# FCC RF Test Report

| | | |
|---|---|---|
| APPLICANT | : | NEC Corp. of America |
| EQUIPMENT | : | GSM / WCDMA Mobile Phone |
| BRAND NAME | : | NEC CASIO Mobile Communications, Ltd. |
| MODEL NAME | : | KMP7R4H1-1A |
| FCC ID | : | A98-FWP7935 |
| STANDARD | : | FCC Part 15 Subpart C §15.247 |
| CLASSIFICATION | : | (DTS) Digital Transmission System |

The product was received on Sep. 05, 2012 and completely tested on Oct. 28, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

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

Reviewed by:

Jones Tsai / Manager

Testing Laboratory 1190

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

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# REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR282414-02C | Rev. 01 | Initial issue of report | Nov. 07, 2012 |
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# SUMMARY OF TEST RESULT

| Report Section | FCC Rule | IC Rule | Description | Limit | Result | Remark |
|---|---|---|---|---|---|---|
| 3.1 | 15.247(a)(2) | A8.2(a) | 6dB Bandwidth | ≥ 0.5MHz | Pass | - |
| 3.2 | 15.247(b) | A8.4 | Power Output Measurement | ≤ 30dBm | Pass | - |
| 3.3 | 15.247(e) | A8.2(b) | Power Spectral Density | ≤ 8dBm/3kHz | Pass | - |
| 3.4 | 15.247(d) | A8.5 | Conducted Band Edges | ≤ 20dBc | Pass | - |
| | | | Conducted Spurious Emission | | Pass | - |
| 3.5 | 15.247(d) | A8.5 | Radiated Band Edges | 15.209(a) & 15.247(d) | Pass | - |
| | | | Radiated Spurious Emission | | Pass | Under limit 1.85 dB at 2390.000 MHz |
| 3.6 | 15.207 | Gen 7.2.4 | AC Conducted Emission | 15.207(a) | Pass | Under limit 10.00 dB at 1.814 MHz |
| 3.7 | 15.203 & 15.247(b) | A8.4 | Antenna Requirement | N/A | Pass | - |

# 1 General Description

## 1.1 Applicant

**NEC Corp. of America**
Mobile Communications Division, 6535 N. State Highway 161, Irving Texas 75039, United States

## 1.2 Manufacturer

**Arima Communications Corp.**
6F., No. 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

## 1.3 Feature of Equipment Under Test

| Product Feature | |
|---|---|
| **Equipment** | GSM / WCDMA Mobile Phone |
| **Brand Name** | NEC CASIO Mobile Communications, Ltd.. |
| **Model Name** | KMP7R4H1-1A |
| **Sample 1** | EUT with black color |
| **Sample 2** | EUT with white color |
| **Sample 3** | EUT with brown color |
| **FCC ID** | A98-FWP7935 |
| **EUT supports Radios application** | GSM/GPRS/WCDMA/HSPA/<br>WLAN 11bgn / Bluetooth / NFC |
| **HW Version** | 8007MB-004 |
| **SW Version** | AN0020220r |
| **EUT Stage** | Identical Prototype |

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

| Product Specification subjective to this standard | |
|---|---|
| **Tx/Rx Frequency Range** | 2412 MHz ~ 2462 MHz |
| **Number of Channels** | 11 |
| **Carrier Frequency of Each Channel** | 2412+(n-1)*5 MHz; n=1~11 |
| **Maximum Output Power to Antenna** | 802.11b : 17.26 dBm (0.0532 W)<br>802.11g : 21.47 dBm (0.1403 W)<br>802.11n HT20 : 20.45 dBm (0.1109 W) |
| **Antenna Type** | Chip Antenna type with gain -1.30 dBi |
| **Type of Modulation** | 802.11b : DSSS (BPSK / QPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) |

## 1.4 Testing Site

| Test Site | SPORTON INTERNATIONAL INC. | | | |
|---|---|---|---|---|
| Test Site Location | No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,<br>Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL: +886-3-3273456 / FAX: +886-3-3284978 | | | |
| Test Site No. | Sporton Site No. | | | FCC/IC Registration No. |
| | TH02-HY | CO05-HY | 03CH07-HY | 722060/4086B-1 |

## 1.5 Applied Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v01
- FCC TCB Workshop 2012, April
- ANSI C63.4-2003 and ANSI C63.10-2009
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 3

**Remark:**

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

## 1.6 Ancillary Equipment List

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|---|---|---|---|---|---|---|
| 1. | System Simulator | R&S | CMU 200 | N/A | N/A | Unshielded, 1.8 m |
| 2. | Bluetooth Earphone | Sony Ericsson | MW600 | PY70DA2029 | N/A | N/A |
| 3. | WLAN AP | D-Link | DIR-628 | KA2DIR628A2 | N/A | Unshielded, 1.8 m |
| 4. | Notebook | DELL | Latitude E6320 | FCC DoC | N/A | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 5. | Earphone | NTT | Stereo | FCC DoC | N/A | N/A |

# 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). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

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

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

## 2.1 Carrier Frequency Channel

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

## 2.2 Pre-Scanned RF Power

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

| 2.4GHz 802.11b mode | | | | |
|---|---|---|---|---|
| Data Rate (MHz) | 1M bps | 2M bps | 5.5M bps | 11M bps |
| Peak Power (dBm) | 17.26 | 17.24 | 17.25 | 17.25 |

| 2.4GHz 802.11g mode | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | 6M bps | 9M bps | 12M bps | 18M bps | 24M bps | 36M bps | 48M bps | 54M bps |
| Peak Power (dBm) | 21.47 | 21.38 | 21.35 | 21.44 | 21.43 | 21.38 | 21.42 | 21.43 |

| 2.4GHz 802.11n HT20 mode | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Data Rate (MHz) | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| Peak Power (dBm) | 400GI | 20.40 | 20.29 | 20.38 | 20.34 | 20.37 | 20.27 | 20.35 | 20.31 |
| | 800GI | 20.45 | 20.3 | 20.36 | 20.41 | 20.06 | 20.38 | 20.33 | 20.25 |

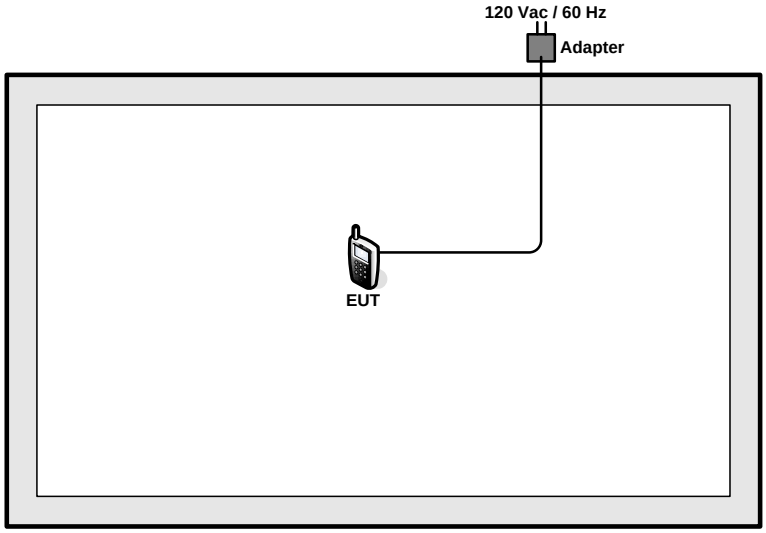
## 2.3 Test Mode

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

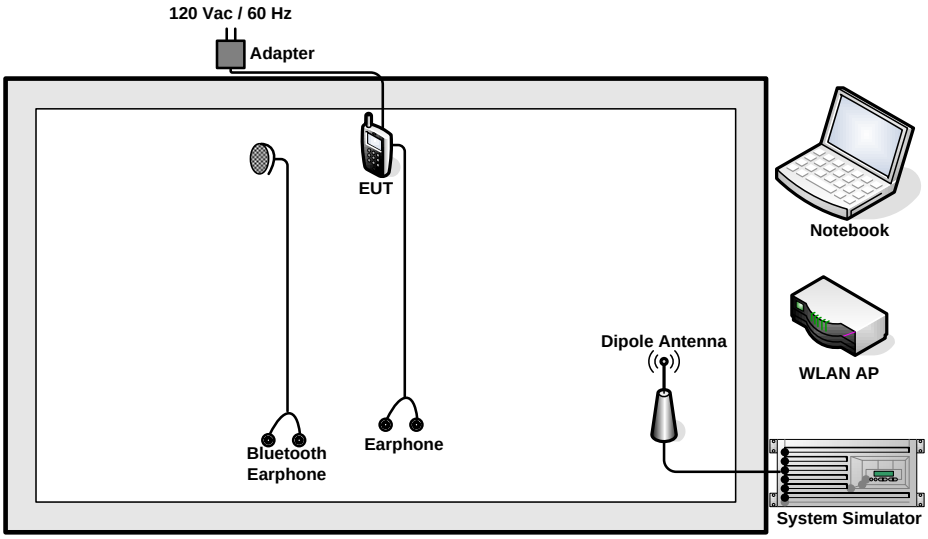
| Test Cases | | | | |
|---|---|---|---|---|
| | **Test Items** | **Mode** | **Data Rate** | **Test Channel** |
| **Conducted TCs** | **6dB and 99% BW / Power Spectral Density** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/6/11** |
| | **Output Power** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/6/11** |
| | **Conducted Band EDGE** | **802.11b** | **1 Mbps** | **1/11** |
| | | **802.11g** | **6 Mbps** | **1/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/11** |
| | **Conducted Spurious Emission** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/6/11** |
| **Radiated TCs** | **Radiated Band EDGE** | **802.11b** | **1 Mbps** | **1/11** |
| | | **802.11g** | **6 Mbps** | **1/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/11** |
| | **Radiated Spurious Emission** | **802.11b** | **1 Mbps** | **1/6/11** |
| | | **802.11g** | **6 Mbps** | **1/6/11** |
| | | **802.11n HT20** | **6.5 Mbps** | **1/6/11** |
| **AC Conducted Emission** | Mode 1 : WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + Charging Cable from Adapter | | | |

## 2.4 Connection Diagram of Test System

**<WLAN Tx Mode>**




**<AC Conducted Emission Mode>**




## 2.5 RF Utility

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

# 3 Test Result

## 3.1 6dB Bandwidth Measurement

### 3.1.1 Limit of 6dB Bandwidth

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

### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1-5% of the emission bandwidth (EBW).Set the Video bandwidth (VBW) ≥ 3 * RBW. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 KHz.

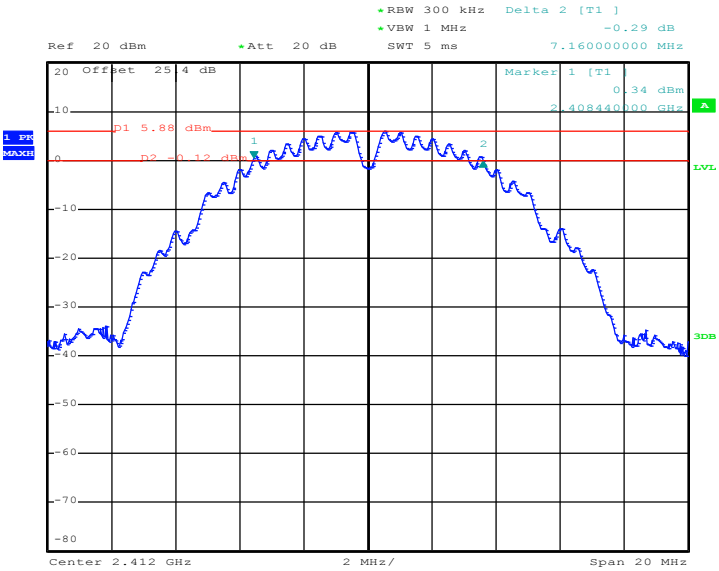
### 3.1.4 Test Setup

### 3.1.5 Test Result of 6dB Bandwidth

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

| Channel | Frequency (MHz) | 802.11b 6dB Bandwidth (MHz) | 6dB Bandwidth Min. Limit (MHz) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 7.16 | 0.5 | Pass |
| 06 | 2437 | 7.16 | 0.5 | Pass |
| 11 | 2462 | 7.16 | 0.5 | Pass |

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

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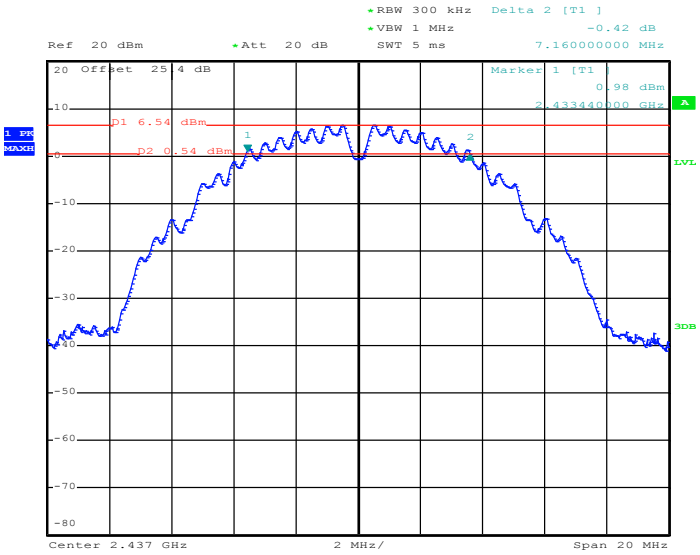
## 6 dB Bandwidth Plot on 802.11b Channel 06

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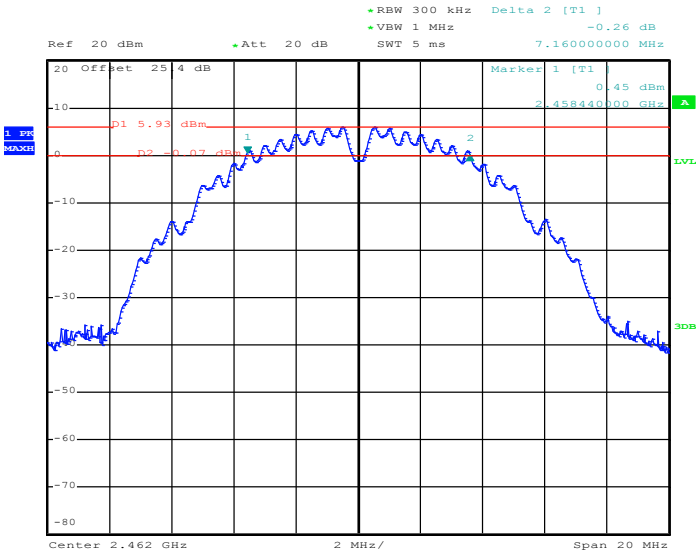
## 6 dB Bandwidth Plot on 802.11b Channel 11

