

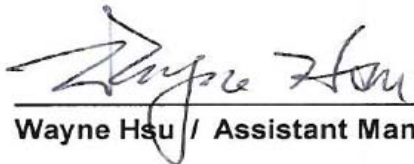
# FCC Test Report

**Equipment** : 150N Wireless LAN Broadband Router  
**Brand Name** : EDIMAX  
**Model No.** : BR-6228GNS, GR-228GNS, BR-6228nS,  
BR-6228nC, BR-6228nS V2, BR-6228nC V2  
**FCC ID** : NDD9562281205  
**Standard** : 47 CFR FCC Part 15.247  
**Applicant** : EDIMAX TECHNOLOGY CO., LTD.  
**Manufacturer** : No. 3, Wu-Chuan 3rd Road, Wu-Ku Industrial Park,  
New Taipei City, Taiwan  
**Multiple Listing** : Please refer to section 1.3

The product sample received on May 10, 2012 and completely tested on Aug. 29, 2012. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown 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:

  
Wayne Hsu / Assistant Manager



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## Summary of Test Result

| Conformance Test Specifications |                  |                                                       |                                                                                                                                                            |                                                                      |          |
|---------------------------------|------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------|
| Report Clause                   | Ref. Std. Clause | Description                                           | Measured                                                                                                                                                   | Limit                                                                | Result   |
| 1.1.2                           | 15.203           | Antenna Requirement                                   | Antenna connector mechanism complied                                                                                                                       | FCC 15.203                                                           | Complied |
| 3.1                             | 15.207           | AC Power-line Conducted Emissions                     | 0.415495MHz:<br>32.47dBuV (15.07dB) - AV<br>38.30dBuV (27.44dB) - QP                                                                                       | FCC 15.207                                                           | Complied |
| 3.2                             | 15.247(a)        | 6dB Bandwidth                                         | 6dB Bandwidth Unit [MHz]<br>2412-2462MHz: 10.14-DSSS<br>2412-2462MHz: 17.56-OFDM<br>2422-2452MHz: 35.56-OFDM                                               | ≥500kHz                                                              | Complied |
| 3.3                             | 15.247(b)        | RF Output Power (Maximum Peak Conducted Output Power) | Power [dBm]<br>2412-2462MHz: 18.82-DSSS<br>2412-2462MHz: 20.74-OFDM<br>2422-2452MHz: 20.63-OFDM                                                            | Power [dBm]<br>2412-2462MHz: 30<br>2422-2452MHz: 30                  | Complied |
| 3.4                             | 15.247(d)        | Power Spectral Density                                | PSD [dBm/3kHz]<br>2412-2462MHz: -10.62-DSSS<br>2412-2462MHz: -16.35-OFDM<br>2422-2452MHz: -19.59-OFDM                                                      | PSD [dBm/3kHz]<br>2412-2462MHz: 8<br>2422-2452MHz: 8                 | Complied |
| 3.5                             | 15.247(c)        | Transmitter Radiated Bandedge Emissions               | Non-Restricted Bands:<br>2398.04MHz:32.42dB<br>Restricted Bands<br>[dBuV/m at 3m]: 2486.89MHz:<br>71.02 (Margin 2.98dB) - PK<br>52.99 (Margin 1.01dB) - AV | Non-Restricted Bands: > 20 dB<br><br>Restricted Bands:<br>FCC 15.209 | Complied |
| 3.6                             | 15.247(c)        | Transmitter Radiated Unwanted Emissions               | Restricted Bands<br>[dBuV/m at 3m]: 7311MHz:<br>50.88 (Margin 3.12dB) - PK                                                                                 | Non-Restricted Bands: > 20 dB<br><br>Restricted Bands:<br>FCC 15.209 | Complied |



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

| RF General Information                                                                                                     |                           |                     |                |                       |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------|----------------|-----------------------|
| Frequency Range (MHz)                                                                                                      | IEEE Std. 802.11 Protocol | Ch. Frequency (MHz) | Channel Number | RF Output Power (dBm) |
| 2400-2483.5                                                                                                                | b                         | 2412-2462           | 1-11 [11]      | 18.82                 |
| 2400-2483.5                                                                                                                | g                         | 2412-2462           | 1-11 [11]      | 20.74                 |
| 2400-2483.5                                                                                                                | n (HT20)                  | 2412-2462           | 1-11 [11]      | 19.99                 |
| 2400-2483.5                                                                                                                | n (HT40)                  | 2422-2452           | 3-9 [7]        | 20.63                 |
| Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11g-2003 and IEEE Std. 802.11b-1999.                    |                           |                     |                |                       |
| Note 2: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. |                           |                     |                |                       |
| Note 3: RF output power specifies that Maximum Peak Conducted Output Power.                                                |                           |                     |                |                       |

| Transmitter Chains & Receiver Chains Information                                                                                                                                                                           |                                              |                                             |                                                   |                              |             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------|---------------------------------------------------|------------------------------|-------------|
| IEEE Std. 802.11 Protocol                                                                                                                                                                                                  | Number of Transmit Chains (N <sub>TX</sub> ) | Number of Receive Chains (N <sub>RX</sub> ) | Correlation Signals with Multiple N <sub>TX</sub> | 99% Emission Bandwidth (MHz) | Co-location |
| b                                                                                                                                                                                                                          | 1                                            | 1                                           | N/A                                               | 14.85                        | N/A         |
| g                                                                                                                                                                                                                          | 1                                            | 1                                           | Correlated                                        | 16.75                        | N/A         |
| n (HT20)                                                                                                                                                                                                                   | 1                                            | 1                                           | Uncorrelated                                      | 17.85                        | N/A         |
| n (HT40)                                                                                                                                                                                                                   | 1                                            | 1                                           | Uncorrelated                                      | 35.90                        | N/A         |
| Note 1: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other. (i.e., EUT has simultaneously co-transmitting that operating 2.4GHz and 5GHz.) |                                              |                                             |                                                   |                              |             |

## 1.1.2 Antenna Information

| Antenna Category                    |                                                                                                                                                                                                                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | External antenna (dedicated antennas)                                                                                                                                                                                                                                       |
| <input checked="" type="checkbox"/> | Single power level with corresponding antenna(s). Power Level (PL): 1                                                                                                                                                                                                       |
| <input type="checkbox"/>            | Multiple power level and corresponding antenna(s). Power Level (PL): 1~...                                                                                                                                                                                                  |
| <input type="checkbox"/>            | No RF connector provided                                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            | Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path. |
| <input type="checkbox"/>            | RF connector provided                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | Unique antenna connector. (e.g., MMCX, U.FL, IPX, and RP-SMA, RP-N type...)                                                                                                                                                                                                 |
| <input type="checkbox"/>            | Standard antenna connector. (e.g., SMA, N, BNC, and TNC type...)                                                                                                                                                                                                            |

| Antenna General Information                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                           |                                                       |                                                                                                                 |                     |                                                 |                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------|---------------------------------------------------|
| Transmit Chains Power Distribution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                           |                                                       | <input checked="" type="checkbox"/> symmetrical distribution <input type="checkbox"/> asymmetrical distribution |                     |                                                 |                                                   |
| Model No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ant. No.                                                                                                                                                                                                                                  | Ant. Port<br>[Ant No. X<br>connect to Ant.<br>Port Y] | Ant. Cat.                                                                                                       | Ant. Type           | DG (dBi)<br>[correlated]<br>N <sub>TX</sub> = 1 | DG (dBi)<br>[uncorrelated]<br>N <sub>TX</sub> = 2 |
| BR-6228GNS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1                                                                                                                                                                                                                                         | 1,2                                                   | External                                                                                                        | Dipole (Integral)   | N/A                                             | 2                                                 |
| BR-6228nC V2 V2.0A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                                                                                                                                                                                                                                         | 1,2                                                   | External                                                                                                        | Dipole (Integral)   |                                                 | 5                                                 |
| BR-6228nC V2 V2.0A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3                                                                                                                                                                                                                                         | 1,2                                                   | External                                                                                                        | Dipole (detachable) |                                                 | 3                                                 |
| BR-6228nC V2 V2.0A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4                                                                                                                                                                                                                                         | 1,2                                                   | External                                                                                                        | Dipole (detachable) |                                                 | 5                                                 |
| BR-6228nC V2 V2.0A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5                                                                                                                                                                                                                                         | 1,2                                                   | External                                                                                                        | Dipole (detachable) |                                                 | 5                                                 |
| <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | EUT is consist of multiple antenna models assembly (multiple antenna models are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. |                                                       |                                                                                                                 |                     |                                                 |                                                   |
| <p>Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:<br/> Any transmit signals are correlated, Directional Gain (DG) = <math>G_{ANT} + 10 \log(N)</math> dBi<br/> All transmit signals are completely uncorrelated, Directional Gain (DG) = <math>G_{ANT}</math></p> <p>Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:<br/> Any transmit signals are correlated, Directional Gain (DG) = <math>10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]</math> dBi<br/> All transmit signals are completely uncorrelated, Directional Gain (DG) = <math>10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]</math> dBi</p> |                                                                                                                                                                                                                                           |                                                       |                                                                                                                 |                     |                                                 |                                                   |

## 1.1.3 Type of EUT

| Identify EUT                        |                                                                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| EUT Serial Number                   | N/A                                                                                                                               |
| Presentation of Equipment           | <input type="checkbox"/> Production ; <input checked="" type="checkbox"/> Pre-Production ; <input type="checkbox"/> Prototype     |
| Type of EUT                         |                                                                                                                                   |
| <input checked="" type="checkbox"/> | Stand-alone                                                                                                                       |
| <input type="checkbox"/>            | Combined (EUT where the radio part is fully integrated within another device)<br>Combined Equipment - Brand Name / Model No.: ... |
| <input type="checkbox"/>            | Plug-in radio (EUT intended for a variety of host systems)<br>Host System - Brand Name / Model No.: ...                           |
| <input type="checkbox"/>            | Other:                                                                                                                            |

## 1.1.4 Test Signal Duty Cycle

| Operated Mode for Worst Duty Cycle                                          |                                          |                                            |
|-----------------------------------------------------------------------------|------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> Operated normally mode for worst duty cycle        |                                          |                                            |
| <input checked="" type="checkbox"/> Operated test mode for worst duty cycle |                                          |                                            |
| Test Signal Duty Cycle (x)                                                  | Power Duty Factor [dB] –<br>(10 log 1/x) | Voltage Duty Factor [dB] –<br>(20 log 1/x) |
| <input checked="" type="checkbox"/> 100% - IEEE 802.11b                     | 0                                        | 0                                          |
| <input checked="" type="checkbox"/> 100% - IEEE 802.11g                     | 0                                        | 0                                          |
| <input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT20)              | 0                                        | 0                                          |
| <input checked="" type="checkbox"/> 100% - IEEE 802.11n (HT40)              | 0                                        | 0                                          |

## 1.1.5 EUT Operational Condition

|                   |                                              |                                                         |                                  |
|-------------------|----------------------------------------------|---------------------------------------------------------|----------------------------------|
| Supply Voltage    | <input checked="" type="checkbox"/> AC mains | <input type="checkbox"/> DC                             |                                  |
| Type of DC Source | <input type="checkbox"/> Internal DC supply  | <input checked="" type="checkbox"/> External DC adapter | <input type="checkbox"/> Battery |

## 1.2 Product Details

There are four types of the EUT. The differences between these EUTs are antenna type and LAN port. Both EUT may install the same WLAN module. In this report, we chose the full function type to test. For more detailed features description, please refer to the specifications or user's manual.

