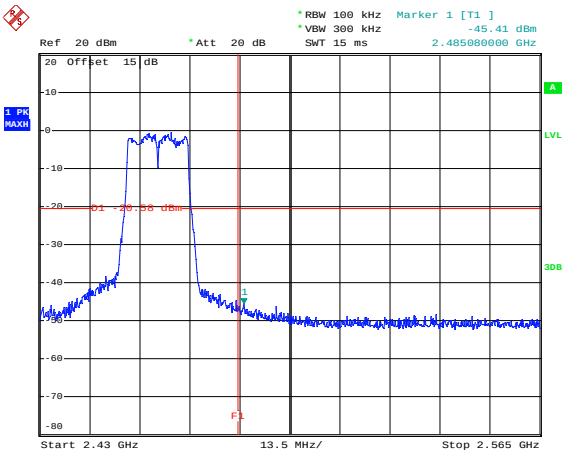
## WLAN 802.11g Channel 11

### 100kHz PSD reference Level



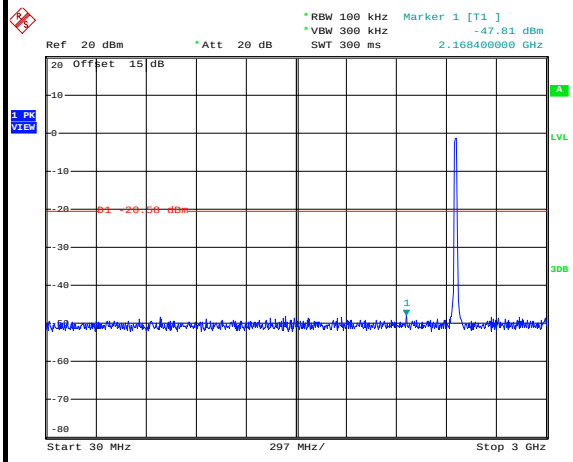

Date: 1.APR.2015 22:38:11

### High Channel Plot



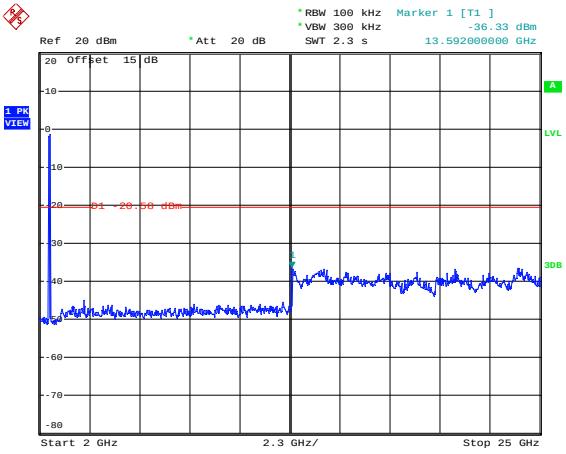

Date: 1.APR.2015 22:39:14

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 22:40:39

### Spurious Emission 2GHz~25GHz

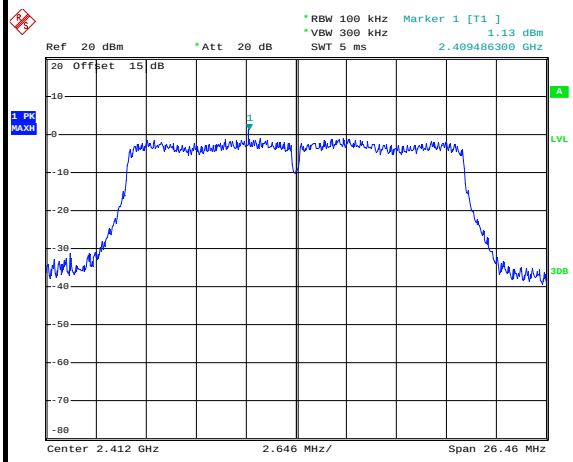



Date: 1.APR.2015 22:40:57

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

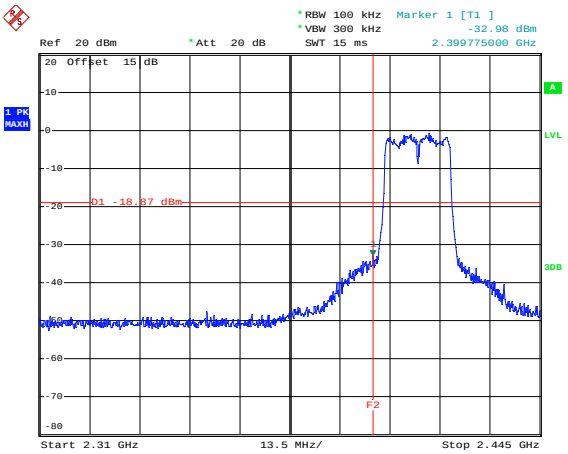
## WLAN 802.11n HT20 Channel 01

### 100kHz PSD reference Level



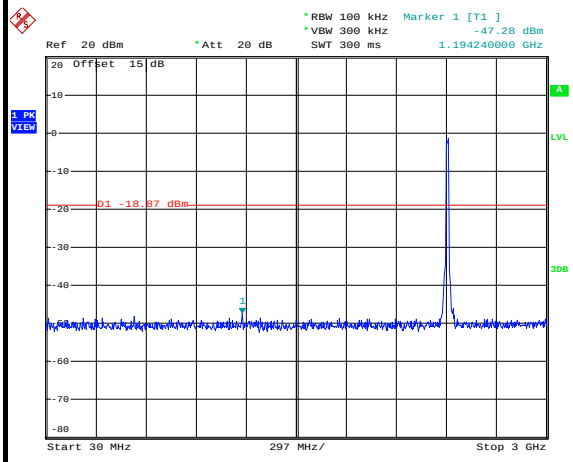

Date: 1.APR.2015 22:09:42

### Low Channel Plot



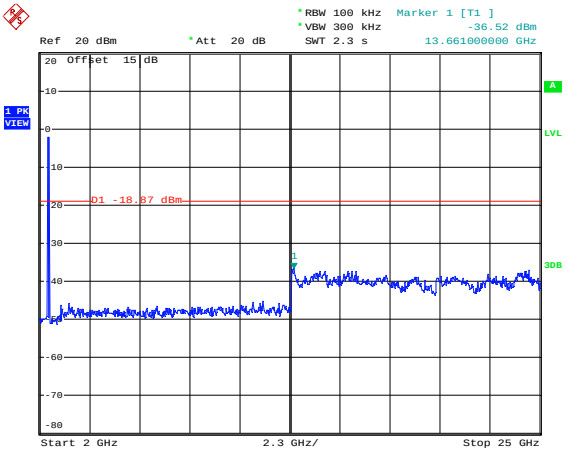

Date: 1.APR.2015 22:11:13

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 22:16:12

### Spurious Emission 2GHz~25GHz

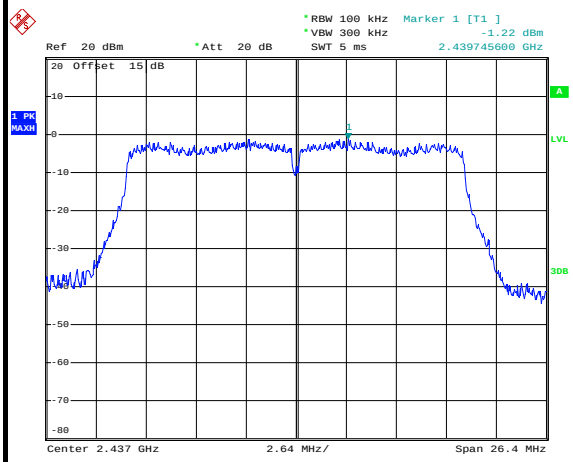



Date: 1.APR.2015 22:16:30

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

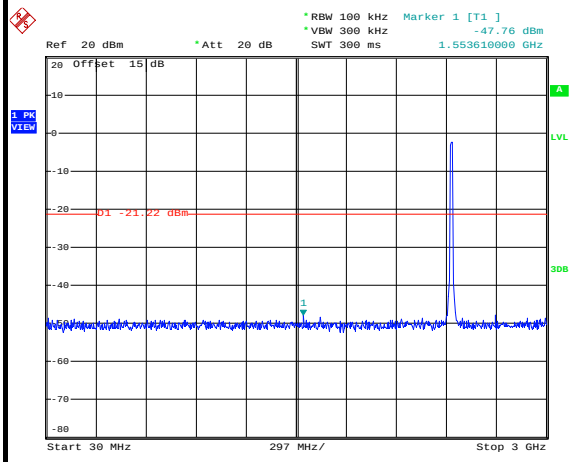
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



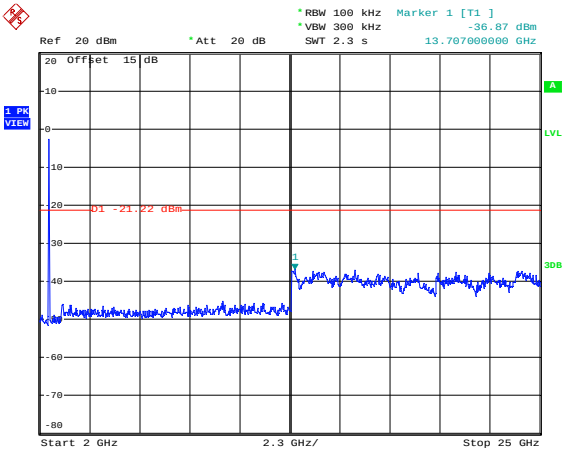

Date: 1.APR.2015 22:20:23

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 22:22:24

**Spurious Emission 2GHz~25GHz**

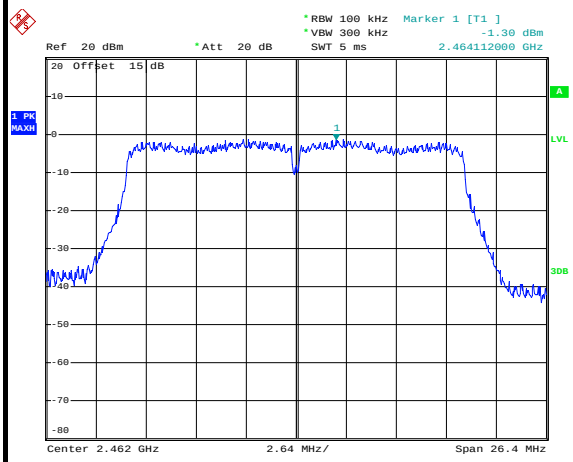



Date: 1.APR.2015 22:22:42

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

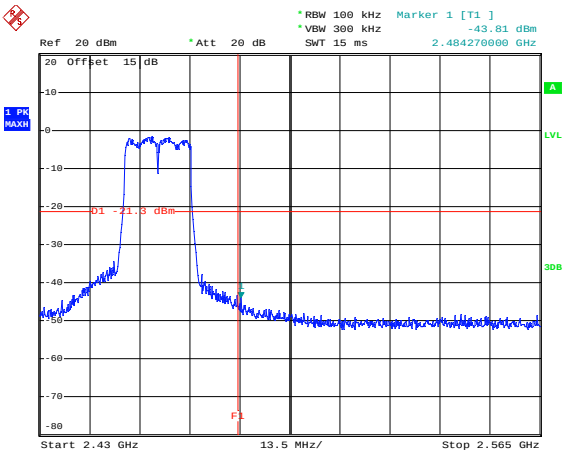
## WLAN 802.11n HT20 Channel 11

### 100kHz PSD reference Level



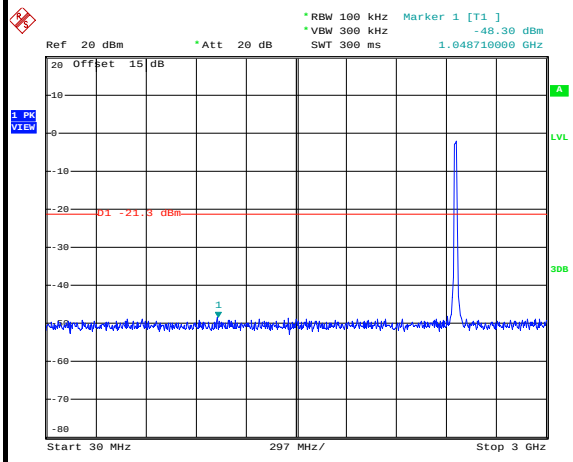

Date: 1.APR.2015 22:27:43

### High Channel Plot



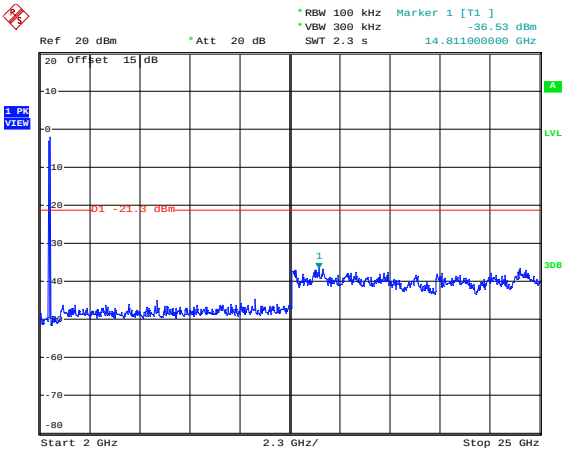

Date: 1.APR.2015 22:28:25

### Spurious Emission 30MHz~3GHz




Date: 1.APR.2015 22:30:51

### Spurious Emission 2GHz~25GHz

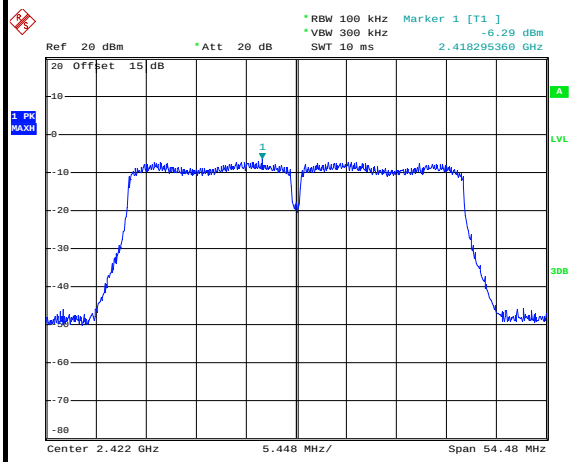



Date: 1.APR.2015 22:31:08

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 03 | **Test Engineer :** | Tiny You |