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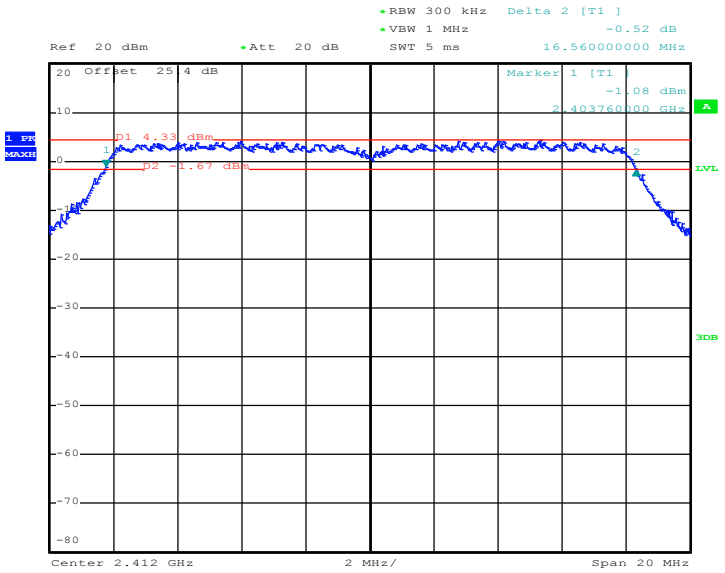
| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

| Channel | Frequency (MHz) | 802.11g 6dB Bandwidth (MHz) | 6dB Bandwidth Min. Limit (MHz) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 16.56 | 0.5 | Pass |
| 06 | 2437 | 16.44 | 0.5 | Pass |
| 11 | 2462 | 16.68 | 0.5 | Pass |

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

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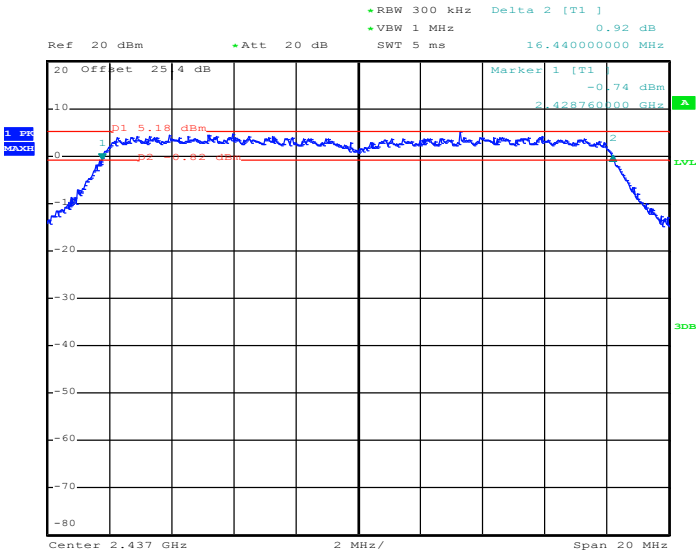
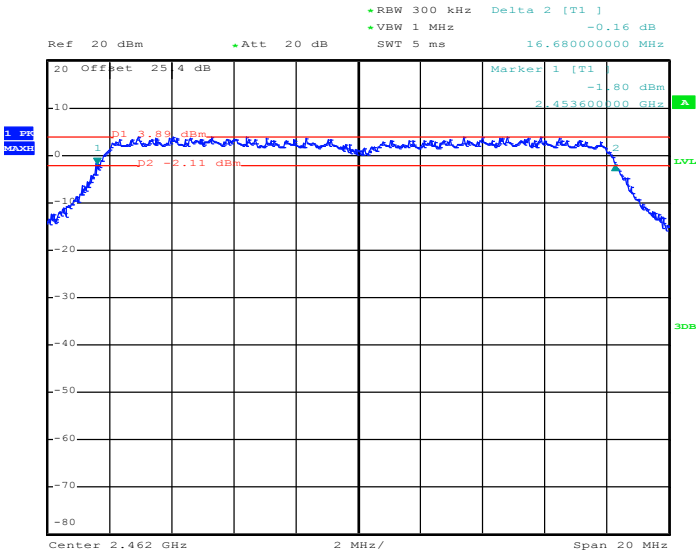
## 6 dB Bandwidth Plot on 802.11g Channel 06




Date: 27.SEP.2012 00:45:24

## 6 dB Bandwidth Plot on 802.11g Channel 11

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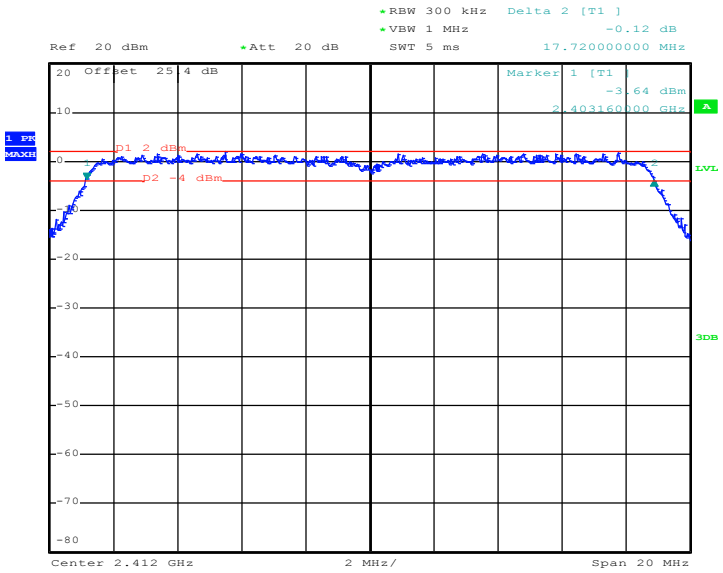
| Test Mode : | 802.11n HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

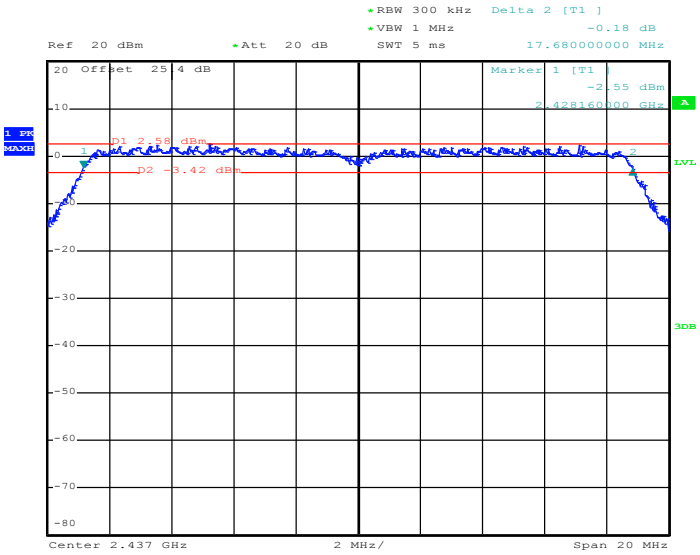
| Channel | Frequency (MHz) | 2.4GHz 802.11n HT20 6dB Bandwidth (MHz) | 6dB Bandwidth Min. Limit (MHz) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 17.72 | 0.5 | Pass |
| 06 | 2437 | 17.68 | 0.5 | Pass |
| 11 | 2462 | 17.72 | 0.5 | Pass |

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



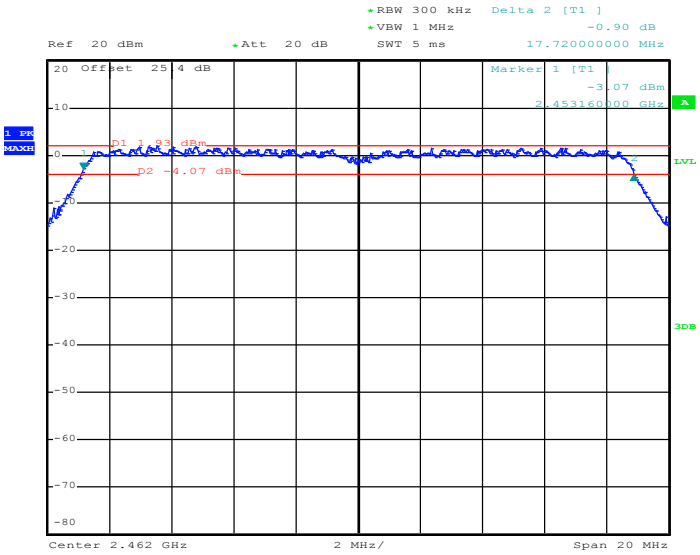

Date: 27.SEP.2012 00:56:38

## 6 dB Bandwidth Plot on 802.11n HT20 Channel 06




Date: 27.SEP.2012 00:59:53

## 6 dB Bandwidth Plot on 802.11n HT20 Channel 11

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## 3.2 Output Power Measurement

### 3.2.1 Limit of Output Power

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

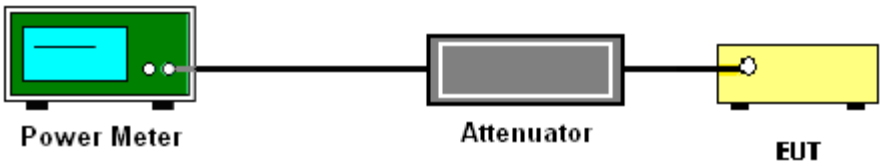
### 3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the power meter by a low loss cable
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

### 3.2.4 Test Setup



### 3.2.5 Test Result of Peak Output Power

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

| Channel | Frequency (MHz) | 802.11b Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 16.56 | 30 | Pass |
| 06 | 2437 | 17.26 | 30 | Pass |
| 11 | 2462 | 16.71 | 30 | Pass |

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

| Channel | Frequency (MHz) | 802.11g Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 21.07 | 30 | Pass |
| 06 | 2437 | 21.47 | 30 | Pass |
| 11 | 2462 | 21.04 | 30 | Pass |

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

| Channel | Frequency (MHz) | 2.4GHz 802.11n HT20 Peak Output Power (dBm) | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|
| 01 | 2412 | 19.65 | 30 | Pass |
| 06 | 2437 | 20.45 | 30 | Pass |
| 11 | 2462 | 20.12 | 30 | Pass |

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

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

| Channel | Frequency (MHz) | 802.11b Average Output Power (dBm) |
|---|---|---|
| 01 | 2412 | 12.80 |
| 06 | 2437 | 13.47 |
| 11 | 2462 | 12.93 |

| Test Mode : | 802.11g | Temperature : | 24~26 |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53 |
| Duty Cycle: | 98.96% | Duty Factor: | 0.05dB |

| Channel | Frequency (MHz) | 802.11g Average Output Power (dBm) |
|---|---|---|
| 01 | 2412 | 12.15 |
| 06 | 2437 | 12.68 |
| 11 | 2462 | 12.25 |

| Test Mode : | 802.11n HT20 | Temperature : | 24~26 |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53 |
| Duty Cycle: | 98.96% | Duty Factor: | 0.05dB |

| Channel | Frequency (MHz) | 802.11n HT20 Average Output Power (dBm) |
|---|---|---|
| 01 | 2412 | 10.12 |
| 06 | 2437 | 10.71 |
| 11 | 2462 | 10.25 |

## 3.3 Power Spectral Density Measurement

### 3.3.1 Limit of Power Spectral Density

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

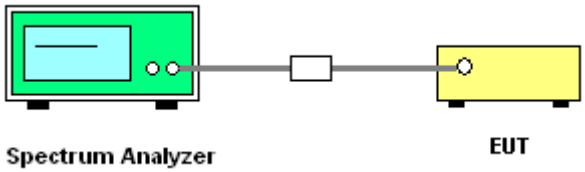
### 3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

### 3.3.3 Test Procedures

1. The testing follows Measurement Procedure 5.3.1 (Peak PSD) of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable. 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. Video bandwidth (VBW) >= 300 KHz In order to make an accurate measurement, set the span to 5-30% greater than Emission Bandwidth (EBW)
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 in any 100 kHz band segment within the fundamental EBW.
6. Record the measurement data derived from spectrum analyzer.
7. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (3 kHz/100 kHz = -15.2 dB).