## 1.3 Table for Multiple Listing

The models are exactly same in both physical and electrical. The different in model number for marketing purpose.

| No. | Brand Name | Model Name                                                              |
|-----|------------|-------------------------------------------------------------------------|
| 1   | EDIMAX     | BR-6228GNS, GR-228GNS, BR-6228nS, BR-6228nC, BR-6228nS V2, BR-6228nC V2 |

## 1.4 Accessories

| Accessories Information |              |                                               |            |                 |
|-------------------------|--------------|-----------------------------------------------|------------|-----------------|
| AC Adapter              | Brand Name   | DVE                                           | Model Name | DSC-6PFA-05 FUS |
|                         | Power Rating | I/P: 100-240Vac ~50/60Hz 0.2A ; O/P: +5Vdc 1A |            |                 |

Note: Regarding to more detail and other information, please refer to user manual.

## 1.5 Support Equipment

| Support Equipment - Conducted Emissions |                                  |            |               |            |
|-----------------------------------------|----------------------------------|------------|---------------|------------|
| No.                                     | Equipment                        | Brand Name | Model Name    | Serial No. |
| 1                                       | Notebook                         | DELL       | VOSTRO 3350   | DoC        |
| 2                                       | iPod Nano                        | Apple      | A1320         | DoC        |
| 3                                       | (USB) Mouse                      | Microsoft  | 1004          | DoC        |
| 4                                       | Dummy Load                       | -          | -             | -          |
| 5                                       | Notebook<br>(Remote Workstation) | DELL       | INSPIRON 6400 | DoC        |

| Support Equipment - Radiated Emissions |             |            |            |            |
|----------------------------------------|-------------|------------|------------|------------|
| No.                                    | Equipment   | Brand Name | Model Name | Serial No. |
| 1                                      | Notebook    | DELL       | E5520      | DoC        |
| 2                                      | iPod Nano   | Apple      | A1051      | DoC        |
| 3                                      | (USB) Mouse | Microsoft  | 1004       | DoC        |

## 1.6 Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2009
- ♦ FCC KDB 558074 - Guidance for Performing Compliance Measurements on DTS



- ♦ FCC KDB 662911 - Emissions Testing of Transmitters with Multiple Outputs
- ♦ FCC KDB 412172 - Guidelines for Determining the ERP and EIRP

## 1.7 Testing Location Information

| Testing Location                    |               |                                                                                                       |                      |                     |
|-------------------------------------|---------------|-------------------------------------------------------------------------------------------------------|----------------------|---------------------|
| <input checked="" type="checkbox"/> | HWA YA        | ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C |                      |                     |
|                                     |               | TEL : 886-3-327-3456                                                                                  | FAX : 886-3-327-0973 |                     |
| Test Condition                      | Test Site No. | Test Engineer                                                                                         | Test Environment     | Test Date           |
| Conducted Emission                  | CO04-HY       | Sam                                                                                                   | 24.5°C / 48%         | 05-Jun-12           |
| RF Conducted                        | TH01-HY       | Ian                                                                                                   | 23.9°C / 36%         | 29-May-12~13-Jul-12 |
| Radiated Emission                   | 03CH02-HY     | Streak                                                                                                | 22.8°C / 62%         | 24-May-12~29-Aug-12 |

## 1.8 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Measurement Uncertainty           |               |             |       |
|-----------------------------------|---------------|-------------|-------|
| Test Item                         |               | Uncertainty | Limit |
| AC power-line conducted emissions |               | ±2.26 dB    | N/A   |
| Emission bandwidth, 6dB bandwidth |               | ±1.42 %     | N/A   |
| RF output power, conducted        |               | ±0.63 dB    | N/A   |
| Power density, conducted          |               | ±0.81 dB    | N/A   |
| Unwanted emissions, conducted     | 30 – 1000 MHz | ±0.51 dB    | N/A   |
|                                   | 1 – 18 GHz    | ±0.67 dB    | N/A   |
|                                   | 18 – 40 GHz   | ±0.83 dB    | N/A   |
|                                   | 40 – 200 GHz  | N/A         | N/A   |
| All emissions, radiated           | 30 – 1000 MHz | ± 2.54 dB   | N/A   |
|                                   | 1 – 18 GHz    | ±3.59 dB    | N/A   |
|                                   | 18 – 40 GHz   | ±3.82 dB    | N/A   |
|                                   | 40 – 200 GHz  | N/A         | N/A   |
| Temperature                       |               | ±0.8 °C     | N/A   |
| Humidity                          |               | ±3 %        | N/A   |
| DC and low frequency voltages     |               | ±3 %        | N/A   |
| Time                              |               | ±1.42 %     | N/A   |
| Duty Cycle                        |               | ±1.42 %     | N/A   |

## 2 Test Configuration of EUT

### 2.1 The Worst Case Modulation Configuration

| Worst Modulation Used for Conformance Testing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                              |                 |                       |                       |                       |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------------------|
| Power Level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              | 1               |                       |                       |                       |                                   |
| IEEE 802.11 Protocol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Number of Transmit Chains (N <sub>TX</sub> ) | Data Rate / MCS | Worst Data Rate / MCS | Worst Modulation Mode | RF Output Power (dBm) | Power Spectral Density (dBm/3kHz) |
| b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                            | 1-11 Mbps       | 11Mbps                | 11B-20M               | 18.82                 | -10.62                            |
| g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1                                            | 6-54 Mbps       | 6Mbps                 | 11G-20M               | 20.74                 | -16.35                            |
| n (HT20)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                            | MCS 0-15        | MCS 0                 | 11N2.4G-20M           | 19.99                 | -17.41                            |
| n (HT40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1                                            | MCS 0-15        | MCS 0                 | 11N2.4G-40M           | 20.63                 | -19.59                            |
| Note 1: IEEE Std. 802.11-2007 modulation consists of IEEE Std. 802.11g-2003 and IEEE Std. 802.11b-1999.<br>Note 2: IEEE Std. 802.11n-2009 modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT support HT20 and HT40. Worst modulation mode of Guard Interval (GI) is 400ns.<br>Note 3: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:<br>11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band)<br>20M/40M: Channel Bandwidth 20MHz/40MHz<br>Note 4: RF output power specifies that Maximum Peak Conducted Output Power. |                                              |                 |                       |                       |                       |                                   |

### 2.2 Test Channel Frequencies Configuration

| Test Channel Frequencies Configuration                                                                                                                                                             |                       |                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------|
| IEEE 802.11 Protocol                                                                                                                                                                               | Worst Modulation Mode | Test Channel Frequencies (MHz) – FX (Frequencies Abbreviations) |
| b                                                                                                                                                                                                  | 11B-20M               | 2412-(F1), 2437-(F2), 2462-(F3)                                 |
| g                                                                                                                                                                                                  | 11G-20M               | 2412-(F1), 2437-(F2), 2462-(F3)                                 |
| n (HT20)                                                                                                                                                                                           | 11N2.4G-20M           | 2412-(F1), 2437-(F2), 2462-(F3)                                 |
| n (HT40)                                                                                                                                                                                           | 11N2.4G-40M           | 2422-(F4), 2437-(F5), 2452-(F6)                                 |
| Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:<br>11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band)<br>20M/40M: Channel Bandwidth 20M/40M |                       |                                                                 |

## 2.3 The Worst Case Power Setting Parameter

| The Worst Case Power Setting Parameter                                                                                                                                                                                                                                                |                                              |                 |               |                       |                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------|---------------|-----------------------|-----------------------|
| Test Software Version                                                                                                                                                                                                                                                                 |                                              | MP N Test*      |               |                       |                       |
| Worst Modulation Mode                                                                                                                                                                                                                                                                 | Number of Transmit Chains (N <sub>TX</sub> ) | Frequency (MHz) | Power Setting | Worst Data Rate / MCS | RF Output Power (dBm) |
| 11B-20M                                                                                                                                                                                                                                                                               | 1                                            | 2412            | 42            | 11 Mbps               | 17.68                 |
| 11B-20M                                                                                                                                                                                                                                                                               | 1                                            | 2437            | 45            | 11 Mbps               | 18.82                 |
| 11B-20M                                                                                                                                                                                                                                                                               | 1                                            | 2462            | 40            | 11 Mbps               | 16.68                 |
| 11G-20M                                                                                                                                                                                                                                                                               | 1                                            | 2412            | 48            | 6 Mbps                | 19.46                 |
| 11G-20M                                                                                                                                                                                                                                                                               | 1                                            | 2437            | 51            | 6 Mbps                | 20.74                 |
| 11G-20M                                                                                                                                                                                                                                                                               | 1                                            | 2462            | 46            | 6 Mbps                | 18.28                 |
| 11N2.4G-20M                                                                                                                                                                                                                                                                           | 1                                            | 2412            | 46            | MCS 0                 | 18.88                 |
| 11N2.4G-20M                                                                                                                                                                                                                                                                           | 1                                            | 2437            | 49            | MCS 0                 | 19.99                 |
| 11N2.4G-20M                                                                                                                                                                                                                                                                           | 1                                            | 2462            | 46            | MCS 0                 | 18.54                 |
| 11N2.4G-40M                                                                                                                                                                                                                                                                           | 1                                            | 2422            | 45            | MCS 0                 | 18.12                 |
| 11N2.4G-40M                                                                                                                                                                                                                                                                           | 1                                            | 2437            | 50            | MCS 0                 | 20.63                 |
| 11N2.4G-40M                                                                                                                                                                                                                                                                           | 1                                            | 2452            | 47            | MCS 0                 | 18.89                 |
| Note 1: Modulation modes consist of 11B-20M, 11G-20M, 11N2.4G-20M, 11N2.4G-40M:<br>11B: IEEE 802.11b, 11G: IEEE 802.11g, 11N2.4G: IEEE 802.11n (2.4GHz Band)<br>20M/40M: Channel Bandwidth 20MHz/40MHz<br>Note 2: RF output power specifies that Maximum Peak Conducted Output Power. |                                              |                 |               |                       |                       |