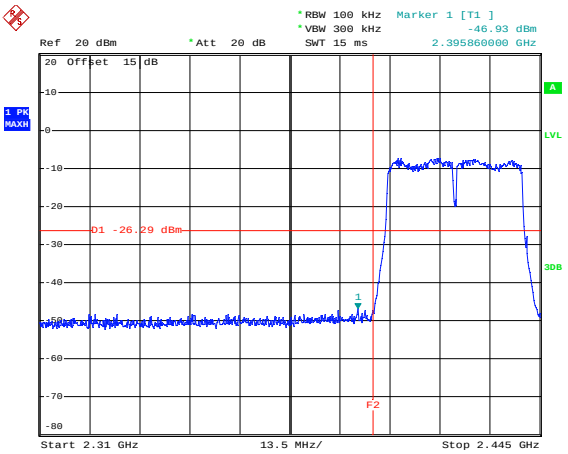
**WLAN 802.11n HT40 Channel 03**

**100kHz PSD reference Level**



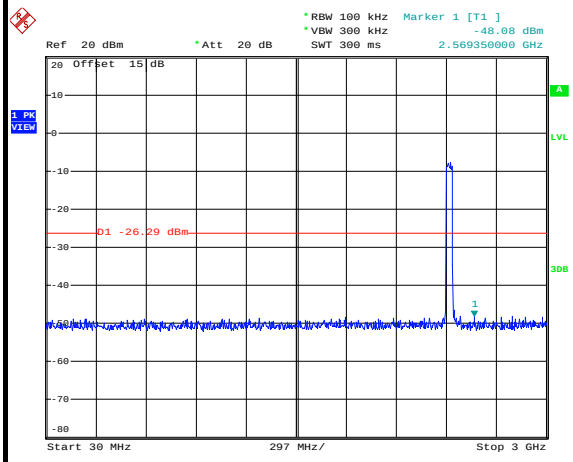

Date: 1.APR.2015 22:00:10

**Low Channel Plot**



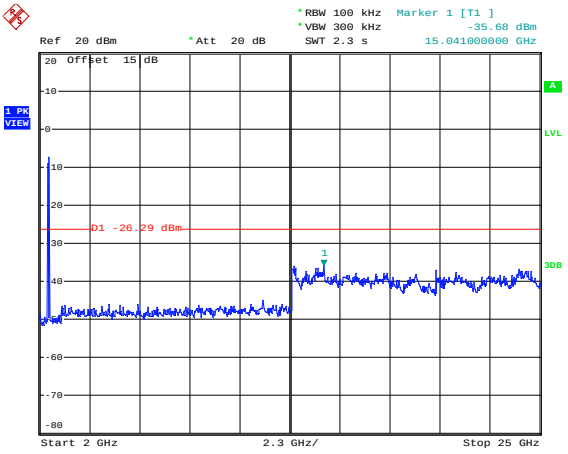

Date: 1.APR.2015 22:01:41

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 22:02:49

**Spurious Emission 2GHz~25GHz**

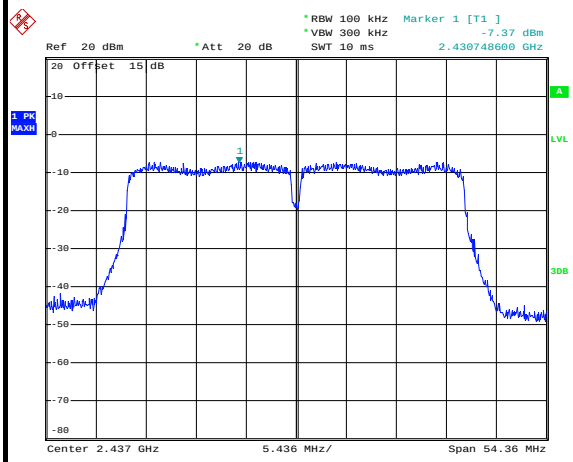



Date: 1.APR.2015 22:03:07

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

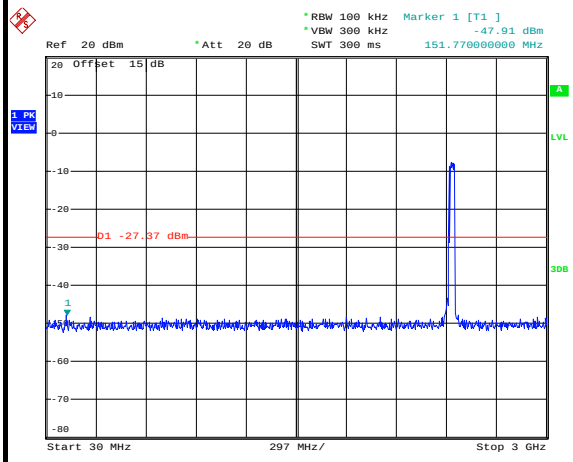
**WLAN 802.11n HT40 Channel 06**

**100kHz PSD reference Level**



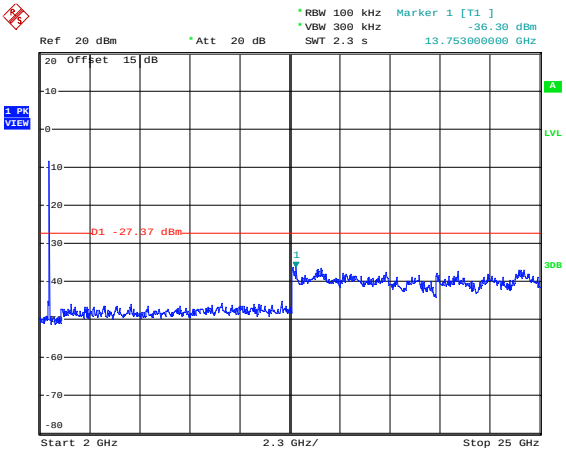

Date: 1.APR.2015 21:55:31

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 21:56:19

**Spurious Emission 2GHz~25GHz**

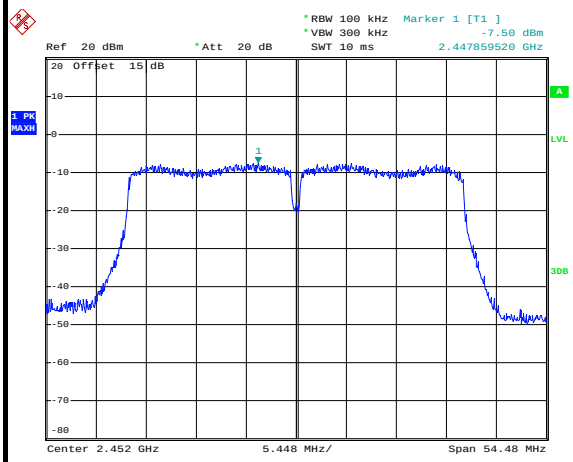



Date: 1.APR.2015 21:56:37

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(0) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 09 | **Test Engineer :** | Tiny You |

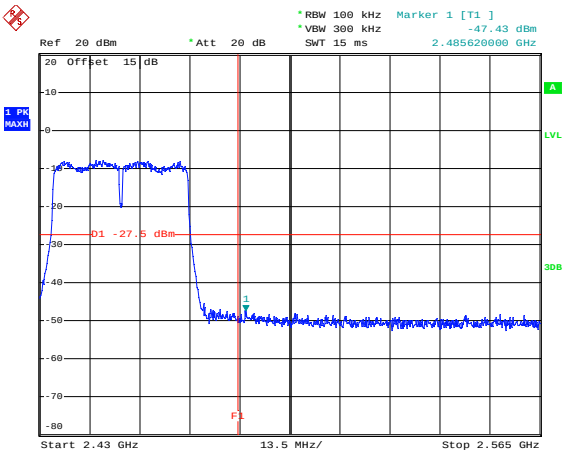
**WLAN 802.11n HT40 Channel 09**

**100kHz PSD reference Level**



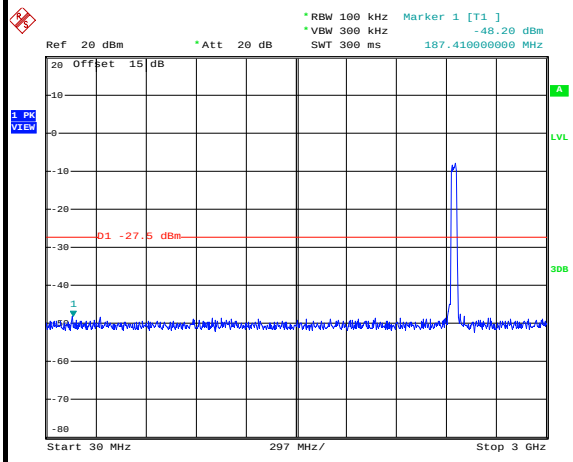

Date: 1.APR.2015 21:49:08

**High Channel Plot**



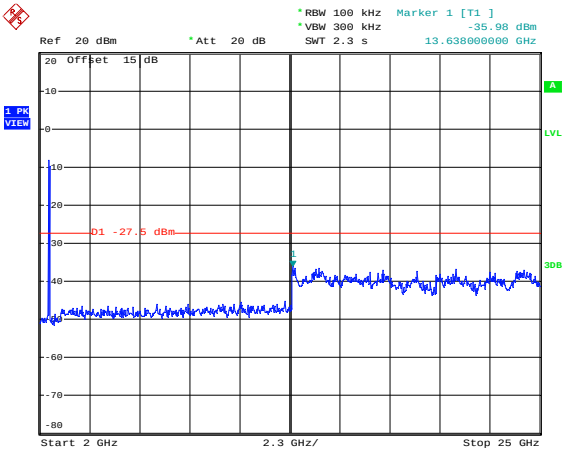

Date: 1.APR.2015 21:50:13

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 21:51:46

**Spurious Emission 2GHz~25GHz**



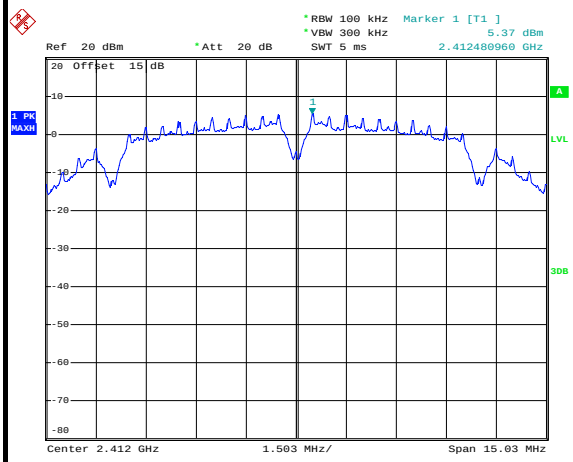

Date: 1.APR.2015 21:52:04

**Number of TX = 2, Chain Port 0+1(1) (Measured)**

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

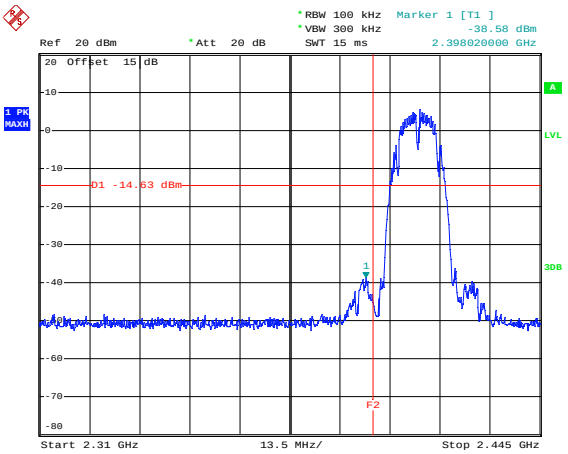
**WLAN 802.11b Channel 01**

**100kHz PSD reference Level**



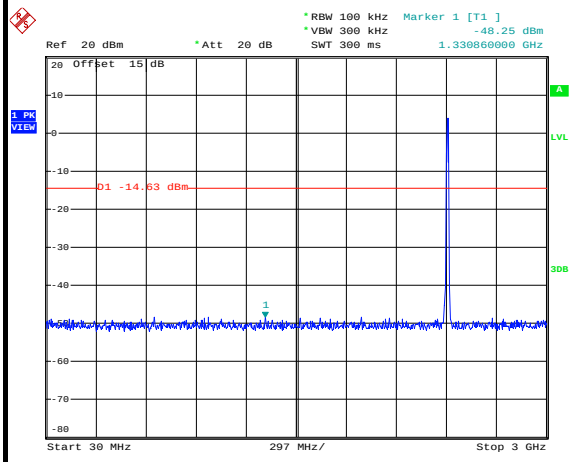

Date: 1.APR.2015 23:52:29

**Low Channel Plot**



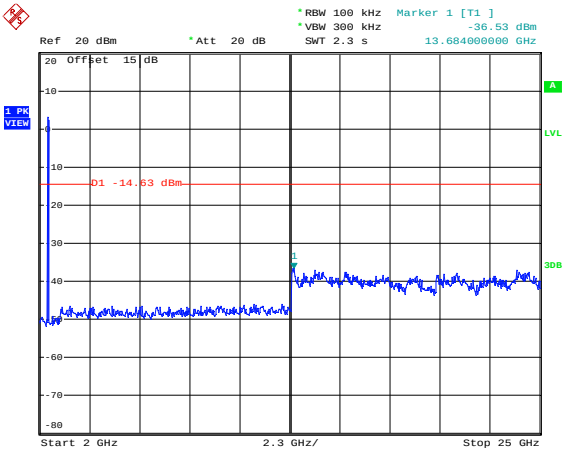

Date: 1.APR.2015 23:54:56

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 23:59:50

**Spurious Emission 2GHz~25GHz**

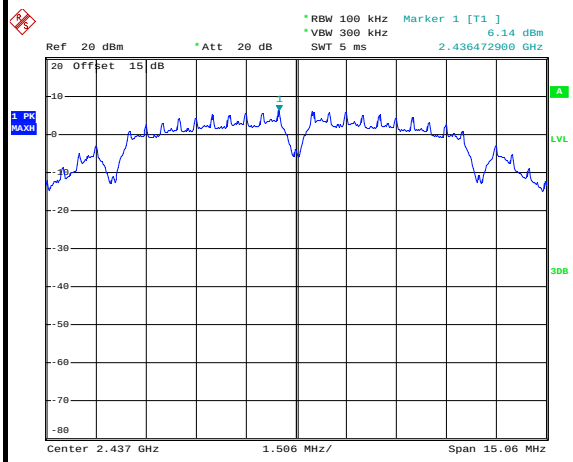



Date: 2.APR.2015 00:00:08

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

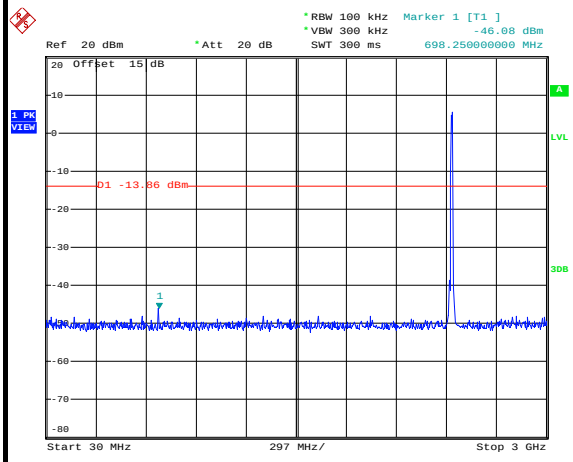
**WLAN 802.11b Channel 06**

**100kHz PSD reference Level**



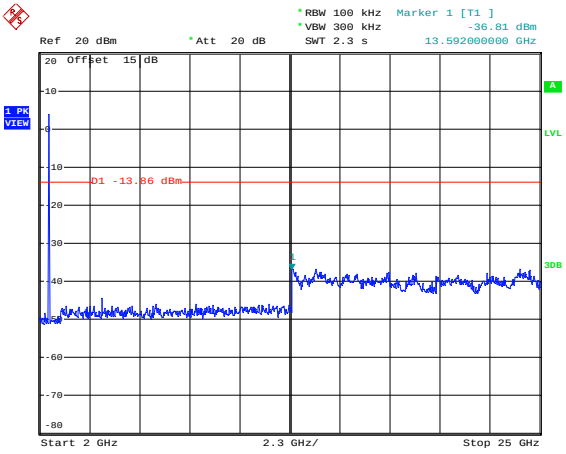

Date: 1.APR.2015 23:42:52

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 23:44:10

**Spurious Emission 2GHz~25GHz**

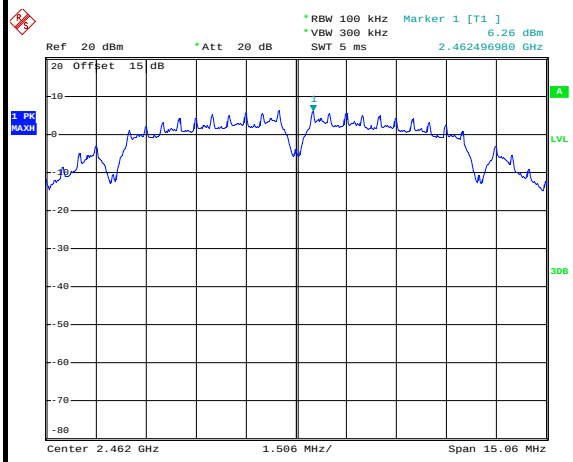



Date: 1.APR.2015 23:44:28

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11b | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