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

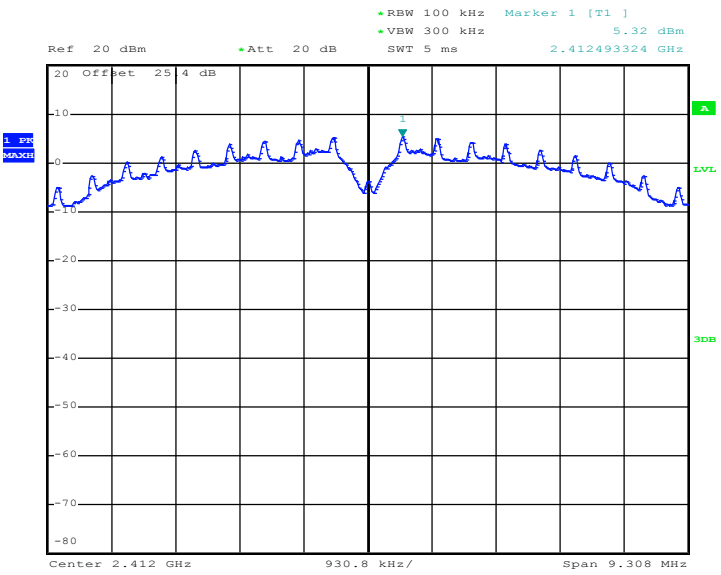
| Test Mode : | 802.11b | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

| Channel | Frequency (MHz) | 802.11b Power Density | | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|---|
| | | Measured PSD/100KHz (dBm) | PSD/3KHz (dBm) | | |
| 01 | 2412 | 5.32 | - | 8 | Pass |
| 06 | 2437 | 6.34 | - | 8 | Pass |
| 11 | 2462 | 5.44 | - | 8 | Pass |

***Note:***

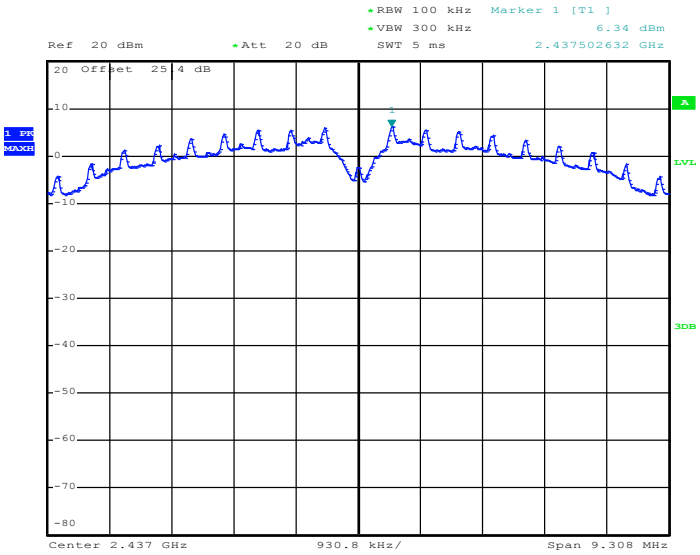
1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.*
3. *Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Video bandwidth VBW =300 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)*
4. *When above step result is Pass limit, 8dBm/3KHz, and then the PSD is not required to re-test by RBW=3KHz. Otherwise, the PSD shall be re-measured by RBW=3KHz, and compare to the limit line.*

**PSD Plot on 802.11b Channel 01**



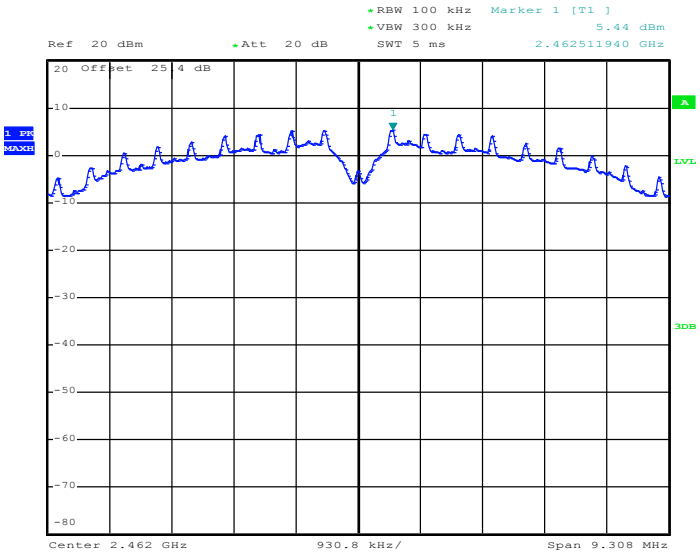

Date: 27.SEP.2012 00:04:04

## PSD Plot on 802.11b Channel 06




Date: 27.SEP.2012 00:20:13

## PSD Plot on 802.11b Channel 11




Date: 27.SEP.2012 00:36:30

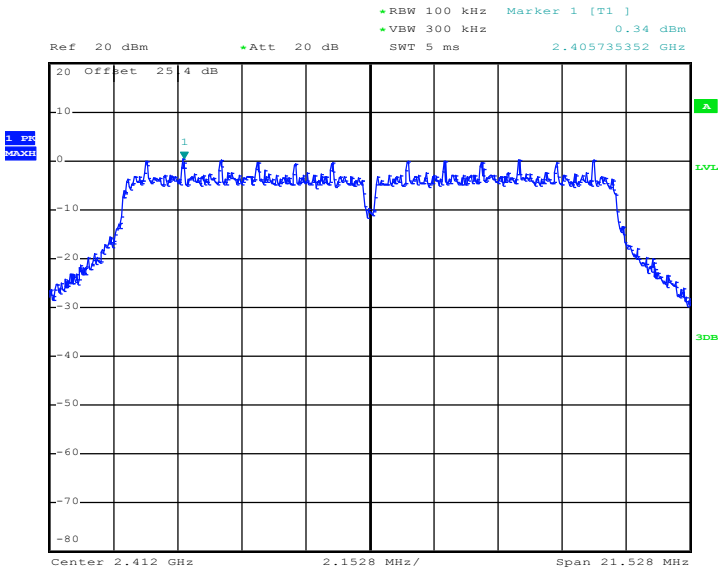
| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

| Channel | Frequency (MHz) | 802.11g Power Density | | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|---|
| | | Measured PSD/100KHz (dBm) | PSD/3KHz (dBm) | | |
| 01 | 2412 | 0.34 | - | 8 | Pass |
| 06 | 2437 | 0.66 | - | 8 | Pass |
| 11 | 2462 | 0.09 | - | 8 | Pass |

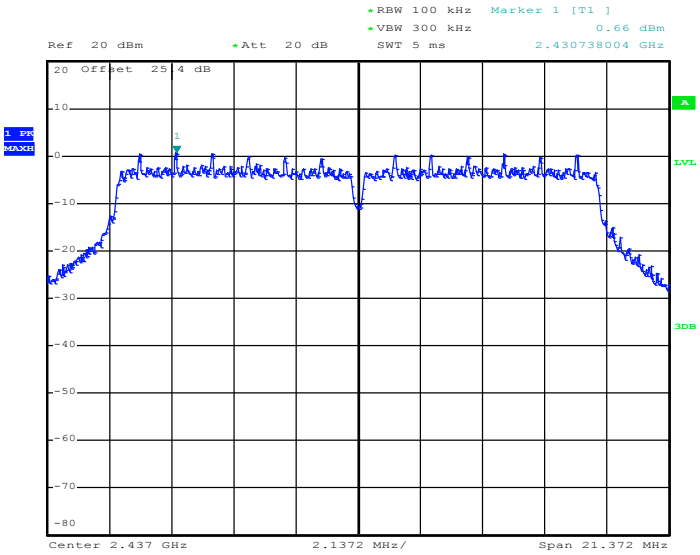
***Note:***

1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.*
3. *Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Video bandwidth VBW =300 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)*
4. *When above step result is Pass limit, 8dBm/3KHz, and then the PSD is not required to re-test by RBW=3KHz. Otherwise, the PSD shall be re-measured by RBW=3KHz, and compare to the limit line.*

**PSD Plot on 802.11g Channel 01**

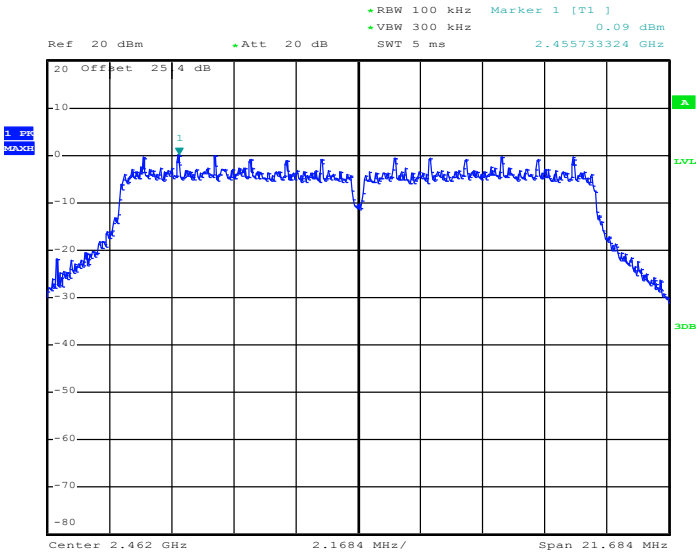


## PSD Plot on 802.11g Channel 06




Date: 27.SEP.2012 00:45:45

## PSD Plot on 802.11g Channel 11




Date: 27.SEP.2012 00:41:07

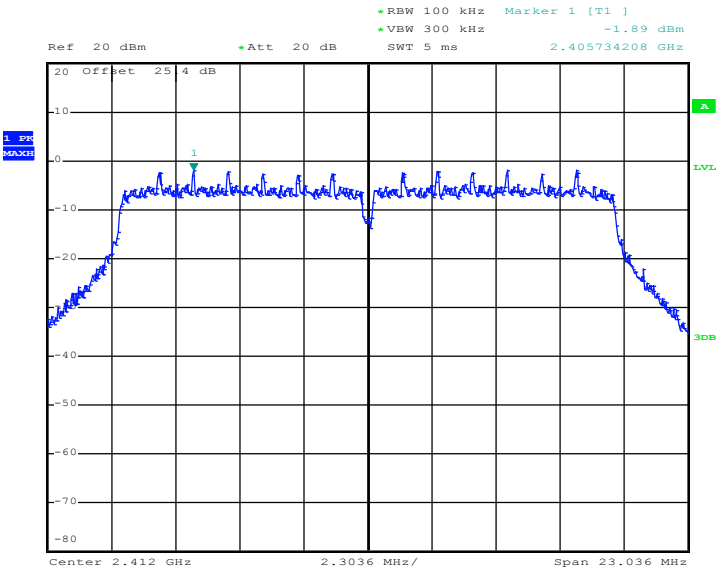
| Test Mode : | 802.11n HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Engineer : | Bill Kuo | Relative Humidity : | 50~53% |

| Channel | Frequency (MHz) | 802.11n HT20 Power Density | | Max. Limits (dBm) | Pass/Fail |
|---|---|---|---|---|---|
| | | Measured PSD/100KHz (dBm) | PSD/3KHz (dBm) | | |
| 01 | 2412 | -1.89 | - | 8 | Pass |
| 06 | 2437 | -1.20 | - | 8 | Pass |
| 11 | 2462 | -1.71 | - | 8 | Pass |

***Note:***

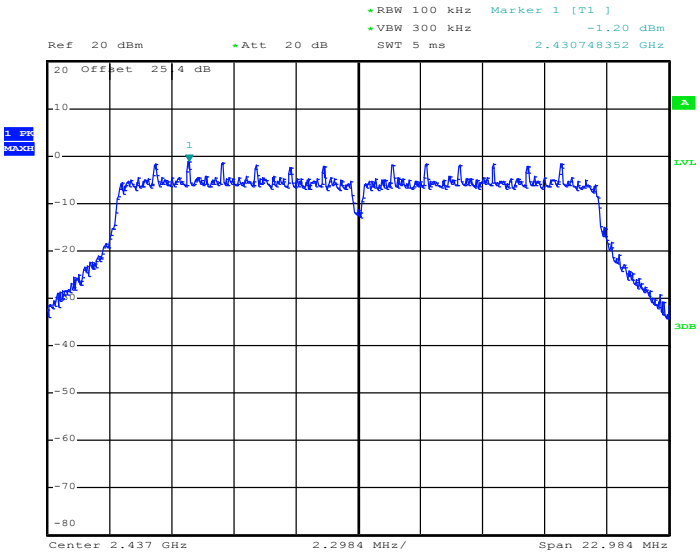
1. *Measured power density (dBm) has offset with cable loss.*
2. *The Measured power density (dBm)/ 100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.*
3. *Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Video bandwidth VBW =300 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)*
4. *When above step result is Pass limit, 8dBm/3KHz, and then the PSD is not required to re-test by RBW=3KHz. Otherwise, the PSD shall be re-measured by RBW=3KHz, and compare to the limit line.*

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



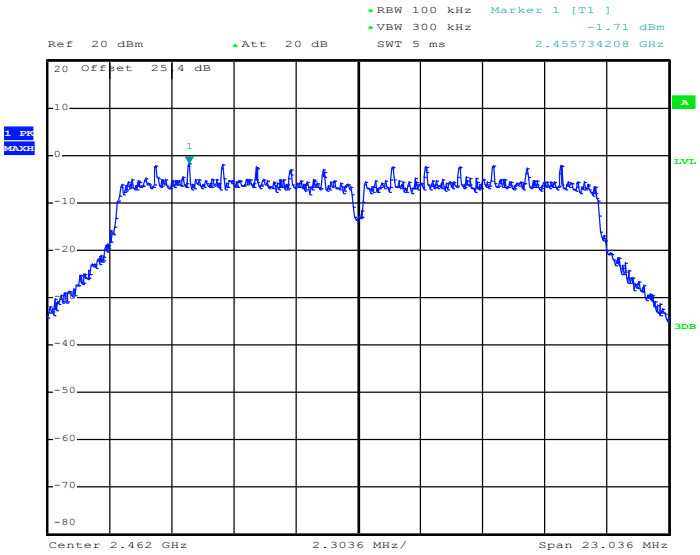

Date: 27.SEP.2012 00:56:56

## PSD Plot on 802.11n HT20 Channel 06




Date: 27.SEP.2012 01:00:11

## PSD Plot on 802.11n HT20 Channel 11




Date: 27.SEP.2012 01:04:29

# 3.4 Conducted Band Edges and Spurious Emission Measurement

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

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

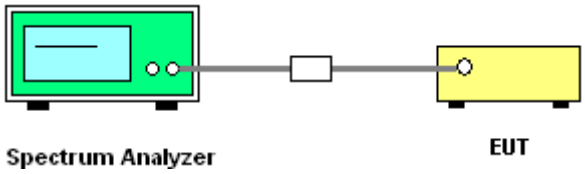
## 3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.4.3 Test Procedures

1. The testing follows the guidelines in the Measurement Procedure of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance and TCB Workshop 2012, April.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 KHz, VBW=300 KHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz, when maximum peak conducted output power procedure is used. The attenuation is set to 30dB, when maximum conducted output power procedure is used.
4. Measure and record the results in the test report.