## 2.4 The Worst Case Measurement Configuration

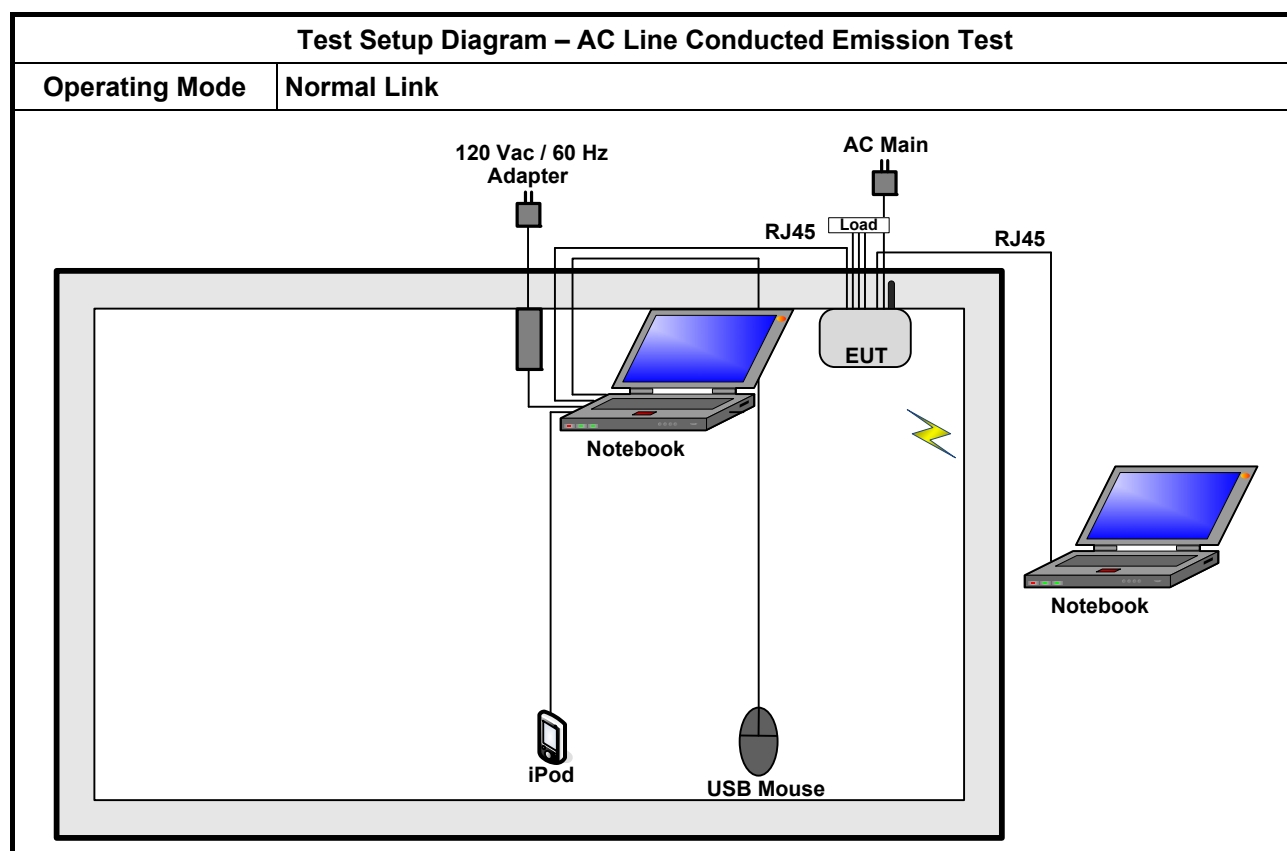
| The Worst Case Mode for Following Conformance Tests |                                                          |                              |                   |                    |
|-----------------------------------------------------|----------------------------------------------------------|------------------------------|-------------------|--------------------|
| <b>Tests Item</b>                                   | AC power-line conducted emissions                        |                              |                   |                    |
| <b>Condition</b>                                    | AC power-line conducted measurement for line and neutral |                              |                   |                    |
| <b>Operating Mode</b>                               | <b>Operating Mode Description</b>                        | <b>Worst Modulation Mode</b> | <b>Test Freq.</b> | <b>Power Level</b> |
| 1                                                   | Normal Link                                              | 11N2.4G-20M                  | F2                | 1                  |

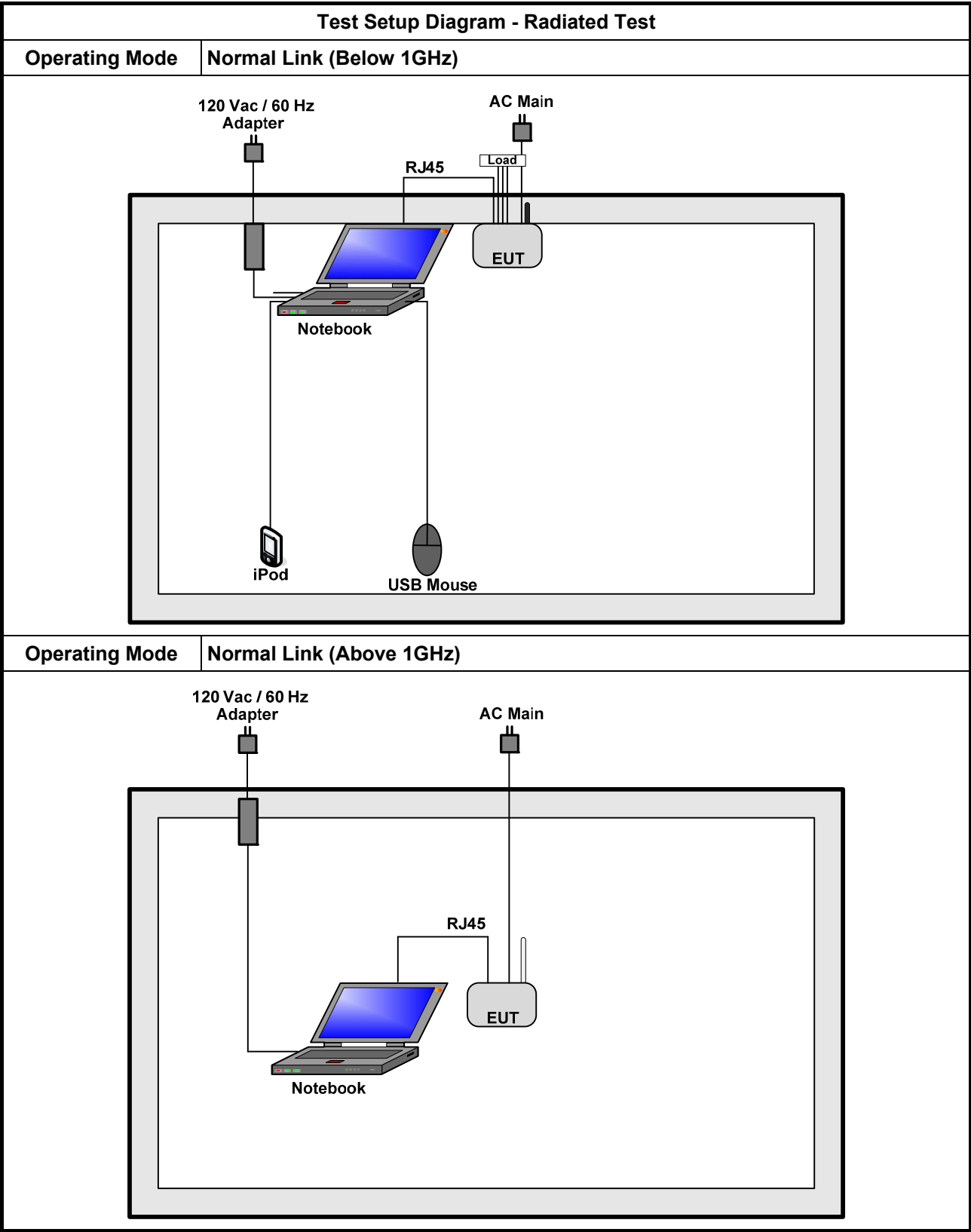
| The Worst Case Mode for Following Conformance Tests |                                                             |                              |                       |                    |
|-----------------------------------------------------|-------------------------------------------------------------|------------------------------|-----------------------|--------------------|
| <b>Tests Item</b>                                   | RF Output Power<br>Power Spectral Density<br>6 dB Bandwidth |                              |                       |                    |
| <b>Test Condition</b>                               | Conducted measurement at transmit chains                    |                              |                       |                    |
| <b>Worst Modulation Mode</b>                        | <b>Number of Transmit Chains (N<sub>TX</sub>)</b>           | <b>Worst Data Rate / MCS</b> | <b>Test Frequency</b> | <b>Power Level</b> |
| 11B-20M                                             | 1                                                           | 11Mbps                       | F1, F2, F3            | 1                  |
| 11G-20M                                             | 1                                                           | 6Mbps                        | F1, F2, F3            | 1                  |
| 11N2.4G-20M                                         | 1                                                           | MCS 0                        | F1, F2, F3            | 1                  |
| 11N2.4G-40M                                         | 1                                                           | MCS 0                        | F4, F5, F6            | 1                  |

| The Worst Case Mode for Following Conformance Tests |                                                   |                              |                       |                    |
|-----------------------------------------------------|---------------------------------------------------|------------------------------|-----------------------|--------------------|
| <b>Tests Item</b>                                   | Transmitter Radiated Bandedge Emissions           |                              |                       |                    |
| <b>Test Condition</b>                               | Radiated measurement                              |                              |                       |                    |
| <b>Worst Modulation Mode</b>                        | <b>Number of Transmit Chains (N<sub>TX</sub>)</b> | <b>Worst Data Rate / MCS</b> | <b>Test Frequency</b> | <b>Power Level</b> |
| 11B-20M                                             | 1                                                 | 11Mbps                       | F1, F3                | 1                  |
| 11G-20M                                             | 1                                                 | 6Mbps                        | F1, F3                | 1                  |
| 11N2.4G-20M                                         | 1                                                 | MCS 0                        | F1, F3                | 1                  |
| 11N2.4G-40M                                         | 1                                                 | MCS 0                        | F4, F6                | 1                  |

| The Worst Case Mode for Following Conformance Tests |                                                                                                                                                                                |                                                                                     |                                                                                       |                                       |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------|
| <b>Tests Item</b>                                   | Transmitter Radiated Unwanted Emissions                                                                                                                                        |                                                                                     |                                                                                       |                                       |
| <b>Test Condition</b>                               | Radiated measurement                                                                                                                                                           |                                                                                     |                                                                                       |                                       |
| <b>User Position</b>                                | <input checked="" type="checkbox"/> EUT will be placed in fixed position.                                                                                                      |                                                                                     |                                                                                       |                                       |
|                                                     | <input type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed two or three orthogonal planes.                        |                                                                                     |                                                                                       |                                       |
|                                                     | <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes. |                                                                                     |                                                                                       |                                       |
| <b>Operating Mode &lt; 1GHz</b>                     | <input checked="" type="checkbox"/> 1. Normal Link                                                                                                                             |                                                                                     |                                                                                       |                                       |
| <b>Worst Modulation Mode</b>                        | <b>Number of Transmit Chains (N<sub>TX</sub>)</b>                                                                                                                              | <b>Worst Data Rate / MCS</b>                                                        | <b>Test Frequency</b>                                                                 | <b>Worst Orthogonal Planes of EUT</b> |
| 11B-20M                                             | 1                                                                                                                                                                              | 11Mbps                                                                              | F1, F2, F3                                                                            | X Plane                               |
| 11G-20M                                             | 1                                                                                                                                                                              | 6Mbps                                                                               | F1, F2, F3                                                                            | X Plane                               |
| 11N2.4G-20M                                         | 1                                                                                                                                                                              | MCS 0                                                                               | F1, F2, F3                                                                            | X Plane                               |
| 11N2.4G-40M                                         | 1                                                                                                                                                                              | MCS 0                                                                               | F4, F5, F6                                                                            | X Plane                               |
| <b>Orthogonal Planes of EUT</b>                     | <b>X Plane</b>                                                                                                                                                                 | <b>Y Plane</b>                                                                      | <b>Z Plane</b>                                                                        |                                       |
|                                                     |                                                                                             |  |  |                                       |