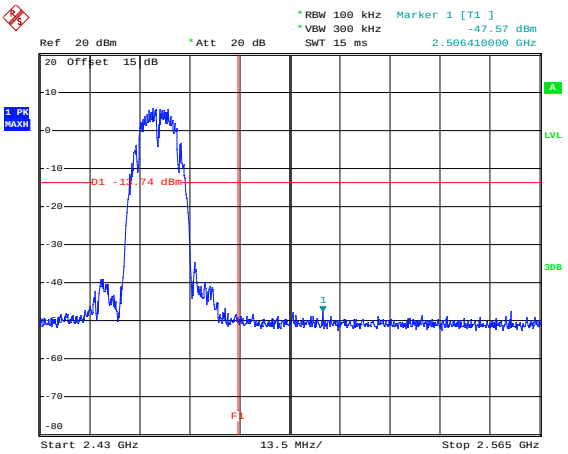
**WLAN 802.11b Channel 11**

**100kHz PSD reference Level**



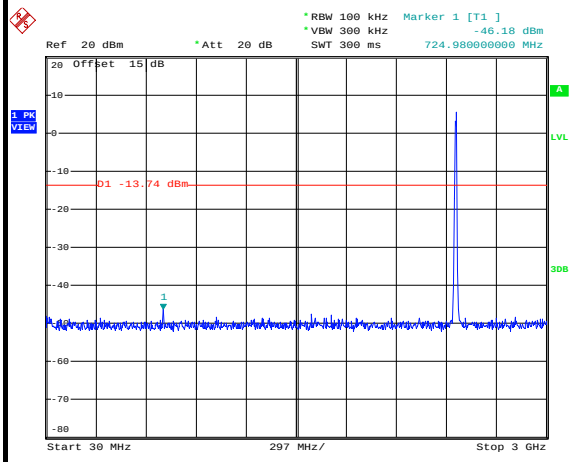

Date: 1.APR.2015 23:35:38

**High Channel Plot**



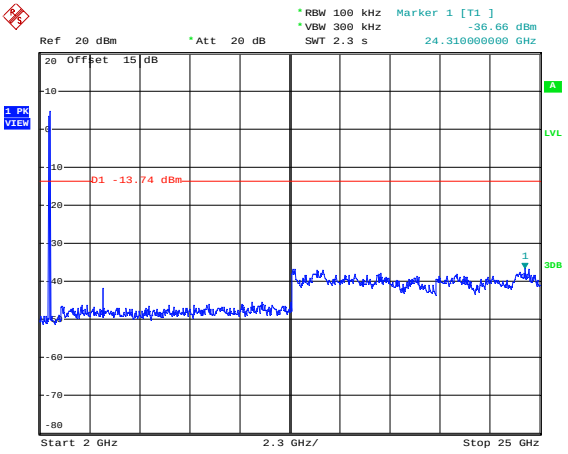

Date: 1.APR.2015 23:36:17

**Spurious Emission 30MHz~3GHz**




Date: 1.APR.2015 23:37:36

**Spurious Emission 2GHz~25GHz**

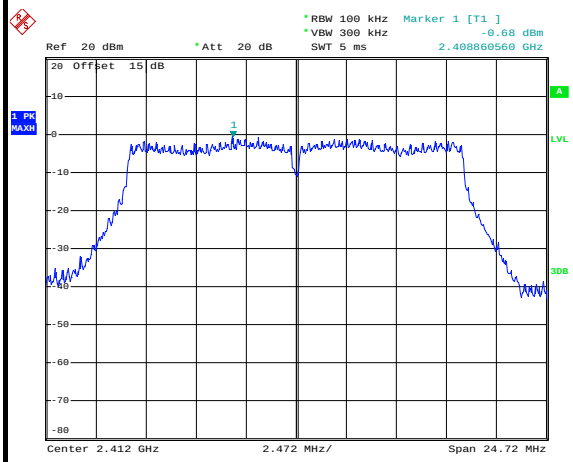



Date: 1.APR.2015 23:37:53

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

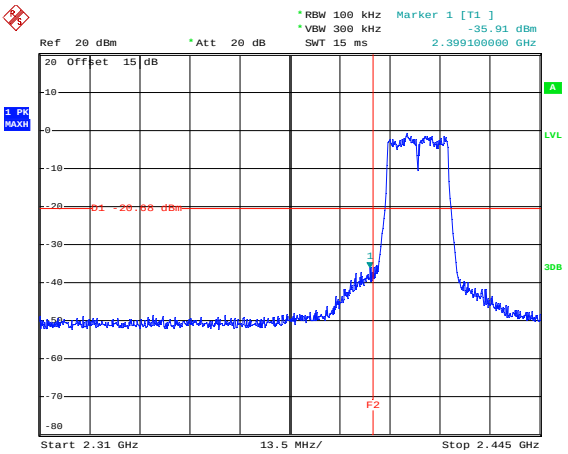
**WLAN 802.11g Channel 01**

**100kHz PSD reference Level**



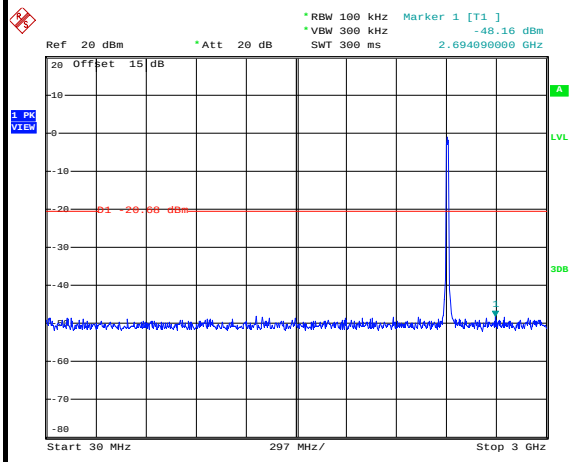

Date: 2.APR.2015 00:05:55

**Low Channel Plot**



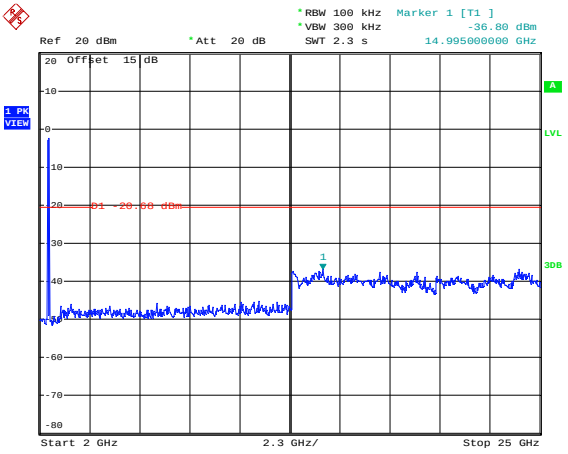

Date: 2.APR.2015 00:06:15

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 00:07:17

**Spurious Emission 2GHz~25GHz**

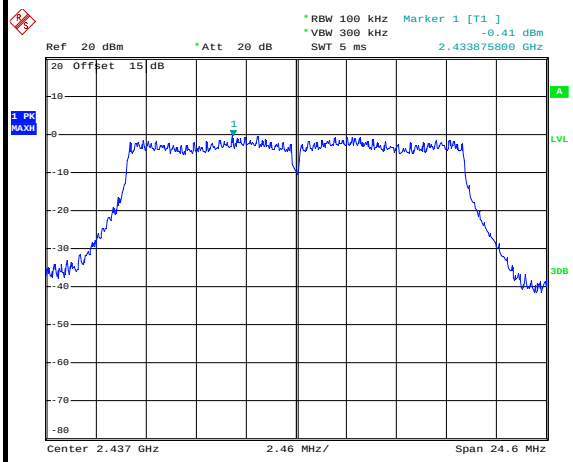



Date: 2.APR.2015 00:07:35

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

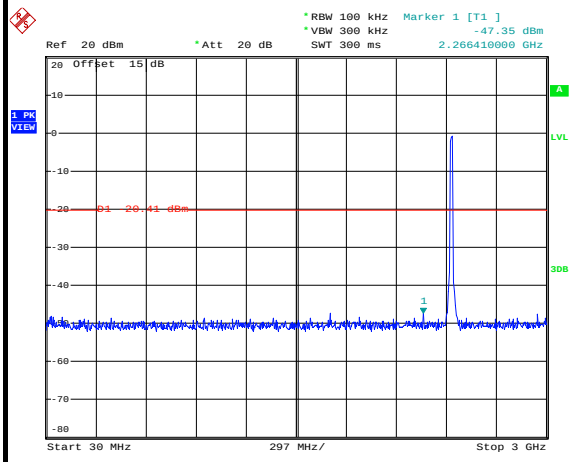
**WLAN 802.11g Channel 06**

**100kHz PSD reference Level**



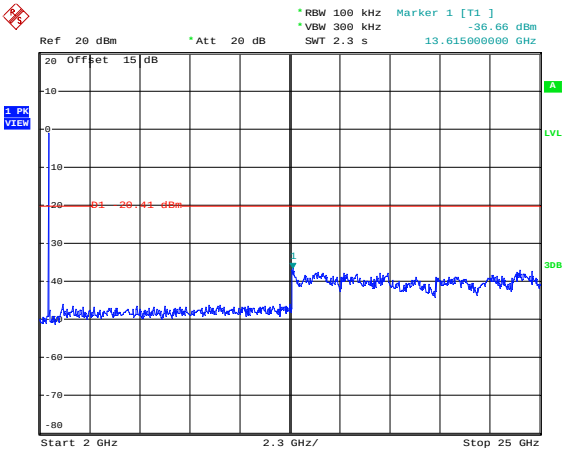

Date: 2.APR.2015 00:13:26

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 00:14:26

**Spurious Emission 2GHz~25GHz**

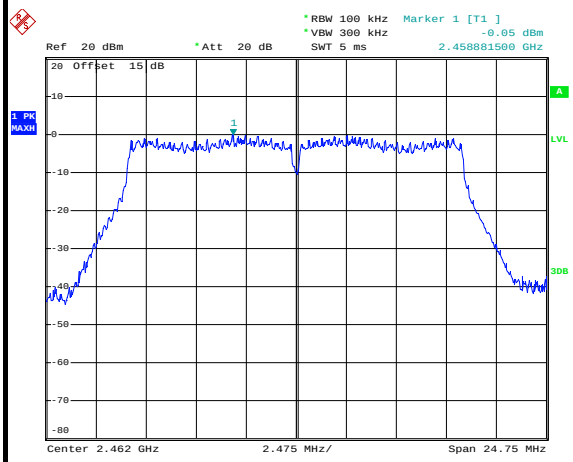



Date: 2.APR.2015 00:14:44

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11g | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

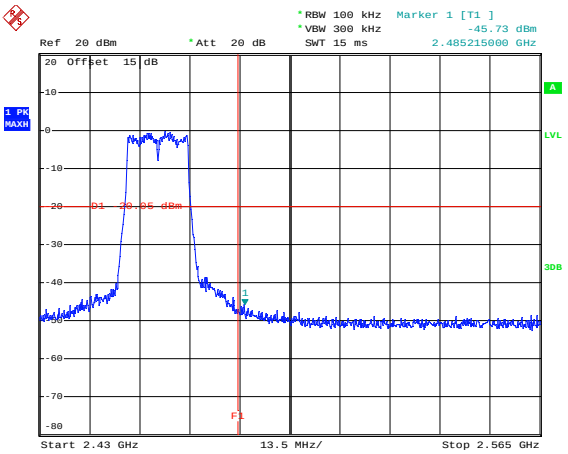
## WLAN 802.11g Channel 11

### 100kHz PSD reference Level



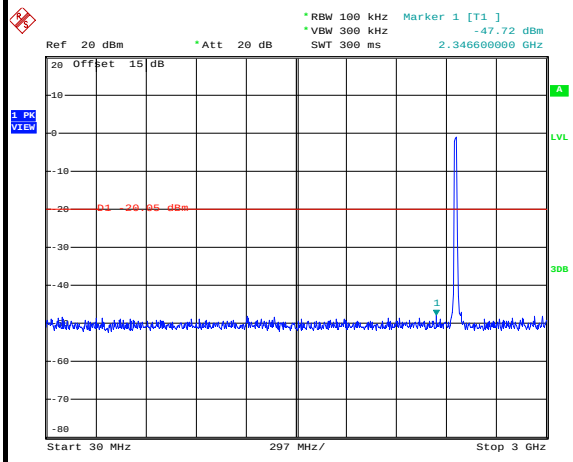

Date: 2.APR.2015 00:18:30

### High Channel Plot



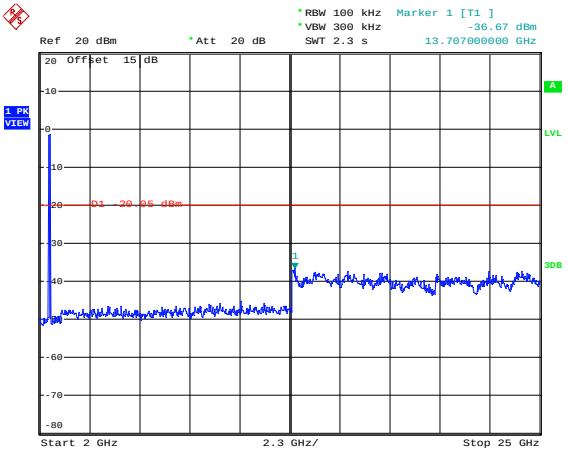

Date: 2.APR.2015 00:19:10

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 00:19:51

### Spurious Emission 2GHz~25GHz

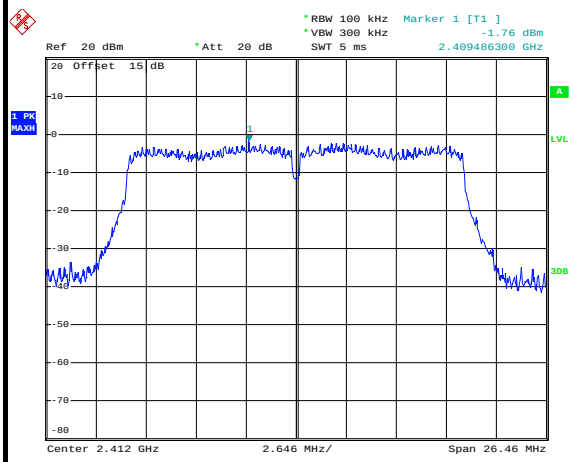



Date: 2.APR.2015 00:20:09

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 01 | **Test Engineer :** | Tiny You |