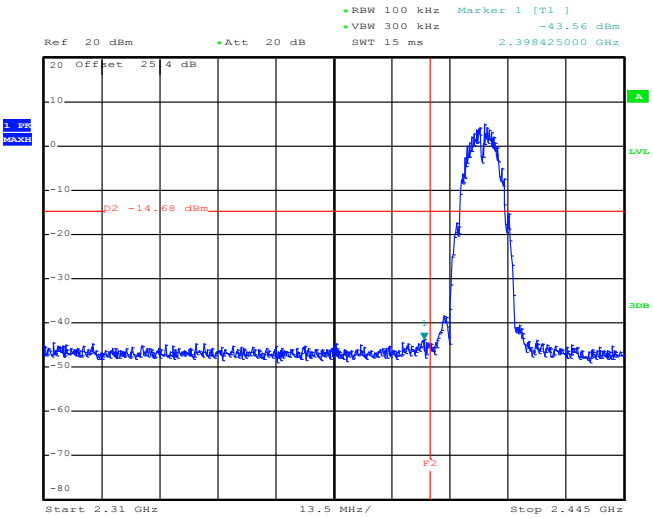
## 3.4.4 Test Setup



### 3.4.5 Test Plots of Conducted Band Edges

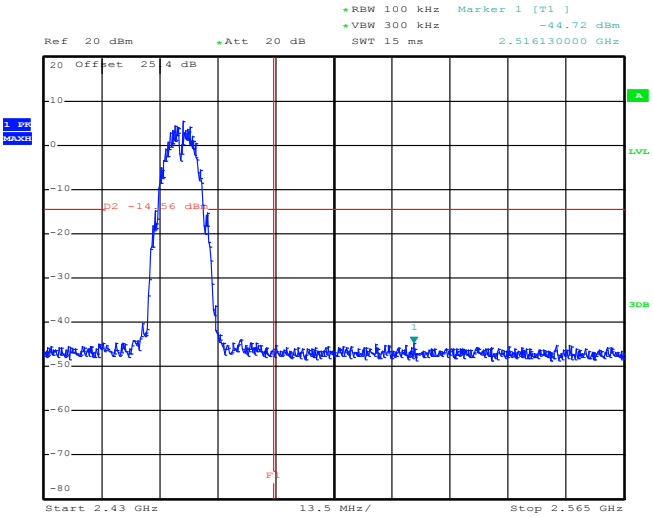
| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 24~26℃ |
| **Test Band :** | Low and High | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 and 11 | **Test Engineer :** | Bill Kuo |

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




Date: 27.SEP.2012 00:06:33

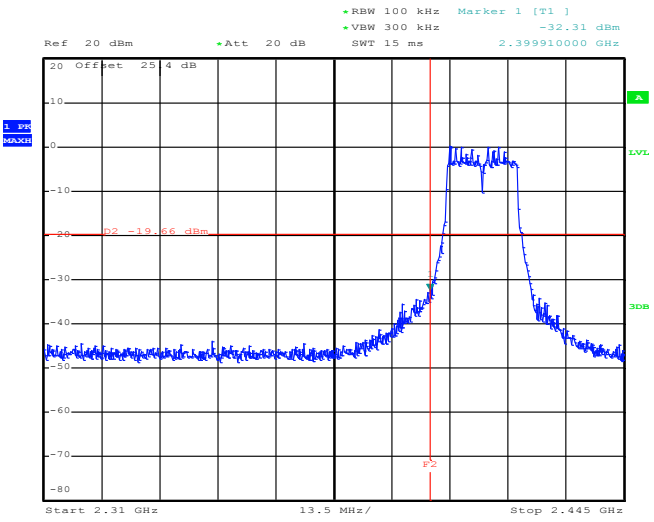
**High Band Edge Plot on 802.11b Channel 11**




Date: 27.SEP.2012 00:36:51

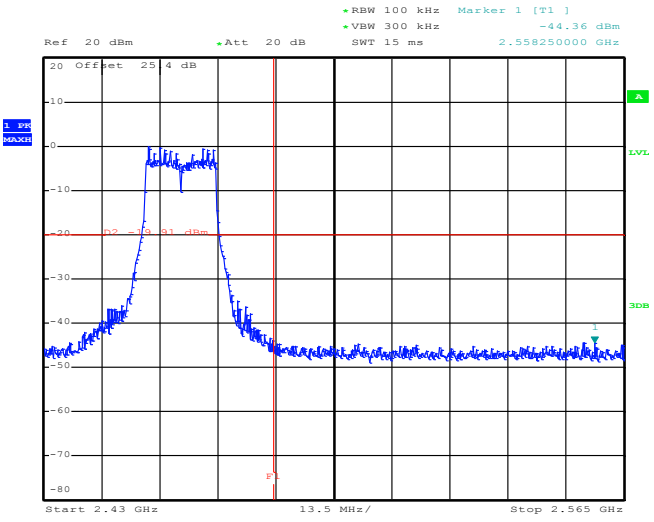
| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11g | **Temperature :** | 24~26℃ |
| **Test Band :** | Low and High | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 and 11 | **Test Engineer :** | Bill Kuo |

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




Date: 27.SEP.2012 00:52:46

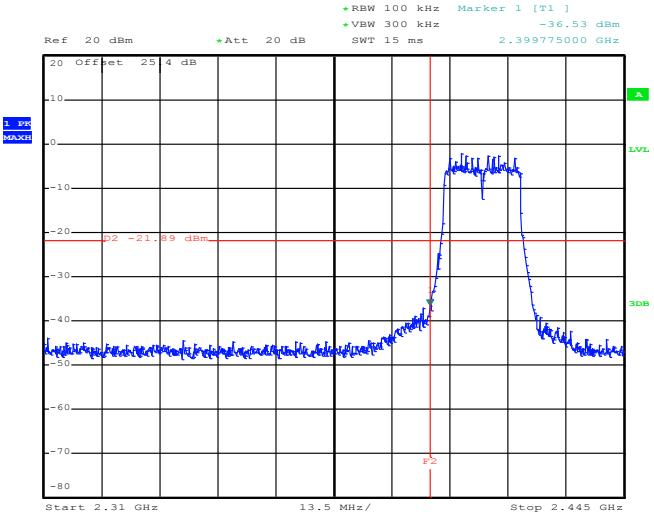
**High Band Edge Plot on 802.11g Channel 11**




Date: 27.SEP.2012 00:41:23

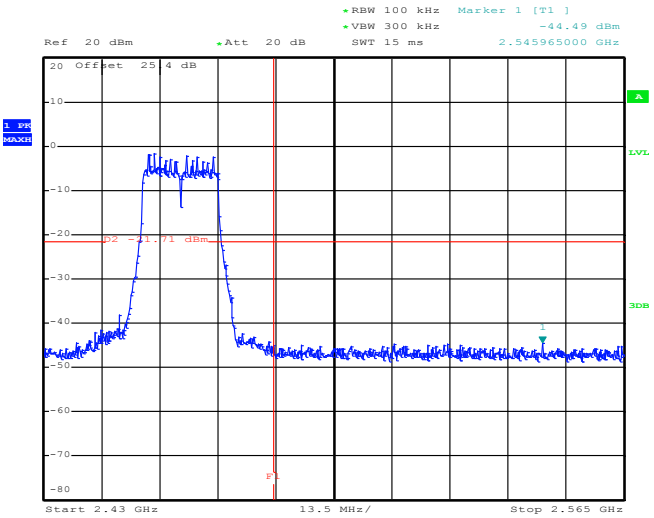
| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 24~26℃ |
| **Test Band :** | Low and High | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 and 11 | **Test Engineer :** | Bill Kuo |

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




Date: 27.SEP.2012 00:57:12

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



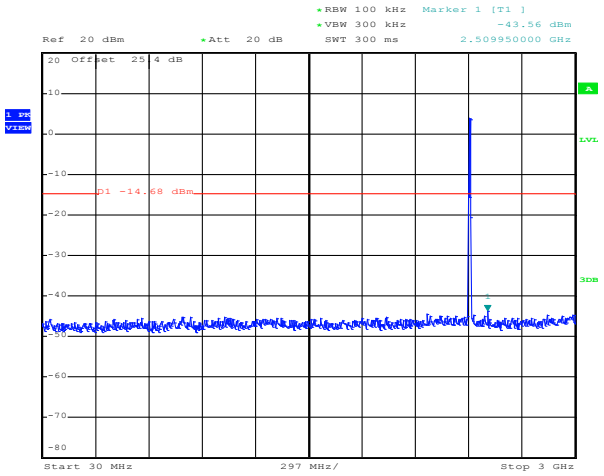

Date: 27.SEP.2012 01:04:43

## 3.4.6 Test Plots of Spurious Emission

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

**802.11b 30 MHz~3 GHz**

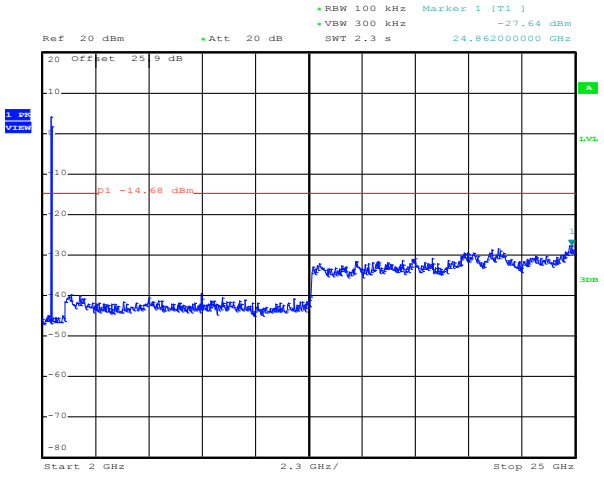
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:06:53

**802.11b 2 GHz~25 GHz**

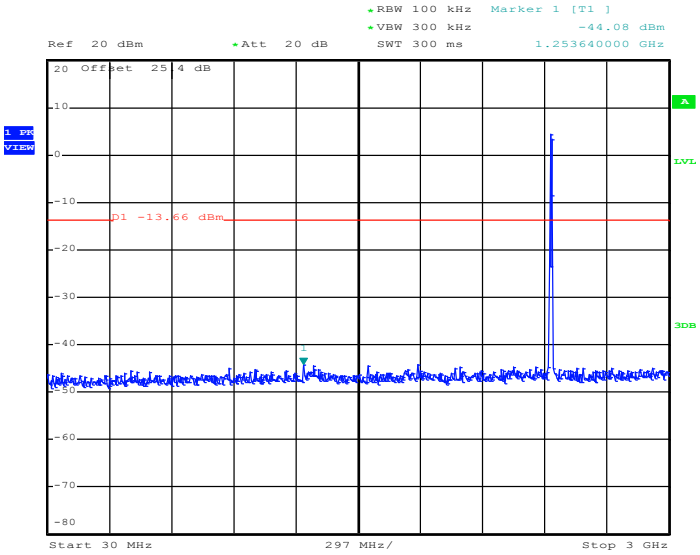
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:07:11

### 802.11b 30 MHz~3 GHz

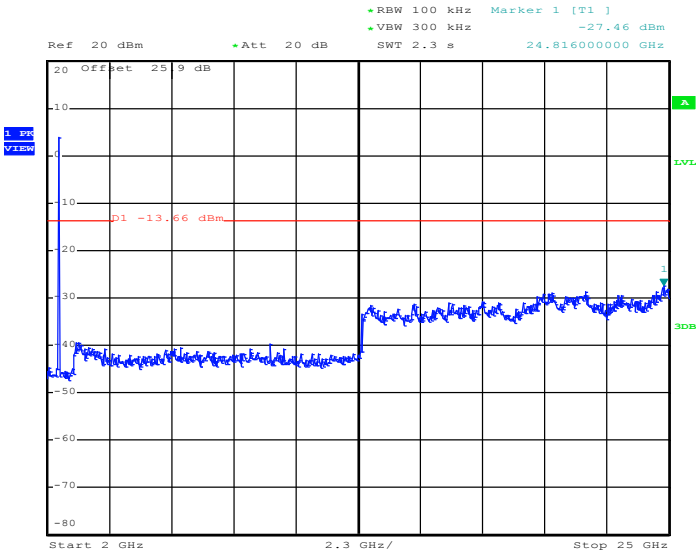
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 00:20:33

### 802.11b 2 GHz~25 GHz

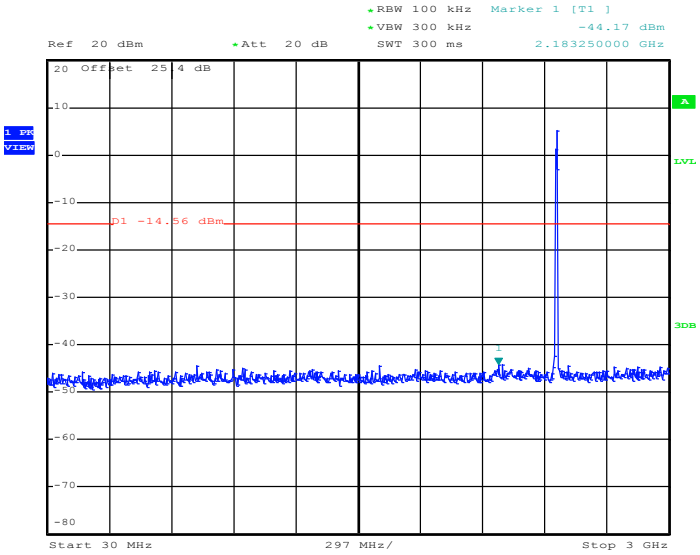
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 00:20:50

### 802.11b 30 MHz~3 GHz

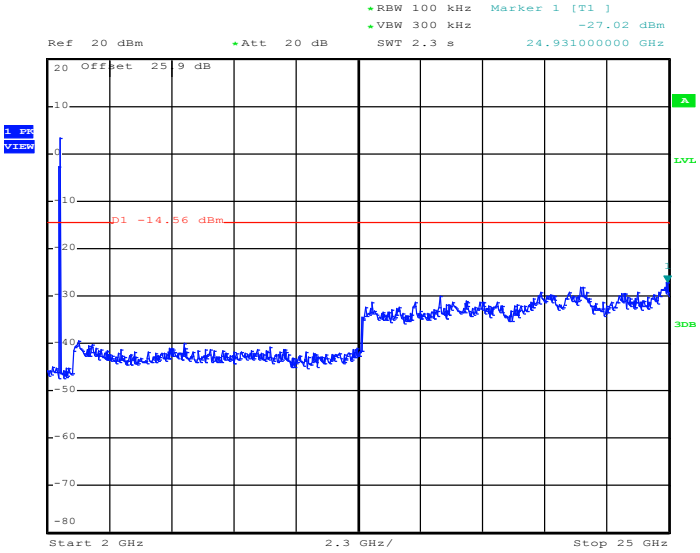
### Conducted Spurious Emission Plot on Channel 11




Date: 27.SEP.2012 00:37:10

### 802.11b 2 GHz~25 GHz

### Conducted Spurious Emission Plot on Channel 11

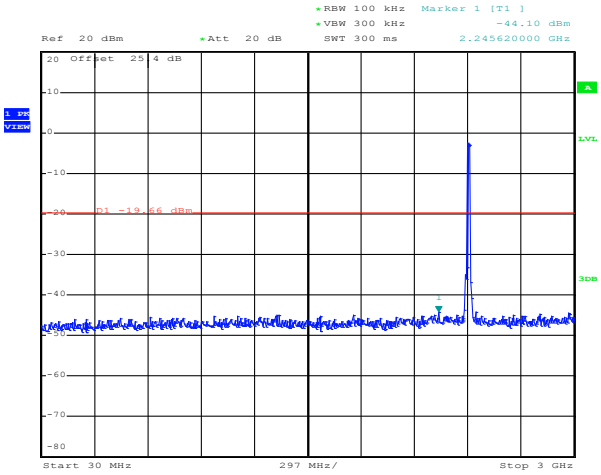



Date: 27.SEP.2012 00:37:28

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

**802.11g 30 MHz~3 GHz**

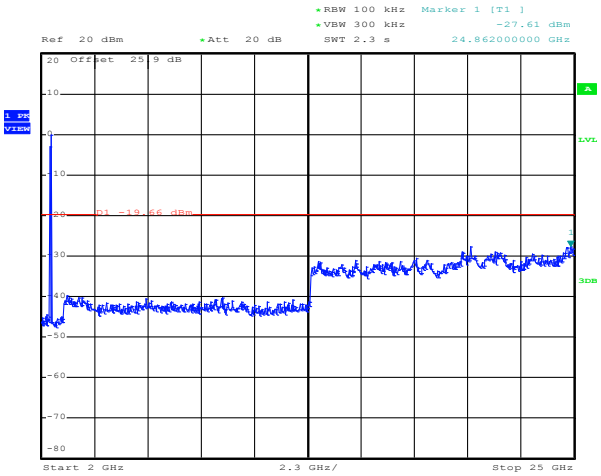
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:53:07