## 2.5 Test Setup Diagram







### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

| AC Power-line Conducted Emissions Limit |            |           |
|-----------------------------------------|------------|-----------|
| Frequency Emission (MHz)                | Quasi-Peak | Average   |
| 0.15-0.5                                | 66 - 56 *  | 56 - 46 * |
| 0.5-5                                   | 56         | 46        |
| 5-30                                    | 60         | 50        |

Note 1: \* Decreases with the logarithm of the frequency.

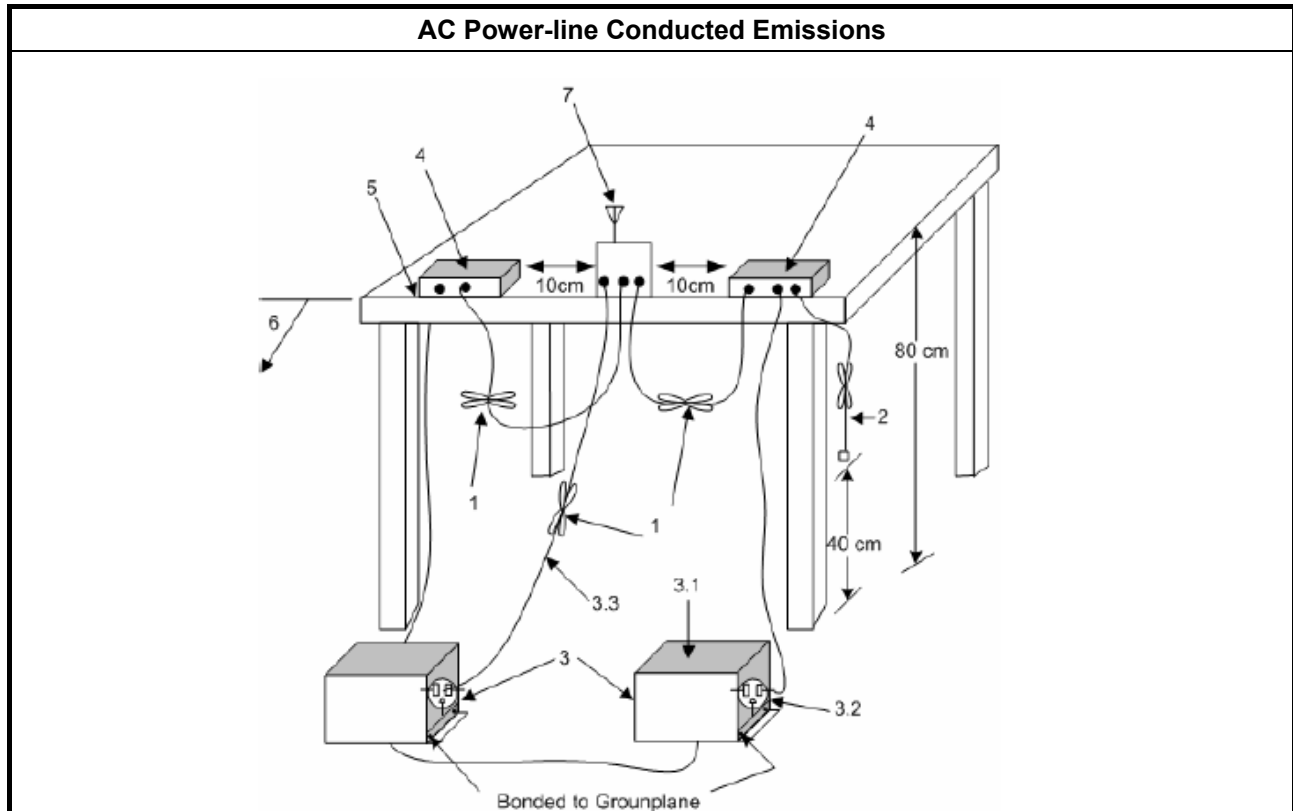
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

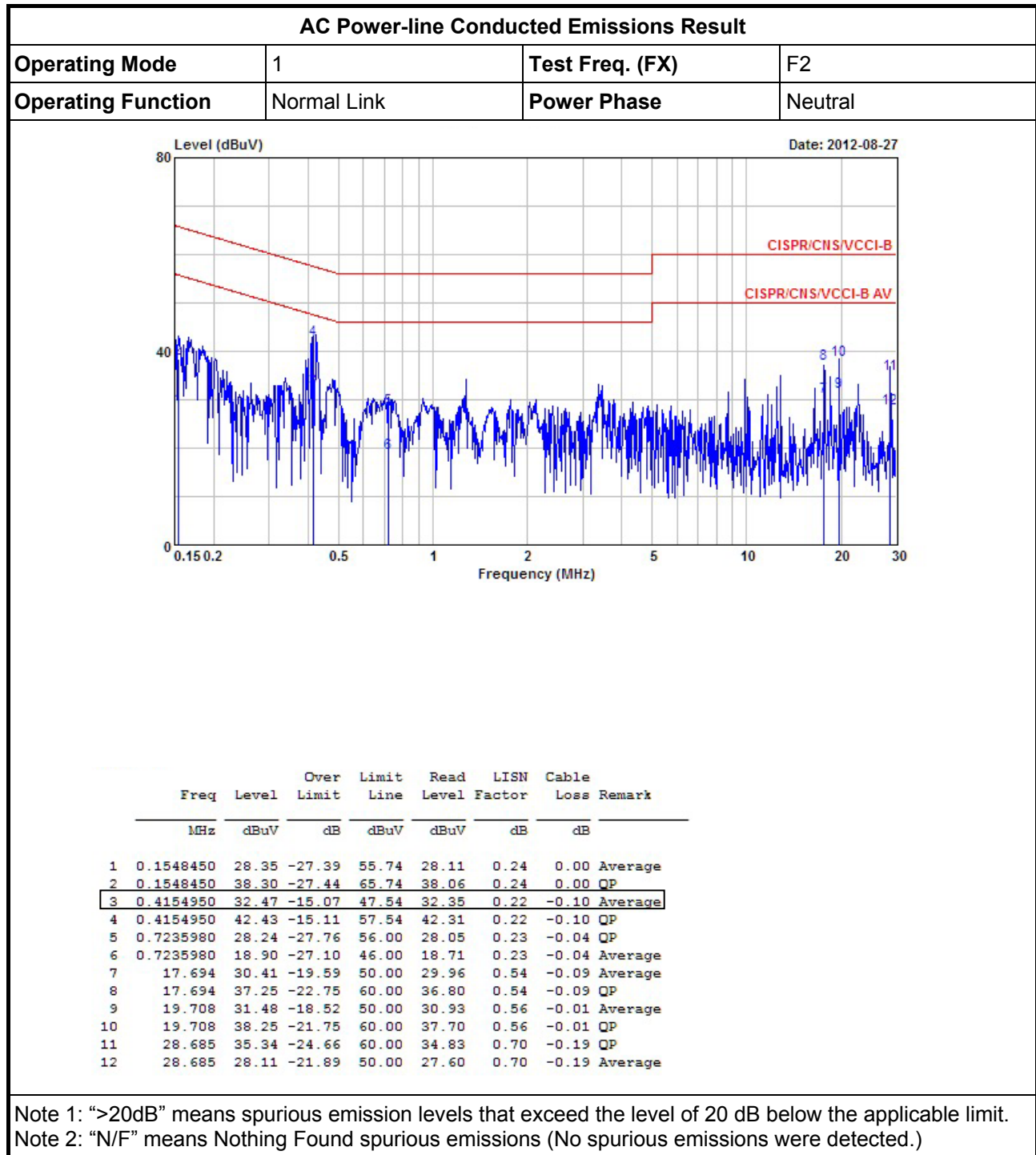
##### 3.1.3 Test Procedures

| Test Method                                                                                                      |
|------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> Refer as ANSI C63.10-2009, clause 6.2 for AC power-line conducted emissions. |

##### 3.1.4 Test Setup

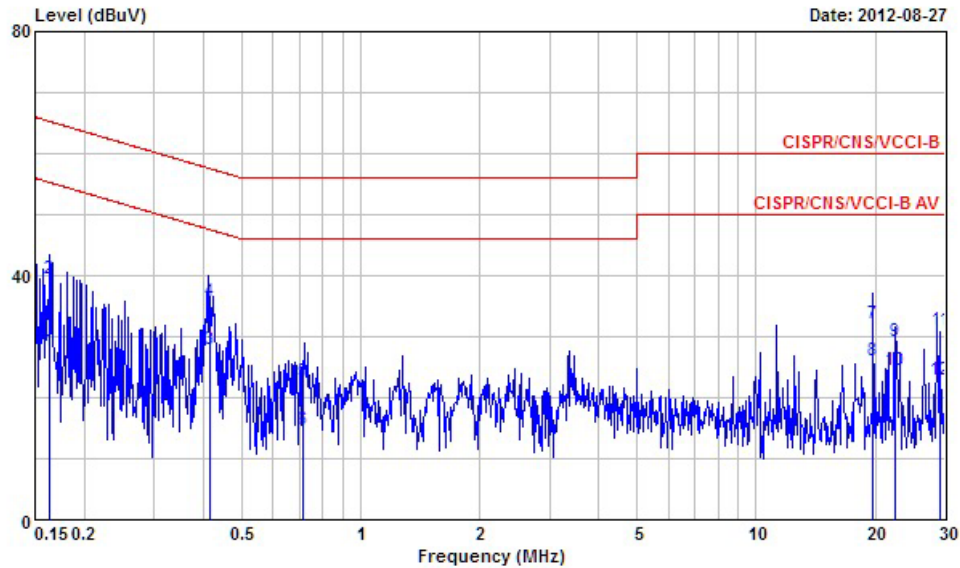


## 3.1.5 Test Result of AC Power-line Conducted Emissions



## AC Power-line Conducted Emissions Result

|                    |             |                 |      |
|--------------------|-------------|-----------------|------|
| Operating Mode     | 1           | Test Freq. (FX) | F2   |
| Operating Function | Normal Link | Power Phase     | Line |