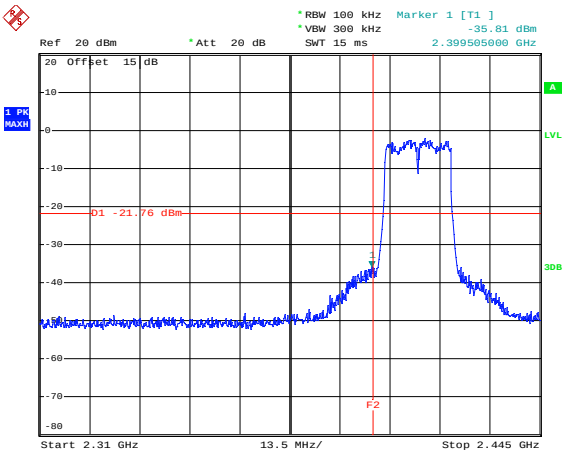
**WLAN 802.11n HT20 Channel 01**

**100kHz PSD reference Level**



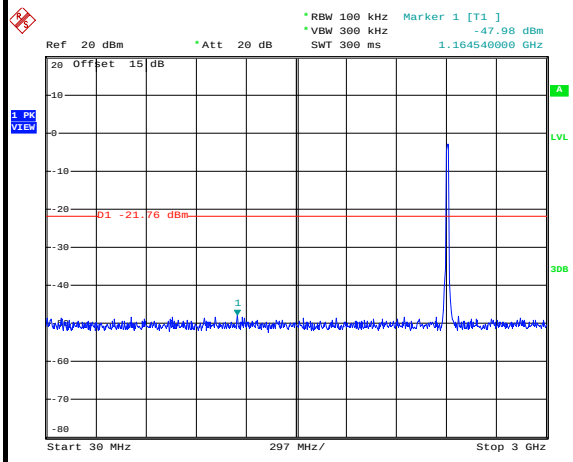

Date: 2.APR.2015 00:34:37

**Low Channel Plot**



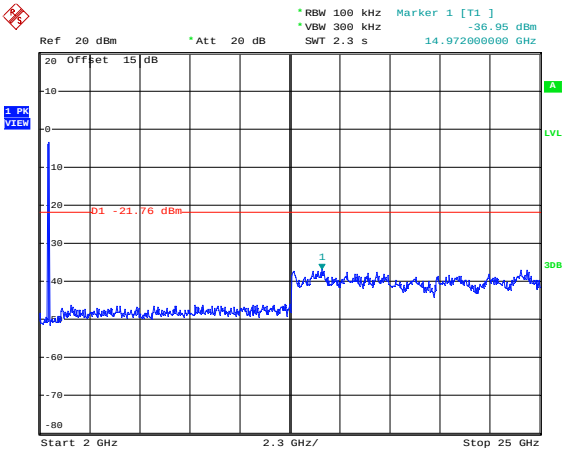

Date: 2.APR.2015 00:35:37

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 00:37:48

**Spurious Emission 2GHz~25GHz**

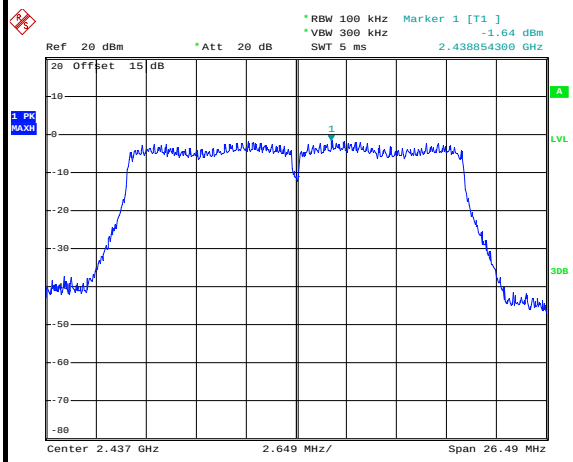



Date: 2.APR.2015 00:38:05

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

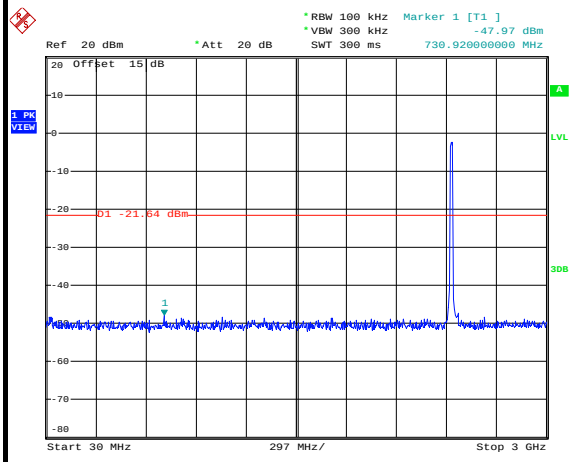
**WLAN 802.11n HT20 Channel 06**

**100kHz PSD reference Level**



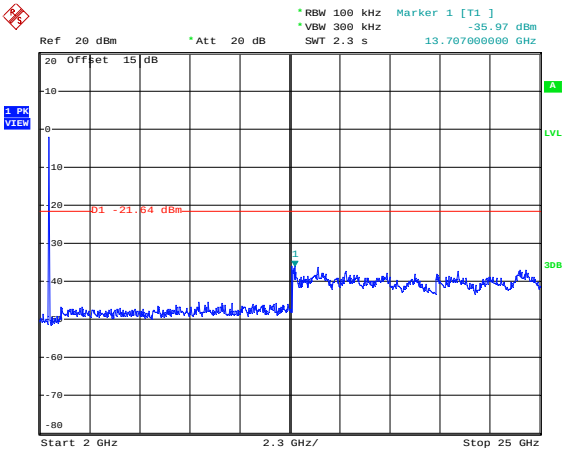

Date: 2.APR.2015 00:43:12

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 00:45:41

**Spurious Emission 2GHz~25GHz**

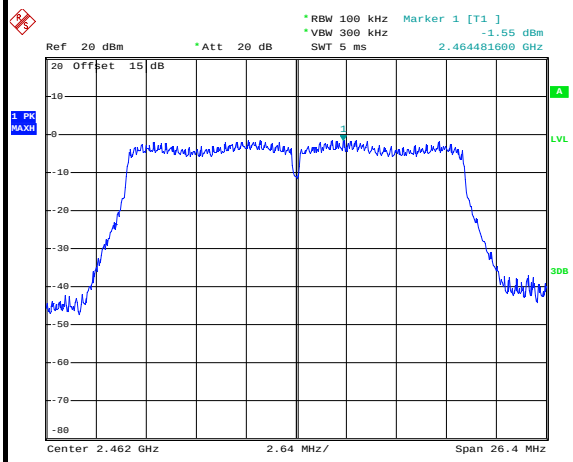



Date: 2.APR.2015 00:45:58

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 11 | **Test Engineer :** | Tiny You |

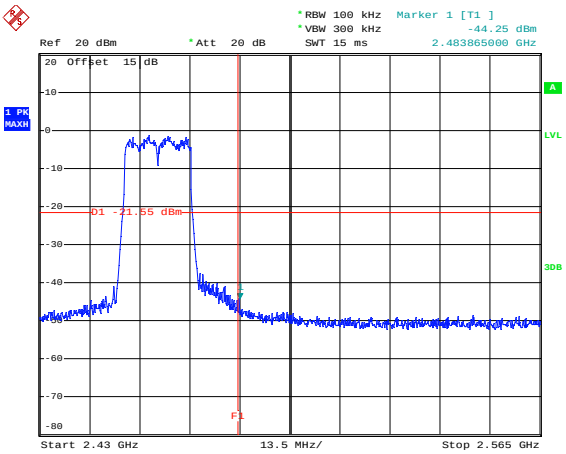
**WLAN 802.11n HT20 Channel 11**

**100kHz PSD reference Level**



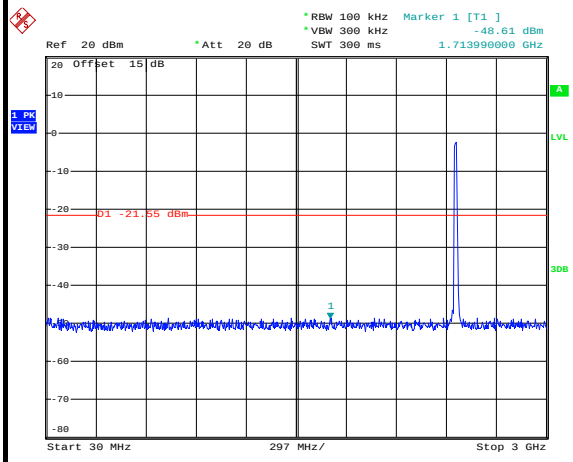

Date: 2.APR.2015 00:53:51

**High Channel Plot**



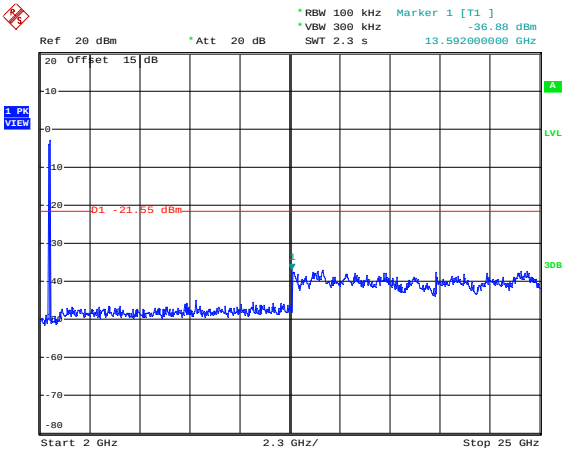

Date: 2.APR.2015 00:54:20

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 00:55:59

**Spurious Emission 2GHz~25GHz**

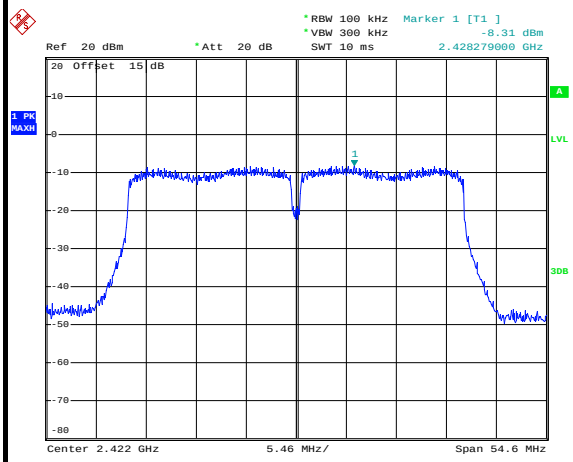



Date: 2.APR.2015 00:56:16

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Low | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 03 | **Test Engineer :** | Tiny You |

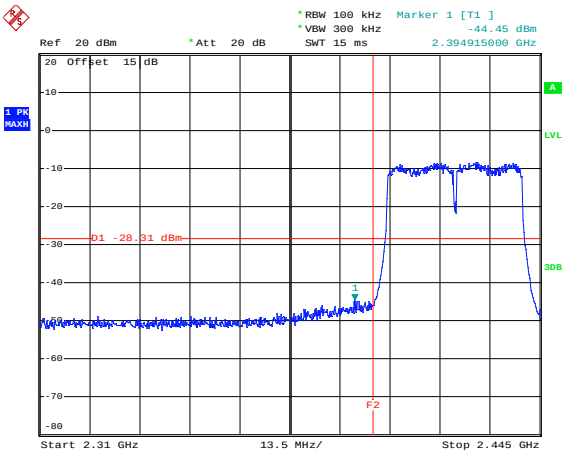
**WLAN 802.11n HT40 Channel 03**

**100kHz PSD reference Level**



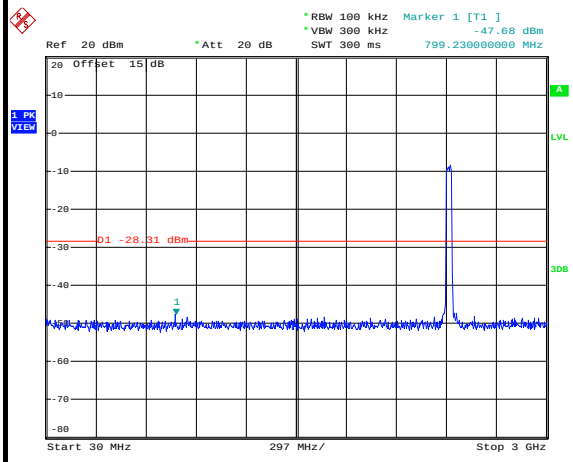

Date: 2.APR.2015 01:06:49

**Low Channel Plot**



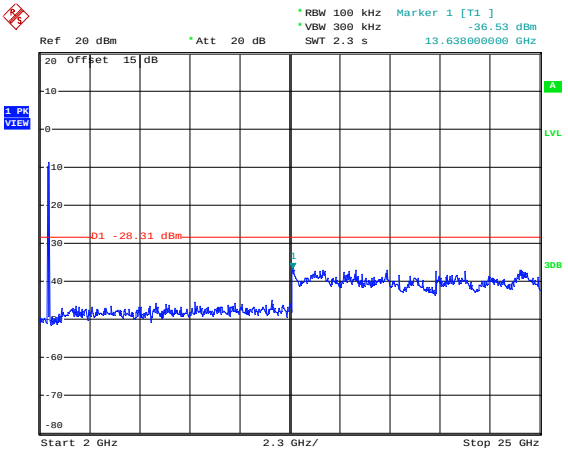

Date: 2.APR.2015 01:07:21

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 01:08:38

**Spurious Emission 2GHz~25GHz**

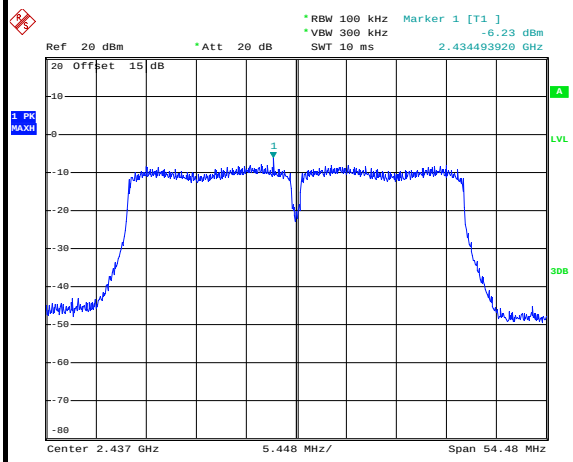



Date: 2.APR.2015 01:08:55

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz Mid | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 06 | **Test Engineer :** | Tiny You |

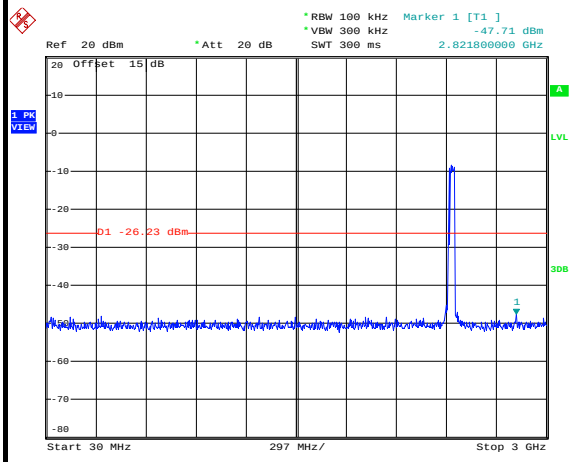
**WLAN 802.11n HT40 Channel 06**

**100kHz PSD reference Level**



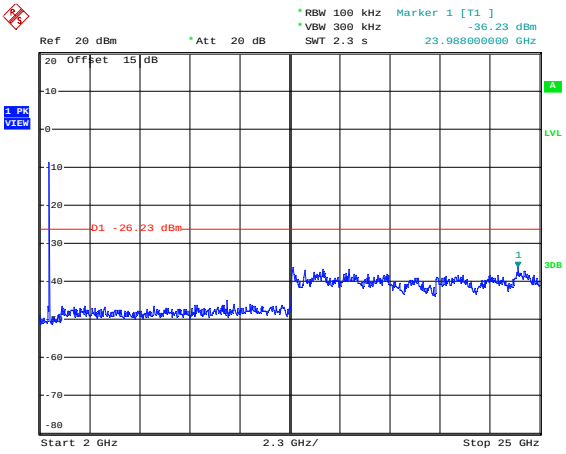

Date: 2.APR.2015 01:16:53

**Spurious Emission 30MHz~3GHz**




Date: 2.APR.2015 01:18:48

**Spurious Emission 2GHz~25GHz**

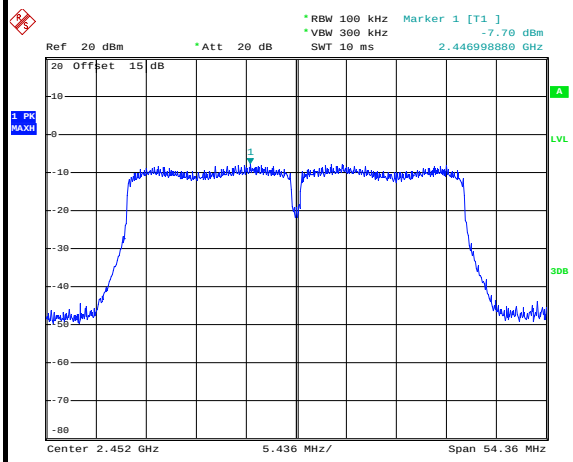



Date: 2.APR.2015 01:19:06

| | | | |
|---|---|---|---|
| **Number of TX :** | 2 | **Chain Port:** | 0+1(1) |
| **Test Mode :** | 802.11n HT40 | **Temperature :** | 21~25℃ |
| **Test Band :** | 2.4GHz High | **Relative Humidity :** | 51~54% |
| **Test Channel :** | 09 | **Test Engineer :** | Tiny You |