**802.11g 2 GHz~25 GHz**

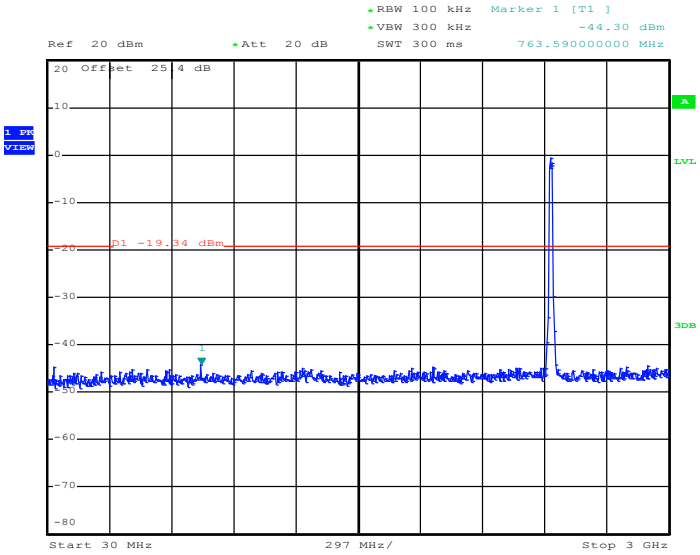
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:53:24

### 802.11g 30 MHz~3 GHz

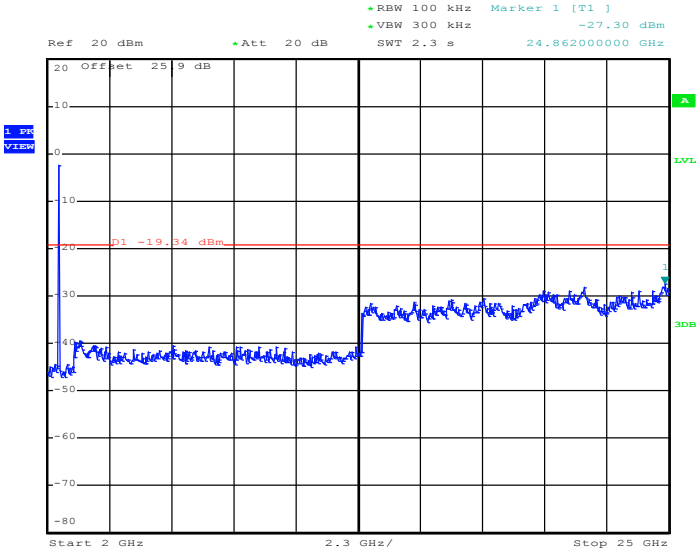
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 00:46:08

### 802.11g 2 GHz~25 GHz

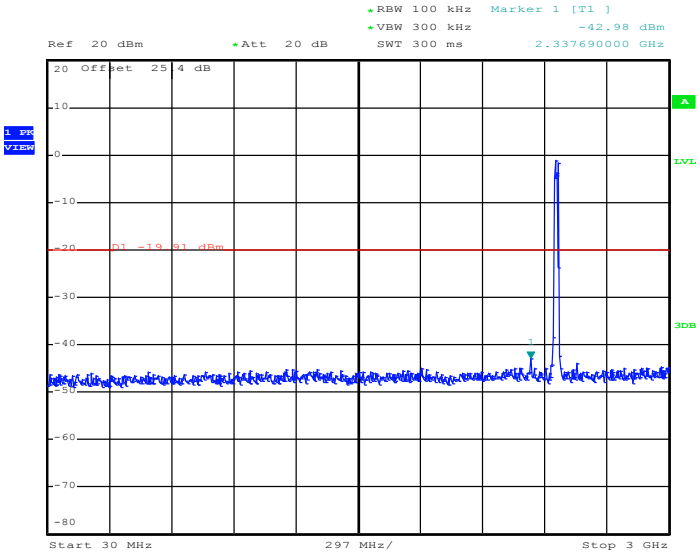
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 00:46:26

### 802.11g 30 MHz~3 GHz

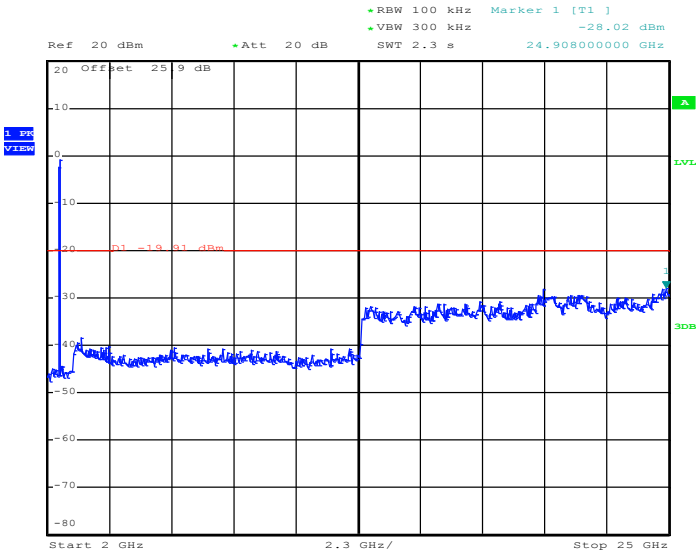
### Conducted Spurious Emission Plot on Channel 11




Date: 27.SEP.2012 00:41:45

### 802.11g 2 GHz~25 GHz

### Conducted Spurious Emission Plot on Channel 11

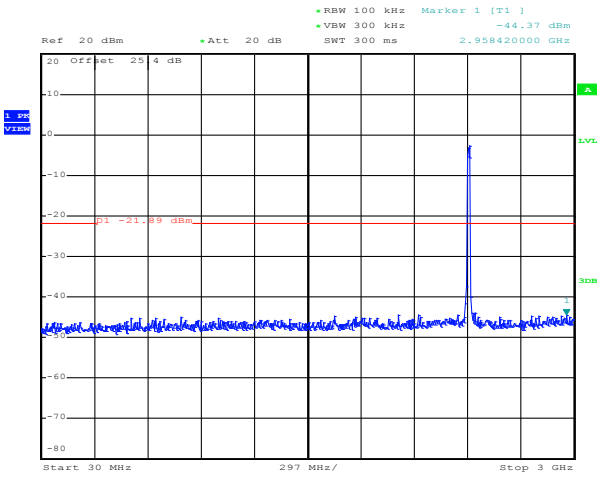



Date: 27.SEP.2012 00:42:03

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

**802.11n HT20 30 MHz~3 GHz**

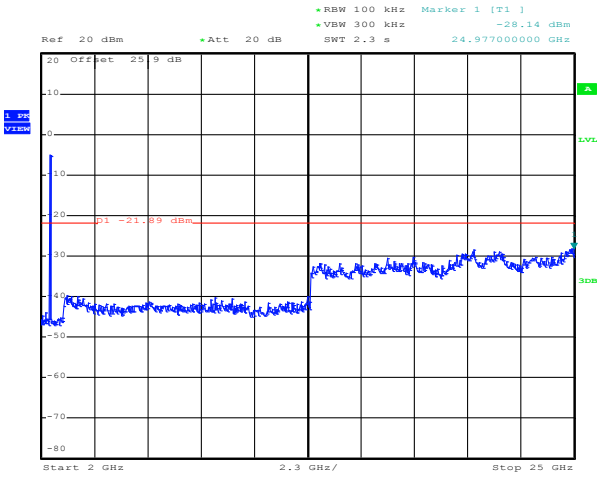
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:57:35

**802.11n HT20 2 GHz~25 GHz**

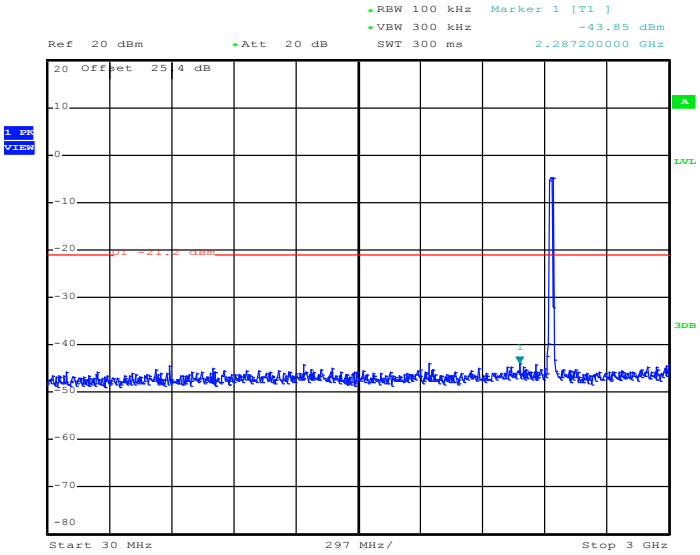
**Conducted Spurious Emission Plot on Channel 01**




Date: 27.SEP.2012 00:57:53

### 802.11n HT20 30 MHz~3 GHz

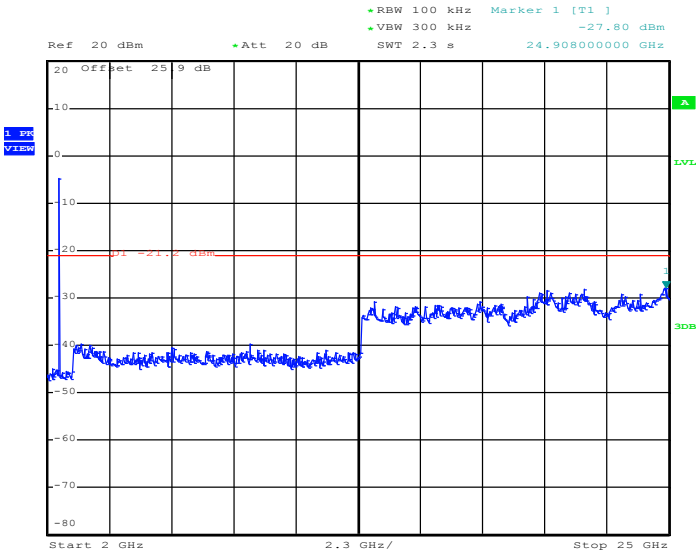
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 01:00:32

### 802.11n HT20 2 GHz~25 GHz

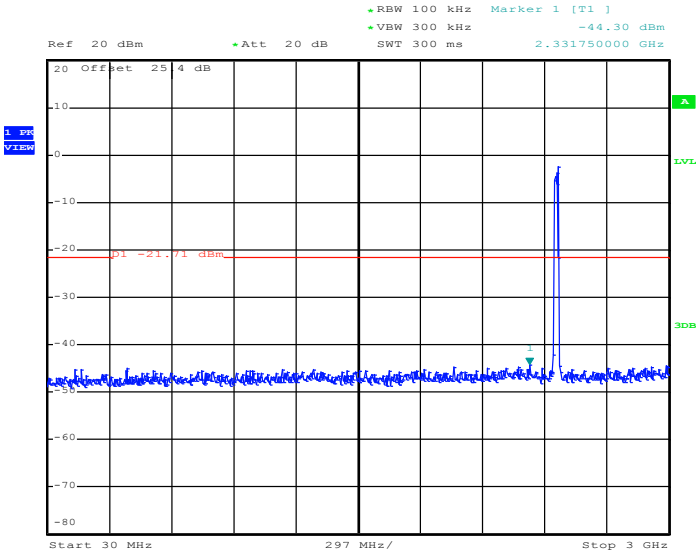
### Conducted Spurious Emission Plot on Channel 06




Date: 27.SEP.2012 01:00:50

### 802.11n HT20 30 MHz~3 GHz

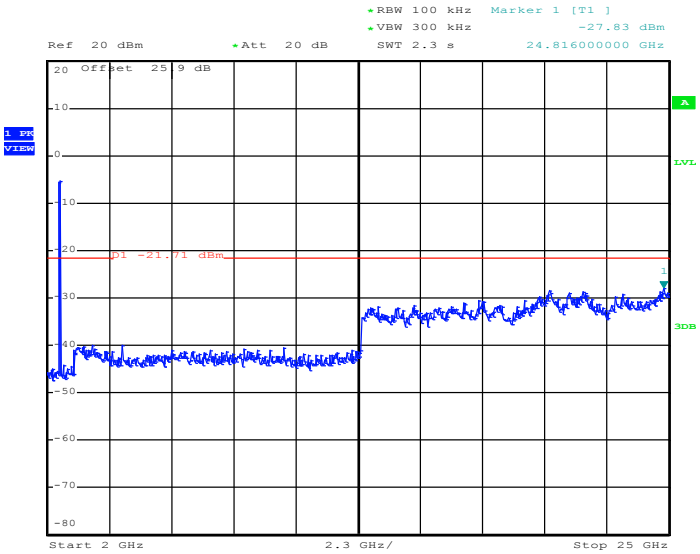
### Conducted Spurious Emission Plot on Channel 11




Date: 27.SEP.2012 01:05:07

### 802.11n HT20 2 GHz~25 GHz

### Conducted Spurious Emission Plot on Channel 11




Date: 27.SEP.2012 01:05:25

## 3.5 Radiated Emission Measurement

### 3.5.1 Limit of Radiated Emission

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

| Frequency (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

See list of measuring instruments of this test report.