|    | Freq      | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark  |
|----|-----------|-------|------------|------------|------------|-------------|------------|---------|
|    | MHz       | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |         |
| 1  | 0.1632710 | 27.76 | -27.54     | 55.30      | 27.65      | 0.11        | 0.00       | Average |
| 2  | 0.1632710 | 39.45 | -25.85     | 65.30      | 39.34      | 0.11        | 0.00       | QP      |
| 3  | 0.4156560 | 28.01 | -19.52     | 47.53      | 28.01      | 0.10        | -0.10      | Average |
| 4  | 0.4156560 | 35.78 | -21.75     | 57.53      | 35.78      | 0.10        | -0.10      | QP      |
| 5  | 0.7167740 | 22.64 | -33.36     | 56.00      | 22.57      | 0.11        | -0.04      | QP      |
| 6  | 0.7167740 | 14.79 | -31.21     | 46.00      | 14.72      | 0.11        | -0.04      | Average |
| 7  | 19.709    | 32.16 | -27.84     | 60.00      | 31.86      | 0.31        | -0.01      | QP      |
| 8  | 19.709    | 26.04 | -23.96     | 50.00      | 25.74      | 0.31        | -0.01      | Average |
| 9  | 22.459    | 29.32 | -30.68     | 60.00      | 28.94      | 0.33        | 0.05       | QP      |
| 10 | 22.459    | 24.57 | -25.43     | 50.00      | 24.19      | 0.33        | 0.05       | Average |
| 11 | 29.234    | 31.08 | -28.92     | 60.00      | 30.96      | 0.37        | -0.25      | QP      |
| 12 | 29.234    | 22.99 | -27.01     | 50.00      | 22.87      | 0.37        | -0.25      | Average |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.  
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

## 3.2 6dB Bandwidth

### 3.2.1 6dB Bandwidth Limit

| 6dB Bandwidth Limit                                                |
|--------------------------------------------------------------------|
| Systems using digital modulation techniques:                       |
| <input checked="" type="checkbox"/> 6 dB bandwidth $\geq$ 500 kHz. |

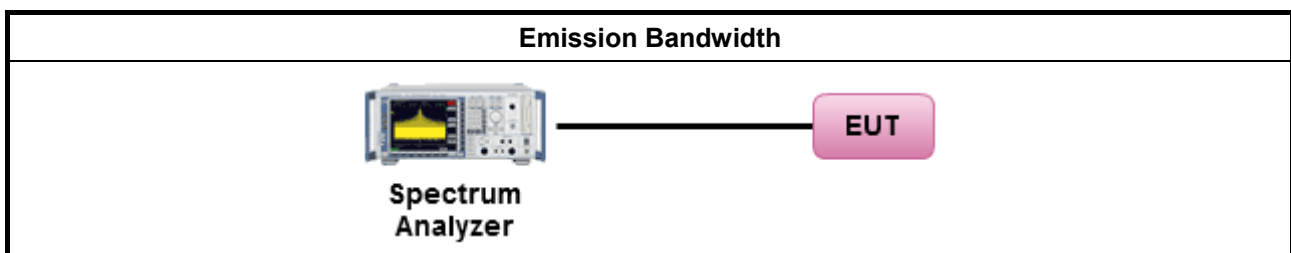
### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

| Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> For the emission bandwidth shall be measured using one of the options below:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 5.1.1 Option 1 for 6 dB bandwidth measurement.<br><input type="checkbox"/> Refer as FCC KDB 558074, clause 5.1.2 Option 2 for 6 dB bandwidth measurement.<br><input type="checkbox"/> Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> For conducted measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> For conducted measurements on devices with multiple transmit chains using options given below: <table border="1"> <tbody> <tr> <td><input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.</td> </tr> <tr> <td><input checked="" type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.</td> </tr> <tr> <td><input type="checkbox"/> Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW.</td> </tr> </tbody> </table> | <input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1. | <input checked="" type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains. | <input type="checkbox"/> Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW. |
| <input type="checkbox"/> Option 1: Multiple transmit chains measurements need to be performed on one of the active transmit chains (antenna outputs). All measurement had be performed on transmit chains 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> Option 2: Multiple transmit chains measurements need to be performed on each transmit chains individually (antenna outputs). All measurement had be performed on all transmit chains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input type="checkbox"/> Option 3: A power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point and record a single test point EBW.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |
| <input type="checkbox"/> For radiated measurement. The equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted power level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                              |                                                                                                                                                                                                                           |                                                                                                                                                                                              |

### 3.2.4 Test Setup

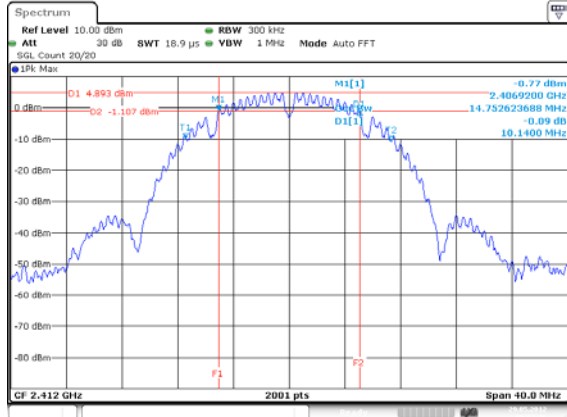


## 3.2.5 Test Result of Emission Bandwidth

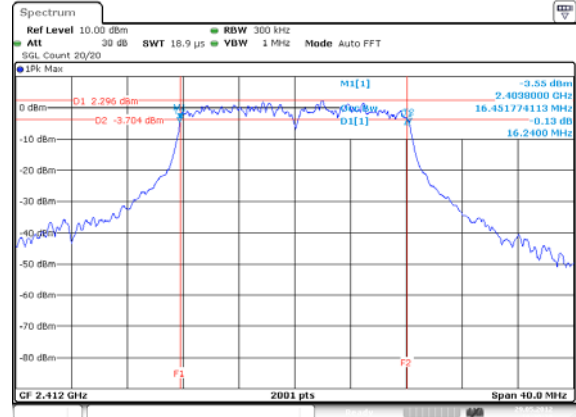
| Emission Bandwidth Result                           |                 |             |                          |   |   |   |               |   |   |   |
|-----------------------------------------------------|-----------------|-------------|--------------------------|---|---|---|---------------|---|---|---|
| Power Level                                         | 1               |             | Emission Bandwidth (MHz) |   |   |   |               |   |   |   |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | 99% Bandwidth            |   |   |   | 6dB Bandwidth |   |   |   |
|                                                     |                 |             | Chain-Port 1             | - | - | - | Chain-Port 1  | - | - | - |
| 11B-20M                                             | 1               | 2412        | 14.75                    | - | - | - | 10.14         | - | - | - |
| 11B-20M                                             | 1               | 2437        | 14.85                    | - | - | - | 9.30          | - | - | - |
| 11B-20M                                             | 1               | 2462        | 14.57                    | - | - | - | 10.14         | - | - | - |
| 11G-20M                                             | 1               | 2412        | 16.45                    | - | - | - | 16.24         | - | - | - |
| 11G-20M                                             | 1               | 2437        | 16.75                    | - | - | - | 16.40         | - | - | - |
| 11G-20M                                             | 1               | 2462        | 16.43                    | - | - | - | 16.28         | - | - | - |
| 11N2.4G-20M                                         | 1               | 2412        | 17.85                    | - | - | - | 17.56         | - | - | - |
| 11N2.4G-20M                                         | 1               | 2437        | 17.57                    | - | - | - | 17.16         | - | - | - |
| 11N2.4G-20M                                         | 1               | 2462        | 17.79                    | - | - | - | 17.00         | - | - | - |
| 11N2.4G-40M                                         | 1               | 2412        | 35.78                    | - | - | - | 34.96         | - | - | - |
| 11N2.4G-40M                                         | 1               | 2437        | 35.90                    | - | - | - | 35.56         | - | - | - |
| 11N2.4G-40M                                         | 1               | 2462        | 35.66                    | - | - | - | 35.28         | - | - | - |
| Limit                                               |                 |             | N/A                      |   |   |   | ≥500 kHz      |   |   |   |
| Result                                              |                 |             | Complied                 |   |   |   |               |   |   |   |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                          |   |   |   |               |   |   |   |

## Emission Bandwidth Plots

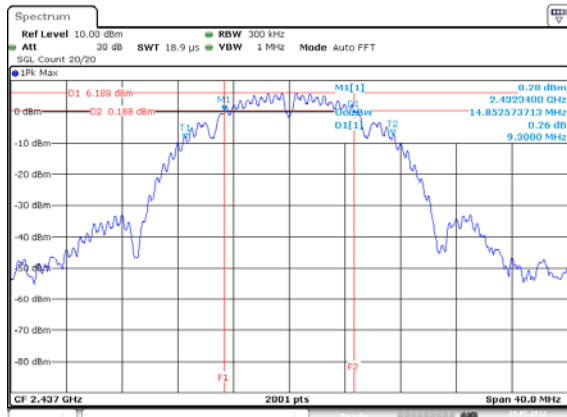
11B-20M – F1 [Port 1]



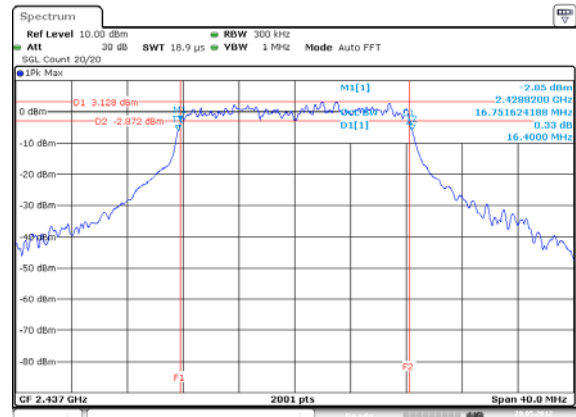
11G-20M – F1 [Port 1]