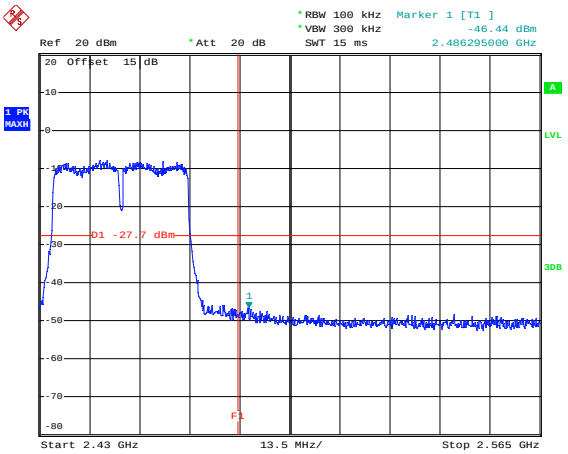
## WLAN 802.11n HT40 Channel 09

### 100kHz PSD reference Level



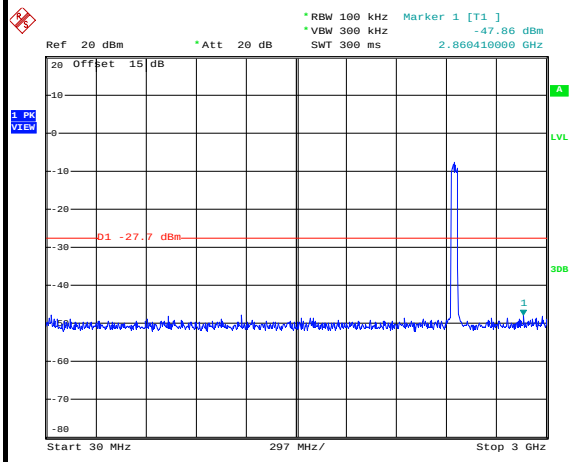

Date: 2.APR.2015 01:23:43

### High Channel Plot



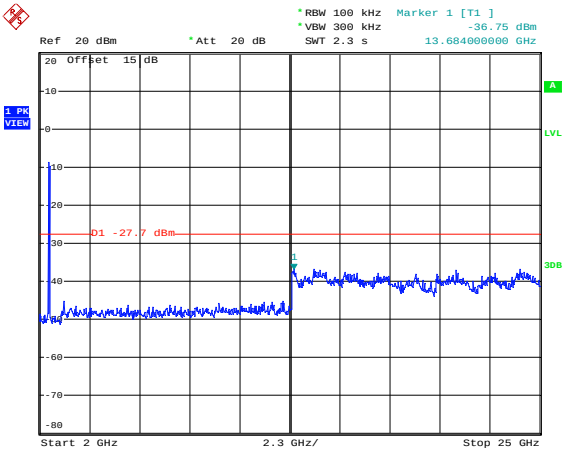

Date: 2.APR.2015 01:24:24

### Spurious Emission 30MHz~3GHz




Date: 2.APR.2015 01:25:57

### Spurious Emission 2GHz~25GHz




Date: 2.APR.2015 01:26:15

# 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.

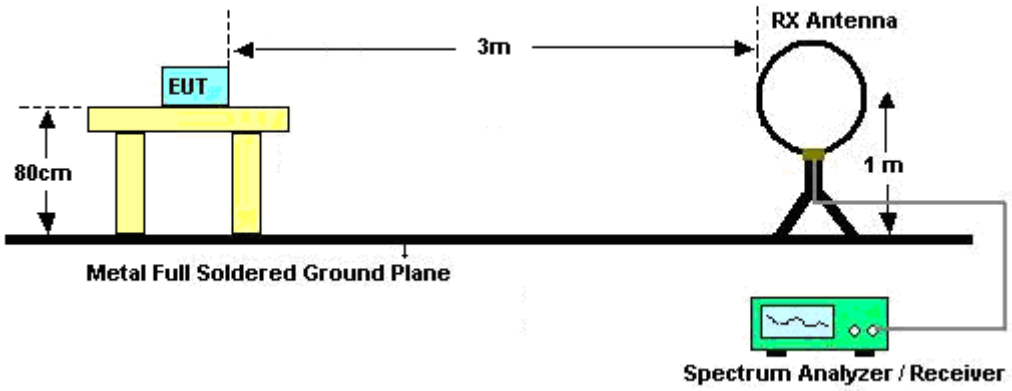
### 3.5.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
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.

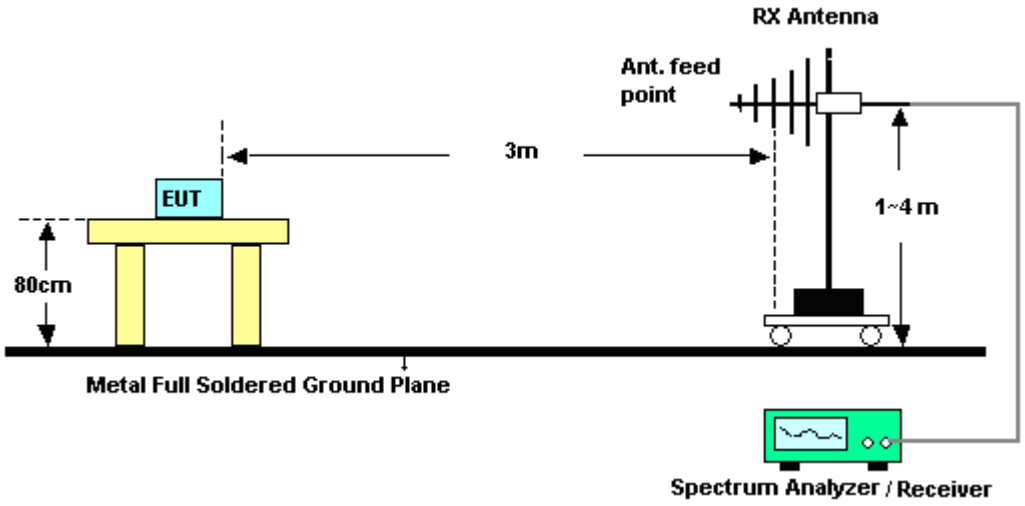
| Band | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|---|---|---|---|---|
| 802.11b | 100 | - | - | 10Hz |
| 802.11g | 100 | - | - | 10Hz |
| 2.4GHz 802.11n HT20 | 100 | - | - | 10Hz |
| 2.4GHz 802.11n HT40 | 100 | - | - | 10Hz |

### 3.5.4 Test Setup

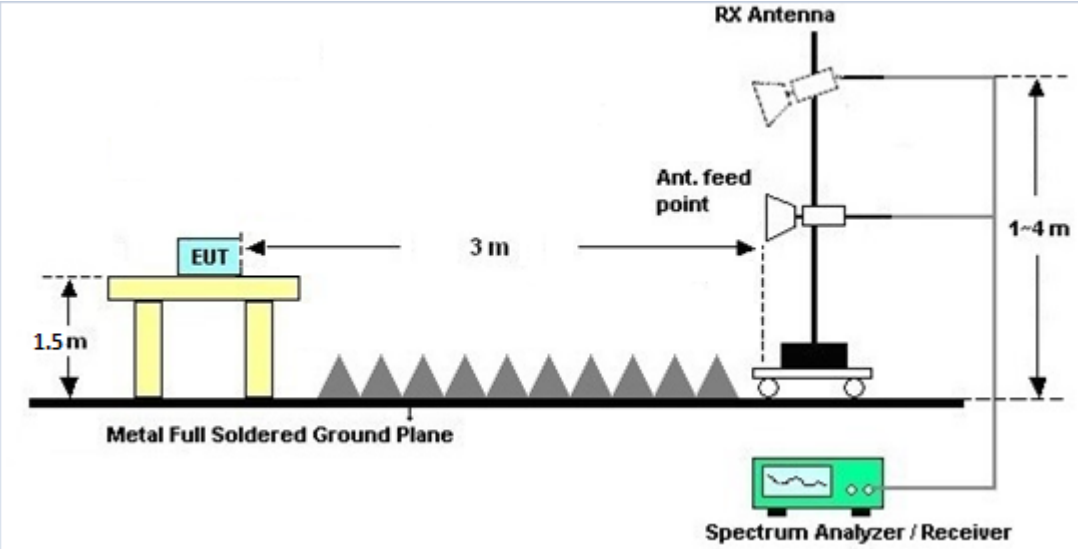
**For radiated emissions below 30MHz**




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



**For radiated emissions above 1GHz**




### 3.5.5 Test Results of Radiated Spurious 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

Please refer to Appendix B.

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

Please refer to Appendix B.

# 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.

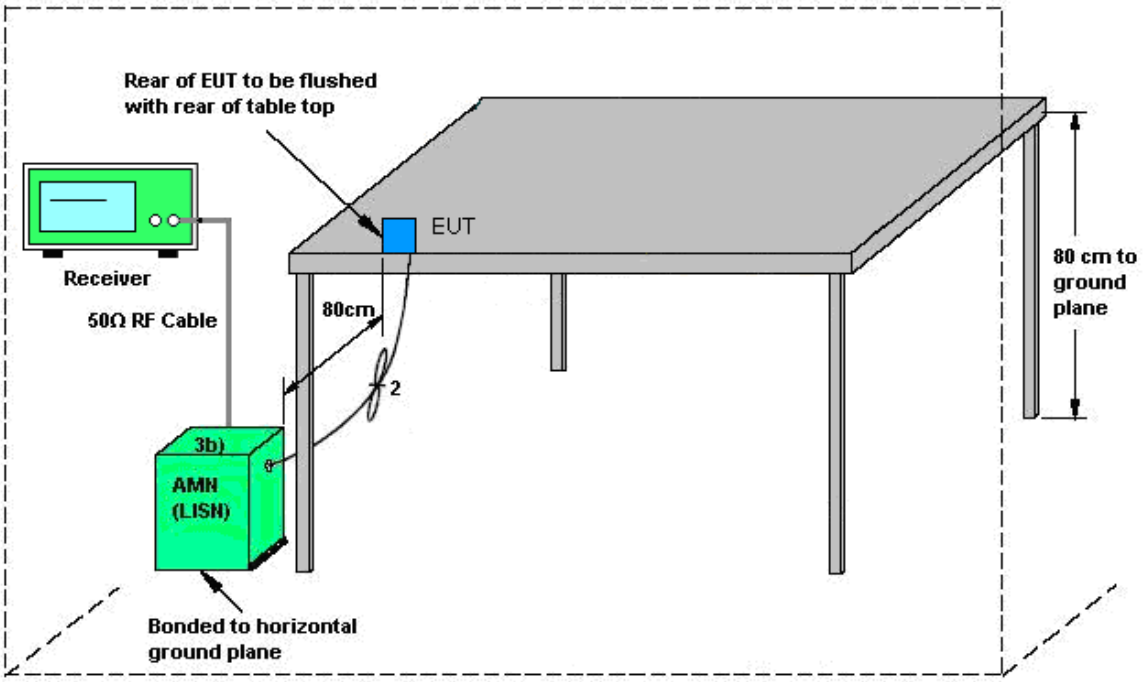
## 3.6.2 Measuring Instruments

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 (IF bandwidth = 9kHz) with Maximum Hold Mode.

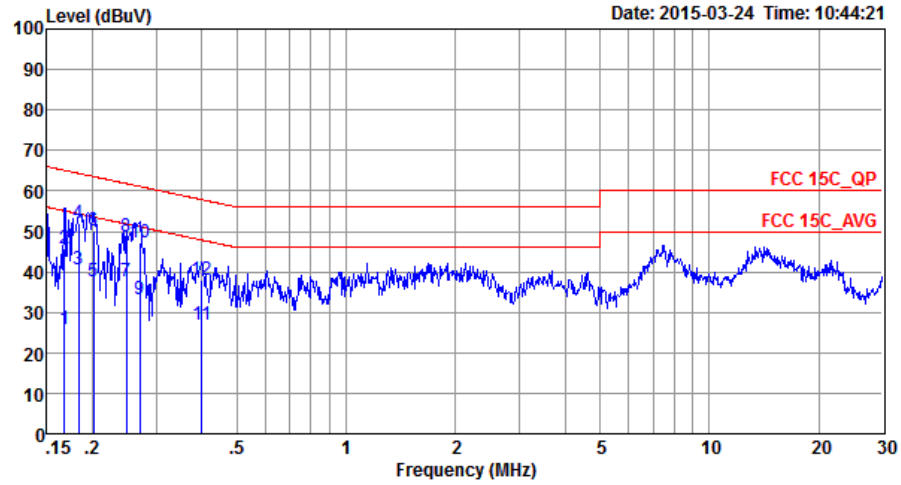
### 3.6.4 Test Setup




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

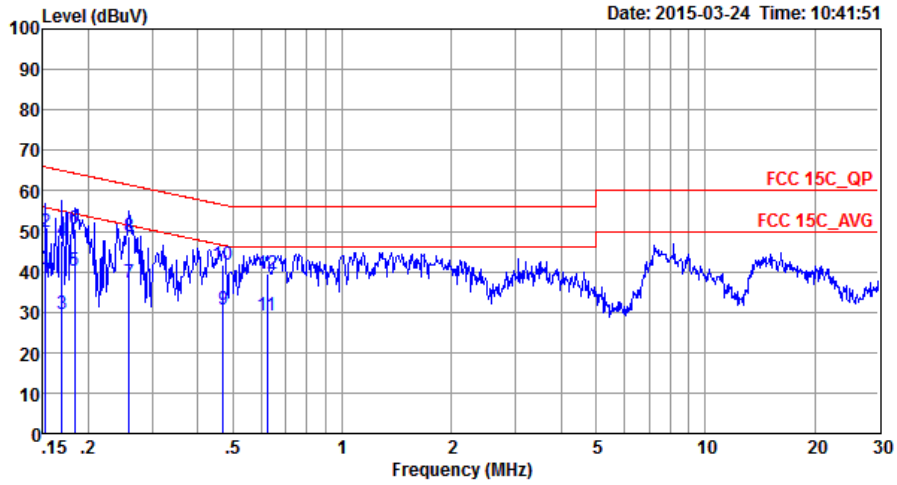
| Test Mode : | Mode 1 | Temperature : | 21~22℃ |
|---|---|---|---|
| Test Engineer : | Jack Tian | Relative Humidity : | 41~42% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Line |
| Function Type : | Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + Adapter 2 | | |