### 3.5.3 Test Procedures

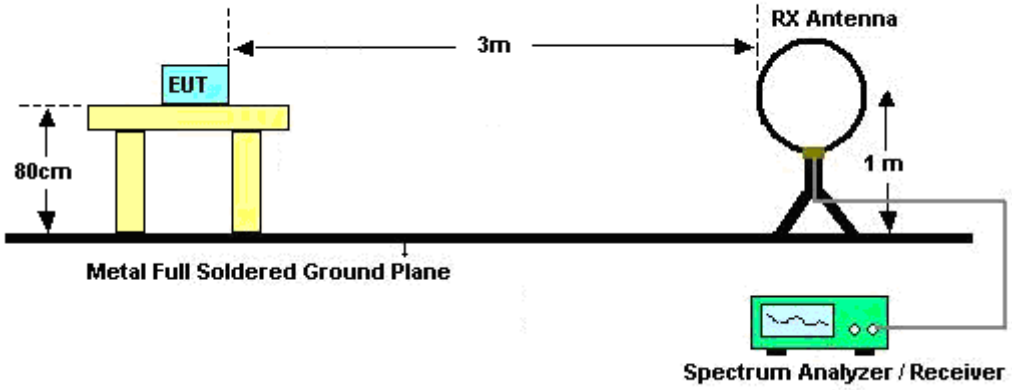
1. The testing follows the guidelines in ANSI C63. 10-2009
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 KHz for f < 1 GHz; VBW ≥ 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(us) | 1/T(KHz) | VBW Setting |
|---|---|---|---|---|
| 802.11b | 100.00 | - | - | 10Hz |
| 802.11g | 98.96 | - | - | 10Hz |
| 802.11n HT20 | 98.96 | - | - | 10Hz |

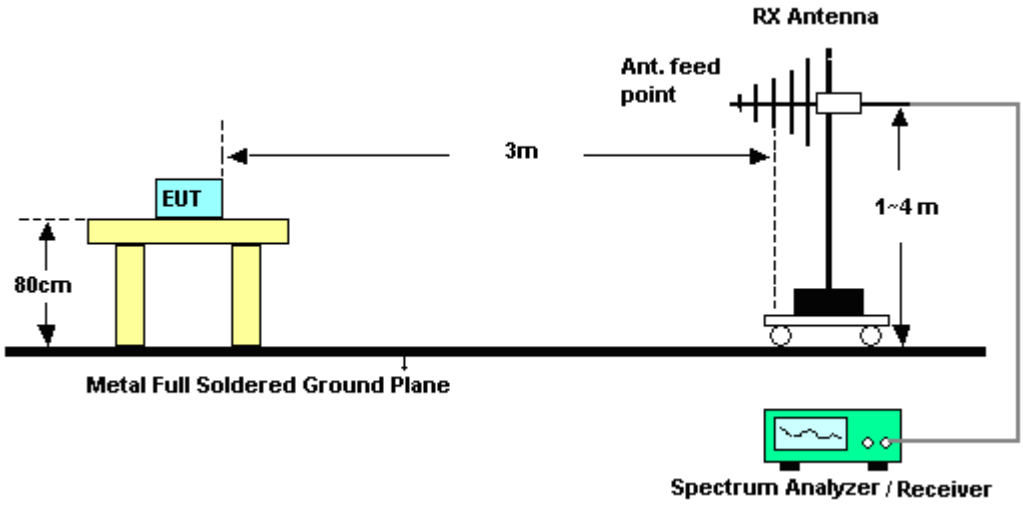
**Note:** For average measurement with duty cycle < 98%, use reduced VBW measurement method 4.2.3.2.3 in ANSI C63.10.

### 3.5.4 Test Setup

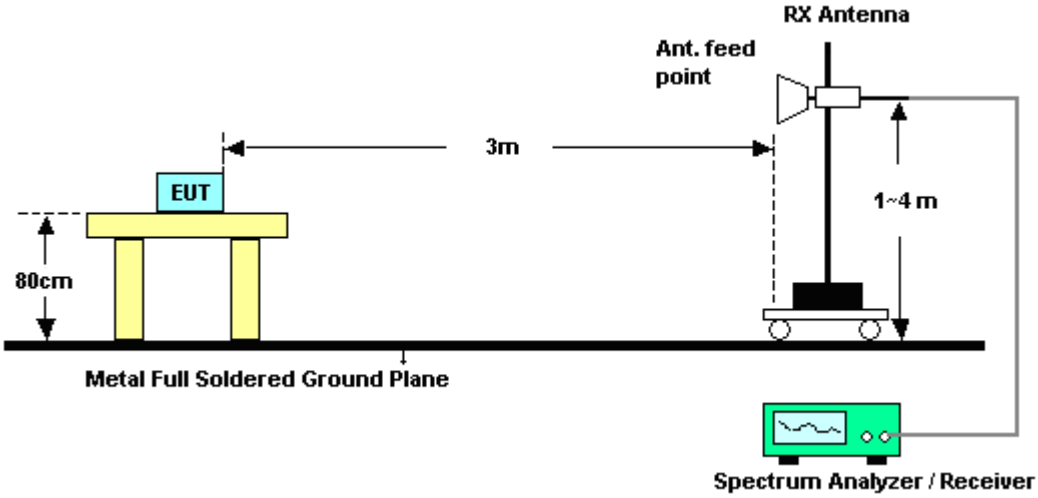
**For radiated emissions below 30MHz**




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



**For radiated emissions above 1GHz**




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

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

### 3.5.6 Test Result of Radiated Band Edges

**<Sample 1>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 24~26℃ |
| **Test Band :** | Low | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 | **Test Engineer :** | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBμV/m )** | **Over Limit ( dB )** | **Limit Line ( dBμV/m )** | **Read Level (dBμV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2385.6 | 50.49 | -23.51 | 74 | 46.12 | 32.3 | 6.03 | 33.96 | 104 | 8 | Peak |
| 2390 | 39.32 | -14.68 | 54 | 34.95 | 32.3 | 6.03 | 33.96 | 104 | 8 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBμV/m )** | **Over Limit ( dB )** | **Limit Line ( dBμV/m )** | **Read Level (dBμV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2389.92 | 53.63 | -20.37 | 74 | 49.26 | 32.3 | 6.03 | 33.96 | 126 | 13 | Peak |
| 2390 | 37.04 | -16.96 | 54 | 32.67 | 32.3 | 6.03 | 33.96 | 126 | 13 | Average |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 24~26℃ |
| **Test Band :** | High | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 11 | **Test Engineer :** | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBμV/m )** | **Over Limit ( dB )** | **Limit Line ( dBμV/m )** | **Read Level (dBμV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2483.92 | 54.83 | -19.17 | 74 | 50.27 | 32.38 | 6.18 | 34 | 105 | 50 | Peak |
| 2483.68 | 39.24 | -14.76 | 54 | 34.68 | 32.38 | 6.18 | 34 | 105 | 50 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Frequency ( MHz )** | **Level ( dBμV/m )** | **Over Limit ( dB )** | **Limit Line ( dBμV/m )** | **Read Level (dBμV)** | **Antenna Factor ( dB )** | **Cable Loss ( dB )** | **Preamp Factor ( dB )** | **Ant Pos ( cm )** | **Table Pos ( deg )** | **Remark** |
| 2483.68 | 52.14 | -21.86 | 74 | 47.58 | 32.38 | 6.18 | 34 | 100 | 91 | Peak |
| 2483.94 | 36.52 | -17.48 | 54 | 31.96 | 32.38 | 6.18 | 34 | 100 | 91 | Average |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Band : | Low | Relative Humidity : | 50~53% |
| Test Channel : | 01 | Test Engineer : | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.92 | 70.53 | -3.47 | 74 | 66.16 | 32.3 | 6.03 | 33.96 | 108 | 20 | Peak |
| 2390 | 48 | -6 | 54 | 43.63 | 32.3 | 6.03 | 33.96 | 108 | 20 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.47 | 69.99 | -4.01 | 74 | 65.62 | 32.3 | 6.03 | 33.96 | 135 | 0 | Peak |
| 2390 | 47.1 | -6.9 | 54 | 42.73 | 32.3 | 6.03 | 33.96 | 135 | 0 | Average |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Band : | High | Relative Humidity : | 50~53% |
| Test Channel : | 11 | Test Engineer : | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.98 | 71.97 | -2.03 | 74 | 67.41 | 32.38 | 6.18 | 34 | 108 | 5 | Peak |
| 2483.5 | 47.56 | -6.44 | 54 | 43 | 32.38 | 6.18 | 34 | 108 | 5 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2483.74 | 70.81 | -3.19 | 74 | 66.25 | 32.38 | 6.18 | 34 | 109 | 349 | Peak |
| 2483.5 | 44.11 | -9.89 | 54 | 39.55 | 32.38 | 6.18 | 34 | 109 | 349 | Average |

| Test Mode : | 802.11n HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Band : | Low | Relative Humidity : | 50~53% |
| Test Channel : | 01 | Test Engineer : | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2390 | 72.15 | -1.85 | 74 | 67.78 | 32.3 | 6.03 | 33.96 | 106 | 52 | Peak |
| 2390 | 43.88 | -10.12 | 54 | 39.51 | 32.3 | 6.03 | 33.96 | 106 | 52 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.92 | 66.65 | -7.35 | 74 | 62.28 | 32.3 | 6.03 | 33.96 | 100 | 95 | Peak |
| 2390 | 40.18 | -13.82 | 54 | 35.81 | 32.3 | 6.03 | 33.96 | 100 | 95 | Average |

| Test Mode : | 802.11n HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Band : | High | Relative Humidity : | 50~53% |
| Test Channel : | 11 | Test Engineer : | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2380.2 | 48.42 | -25.58 | 74 | 44.07 | 32.28 | 6.03 | 33.96 | 100 | 7 | Peak |
| 2390 | 35.31 | -18.69 | 54 | 30.94 | 32.3 | 6.03 | 33.96 | 100 | 7 | Average |
| 2484.18 | 68.35 | -5.65 | 74 | 63.79 | 32.38 | 6.18 | 34 | 100 | 7 | Peak |
| 2483.5 | 43.76 | -10.24 | 54 | 39.2 | 32.38 | 6.18 | 34 | 100 | 7 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2379.75 | 47.23 | -26.77 | 74 | 42.91 | 32.28 | 5.99 | 33.95 | 100 | 64 | Peak |
| 2386.59 | 34.5 | -19.5 | 54 | 30.13 | 32.3 | 6.03 | 33.96 | 100 | 64 | Average |
| 2483.56 | 62.14 | -11.86 | 74 | 57.58 | 32.38 | 6.18 | 34 | 100 | 64 | Peak |
| 2483.5 | 38.92 | -15.08 | 54 | 34.36 | 32.38 | 6.18 | 34 | 100 | 64 | Average |

**<Sample 2>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 24~26℃ |
| **Test Band :** | Low | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 | **Test Engineer :** | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.83 | 64.64 | -9.36 | 74 | 60.27 | 32.3 | 6.03 | 33.96 | 109 | 62 | Peak |
| 2390 | 44.37 | -9.63 | 54 | 40 | 32.3 | 6.03 | 33.96 | 109 | 62 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.56 | 59.9 | -14.1 | 74 | 55.53 | 32.3 | 6.03 | 33.96 | 100 | 294 | Peak |
| 2390 | 40.72 | -13.28 | 54 | 36.35 | 32.3 | 6.03 | 33.96 | 100 | 294 | Average |

**<Sample 3>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n HT20 | **Temperature :** | 24~26℃ |
| **Test Band :** | Low | **Relative Humidity :** | 50~53% |
| **Test Channel :** | 01 | **Test Engineer :** | Kyle Jhuang |

| ANTENNA POLARITY : HORIZONTAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.11 | 63.63 | -10.37 | 74 | 59.26 | 32.3 | 6.03 | 33.96 | 134 | 350 | Peak |
| 2390 | 43.88 | -10.12 | 54 | 39.51 | 32.3 | 6.03 | 33.96 | 134 | 350 | Average |

| ANTENNA POLARITY : VERTICAL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
| 2389.2 | 61.4 | -12.6 | 74 | 57.03 | 32.3 | 6.03 | 33.96 | 100 | 288 | Peak |
| 2390 | 41.15 | -12.85 | 54 | 36.78 | 32.3 | 6.03 | 33.96 | 100 | 288 | Average |

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

**<Sample 1>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 24~26℃ |
| **Test Channel :** | 01 | **Relative Humidity :** | 50~53% |
| **Test Engineer :** | Kyle Jhuang | **Polarization :** | Horizontal |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 101.19 | - | - | 96.78 | 32.31 | 6.07 | 33.97 | 104 | 8 | Average |
| 2412 | 105.72 | - | - | 101.31 | 32.31 | 6.07 | 33.97 | 104 | 8 | Peak |
| 4824 | 45.15 | -28.85 | 74 | 59.53 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11b | **Temperature :** | 24~26℃ |
| **Test Channel :** | 01 | **Relative Humidity :** | 50~53% |
| **Test Engineer :** | Kyle Jhuang | **Polarization :** | Vertical |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 99.63 | - | - | 95.22 | 32.31 | 6.07 | 33.97 | 126 | 13 | Average |
| 2412 | 103.98 | - | - | 99.57 | 32.31 | 6.07 | 33.97 | 126 | 13 | Peak |
| 4824 | 44.62 | -29.38 | 74 | 59 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