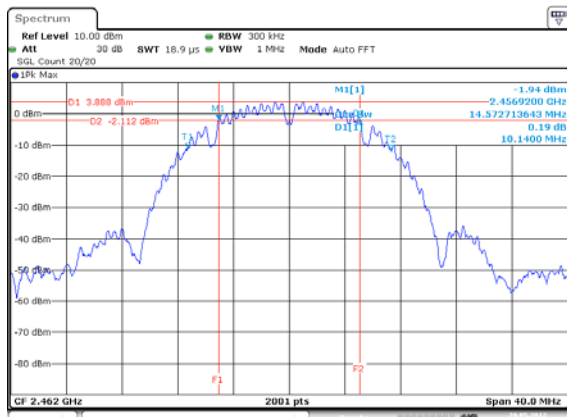
11B-20M – F2 [Port 1]



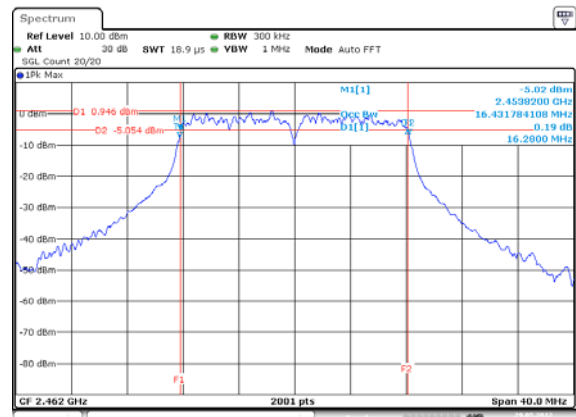
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]

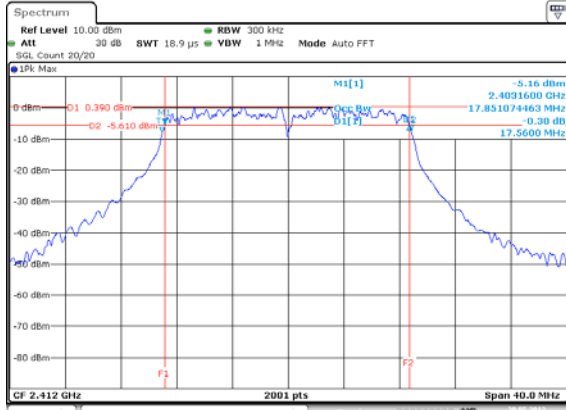


11G-20M – F3 [Port 1]



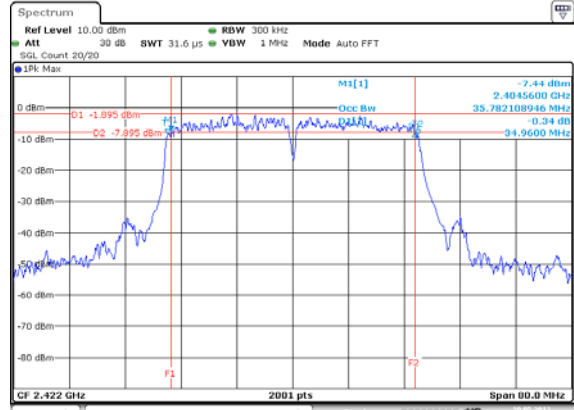
## Emission Bandwidth Plots

11N2.4G-20M – F1 [Port 1]



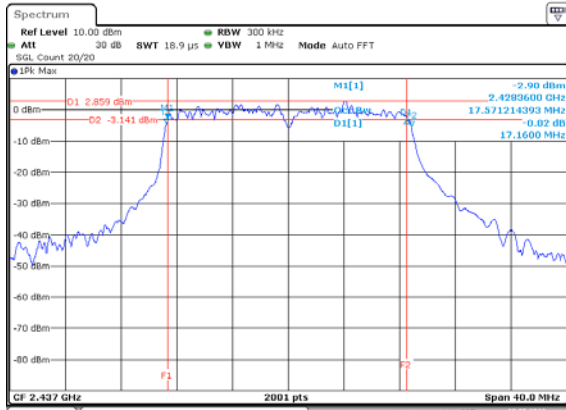
Date: 29.MAY.2012 11:57:42

11N2.4G-40M – F4 [Port 1]



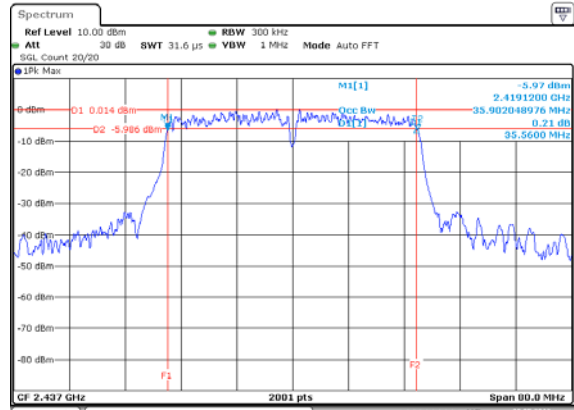
Date: 29.MAY.2012 12:09:09

11N2.4G-20M – F2 [Port 1]



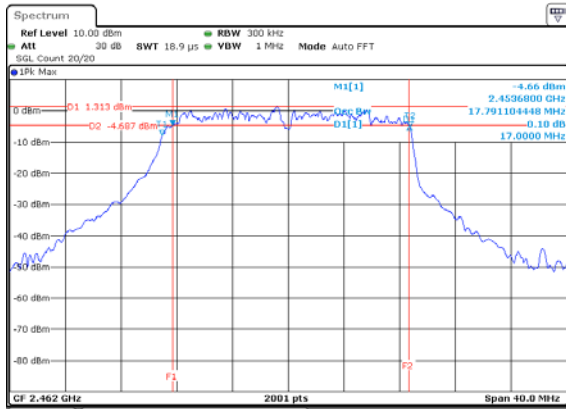
Date: 29.MAY.2012 11:58:32

11N2.4G-40M – F5 [Port 1]



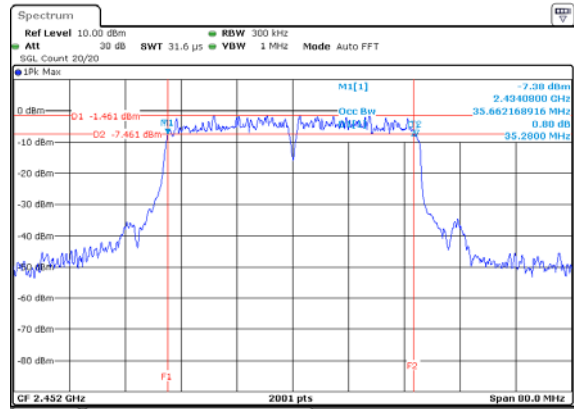
Date: 29.MAY.2012 12:13:47

11N2.4G-20M – F3 [Port 1]



Date: 29.MAY.2012 11:56:47

11N2.4G-40M – F6 [Port 1]



Date: 29.MAY.2012 12:16:51

### 3.3 RF Output Power

#### 3.3.1 RF Output Power Limit

| RF Output Power Limit                                                                                                                                                                                    |                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| <b>Maximum Peak Conducted Output Power or Maximum Conducted Output Power Limit</b>                                                                                                                       |                                                                                                 |
| <input type="checkbox"/> 902-928 MHz Band:                                                                                                                                                               |                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)                                        |
| <input type="checkbox"/>                                                                                                                                                                                 | If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm                                     |
| <input checked="" type="checkbox"/> 2400-2483.5 MHz Band:                                                                                                                                                |                                                                                                 |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)                                        |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm  |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm     |
| <input type="checkbox"/> Smart antenna system (SAS):                                                                                                                                                     |                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm                      |
| <input type="checkbox"/>                                                                                                                                                                                 | Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3$ dBm                     |
| <input type="checkbox"/>                                                                                                                                                                                 | Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)/3 + 8$ dBm |
| <input type="checkbox"/> 5725-5850 MHz Band:                                                                                                                                                             |                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)                                        |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ dBm  |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30$ dBm                      |
| <b>e.i.r.p. Power Limit:</b>                                                                                                                                                                             |                                                                                                 |
| <input type="checkbox"/> 902-928 MHz Band: $P_{eirp} \leq 36$ dBm (4 W)                                                                                                                                  |                                                                                                 |
| <input checked="" type="checkbox"/> 2400-2483.5 MHz Band                                                                                                                                                 |                                                                                                 |
| <input checked="" type="checkbox"/>                                                                                                                                                                      | Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm            |
| <input type="checkbox"/> Smart antenna system (SAS)                                                                                                                                                      |                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm                               |
| <input type="checkbox"/>                                                                                                                                                                                 | Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm                              |
| <input type="checkbox"/>                                                                                                                                                                                 | Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ dBm        |
| <input type="checkbox"/> 5725-5850 MHz Band                                                                                                                                                              |                                                                                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)                                 |
| <input type="checkbox"/>                                                                                                                                                                                 | Point-to-point systems (P2P): N/A                                                               |
| $P_{Out}$ = maximum peak conducted output power or maximum conducted output power in dBm,<br>$G_{TX}$ = the maximum transmitting antenna directional gain in dBi.<br>$P_{eirp}$ = e.i.r.p. Power in dBm. |                                                                                                 |

#### 3.3.2 Measuring Instruments

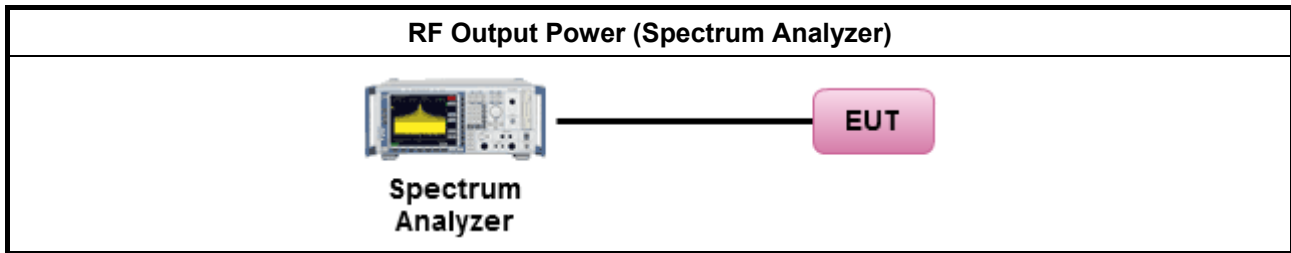
Refer a test equipment and calibration data table in this test report.