Site : CO01-SZ
Condition: FCC 15C QP LISN L 20140304 LINE

| | | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | | 0.17 | 25.65 | -29.43 | 55.08 | 15.10 | 0.22 | 10.33 | Average |
| 2 | | 0.17 | 45.65 | -19.43 | 65.08 | 35.10 | 0.22 | 10.33 | QP |
| 3 | | 0.18 | 40.53 | -13.80 | 54.33 | 30.00 | 0.22 | 10.31 | Average |
| 4 | * | 0.18 | 52.13 | -12.20 | 64.33 | 41.60 | 0.22 | 10.31 | QP |
| 5 | | 0.20 | 37.71 | -15.83 | 53.54 | 27.20 | 0.22 | 10.29 | Average |
| 6 | | 0.20 | 50.01 | -13.53 | 63.54 | 39.50 | 0.22 | 10.29 | QP |
| 7 | | 0.25 | 37.58 | -14.24 | 51.82 | 27.10 | 0.24 | 10.24 | Average |
| 8 | | 0.25 | 48.88 | -12.94 | 61.82 | 38.40 | 0.24 | 10.24 | QP |
| 9 | | 0.27 | 33.17 | -17.95 | 51.12 | 22.70 | 0.25 | 10.22 | Average |
| 10 | | 0.27 | 47.27 | -13.85 | 61.12 | 36.80 | 0.25 | 10.22 | QP |
| 11 | | 0.40 | 27.05 | -20.81 | 47.86 | 16.60 | 0.28 | 10.17 | Average |
| 12 | | 0.40 | 38.05 | -19.81 | 57.86 | 27.60 | 0.28 | 10.17 | QP |

| Test Mode : | Mode 1 | Temperature : | 21~22℃ |
|---|---|---|---|
| Test Engineer : | Jack Tian | Relative Humidity : | 41~42% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Neutral |
| Function Type : | Bluetooth Link + WLAN (2.4G) Link + Earphone + Battery + Adapter 2 | | |




Site : CO01-SZ
Condition: FCC 15C QP LISN N 20140304 NEUTRAL

| | | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | | 0.15 | 38.49 | -17.38 | 55.87 | 27.80 | 0.33 | 10.36 | Average |
| 2 | | 0.15 | 49.79 | -16.08 | 65.87 | 39.10 | 0.33 | 10.36 | QP |
| 3 | | 0.17 | 29.56 | -25.43 | 54.99 | 18.90 | 0.33 | 10.33 | Average |
| 4 | | 0.17 | 47.56 | -17.43 | 64.99 | 36.90 | 0.33 | 10.33 | QP |
| 5 | | 0.18 | 40.14 | -14.19 | 54.33 | 29.51 | 0.32 | 10.31 | Average |
| 6 | | 0.18 | 50.44 | -13.89 | 64.33 | 39.81 | 0.32 | 10.31 | QP |
| 7 | | 0.26 | 37.28 | -14.19 | 51.47 | 26.70 | 0.35 | 10.23 | Average |
| 8 | * | 0.26 | 48.78 | -12.69 | 61.47 | 38.20 | 0.35 | 10.23 | QP |
| 9 | | 0.47 | 30.76 | -15.73 | 46.49 | 20.20 | 0.40 | 10.16 | Average |
| 10 | | 0.47 | 41.66 | -14.83 | 56.49 | 31.10 | 0.40 | 10.16 | QP |
| 11 | | 0.62 | 29.06 | -16.94 | 46.00 | 18.60 | 0.31 | 10.15 | Average |
| 12 | | 0.62 | 39.56 | -16.44 | 56.00 | 29.10 | 0.31 | 10.15 | QP |

## 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

An embedded-in antenna design 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. 0 (dBi) | Ant. 1 (dBi) | DG for Power (dBi) | DG for PSD (dBi) | Power Limit Reduction (dB) | PSD Limit Reduction (dB) |
|---|---|---|---|---|---|---|
| **2.4 GHz** | 2.47 | 1.81 | 5.16 | 5.16 | 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 | R&S | FSP30 | 101400 | 9kHz~30GHz | Jan. 28, 2015 | Apr. 01, 2015~ Apr. 02, 2015 | Jan. 27, 2016 | Conducted (TH01-SZ) |
| Power Meter | Anritsu | ML2495A | 1218010 | 10Hz~40GHz | Jan. 28, 2015 | Apr. 01, 2015~ Apr. 02, 2015 | Jan. 27, 2016 | Conducted (TH01-SZ) |
| Power Sensor | Anritsu | MA2411B | 1207253 | 0.3GHz~40GHz | Jan. 28, 2015 | Apr. 01, 2015~ Apr. 02, 2015 | Jan. 27, 2016 | Conducted (TH01-SZ) |
| EMI TEST Receiver | R&S | ESCI7 | 100768 | 9kHz~3GHz | May 04, 2014 | Mar. 25, 2015 | May 03, 2015 | Radiation (03CH02-SZ) |
| Spectrum Analyzer | Agilent Technologies | N9038A | MY52260185 | 20Hz~26.5GHz | May 26, 2014 | Mar. 25, 2015 | May 25, 2015 | Radiation (03CH02-SZ) |
| Loop Antenna | R&S | HFH2-Z2 | 100354 | 9kHz~30MHz | May 09, 2014 | Mar. 25, 2015 | May 08, 2015 | Radiation (03CH02-SZ) |
| Bilog Antenna | TESEQ | CBL 6112D | 37877 | 30MHz~2GHz | Oct. 15, 2014 | Mar. 25, 2015 | Oct. 14, 2015 | Radiation (03CH02-SZ) |
| Double Ridge Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-1285 | 1GHz~18GHz | Jan. 20, 2015 | Mar. 25, 2015 | Jan. 19, 2016 | Radiation (03CH02-SZ) |
| Double Ridged Horn Antenna | COM-POWER | AH-840 | 101071 | 18GHz~40GHz | Sep. 04, 2014 | Mar. 25, 2015 | Sep. 03, 2015 | Radiation (03CH02-SZ) |
| Amplifier | com-power | PA-103A | 161069 | 1~1000MHz | May 04, 2014 | Mar. 25, 2015 | May 03, 2015 | Radiation (03CH02-SZ) |
| Amplifier | Agilent | 8449B | 3008A01023 | 1GHz~26.5GHz | Oct. 29, 2014 | Mar. 25, 2015 | Oct. 28, 2015 | Radiation (03CH02-SZ) |
| AC Source(AVR) | CHROMA | 61601ACSOURCE | 616010002470 | 100Vac~240Vac | NCR | Mar. 25, 2015 | NCR | Radiation (03CH02-SZ) |
| Turn Table | Qiangdian | 3000 | N/A | 0~360 degree | NCR | Mar. 25, 2015 | NCR | Radiation (03CH02-SZ) |
| Antenna Mast | Qiangdian | 3000 | N/A | 1 m~4 m | NCR | Mar. 25, 2015 | NCR | Radiation (03CH02-SZ) |
| EMI TEST Receiver | R&S | ESCI7 | 100768 | 9kHz~3GHz | May 04, 2014 | Mar. 24, 2015 | May 03, 2015 | Conduction (CO01-SZ) |
| AC LISN | EMCO | 3816/2SH | 00103912 | 9kHz~30MHz | Feb. 02, 2015 | Mar. 24, 2015 | Feb. 01, 2016 | Conduction (CO01-SZ) |
| AC LISN (for auxiliary equipment) | EMCO | 3816/2SH | 00103892 | 9kHz~30MHz | Feb. 02, 2015 | Mar. 24, 2015 | Feb. 01, 2016 | Conduction (CO01-SZ) |
| AC Power Source | Chroma | 61602 | 616020000891 | 100Vac~250Vac | Sep. 29, 2014 | Mar. 24, 2015 | Sep. 28, 2015 | Conduction (CO01-SZ) |

# 5 Uncertainty of Evaluation

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **2.3dB** |

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

| | |
|---|---|
| **Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))** | **4.5dB** |

# Appendix A. Conducted Test Results

| | | | | |
|---|---|---|---|---|
| Test Engineer: | Tiny You | Temperature: | 21~25 | °C |
| Test Date: | 2015/4/1~2015/4/2 | Relative Humidity: | 51~54 | % |

## ***TEST RESULTS DATA***
## ***6dB and 99% Occupied Bandwidth***

| 2.4GHz Band | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | 99% Occupied BW (MHz) | | 6dB BW (MHz) | | 6dB BW Limit (MHz) | Pass/Fail |
| | | | | | Ant 1 | Ant 2 | Ant 1 | Ant 2 | | |
| 11b | 1Mbps | 1 | 1 | 2412 | 13.65 | 13.55 | 10.04 | 10.04 | 0.50 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | 13.65 | 13.60 | 10.04 | 10.04 | 0.50 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | 13.60 | 13.65 | 10.04 | 10.04 | 0.50 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | 17.40 | 17.50 | 16.52 | 16.56 | 0.50 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | 17.55 | 17.50 | 16.48 | 16.52 | 0.50 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | 17.50 | 17.50 | 16.52 | 16.52 | 0.50 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | 18.30 | 18.30 | 17.56 | 17.66 | 0.50 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | 18.25 | 18.35 | 17.60 | 17.60 | 0.50 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | 18.30 | 18.35 | 17.58 | 17.62 | 0.50 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | 36.50 | 36.50 | 36.32 | 36.40 | 0.50 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | 36.40 | 36.40 | 35.84 | 36.40 | 0.50 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | 36.30 | 36.40 | 36.24 | 36.40 | 0.50 | Pass |
| 11b | 1Mbps | 2 | 1 | 2412 | 13.55 | 13.50 | 10.04 | 10.02 | 0.50 | Pass |
| 11b | 1Mbps | 2 | 6 | 2437 | 13.55 | 13.50 | 10.04 | 10.04 | 0.50 | Pass |
| 11b | 1Mbps | 2 | 11 | 2462 | 13.55 | 13.55 | 10.04 | 10.04 | 0.50 | Pass |
| 11g | 6Mbps | 2 | 1 | 2412 | 17.40 | 17.35 | 16.44 | 16.48 | 0.50 | Pass |
| 11g | 6Mbps | 2 | 6 | 2437 | 17.45 | 17.40 | 16.40 | 16.40 | 0.50 | Pass |
| 11g | 6Mbps | 2 | 11 | 2462 | 17.55 | 17.50 | 16.48 | 16.50 | 0.50 | Pass |
| HT20 | MCS0 | 2 | 1 | 2412 | 18.35 | 18.35 | 17.64 | 17.64 | 0.50 | Pass |
| HT20 | MCS0 | 2 | 6 | 2437 | 18.30 | 18.25 | 17.60 | 17.66 | 0.50 | Pass |
| HT20 | MCS0 | 2 | 11 | 2462 | 18.30 | 18.30 | 17.60 | 17.60 | 0.50 | Pass |
| HT40 | MCS0 | 2 | 3 | 2422 | 36.40 | 36.40 | 36.32 | 36.40 | 0.50 | Pass |
| HT40 | MCS0 | 2 | 6 | 2437 | 36.50 | 36.40 | 36.24 | 36.32 | 0.50 | Pass |
| HT40 | MCS0 | 2 | 9 | 2452 | 36.30 | 36.40 | 36.32 | 36.24 | 0.50 | Pass |

Report Number : FR530302-01C

## ***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 | 20.78 | 19.60 | | 30.00 | 30.00 | 2.47 | 1.81 | 23.25 | 21.41 | 36.00 | 36.00 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | 20.72 | 19.87 | | 30.00 | 30.00 | 2.47 | 1.81 | 23.19 | 21.68 | 36.00 | 36.00 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | 20.68 | 19.78 | | 30.00 | 30.00 | 2.47 | 1.81 | 23.15 | 21.59 | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | 25.56 | 24.87 | | 30.00 | 30.00 | 2.47 | 1.81 | 28.03 | 26.68 | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | 25.32 | 24.84 | | 30.00 | 30.00 | 2.47 | 1.81 | 27.79 | 26.65 | 36.00 | 36.00 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | 25.40 | 25.12 | | 30.00 | 30.00 | 2.47 | 1.81 | 27.87 | 26.93 | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | 25.23 | 24.56 | | 30.00 | 30.00 | 2.47 | 1.81 | 27.70 | 26.37 | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | 24.69 | 24.45 | | 30.00 | 30.00 | 2.47 | 1.81 | 27.16 | 26.26 | 36.00 | 36.00 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | 24.58 | 24.23 | | 30.00 | 30.00 | 2.47 | 1.81 | 27.05 | 26.04 | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | 23.21 | 22.87 | | 30.00 | 30.00 | 2.47 | 1.81 | 25.68 | 24.68 | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | 22.88 | 22.53 | | 30.00 | 30.00 | 2.47 | 1.81 | 25.35 | 24.34 | 36.00 | 36.00 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | 22.60 | 22.43 | | 30.00 | 30.00 | 2.47 | 1.81 | 25.07 | 24.24 | 36.00 | 36.00 | Pass |
| 11b | 1Mbps | 2 | 1 | 2412 | 18.95 | 18.25 | 21.62 | 30.00 | | 5.16 | | 26.78 | | 36.00 | | Pass |
| 11b | 1Mbps | 2 | 6 | 2437 | 18.94 | 18.10 | 21.55 | 30.00 | | 5.16 | | 26.71 | | 36.00 | | Pass |
| 11b | 1Mbps | 2 | 11 | 2462 | 18.93 | 18.04 | 21.52 | 30.00 | | 5.16 | | 26.67 | | 36.00 | | Pass |
| 11g | 6Mbps | 2 | 1 | 2412 | 23.72 | 22.98 | 26.38 | 30.00 | | 5.16 | | 31.53 | | 36.00 | | Pass |
| 11g | 6Mbps | 2 | 6 | 2437 | 23.54 | 22.75 | 26.17 | 30.00 | | 5.16 | | 31.33 | | 36.00 | | Pass |
| 11g | 6Mbps | 2 | 11 | 2462 | 23.62 | 22.69 | 26.19 | 30.00 | | 5.16 | | 31.35 | | 36.00 | | Pass |
| HT20 | MCS0 | 2 | 1 | 2412 | 23.32 | 22.98 | 26.16 | 30.00 | | 5.16 | | 31.32 | | 36.00 | | Pass |
| HT20 | MCS0 | 2 | 6 | 2437 | 23.24 | 22.84 | 26.05 | 30.00 | | 5.16 | | 31.21 | | 36.00 | | Pass |
| HT20 | MCS0 | 2 | 11 | 2462 | 23.15 | 22.69 | 25.94 | 30.00 | | 5.16 | | 31.09 | | 36.00 | | Pass |
| HT40 | MCS0 | 2 | 3 | 2422 | 20.53 | 19.97 | 23.27 | 30.00 | | 5.16 | | 28.43 | | 36.00 | | Pass |
| HT40 | MCS0 | 2 | 6 | 2437 | 19.87 | 20.01 | 22.95 | 30.00 | | 5.16 | | 28.11 | | 36.00 | | Pass |
| HT40 | MCS0 | 2 | 9 | 2452 | 18.93 | 20.21 | 22.63 | 30.00 | | 5.16 | | 27.78 | | 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 | 0.00 | 0.00 | 17.75 | 16.60 | |
| 11b | 1Mbps | 1 | 6 | 2437 | 0.00 | 0.00 | 17.72 | 16.85 | |
| 11b | 1Mbps | 1 | 11 | 2462 | 0.00 | 0.00 | 17.69 | 16.73 | |
| 11g | 6Mbps | 1 | 1 | 2412 | 0.00 | 0.00 | 15.80 | 15.32 | |
| 11g | 6Mbps | 1 | 6 | 2437 | 0.00 | 0.00 | 15.72 | 15.36 | |
| 11g | 6Mbps | 1 | 11 | 2462 | 0.00 | 0.00 | 15.69 | 15.52 | |
| HT20 | MCS0 | 1 | 1 | 2412 | 0.00 | 0.00 | 15.04 | 14.89 | |
| HT20 | MCS0 | 1 | 6 | 2437 | 0.00 | 0.00 | 14.91 | 14.75 | |
| HT20 | MCS0 | 1 | 11 | 2462 | 0.00 | 0.00 | 14.86 | 14.67 | |
| HT40 | MCS0 | 1 | 3 | 2422 | 0.00 | 0.00 | 12.68 | 12.20 | |
| HT40 | MCS0 | 1 | 6 | 2437 | 0.00 | 0.00 | 12.25 | 11.98 | |
| HT40 | MCS0 | 1 | 9 | 2452 | 0.00 | 0.00 | 12.36 | 11.68 | |
| 11b | 1Mbps | 2 | 1 | 2412 | 0.00 | 0.00 | 16.02 | 15.34 | 18.70 |
| 11b | 1Mbps | 2 | 6 | 2437 | 0.00 | 0.00 | 15.88 | 15.13 | 18.53 |
| 11b | 1Mbps | 2 | 11 | 2462 | 0.00 | 0.00 | 15.87 | 15.07 | 18.50 |
| 11g | 6Mbps | 2 | 1 | 2412 | 0.00 | 0.00 | 13.12 | 12.75 | 15.95 |
| 11g | 6Mbps | 2 | 6 | 2437 | 0.00 | 0.00 | 12.97 | 12.62 | 15.81 |
| 11g | 6Mbps | 2 | 11 | 2462 | 0.00 | 0.00 | 12.88 | 12.58 | 15.74 |
| HT20 | MCS0 | 2 | 1 | 2412 | 0.00 | 0.00 | 12.43 | 11.65 | 15.07 |
| HT20 | MCS0 | 2 | 6 | 2437 | 0.00 | 0.00 | 12.34 | 11.58 | 14.99 |
| HT20 | MCS0 | 2 | 11 | 2462 | 0.00 | 0.00 | 12.30 | 11.55 | 14.95 |
| HT40 | MCS0 | 2 | 3 | 2422 | 0.00 | 0.00 | 10.15 | 9.23 | 12.72 |
| HT40 | MCS0 | 2 | 6 | 2437 | 0.00 | 0.00 | 9.98 | 8.98 | 12.52 |
| HT40 | MCS0 | 2 | 9 | 2452 | 0.00 | 0.00 | 9.76 | 8.87 | 12.35 |