| Test Mode : | 802.11b | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 104.44 | - | - | 99.96 | 32.35 | 6.11 | 33.98 | 103 | 14 | Average |
| 2437 | 108.95 | - | - | 104.47 | 32.35 | 6.11 | 33.98 | 103 | 14 | Peak |
| 4875 | 46.23 | -27.77 | 74 | 60.63 | 33.95 | 9.13 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11b | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 100.09 | - | - | 95.61 | 32.35 | 6.11 | 33.98 | 100 | 3 | Average |
| 2437 | 104.68 | - | - | 100.2 | 32.35 | 6.11 | 33.98 | 100 | 3 | Peak |
| 4875 | 47.11 | -26.89 | 74 | 61.51 | 33.95 | 9.13 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11b | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 104.28 | - | - | 99.76 | 32.37 | 6.14 | 33.99 | 105 | 50 | Average |
| 2462 | 108.82 | - | - | 104.3 | 32.37 | 6.14 | 33.99 | 105 | 50 | Peak |
| 4926 | 46.48 | -27.52 | 74 | 60.88 | 33.93 | 9.15 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11b | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 99.55 | - | - | 95.03 | 32.37 | 6.14 | 33.99 | 100 | 91 | Average |
| 2462 | 103.67 | - | - | 99.15 | 32.37 | 6.14 | 33.99 | 100 | 91 | Peak |
| 4926 | 45.2 | -28.8 | 74 | 59.6 | 33.93 | 9.15 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 96.55 | - | - | 92.14 | 32.31 | 6.07 | 33.97 | 108 | 20 | Average |
| 2412 | 108.03 | - | - | 103.62 | 32.31 | 6.07 | 33.97 | 108 | 20 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 95.36 | - | - | 90.95 | 32.31 | 6.07 | 33.97 | 135 | 0 | Average |
| 2412 | 106.42 | - | - | 102.01 | 32.31 | 6.07 | 33.97 | 135 | 0 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 95.52 | - | - | 91.04 | 32.35 | 6.11 | 33.98 | 105 | 4 | Average |
| 2437 | 107 | - | - | 102.52 | 32.35 | 6.11 | 33.98 | 105 | 4 | Peak |
| 4875 | 43.11 | -30.89 | 74 | 57.51 | 33.95 | 9.13 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 92.63 | - | - | 88.15 | 32.35 | 6.11 | 33.98 | 100 | 304 | Average |
| 2437 | 104.13 | - | - | 99.65 | 32.35 | 6.11 | 33.98 | 100 | 304 | Peak |
| 4875 | 40.34 | -33.66 | 74 | 57.04 | 33.95 | 9.13 | 59.78 | 100 | 0 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 97.49 | - | - | 92.97 | 32.37 | 6.14 | 33.99 | 108 | 5 | Average |
| 2462 | 108.89 | - | - | 104.37 | 32.37 | 6.14 | 33.99 | 108 | 5 | Peak |
| 4924 | 44.88 | -29.12 | 74 | 59.28 | 33.93 | 9.15 | 57.48 | 100 | 0 | Peak |
| 7386 | 42.46 | -31.54 | 74 | 54.92 | 35.52 | 10.1 | 58.08 | 100 | 0 | Peak |

| Test Mode : | 802.11g | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 95.84 | - | - | 91.32 | 32.37 | 6.14 | 33.99 | 109 | 349 | Average |
| 2462 | 107.77 | - | - | 103.25 | 32.37 | 6.14 | 33.99 | 109 | 349 | Peak |
| 4924 | 41.57 | -32.43 | 74 | 58.07 | 33.93 | 9.15 | 59.58 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 30.54 | 32.23 | -7.77 | 40 | 44.28 | 19.28 | 0.54 | 31.87 | 104 | 21 | Peak |
| 49.17 | 28.73 | -11.27 | 40 | 51.17 | 8.5 | 0.69 | 31.63 | - | - | Peak |
| 62.4 | 25.4 | -14.6 | 40 | 50.26 | 6.14 | 0.78 | 31.78 | - | - | Peak |
| 323.1 | 19.36 | -26.64 | 46 | 34.77 | 13.93 | 1.82 | 31.16 | - | - | Peak |
| 469.4 | 18.82 | -27.18 | 46 | 30.09 | 17.45 | 2.35 | 31.07 | - | - | Peak |
| 811.7 | 24.38 | -21.62 | 46 | 29.24 | 22.22 | 3.17 | 30.25 | - | - | Peak |
| 2412 | 94.53 | - | - | 90.12 | 32.31 | 6.07 | 33.97 | 106 | 52 | Average |
| 2412 | 105.06 | - | - | 100.65 | 32.31 | 6.07 | 33.97 | 106 | 52 | Peak |
| 4824 | 40.92 | -33.08 | 74 | 55.3 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.4 | 31.66 | -8.34 | 40 | 47.13 | 15.82 | 0.59 | 31.88 | 103 | 82 | Peak |
| 64.83 | 25.47 | -14.53 | 40 | 50.24 | 6.2 | 0.8 | 31.77 | - | - | Peak |
| 242.22 | 24.89 | -21.11 | 46 | 42.49 | 12.06 | 1.53 | 31.19 | - | - | Peak |
| 364.4 | 29.04 | -16.96 | 46 | 43.3 | 15.06 | 2.07 | 31.39 | - | - | Peak |
| 437.2 | 23.57 | -22.43 | 46 | 35.66 | 16.79 | 2.27 | 31.15 | - | - | Peak |
| 824.3 | 24.78 | -21.22 | 46 | 29.58 | 22.34 | 3.2 | 30.34 | - | - | Peak |
| 2412 | 90.12 | - | - | 85.71 | 32.31 | 6.07 | 33.97 | 100 | 95 | Average |
| 2412 | 101.15 | - | - | 96.74 | 32.31 | 6.07 | 33.97 | 100 | 95 | Peak |
| 4824 | 38.31 | -35.69 | 74 | 55.21 | 33.97 | 9.12 | 59.99 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. 2522 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level. For example, 104.83dBuV/m - 20dB = 84.83dBuV/m.<br>3. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 93.66 | - | - | 89.18 | 32.35 | 6.11 | 33.98 | 130 | 0 | Average |
| 2437 | 104.83 | - | - | 100.37 | 32.33 | 6.11 | 33.98 | 130 | 0 | Peak |
| 2522 | 49.95 | -34.88 | 84.83 | 45.31 | 32.43 | 6.21 | 34 | 100 | 0 | Peak |
| 4875 | 41.58 | -32.42 | 74 | 55.98 | 33.95 | 9.13 | 57.48 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 06 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2437 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2437 | 91.18 | - | - | 86.7 | 32.35 | 6.11 | 33.98 | 100 | 299 | Average |
| 2437 | 102.49 | - | - | 98.01 | 32.35 | 6.11 | 33.98 | 100 | 299 | Peak |
| 4875 | 38.82 | -35.18 | 74 | 55.52 | 33.95 | 9.13 | 59.78 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Horizontal |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. 2522 MHz is not within a restricted band, and its limit line is 20dB below the highest emission level.<br>3. Test result of emissions which are 20 dB lower than the limit is not reported per15.31. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 95.23 | - | - | 90.71 | 32.37 | 6.14 | 33.99 | 100 | 7 | Average |
| 2462 | 106.74 | - | - | 102.22 | 32.37 | 6.14 | 33.99 | 100 | 7 | Peak |
| 2522 | 55.88 | -30.86 | 86.74 | 51.24 | 32.43 | 6.21 | 34 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 11 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2462 MHz is fundamental signal which can be ignored.<br>2. Test result of emissions which are 20 dB lower than the limit is not reported per15.31. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 2462 | 90.56 | - | - | 86.04 | 32.37 | 6.14 | 33.99 | 100 | 64 | Average |
| 2462 | 101.5 | - | - | 96.98 | 32.37 | 6.14 | 33.99 | 100 | 64 | Peak |

**<Sample 2>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n-HT20 | **Temperature :** | 24~26℃ |
| **Test Channel :** | 01 | **Relative Humidity :** | 50~53% |
| **Test Engineer :** | Kyle Jhuang | **Polarization :** | Horizontal |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 32.43 | 24.63 | -15.37 | 40 | 38.1 | 17.84 | 0.56 | 31.87 | 100 | 58 | Peak |
| 144.75 | 16.34 | -27.16 | 43.5 | 35.25 | 11.31 | 1.2 | 31.42 | - | - | Peak |
| 294.6 | 26.17 | -19.83 | 46 | 42.56 | 13.23 | 1.73 | 31.35 | - | - | Peak |
| 495.3 | 20.12 | -25.88 | 46 | 30.59 | 18 | 2.43 | 30.9 | - | - | Peak |
| 624.8 | 22.08 | -23.92 | 46 | 29.77 | 19.99 | 2.76 | 30.44 | - | - | Peak |
| 863.5 | 24.79 | -21.21 | 46 | 29.39 | 22.73 | 3.29 | 30.62 | - | - | Peak |
| 2412 | 92.38 | - | - | 87.97 | 32.31 | 6.07 | 33.97 | 109 | 62 | Average |
| 2412 | 103.65 | - | - | 99.24 | 32.31 | 6.07 | 33.97 | 109 | 62 | Peak |
| 4824 | 42.34 | -31.66 | 74 | 56.72 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 32.7 | 29.99 | -10.01 | 40 | 43.47 | 17.84 | 0.56 | 31.88 | 100 | 257 | Peak |
| 86.43 | 27.35 | -12.65 | 40 | 49.89 | 8.24 | 0.92 | 31.7 | - | - | Peak |
| 153.93 | 20.67 | -22.83 | 43.5 | 39.93 | 10.92 | 1.21 | 31.39 | - | - | Peak |
| 300.7 | 19.56 | -26.44 | 46 | 35.72 | 13.33 | 1.77 | 31.26 | - | - | Peak |
| 484.8 | 20.06 | -25.94 | 46 | 30.82 | 17.78 | 2.4 | 30.94 | - | - | Peak |
| 731.9 | 23.12 | -22.88 | 46 | 29.54 | 21.08 | 3.02 | 30.52 | - | - | Peak |
| 2412 | 87.24 | - | - | 82.83 | 32.31 | 6.07 | 33.97 | 100 | 294 | Average |
| 2412 | 98.88 | - | - | 94.47 | 32.31 | 6.07 | 33.97 | 100 | 294 | Peak |
| 4824 | 42.37 | -31.63 | 74 | 56.75 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

**<Sample 3>**

| | | | |
|---|---|---|---|
| **Test Mode :** | 802.11n-HT20 | **Temperature :** | 24~26℃ |
| **Test Channel :** | 01 | **Relative Humidity :** | 50~53% |
| **Test Engineer :** | Kyle Jhuang | **Polarization :** | Horizontal |
| **Remark :** | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBµV/m ) | Over Limit ( dB ) | Limit Line ( dBµV/m ) | Read Level (dBµV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 32.43 | 24.04 | -15.96 | 40 | 37.51 | 17.84 | 0.56 | 31.87 | 100 | 57 | Peak |
| 144.75 | 15.46 | -28.04 | 43.5 | 34.37 | 11.31 | 1.2 | 31.42 | - | - | Peak |
| 291.36 | 26.77 | -19.23 | 46 | 43.3 | 13.18 | 1.7 | 31.41 | - | - | Peak |
| 300.7 | 18.98 | -27.02 | 46 | 35.14 | 13.33 | 1.77 | 31.26 | - | - | Peak |
| 606.6 | 22.53 | -23.47 | 46 | 30.48 | 19.85 | 2.71 | 30.51 | - | - | Peak |
| 811 | 25.64 | -20.36 | 46 | 30.5 | 22.21 | 3.17 | 30.24 | - | - | Peak |
| 2412 | 90.36 | - | - | 85.95 | 32.31 | 6.07 | 33.97 | 134 | 350 | Average |
| 2412 | 102.03 | - | - | 97.62 | 32.31 | 6.07 | 33.97 | 134 | 350 | Peak |
| 4824 | 41.52 | -32.48 | 74 | 55.9 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

| Test Mode : | 802.11n-HT20 | Temperature : | 24~26℃ |
|---|---|---|---|
| Test Channel : | 01 | Relative Humidity : | 50~53% |
| Test Engineer : | Kyle Jhuang | Polarization : | Vertical |
| Remark : | 1. 2412 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. | | |

| Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 25.45 | -14.55 | 40 | 36.79 | 20 | 0.53 | 31.87 | 100 | 211 | Peak |
| 91.02 | 21.9 | -21.6 | 43.5 | 43.88 | 8.72 | 0.95 | 31.65 | - | - | Peak |
| 291.36 | 23.48 | -22.52 | 46 | 40.01 | 13.18 | 1.7 | 31.41 | - | - | Peak |
| 463.1 | 18.92 | -27.08 | 46 | 30.42 | 17.31 | 2.33 | 31.14 | - | - | Peak |
| 657.7 | 22.28 | -23.72 | 46 | 29.53 | 20.26 | 2.86 | 30.37 | - | - | Peak |
| 801.2 | 24.59 | -21.41 | 46 | 29.51 | 22.11 | 3.14 | 30.17 | - | - | Peak |
| 2412 | 86.99 | - | - | 82.58 | 32.31 | 6.07 | 33.97 | 100 | 288 | Average |
| 2412 | 98.46 | - | - | 94.05 | 32.31 | 6.07 | 33.97 | 100 | 288 | Peak |
| 4824 | 41.6 | -32.4 | 74 | 55.98 | 33.97 | 9.12 | 57.47 | 100 | 0 | Peak |

# 3.6 AC Conducted Emission Measurement

## 3.6.1 Limit of AC Conducted Emission

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

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

*Decreases with the logarithm of the frequency.

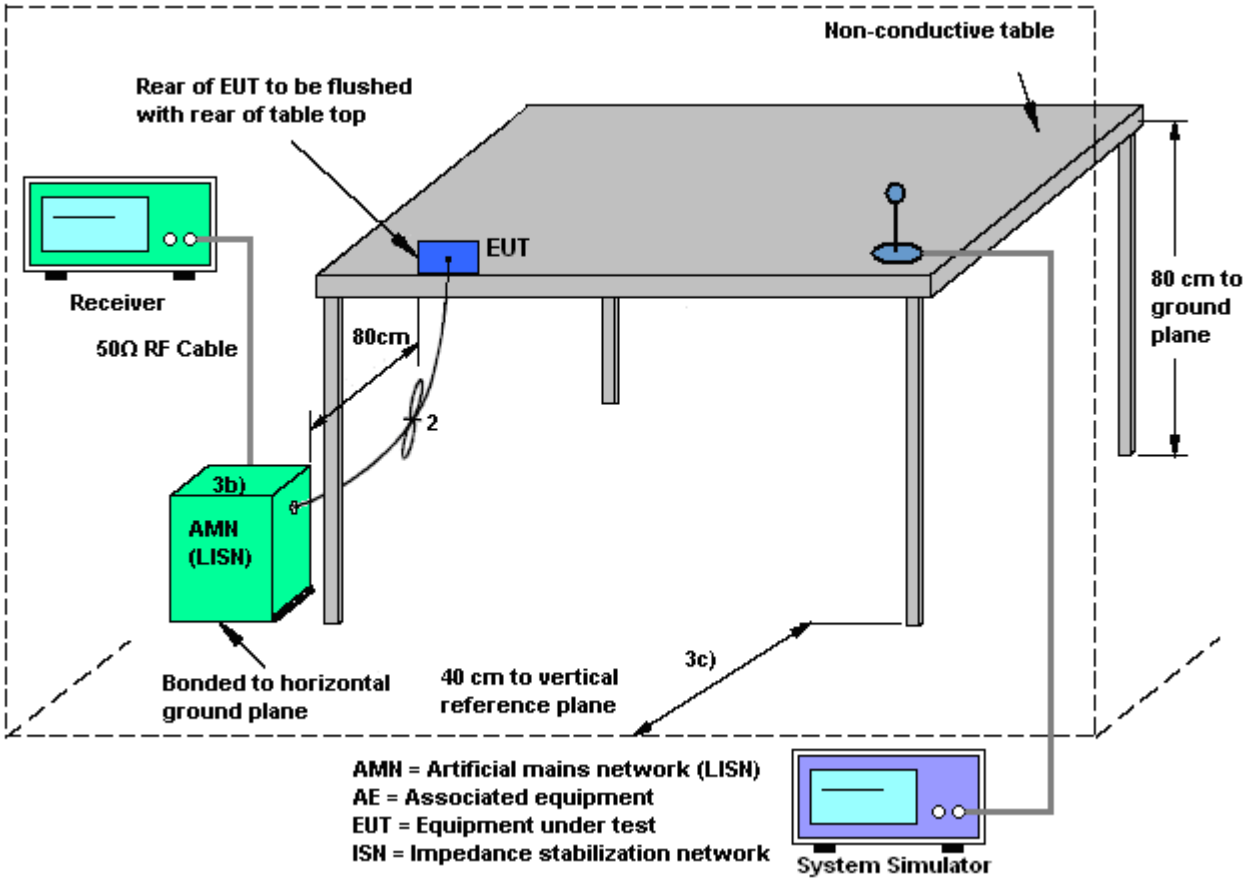
## 3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