## 3.3.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Maximum Peak Conducted Output Power                                                                                                                                                                                                                                                                              |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.1.1 Option 1 (zero-span method).                                                                                                                                                                                                                                             |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.2.1.2 Option 2 (integrated band power method).                                                                                                                                                                                                                                 |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.1.3 Option 3 (peak power meter method).                                                                                                                                                                                                                                      |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.1.4 Alternative 1 (bandwidth correction method).                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.2.1 a) for peak power meter.                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.2.1 a) for spectrum analyzer - (RBW ≥ EBW).                                                                                                                                                                                                                                    |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.2.1 b) for spectrum analyzer - BW correction factor.                                                                                                                                                                                                                           |
| <input checked="" type="checkbox"/> | Maximum Conducted Output Power                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.2.1 Option 1 (RMS detection with slow sweep speed).                                                                                                                                                                                                                          |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.2.2.2 Option 2 (spectral trace averaging).                                                                                                                                                                                                                                     |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.2.3 Option 3 (average power meter method).                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.2.4 Alternative 1 (reduced VBW with max hold)                                                                                                                                                                                                                                |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.2.5 Alternative 2 (zero-span with trace averaging)                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.2.2.6 Alternative 3 (average on/off duty) - refer clause 1.1.4                                                                                                                                                                                                                 |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.3.1 for spectrum analyzer - Method 1 (trace averaging).                                                                                                                                                                                                                        |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 2 (zero-span averaging).                                                                                                                                                                                                                    |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.10.3.2 for spectrum analyzer - Method 3 (band power max-hold).                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 3 for conducted measurement.                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | For conducted measurements on devices with multiple transmit chains:<br>Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them. |
| <input checked="" type="checkbox"/> | If multiple transmit chains, EIRP calculation could be following as methods:                                                                                                                                                                                                                                     |
| <input type="checkbox"/>            | Method 1:<br>$\text{EIRP}_1 = P_1 + G_{\text{ANT}1}; \text{EIRP}_2 = P_2 + G_{\text{ANT}2}; \dots \text{EIRP}_n = P_n + G_{\text{ANT}n}$ $\text{EIRP}_{\text{total}} = \text{EIRP}_1 + \text{EIRP}_2 + \dots + \text{EIRP}_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])                    |
| <input checked="" type="checkbox"/> | Method 2:<br>$P_{\text{total}} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm])<br>$\text{EIRP}_{\text{total}} = P_{\text{total}} + DG$                                                                                                                                |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 3 for radiated measurement.                                                                                                                                                                                                                                                      |

## 3.3.4 Test Setup



## 3.3.5 Test Result of Maximum Peak Conducted Output Power

| Maximum Peak Conducted Output Power Result          |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11B-20M                                             | 1               | 2412        | 17.68                 |   |   |   | 17.68     | 30.0        | 22.68      | 36.0       |
| 11B-20M                                             | 1               | 2437        | 18.82                 |   |   |   | 18.82     | 30.0        | 23.82      | 36.0       |
| 11B-20M                                             | 1               | 2462        | 16.68                 |   |   |   | 16.68     | 30.0        | 21.68      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

| Maximum Peak Conducted Output Power Result          |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11G-20M                                             | 1               | 2412        | 19.46                 |   |   |   | 19.46     | 30.0        | 24.46      | 36.0       |
| 11G-20M                                             | 1               | 2437        | 20.74                 |   |   |   | 20.74     | 30.0        | 25.74      | 36.0       |
| 11G-20M                                             | 1               | 2462        | 18.28                 |   |   |   | 18.28     | 30.0        | 23.28      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

| Maximum Peak Conducted Output Power Result          |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11N2.4G-20M                                         | 1               | 2412        | 18.88                 |   |   |   | 18.88     | 30.0        | 23.88      | 36.0       |
| 11N2.4G-20M                                         | 1               | 2437        | 19.99                 |   |   |   | 19.99     | 30.0        | 24.99      | 36.0       |
| 11N2.4G-20M                                         | 1               | 2462        | 18.54                 |   |   |   | 18.54     | 30.0        | 23.54      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

| Maximum Peak Conducted Output Power Result          |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11N2.4G-40M                                         | 1               | 2422        | 18.12                 |   |   |   | 18.12     | 30.0        | 23.12      | 36.0       |
| 11N2.4G-40M                                         | 1               | 2437        | 20.63                 |   |   |   | 20.63     | 30.0        | 25.63      | 36.0       |
| 11N2.4G-40M                                         | 1               | 2452        | 18.89                 |   |   |   | 18.89     | 30.0        | 23.89      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

## 3.3.6 Test Result of Maximum Conducted Output Power

| Maximum Conducted Output Power Result               |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11B-20M                                             | 1               | 2412        | 14.59                 |   |   |   | 14.59     | 30.0        | 19.59      | 36.0       |
| 11B-20M                                             | 1               | 2437        | 15.71                 |   |   |   | 15.71     | 30.0        | 20.71      | 36.0       |
| 11B-20M                                             | 1               | 2462        | 13.58                 |   |   |   | 13.58     | 30.0        | 18.58      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

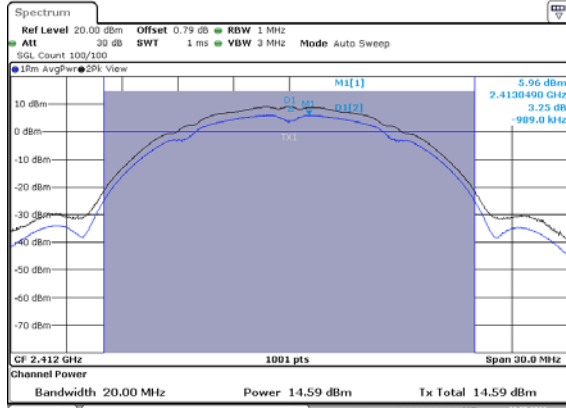
| Maximum Conducted Output Power Result               |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11G-20M                                             | 1               | 2412        | 12.33                 |   |   |   | 12.33     | 30.0        | 17.33      | 36.0       |
| 11G-20M                                             | 1               | 2437        | 13.64                 |   |   |   | 13.64     | 30.0        | 18.64      | 36.0       |
| 11G-20M                                             | 1               | 2462        | 11.10                 |   |   |   | 11.10     | 30.0        | 16.10      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

| Maximum Conducted Output Power Result               |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11N2.4G-20M                                         | 1               | 2412        | 11.41                 |   |   |   | 11.41     | 30.0        | 16.41      | 36.0       |
| 11N2.4G-20M                                         | 1               | 2437        | 12.53                 |   |   |   | 12.53     | 30.0        | 17.53      | 36.0       |
| 11N2.4G-20M                                         | 1               | 2462        | 11.08                 |   |   |   | 11.08     | 30.0        | 16.08      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

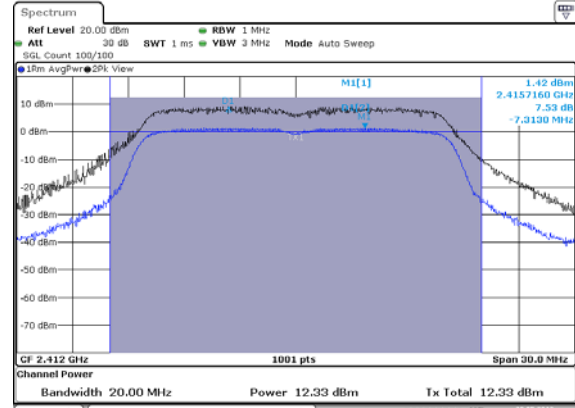
| Maximum Conducted Output Power Result               |                 |             |                       |   |   |   |           |             |            |            |
|-----------------------------------------------------|-----------------|-------------|-----------------------|---|---|---|-----------|-------------|------------|------------|
| Power Level                                         |                 | 1           | RF Output Power (dBm) |   |   |   |           |             |            |            |
| Directional Gain (dBi)                              |                 | 5           |                       |   |   |   |           |             |            |            |
| Modulation Mode                                     | N <sub>TX</sub> | Freq. (MHz) | Chain-Port 1          | - | - | - | Sum Chain | Power Limit | EIRP Power | EIRP Limit |
| 11N2.4G-40M                                         | 1               | 2422        | 10.97                 |   |   |   | 10.97     | 30.0        | 15.97      | 36.0       |
| 11N2.4G-40M                                         | 1               | 2437        | 13.47                 |   |   |   | 13.47     | 30.0        | 18.47      | 36.0       |
| 11N2.4G-40M                                         | 1               | 2452        | 11.70                 |   |   |   | 11.70     | 30.0        | 16.70      | 36.0       |
| Result                                              |                 |             | Complied              |   |   |   |           |             |            |            |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains |                 |             |                       |   |   |   |           |             |            |            |

## Maximum Peak Conducted Output Power Plots and Maximum Conducted Output Power

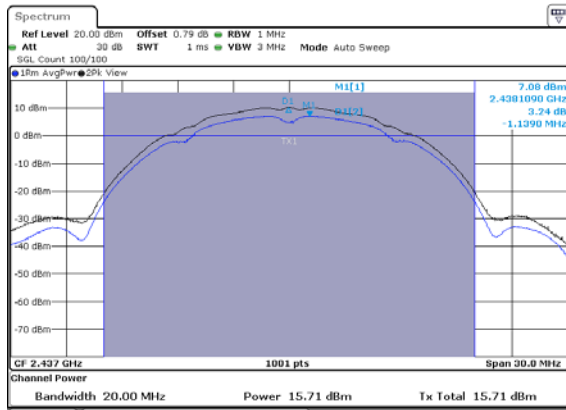
11B-20M – F1 [Port 1]



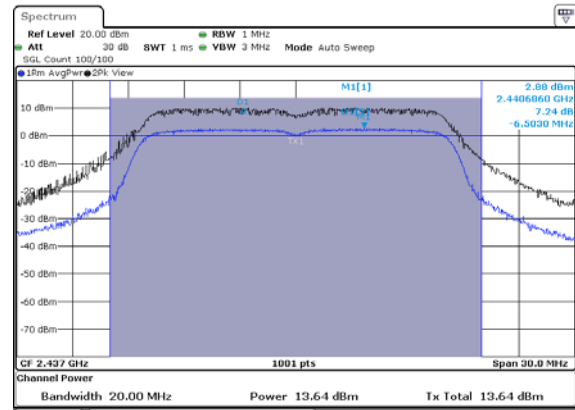
11G-20M – F1 [Port 1]



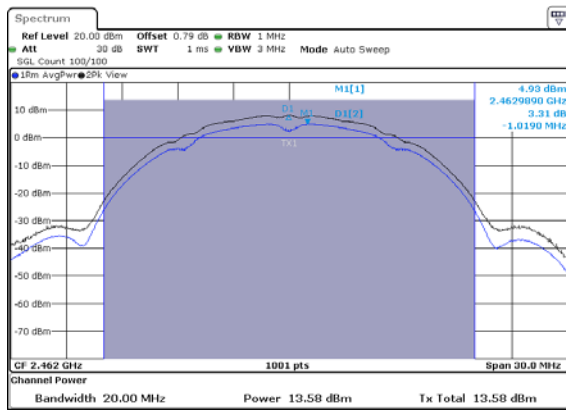
11B-20M – F2 [Port 1]