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

***TEST RESULTS DATA***
***Peak Power Spectral Density***

| 2.4GHz Band | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mod. | Data Rate | NTX | CH. | Freq. (MHz) | Peak PSD (dBm/3kHz) | | | DG (dBi) | | Peak PSD Limit (dBm/3kHz) | | Pass/Fail |
| | | | | | Ant 1 | Ant 2 | Worse + 3.01 | Ant 1 | Ant 2 | Ant 1 | Ant 2 | |
| 11b | 1Mbps | 1 | 1 | 2412 | -5.70 | -6.93 | - | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11b | 1Mbps | 1 | 6 | 2437 | -6.10 | -6.14 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11b | 1Mbps | 1 | 11 | 2462 | -6.10 | -6.31 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11g | 6Mbps | 1 | 1 | 2412 | -10.25 | -11.10 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11g | 6Mbps | 1 | 6 | 2437 | -10.70 | -11.57 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11g | 6Mbps | 1 | 11 | 2462 | -10.28 | -10.54 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT20 | MCS0 | 1 | 1 | 2412 | -9.89 | -9.66 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT20 | MCS0 | 1 | 6 | 2437 | -11.12 | -11.26 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT20 | MCS0 | 1 | 11 | 2462 | -8.75 | -10.26 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT40 | MCS0 | 1 | 3 | 2422 | -16.37 | -16.96 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT40 | MCS0 | 1 | 6 | 2437 | -16.12 | -16.54 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| HT40 | MCS0 | 1 | 9 | 2452 | -16.61 | -15.63 | | 2.47 | 1.81 | 8.00 | 8.00 | Pass |
| 11b | 1Mbps | 2 | 1 | 2412 | -7.87 | -8.98 | -4.86 | 5.16 | | 8.00 | | Pass |
| 11b | 1Mbps | 2 | 6 | 2437 | -8.57 | -8.27 | -5.26 | 5.16 | | 8.00 | | Pass |
| 11b | 1Mbps | 2 | 11 | 2462 | -8.68 | -8.54 | -5.53 | 5.16 | | 8.00 | | Pass |
| 11g | 6Mbps | 2 | 1 | 2412 | -13.21 | -13.82 | -10.20 | 5.16 | | 8.00 | | Pass |
| 11g | 6Mbps | 2 | 6 | 2437 | -13.83 | -13.45 | -10.44 | 5.16 | | 8.00 | | Pass |
| 11g | 6Mbps | 2 | 11 | 2462 | -13.37 | -13.34 | -10.33 | 5.16 | | 8.00 | | Pass |
| HT20 | MCS0 | 2 | 1 | 2412 | -11.75 | -14.40 | -8.74 | 5.16 | | 8.00 | | Pass |
| HT20 | MCS0 | 2 | 6 | 2437 | -13.35 | -13.99 | -10.34 | 5.16 | | 8.00 | | Pass |
| HT20 | MCS0 | 2 | 11 | 2462 | -13.44 | -12.46 | -9.45 | 5.16 | | 8.00 | | Pass |
| HT40 | MCS0 | 2 | 3 | 2422 | -18.87 | -19.50 | -15.86 | 5.16 | | 8.00 | | Pass |
| HT40 | MCS0 | 2 | 6 | 2437 | -18.57 | -20.28 | -15.56 | 5.16 | | 8.00 | | Pass |
| HT40 | MCS0 | 2 | 9 | 2452 | -18.92 | -19.68 | -15.91 | 5.16 | | 8.00 | | Pass |