## 3.6.3 Test Procedures

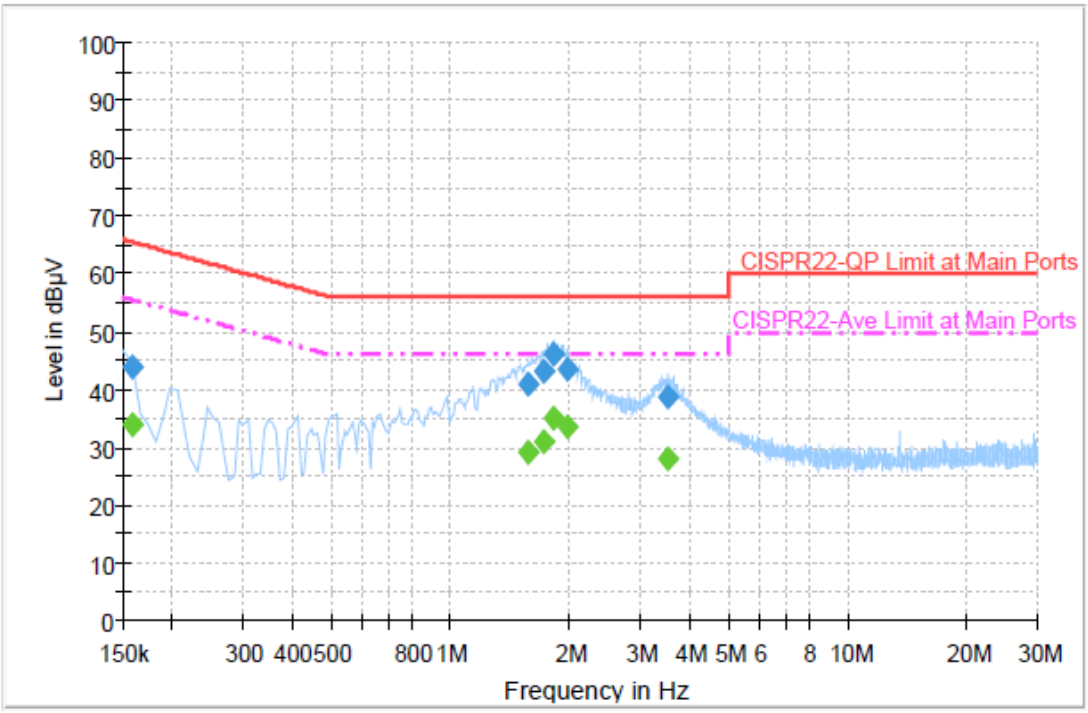
1. The testing follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance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

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

| | | | |
|---|---|---|---|
| **Test Mode :** | Mode 1 | **Temperature :** | 20~22℃ |
| **Test Engineer :** | Slash Huang | **Relative Humidity :** | 45~47% |
| **Test Voltage :** | 120Vac / 60Hz | **Phase :** | Line |
| **Function Type :** | WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + Charging Cable from Adapter | | |
| **Remark :** | All emissions not reported here are more than 10 dB below the prescribed limit. | | |



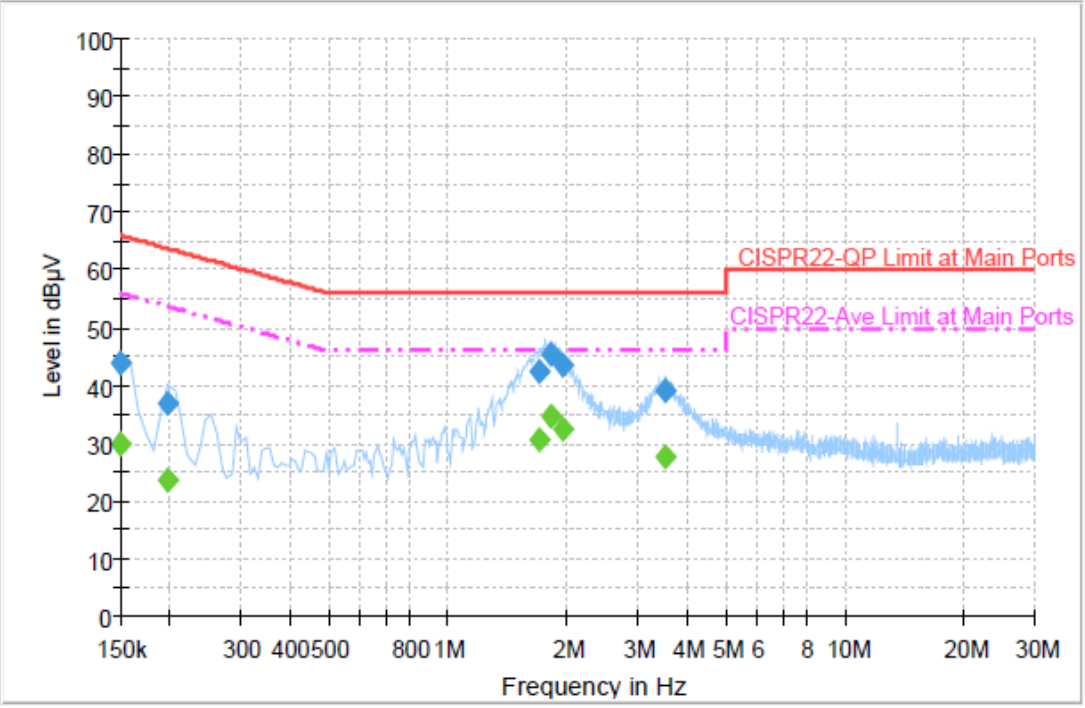

**Final Result : Quasi-Peak**

| Frequency (MHz) | Quasi-Peak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 44.0 | Off | L1 | 19.3 | 21.6 | 65.6 |
| 1.574000 | 41.0 | Off | L1 | 19.4 | 15.0 | 56.0 |
| 1.718000 | 43.2 | Off | L1 | 19.5 | 12.8 | 56.0 |
| 1.814000 | 46.0 | Off | L1 | 19.5 | 10.0 | 56.0 |
| 1.966000 | 43.4 | Off | L1 | 19.5 | 12.6 | 56.0 |
| 3.518000 | 38.8 | Off | L1 | 19.6 | 17.2 | 56.0 |

**Final Result : Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.158000 | 33.8 | Off | L1 | 19.3 | 21.8 | 55.6 |
| 1.574000 | 29.1 | Off | L1 | 19.4 | 16.9 | 46.0 |
| 1.718000 | 30.9 | Off | L1 | 19.5 | 15.1 | 46.0 |
| 1.814000 | 35.1 | Off | L1 | 19.5 | 10.9 | 46.0 |
| 1.966000 | 33.5 | Off | L1 | 19.5 | 12.5 | 46.0 |
| 3.518000 | 28.0 | Off | L1 | 19.6 | 18.0 | 46.0 |

| Test Mode : | Mode 1 | Temperature : | 20~22℃ |
|---|---|---|---|
| Test Engineer : | Slash Huang | Relative Humidity : | 45~47% |
| Test Voltage : | 120Vac / 60Hz | Phase : | Neutral |
| Function Type : | WCDMA Band V Idle + Bluetooth Link + WLAN Link + MPEG4 + Earphone + Battery + Charging Cable from Adapter | | |
| Remark : | All emissions not reported here are more than 10 dB below the prescribed limit. | | |




**Final Result : Quasi-Peak**

| Frequency (MHz) | Quasi-Peak (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 43.9 | Off | N | 19.4 | 22.1 | 66.0 |
| 0.198000 | 37.0 | Off | N | 19.3 | 26.7 | 63.7 |
| 1.702000 | 42.3 | Off | N | 19.5 | 13.7 | 56.0 |
| 1.814000 | 45.5 | Off | N | 19.5 | 10.5 | 56.0 |
| 1.958000 | 43.4 | Off | N | 19.5 | 12.6 | 56.0 |
| 3.526000 | 39.0 | Off | N | 19.6 | 17.0 | 56.0 |

**Final Result : Average**

| Frequency (MHz) | Average (dBµV) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|---|---|---|---|---|---|---|
| 0.150000 | 29.8 | Off | N | 19.4 | 26.2 | 56.0 |
| 0.198000 | 23.7 | Off | N | 19.3 | 30.0 | 53.7 |
| 1.702000 | 30.6 | Off | N | 19.5 | 15.4 | 46.0 |
| 1.814000 | 34.7 | Off | N | 19.5 | 11.3 | 46.0 |
| 1.958000 | 32.4 | Off | N | 19.5 | 13.6 | 46.0 |
| 3.526000 | 27.7 | Off | N | 19.6 | 18.3 | 46.0 |

## 3.7 Antenna Requirements

### 3.7.1 Standard Applicable

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

### 3.7.2 Antenna Connected Construction

Non-standard connector used.

### 3.7.3 Antenna Gain

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

# 4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|---|---|---|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 100055 | 9kHz~40GHz | Jun. 06, 2012 | Sep. 05, 2012 ~ Sep. 27, 2012 | Jun. 05, 2013 | Conducted (TH02-HY) |
| Power Meter | Anritsu | ML2495A | 1132003 | 300MHz~40GHz | Aug. 14, 2012 | Sep. 05, 2012 ~ Sep. 27, 2012 | Aug. 13, 2013 | Conducted (TH02-HY) |
| Power Sensor | Anritsu | MA2411B | 1126017 | 300MHz~40GHz | Aug. 14, 2012 | Sep. 05, 2012 ~ Sep. 27, 2012 | Aug. 13, 2013 | Conducted (TH02-HY) |
| EMI Test Receiver | R&S | ESCS 30 | 100356 | 9KHz ~ 2.75GHz | Oct. 27, 2011 | Sep. 27, 2012 | Oct. 26, 2012 | Conduction (CO05-HY) |
| Two-LISN | R&S | ENV216 | 11-100081 | 9KHz ~ 30MHz | Dec. 09, 2011 | Sep. 27, 2012 | Dec. 08, 2012 | Conduction (CO05-HY) |
| Two-LISN | R&S | ENV216 | 11-100080 | 9KHz ~ 30MHz | Dec. 06, 2011 | Sep. 27, 2012 | Dec. 05, 2012 | Conduction (CO05-HY) |
| AC Power Source | APC | APC-1000 W | N/A | N/A | N/A | Sep. 27, 2012 | N/A | Conduction (CO05-HY) |
| System Simulator | R&S | CMU200 | 117995 | N/A | Jul. 28, 2011 | Sep. 27, 2012 | Jul. 27, 2013 | Conduction (CO05-HY) |
| Bilog Antenna | SCHAFFNER | CBL6111C | 2726 | 30MHz ~ 1GHz | Oct. 22, 2011 | Sep. 10, 2012 ~ Oct. 05, 2012 | Oct. 21, 2012 | Radiation (03CH07-HY) |
| Bilog Antenna | Schaffner | CBL6111C | 2726 | 30MHz ~ 1GHz | Oct. 06, 2012 | Oct. 06, 2012 ~ Oct. 28, 2012 | Oct. 05, 2013 | Radiation (03CH07-HY) |
| Spectrum Analyzer | R&S | FSP30 | 101067 | 9KHz ~ 30GHz | Dec. 06, 2011 | Sep. 10, 2012 ~ Oct. 28, 2012 | Dec. 05, 2012 | Radiation (03CH07-HY) |
| Double Ridge Horn Antenna | EMCO | 3117 | 00066583 | 1GHz ~ 18GHz | Aug. 01, 2012 | Sep. 10, 2012 ~ Oct. 28, 2012 | Jul. 31, 2013 | Radiation (03CH07-HY) |
| Pre Amplifier | Agilent | 8449B | 3008A02362 | 1GHz ~ 26.5GHz | Dec. 05, 2011 | Sep. 10, 2012 ~ Oct. 28, 2012 | Dec. 04, 2012 | Radiation (03CH07-HY) |
| Pre Amplifier | COM-POWER | PA-103A | 161241 | 10-1000MHz.32 dB.GAIN | Feb. 27, 2012 | Sep. 10, 2012 ~ Oct. 28, 2012 | Feb. 26, 2013 | Radiation (03CH07-HY) |
| Signal Analyzer | Rohde & Schwarz | FSQ | 200578/026 | 20Hz~26.5GHz | Feb. 06, 2012 | Sep. 10, 2012 ~ Oct. 28, 2012 | Feb. 05, 2013 | Radiation (03CH07-HY) |
| Pre Amplifier | MITEQ | AMF-7D-00 101800-30-10P | 159088 | 1GHz ~ 18GHz | Mar. 10, 2012 | Sep. 10, 2012 ~ Oct. 28, 2012 | Mar. 09, 2013 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170251 | 15GHz ~ 40GHz | Oct. 21, 2011 | Sep. 10, 2012 ~ Sep. 27, 2012 | Oct. 20, 2012 | Radiation (03CH07-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170251 | 15GHz ~ 40GHz | Sep. 28, 2012 | Sep. 28, 2012 ~ Oct. 28, 2012 | Sep. 27, 2013 | Radiation (03CH07-HY) |
| Loop Antenna | R&S | HFH2-Z2 | 860004/001 | 9 kHz~30 MHz | Jul. 03, 2012 | Sep. 10, 2012 ~ Oct. 28, 2012 | Jul. 02, 2013 | Radiation (03CH07-HY) |

# 5 Uncertainty of Evaluation

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

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

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

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

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

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

# Appendix A. Photographs of EUT

Please refer to Sporton report number EP282414-02 as below.