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

# Appendix B. Radiated Spurious Emission

**2.4GHz 2400~2483.5MHz**

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

| 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 | | 2387.04 | 46.39 | -27.61 | 74 | 49.56 | 27.25 | 6.04 | 36.46 | 203 | 360 | P | H |
| | | 2385.96 | 36 | -18 | 54 | 39.17 | 27.25 | 6.04 | 36.46 | 203 | 360 | A | H |
| | * | 2412 | 103.82 | - | - | 106.93 | 27.31 | 6.04 | 36.46 | 203 | 360 | P | H |
| | * | 2412 | 99.93 | - | - | 103.04 | 27.31 | 6.04 | 36.46 | 203 | 360 | A | H |
| | | 2373.54 | 56.23 | -17.77 | 74 | 59.5 | 27.19 | 6 | 36.46 | 269 | 87 | P | V |
| | | 2385.87 | 37.98 | -16.02 | 54 | 41.15 | 27.25 | 6.04 | 36.46 | 269 | 87 | A | V |
| | * | 2412 | 105.74 | - | - | 108.85 | 27.31 | 6.04 | 36.46 | 269 | 87 | P | V |
| | * | 2412 | 101.85 | - | - | 104.96 | 27.31 | 6.04 | 36.46 | 269 | 87 | A | V |
| 802.11b CH 06 2437MHz | | 2382.09 | 54.15 | -19.85 | 74 | 57.42 | 27.19 | 6 | 36.46 | 191 | 354 | P | H |
| | | 2387.22 | 29.95 | -24.05 | 54 | 33.12 | 27.25 | 6.04 | 36.46 | 191 | 354 | A | H |
| | * | 2437 | 106.76 | - | - | 109.7 | 27.42 | 6.09 | 36.45 | 191 | 354 | P | H |
| | * | 2437 | 102.78 | - | - | 105.72 | 27.42 | 6.09 | 36.45 | 191 | 354 | A | H |
| | | 2490.8 | 44.07 | -29.93 | 74 | 46.75 | 27.6 | 6.17 | 36.45 | 191 | 354 | P | H |
| | | 2485.36 | 30.13 | -23.87 | 54 | 32.87 | 27.54 | 6.17 | 36.45 | 191 | 354 | A | H |
| | | 2385.24 | 44.54 | -29.46 | 74 | 47.77 | 27.19 | 6.04 | 36.46 | 272 | 258 | P | V |
| | | 2388.48 | 30.13 | -23.87 | 54 | 33.3 | 27.25 | 6.04 | 36.46 | 272 | 258 | A | V |
| | * | 2437 | 107.47 | - | - | 110.41 | 27.42 | 6.09 | 36.45 | 272 | 258 | P | V |
| | * | 2437 | 103.32 | - | - | 106.26 | 27.42 | 6.09 | 36.45 | 272 | 258 | A | V |
| | | 2484.12 | 44.37 | -29.63 | 74 | 47.11 | 27.54 | 6.17 | 36.45 | 272 | 258 | P | V |
| | | 2483.52 | 30.73 | -23.27 | 54 | 33.47 | 27.54 | 6.17 | 36.45 | 272 | 258 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11b CH 11 2462MHz | * | 2462 | 107.05 | - | - | 109.89 | 27.48 | 6.13 | 36.45 | 190 | 355 | P | H |
| | * | 2462 | 103.11 | - | - | 105.95 | 27.48 | 6.13 | 36.45 | 190 | 355 | A | H |
| | | 2483.52 | 49.82 | -24.18 | 74 | 52.56 | 27.54 | 6.17 | 36.45 | 190 | 355 | P | H |
| | | 2483.52 | 43.28 | -10.72 | 54 | 46.02 | 27.54 | 6.17 | 36.45 | 190 | 355 | A | H |
| | * | 2462 | 107.38 | - | - | 110.22 | 27.48 | 6.13 | 36.45 | 272 | 258 | P | V |
| | * | 2462 | 103.31 | - | - | 106.15 | 27.48 | 6.13 | 36.45 | 272 | 258 | A | V |
| | | 2483.84 | 50.18 | -23.82 | 74 | 52.92 | 27.54 | 6.17 | 36.45 | 272 | 258 | P | V |
| | | 2483.52 | 41.46 | -12.54 | 54 | 44.2 | 27.54 | 6.17 | 36.45 | 272 | 258 | 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 802.11b (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 | | 4824 | 52.41 | -21.59 | 74 | 48.86 | 31.26 | 8.23 | 35.94 | 250 | 0 | P | H |
| CH 01 | | 4824 | 51.2 | -2.8 | 54 | 47.65 | 31.26 | 8.23 | 35.94 | 250 | 0 | A | H |
| 2412MHz | | 4824 | 49.54 | -24.46 | 74 | 45.99 | 31.26 | 8.23 | 35.94 | 250 | 0 | P | V |
| | | 4874 | 52.62 | -21.38 | 74 | 48.89 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | H |
| 802.11b | | 4874 | 51.29 | -2.71 | 54 | 47.56 | 31.36 | 8.29 | 35.92 | 145 | 265 | A | H |
| CH 06 | | 7311 | 50.5 | -23.5 | 74 | 40.78 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | H |
| 2437MHz | | 4874 | 50.82 | -23.18 | 74 | 47.09 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | V |
| | | 7311 | 50.53 | -23.47 | 74 | 40.81 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | V |
| | | 4924 | 53.64 | -20.36 | 74 | 49.76 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | H |
| 802.11b | | 4924 | 51.46 | -2.54 | 54 | 47.58 | 31.46 | 8.32 | 35.9 | 146 | 347 | A | H |
| CH 11 | | 7386 | 50.88 | -23.12 | 74 | 41.05 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | H |
| 2462MHz | | 4924 | 50.97 | -23.03 | 74 | 47.09 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | V |
| | | 7386 | 50.56 | -23.44 | 74 | 40.73 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | 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 | | 2389.47 | 62.5 | -11.5 | 74 | 65.67 | 27.25 | 6.04 | 36.46 | 150 | 358 | P | H |
| | | 2388.66 | 45.23 | -8.77 | 54 | 48.4 | 27.25 | 6.04 | 36.46 | 150 | 358 | A | H |
| | * | 2412 | 106.4 | - | - | 109.51 | 27.31 | 6.04 | 36.46 | 150 | 358 | P | H |
| | * | 2412 | 96.06 | - | - | 99.17 | 27.31 | 6.04 | 36.46 | 150 | 358 | A | H |
| | | 2386.95 | 63.89 | -10.11 | 74 | 67.06 | 27.25 | 6.04 | 36.46 | 280 | 258 | P | V |
| | | 2388.12 | 46.91 | -7.09 | 54 | 50.08 | 27.25 | 6.04 | 36.46 | 280 | 258 | A | V |
| | * | 2412 | 107.82 | - | - | 110.93 | 27.31 | 6.04 | 36.46 | 280 | 258 | P | V |
| | * | 2412 | 97.4 | - | - | 100.51 | 27.31 | 6.04 | 36.46 | 280 | 258 | A | V |
| 802.11g CH 06 2437MHz | | 2389.56 | 54.76 | -19.24 | 74 | 57.93 | 27.25 | 6.04 | 36.46 | 150 | 358 | P | H |
| | | 2364.99 | 33.56 | -20.44 | 54 | 36.89 | 27.13 | 6 | 36.46 | 150 | 358 | A | H |
| | * | 2437 | 105.84 | - | - | 108.78 | 27.42 | 6.09 | 36.45 | 150 | 358 | P | H |
| | * | 2437 | 95.29 | - | - | 98.23 | 27.42 | 6.09 | 36.45 | 150 | 358 | A | H |
| | | 2484.84 | 54.16 | -19.84 | 74 | 56.9 | 27.54 | 6.17 | 36.45 | 150 | 358 | P | H |
| | | 2483.6 | 31.73 | -22.27 | 54 | 34.47 | 27.54 | 6.17 | 36.45 | 150 | 358 | A | H |
| | | 2389.92 | 48.34 | -25.66 | 74 | 51.51 | 27.25 | 6.04 | 36.46 | 280 | 258 | P | V |
| | | 2364.72 | 35.71 | -18.29 | 54 | 39.04 | 27.13 | 6 | 36.46 | 280 | 258 | A | V |
| | * | 2437 | 108.03 | - | - | 110.97 | 27.42 | 6.09 | 36.45 | 280 | 258 | P | V |
| | * | 2437 | 97.9 | - | - | 100.84 | 27.42 | 6.09 | 36.45 | 280 | 258 | A | V |
| | | 2484.12 | 54.31 | -19.69 | 74 | 57.05 | 27.54 | 6.17 | 36.45 | 280 | 258 | P | V |
| | | 2483.8 | 32.3 | -21.7 | 54 | 35.04 | 27.54 | 6.17 | 36.45 | 280 | 258 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11g CH 11 2462MHz | * | 2462 | 105.68 | - | - | 108.52 | 27.48 | 6.13 | 36.45 | 150 | 358 | P | H |
| | * | 2462 | 95.26 | - | - | 98.1 | 27.48 | 6.13 | 36.45 | 150 | 358 | A | H |
| | | 2485.2 | 67.62 | -6.38 | 74 | 70.36 | 27.54 | 6.17 | 36.45 | 150 | 358 | P | H |
| | | 2483.52 | 48.12 | -5.88 | 54 | 50.86 | 27.54 | 6.17 | 36.45 | 150 | 358 | A | H |
| | * | 2462 | 107.82 | - | - | 110.66 | 27.48 | 6.13 | 36.45 | 280 | 258 | P | V |
| | * | 2462 | 97.58 | - | - | 100.42 | 27.48 | 6.13 | 36.45 | 280 | 258 | A | V |
| | | 2484.12 | 68.92 | -5.08 | 74 | 71.66 | 27.54 | 6.17 | 36.45 | 280 | 258 | P | V |
| | | 2483.52 | 49.24 | -4.76 | 54 | 51.98 | 27.54 | 6.17 | 36.45 | 280 | 258 | 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 802.11g (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 | 46.2 | -27.8 | 74 | 42.65 | 31.26 | 8.23 | 35.94 | 105 | 198 | P | H |
| | | 4824 | 46.29 | -27.71 | 74 | 42.74 | 31.26 | 8.23 | 35.94 | 105 | 198 | P | V |
| 802.11g CH 06 2437MHz | | 4874 | 48.94 | -25.06 | 74 | 45.21 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | H |
| | | 7311 | 49.45 | -24.55 | 74 | 39.73 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | H |
| | | 4874 | 47.65 | -26.35 | 74 | 43.92 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | V |
| | | 7311 | 49.76 | -24.24 | 74 | 40.04 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | V |
| 802.11g CH 11 2462MHz | | 4924 | 49.8 | -24.2 | 74 | 45.92 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | H |
| | | 7386 | 49.38 | -24.62 | 74 | 39.55 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | H |
| | | 4924 | 47.66 | -26.34 | 74 | 43.78 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | V |
| | | 7386 | 49.14 | -24.86 | 74 | 39.31 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2389.47 | 65.07 | -8.93 | 74 | 68.24 | 27.25 | 6.04 | 36.46 | 150 | 356 | P | H |
| | | 2389.92 | 45.52 | -8.48 | 54 | 48.69 | 27.25 | 6.04 | 36.46 | 150 | 356 | A | H |
| 802.11n | * | 2412 | 106.04 | - | - | 109.15 | 27.31 | 6.04 | 36.46 | 150 | 356 | P | H |
| HT20 | * | 2412 | 95.18 | - | - | 98.29 | 27.31 | 6.04 | 36.46 | 150 | 356 | A | H |
| CH 01 | | 2389.92 | 66.53 | -7.47 | 74 | 69.7 | 27.25 | 6.04 | 36.46 | 150 | 258 | P | V |
| 2412MHz | | 2389.92 | 47.13 | -6.87 | 54 | 50.3 | 27.25 | 6.04 | 36.46 | 150 | 258 | A | V |
| | * | 2412 | 106.59 | - | - | 109.7 | 27.31 | 6.04 | 36.46 | 150 | 258 | P | V |
| | * | 2412 | 96.19 | - | - | 99.3 | 27.31 | 6.04 | 36.46 | 150 | 258 | A | V |
| | | 2381.01 | 51.4 | -22.6 | 74 | 54.67 | 27.19 | 6 | 36.46 | 150 | 356 | P | H |
| | | 2365.08 | 33.77 | -20.23 | 54 | 37.1 | 27.13 | 6 | 36.46 | 150 | 356 | A | H |
| | * | 2437 | 105.22 | - | - | 108.16 | 27.42 | 6.09 | 36.45 | 150 | 356 | P | H |
| | * | 2437 | 94.74 | - | - | 97.68 | 27.42 | 6.09 | 36.45 | 150 | 356 | A | H |
| 802.11n | | 2483.56 | 53.61 | -20.39 | 74 | 56.35 | 27.54 | 6.17 | 36.45 | 150 | 356 | P | H |
| HT20 | | 2483.52 | 31.78 | -22.22 | 54 | 34.52 | 27.54 | 6.17 | 36.45 | 150 | 356 | A | H |
| CH 06 | | 2388.75 | 51.31 | -22.69 | 74 | 54.48 | 27.25 | 6.04 | 36.46 | 280 | 258 | P | V |
| 2437MHz | | 2365.08 | 34.98 | -19.02 | 54 | 38.31 | 27.13 | 6 | 36.46 | 280 | 258 | A | V |
| | * | 2437 | 106.55 | - | - | 109.49 | 27.42 | 6.09 | 36.45 | 280 | 258 | P | V |
| | * | 2437 | 95.84 | - | - | 98.78 | 27.42 | 6.09 | 36.45 | 280 | 258 | A | V |
| | | 2484.24 | 52.89 | -21.11 | 74 | 55.63 | 27.54 | 6.17 | 36.45 | 280 | 258 | P | V |
| | | 2483.56 | 31.79 | -22.21 | 54 | 34.53 | 27.54 | 6.17 | 36.45 | 280 | 258 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11n HT20 CH 11 2462MHz | * | 2462 | 105.22 | - | - | 108.06 | 27.48 | 6.13 | 36.45 | 150 | 358 | P | H |
| | * | 2462 | 94.39 | - | - | 97.23 | 27.48 | 6.13 | 36.45 | 150 | 358 | A | H |
| | | 2483.52 | 68.85 | -5.15 | 74 | 71.59 | 27.54 | 6.17 | 36.45 | 150 | 358 | P | H |
| | | 2483.76 | 50.55 | -3.45 | 54 | 53.29 | 27.54 | 6.17 | 36.45 | 150 | 358 | A | H |
| | * | 2462 | 106.15 | - | - | 108.99 | 27.48 | 6.13 | 36.45 | 280 | 258 | P | V |
| | * | 2462 | 95.52 | - | - | 98.36 | 27.48 | 6.13 | 36.45 | 280 | 258 | A | V |
| | | 2483.64 | 68.22 | -5.78 | 74 | 70.96 | 27.54 | 6.17 | 36.45 | 280 | 258 | P | V |
| | | 2483.52 | 49.96 | -4.04 | 54 | 52.7 | 27.54 | 6.17 | 36.45 | 280 | 258 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11n HT20 CH 01 2412MHz | | 4824 | 45.31 | -28.69 | 74 | 41.76 | 31.26 | 8.23 | 35.94 | 105 | 198 | P | H |
| | | 4824 | 45.22 | -28.78 | 74 | 41.67 | 31.26 | 8.23 | 35.94 | 105 | 198 | P | V |
| 802.11n HT20 CH 06 2437MHz | | 4874 | 47.73 | -26.27 | 74 | 44 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | H |
| | | 7311 | 49.78 | -24.22 | 74 | 40.06 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | H |
| | | 4874 | 46.56 | -27.44 | 74 | 42.83 | 31.36 | 8.29 | 35.92 | 145 | 265 | P | V |
| | | 7311 | 49.27 | -24.73 | 74 | 39.55 | 35.96 | 10.29 | 36.53 | 174 | 321 | P | V |
| 802.11n HT20 CH 11 2462MHz | | 4924 | 49.31 | -24.69 | 74 | 45.43 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | H |
| | | 7386 | 49.95 | -24.05 | 74 | 40.12 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | H |
| | | 4924 | 48.53 | -25.47 | 74 | 44.65 | 31.46 | 8.32 | 35.9 | 146 | 347 | P | V |
| | | 7386 | 49.35 | -24.65 | 74 | 39.52 | 36.08 | 10.34 | 36.59 | 145 | 274 | P | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2388.57 | 61.53 | -12.47 | 74 | 64.7 | 27.25 | 6.04 | 36.46 | 150 | 353 | P | H |
| | | 2387.58 | 43.37 | -10.63 | 54 | 46.54 | 27.25 | 6.04 | 36.46 | 150 | 353 | A | H |
| | * | 2422 | 99.9 | - | - | 102.89 | 27.37 | 6.09 | 36.45 | 150 | 353 | P | H |
| | * | 2422 | 88.81 | - | - | 91.8 | 27.37 | 6.09 | 36.45 | 150 | 353 | A | H |
| 802.11n | | 2486.96 | 50.72 | -23.28 | 74 | 53.46 | 27.54 | 6.17 | 36.45 | 150 | 353 | P | H |
| HT40 | | 2486.88 | 33.9 | -20.1 | 54 | 36.64 | 27.54 | 6.17 | 36.45 | 150 | 353 | A | H |
| CH 03 | | 2388.57 | 61.21 | -12.79 | 74 | 64.38 | 27.25 | 6.04 | 36.46 | 150 | 258 | P | V |
| 2422MHz | | 2387.67 | 43.88 | -10.12 | 54 | 47.05 | 27.25 | 6.04 | 36.46 | 150 | 258 | A | V |
| | * | 2422 | 102.59 | - | - | 105.58 | 27.37 | 6.09 | 36.45 | 150 | 258 | P | V |
| | * | 2422 | 90.78 | - | - | 93.77 | 27.37 | 6.09 | 36.45 | 150 | 258 | A | V |
| | | 2486.44 | 51.28 | -22.72 | 74 | 54.02 | 27.54 | 6.17 | 36.45 | 150 | 258 | P | V |
| | | 2486.52 | 34.15 | -19.85 | 54 | 36.89 | 27.54 | 6.17 | 36.45 | 150 | 258 | A | V |
| | | 2387.22 | 56.45 | -17.55 | 74 | 59.62 | 27.25 | 6.04 | 36.46 | 150 | 356 | P | H |
| | | 2387.94 | 38.12 | -15.88 | 54 | 41.29 | 27.25 | 6.04 | 36.46 | 150 | 356 | A | H |
| | * | 2437 | 100.19 | - | - | 103.13 | 27.42 | 6.09 | 36.45 | 150 | 356 | P | H |
| | * | 2437 | 89.3 | - | - | 92.24 | 27.42 | 6.09 | 36.45 | 150 | 356 | A | H |
| 802.11n | | 2487.04 | 58.76 | -15.24 | 74 | 61.5 | 27.54 | 6.17 | 36.45 | 150 | 356 | P | H |
| HT40 | | 2483.52 | 39.71 | -14.29 | 54 | 42.45 | 27.54 | 6.17 | 36.45 | 150 | 356 | A | H |
| CH 06 | | 2387.58 | 57.12 | -16.88 | 74 | 60.29 | 27.25 | 6.04 | 36.46 | 280 | 258 | P | V |
| 2437MHz | | 2387.67 | 38.69 | -15.31 | 54 | 41.86 | 27.25 | 6.04 | 36.46 | 280 | 258 | A | V |
| | * | 2437 | 102.27 | - | - | 105.21 | 27.42 | 6.09 | 36.45 | 280 | 258 | P | V |
| | * | 2437 | 91.27 | - | - | 94.21 | 27.42 | 6.09 | 36.45 | 280 | 258 | A | V |
| | | 2485.72 | 56.83 | -17.17 | 74 | 59.57 | 27.54 | 6.17 | 36.45 | 280 | 258 | P | V |
| | | 2483.52 | 38.46 | -15.54 | 54 | 41.2 | 27.54 | 6.17 | 36.45 | 280 | 258 | A | V |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11n HT40 CH 09 2452MHz | | 2385.15 | 51.11 | -22.89 | 74 | 54.34 | 27.19 | 6.04 | 36.46 | 150 | 356 | P | H |
| | | 2385.51 | 33.37 | -20.63 | 54 | 36.54 | 27.25 | 6.04 | 36.46 | 150 | 356 | A | H |
| | * | 2452 | 99.52 | - | - | 102.42 | 27.42 | 6.13 | 36.45 | 150 | 356 | P | H |
| | * | 2452 | 89 | - | - | 91.9 | 27.42 | 6.13 | 36.45 | 150 | 356 | A | H |
| | | 2483.6 | 66.24 | -7.76 | 74 | 68.98 | 27.54 | 6.17 | 36.45 | 150 | 356 | P | H |
| | | 2483.56 | 45.89 | -8.11 | 54 | 48.63 | 27.54 | 6.17 | 36.45 | 150 | 356 | A | H |
| | | 2388.93 | 53.51 | -20.49 | 74 | 56.68 | 27.25 | 6.04 | 36.46 | 280 | 256 | P | V |
| | | 2389.65 | 34.57 | -19.43 | 54 | 37.74 | 27.25 | 6.04 | 36.46 | 280 | 256 | A | V |
| | * | 2452 | 101.85 | - | - | 104.75 | 27.42 | 6.13 | 36.45 | 280 | 256 | P | V |
| | * | 2452 | 90.57 | - | - | 93.47 | 27.42 | 6.13 | 36.45 | 280 | 256 | A | V |
| | | 2484.96 | 64.37 | -9.63 | 74 | 67.11 | 27.54 | 6.17 | 36.45 | 280 | 256 | P | V |
| | | 2483.52 | 44.47 | -9.53 | 54 | 47.21 | 27.54 | 6.17 | 36.45 | 280 | 256 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802.11n | | 4844 | 45.63 | -28.37 | 74 | 42.01 | 31.29 | 8.26 | 35.93 | 126 | 248 | P | H |
| HT40 | | 7266 | 49.68 | -24.32 | 74 | 40.04 | 35.91 | 10.24 | 36.51 | 185 | 252 | P | H |
| CH 03 | | 4844 | 45.89 | -28.11 | 74 | 42.27 | 31.29 | 8.26 | 35.93 | 126 | 248 | P | V |
| 2422MHz | | 7266 | 50.29 | -23.71 | 74 | 40.65 | 35.91 | 10.24 | 36.51 | 185 | 252 | P | V |
| 802.11n | | 4874 | 44.98 | -29.02 | 74 | 41.25 | 31.36 | 8.29 | 35.92 | 132 | 224 | P | H |
| HT40 | | 7311 | 49.31 | -24.69 | 74 | 39.59 | 35.96 | 10.29 | 36.53 | 119 | 347 | P | H |
| CH 06 | | 4874 | 44.93 | -29.07 | 74 | 41.2 | 31.36 | 8.29 | 35.92 | 132 | 224 | P | V |
| 2437MHz | | 7311 | 48.99 | -25.01 | 74 | 39.27 | 35.96 | 10.29 | 36.53 | 119 | 347 | P | V |
| 802.11n | | 4904 | 45.45 | -28.55 | 74 | 41.61 | 31.43 | 8.32 | 35.91 | 125 | 214 | P | H |
| HT40 | | 7356 | 49.31 | -24.69 | 74 | 39.54 | 36.03 | 10.31 | 36.57 | 127 | 315 | P | H |
| CH 09 | | 4904 | 45.21 | -28.79 | 74 | 41.37 | 31.43 | 8.32 | 35.91 | 125 | 214 | P | V |
| 2452MHz | | 7356 | 49.37 | -24.63 | 74 | 39.6 | 36.03 | 10.31 | 36.57 | 127 | 315 | P | 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 802.11b (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 | | 124.09 | 35.99 | -7.51 | 43.5 | 51.97 | 12.78 | 1.74 | 30.5 | 165 | 321 | P | H |
| | | 273.47 | 32.12 | -13.88 | 46 | 46.42 | 13.67 | 2.35 | 30.32 | | | P | H |
| | | 489.78 | 22.95 | -23.05 | 46 | 32.31 | 17.73 | 2.87 | 29.96 | | | P | H |
| | | 633.34 | 21.94 | -24.06 | 46 | 28.89 | 19.47 | 3.31 | 29.73 | | | P | H |
| | | 782.72 | 22.8 | -23.2 | 46 | 27.98 | 20.69 | 3.59 | 29.46 | | | P | H |
| | | 945.68 | 23.24 | -22.76 | 46 | 26.32 | 22.15 | 3.93 | 29.16 | | | P | H |
| | | 62.98 | 36.02 | -3.98 | 40 | 58.79 | 6.45 | 1.33 | 30.55 | 185 | 261 | P | V |
| | | 148.34 | 32.94 | -10.56 | 43.5 | 49.42 | 12.14 | 1.85 | 30.47 | | | P | V |
| | | 276.38 | 29.18 | -16.82 | 46 | 43.34 | 13.8 | 2.35 | 30.31 | | | P | V |
| | | 422.85 | 20.23 | -25.77 | 46 | 31.26 | 16.27 | 2.78 | 30.08 | | | P | V |
| | | 713.85 | 21.72 | -24.28 | 46 | 27.95 | 19.9 | 3.49 | 29.62 | | | P | V |
| | | 880.69 | 23.6 | -22.4 | 46 | 27.21 | 21.85 | 3.81 | 29.27 | | | P | 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".**