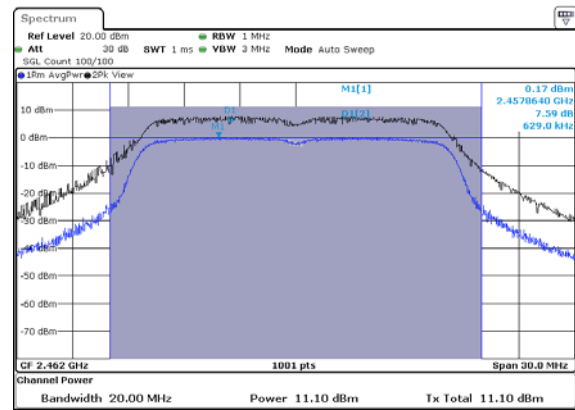
11G-20M – F2 [Port 1]



11B-20M – F3 [Port 1]

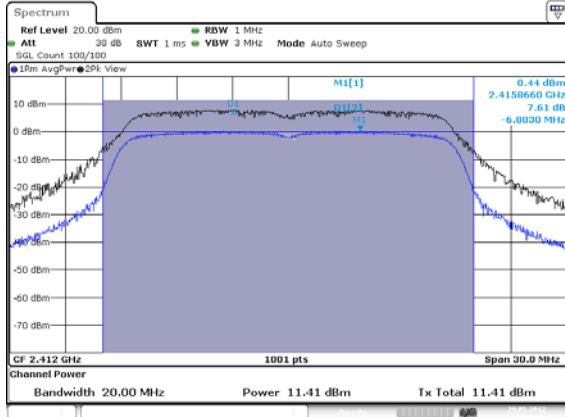


11G-20M – F3 [Port 1]

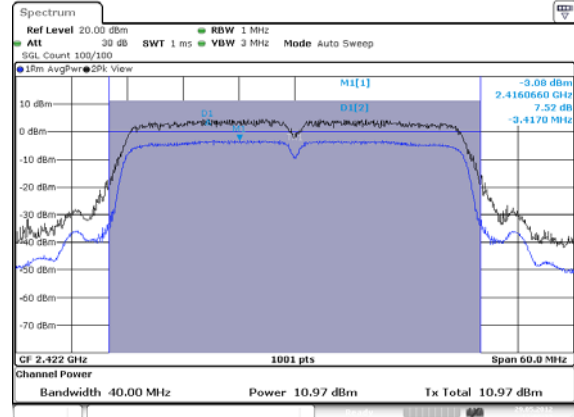


## Maximum Peak Conducted Output Power Plots and Maximum Conducted Output Power

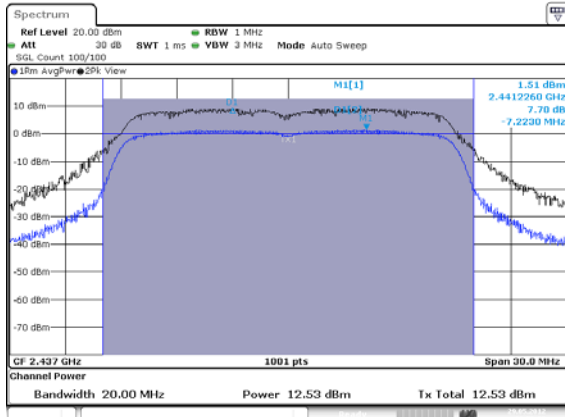
11N2.4G-20M – F1 [Port 1]



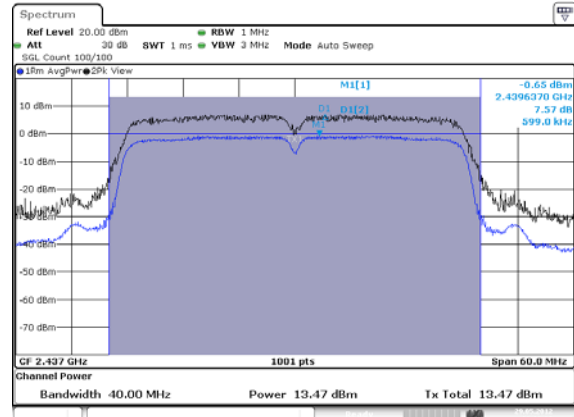
11N2.4G-40M – F1 [Port 1]



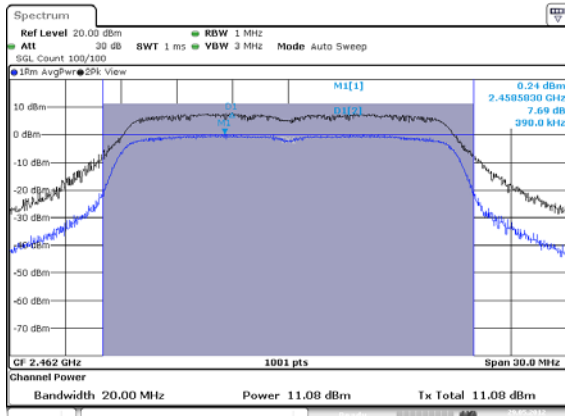
11N2.4G-20M – F2 [Port 1]



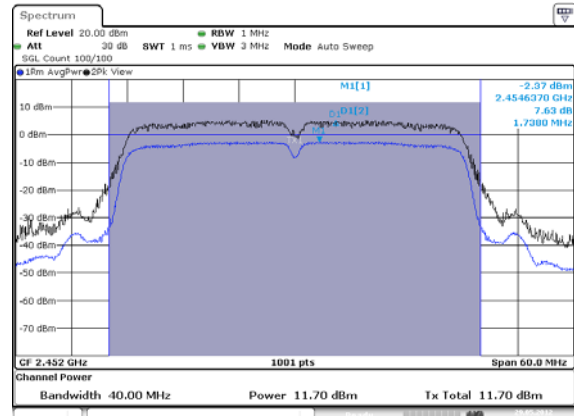
11N2.4G-40M – F2 [Port 1]



11N2.4G-20M – F3 [Port 1]



11N2.4G-40M – F3 [Port 1]



### 3.4 Power Spectral Density

#### 3.4.1 Power Spectral Density Limit

| Power Spectral Density Limit        |                                                |
|-------------------------------------|------------------------------------------------|
| <input checked="" type="checkbox"/> | Power Spectral Density (PSD) $\leq$ 8 dBm/3kHz |

#### 3.4.2 Measuring Instruments

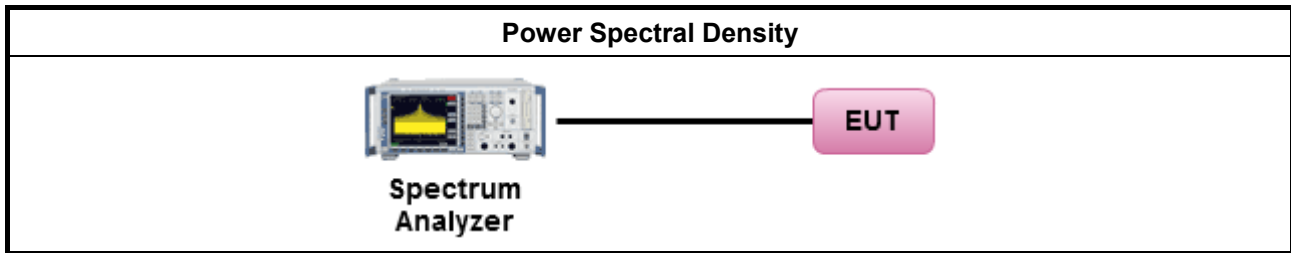
Refer a test equipment and calibration data table in this test report.

#### 3.4.3 Test Procedures

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the power spectral density. In addition, the use of a peak PSD procedure will always result in a "worst-case" measured level for comparison to the limit. Therefore, whenever the DTS bandwidth exceeds 500 kHz, it is acceptable to utilize the peak PSD procedure to demonstrate compliance to the PSD limit, regardless of how the fundamental output power was measured. For the power spectral density shall be measured using below options:                                                                                                                                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.3.1 Option 1 (peak PSD; BWCF=-15.2dB).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.3.2 Option 2 (average PSD; BWCF=-15.2dB).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.3.3 Alternative 1 (peak PSD; RBW=3kHz; sweep=100s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.3.4 Alternative 2 (average PSD; RBW=3kHz; average=100).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.11.2.3 for PSD for DTS - (RBW=3kHz; sweep=100s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.11.2.4 for Alternative PSD for DTS - (RBW=3kHz; average=100)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 3 for conducted measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <input checked="" type="checkbox"/> | For conducted measurements on devices with multiple transmit chains using options given below:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N <sub>TX</sub> output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. The new data trace samples added 100 kHz segment and found the highest value of each 100 kHz segments. Add the bandwidth correction factor (BWCF) [-15.2 dB] adjusting in power spectral density per 3kHz. |
| <input type="checkbox"/>            | Option 2: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 3 for radiated measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



## 3.4.4 Test Setup



## 3.4.5 Test Result of Power Spectral Density

| Power Spectral Density Result                                                                      |                 |             |                                   |   |   |   |           |
|----------------------------------------------------------------------------------------------------|-----------------|-------------|-----------------------------------|---|---|---|-----------|
| Power Level                                                                                        |                 | 1           | Power Spectral Density (dBm/3kHz) |   |   |   |           |
| Directional Gain (dBi)                                                                             |                 | 5           |                                   |   |   |   |           |
| Modulation Mode                                                                                    | N <sub>TX</sub> | Freq. (MHz) | Sum All Chains                    | - | - | - | PSD Limit |
| 11B-20M                                                                                            | 1               | 2412        | -12.50                            |   |   |   | 8.0       |
| 11B-20M                                                                                            | 1               | 2437        | -10.62                            |   |   |   | 8.0       |
| 11B-20M                                                                                            | 1               | 2462        | -13.74                            |   |   |   | 8.0       |
| Result                                                                                             |                 |             | Complied                          |   |   |   |           |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains                                                |                 |             |                                   |   |   |   |           |
| Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB] |                 |             |                                   |   |   |   |           |

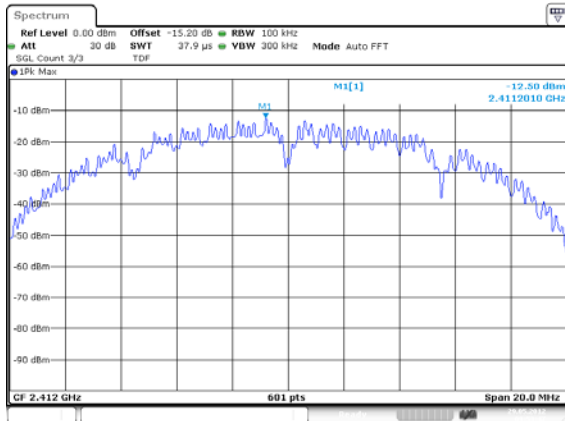
| Power Spectral Density Result                                                                      |                 |             |                                   |   |   |   |           |
|----------------------------------------------------------------------------------------------------|-----------------|-------------|-----------------------------------|---|---|---|-----------|
| Power Level                                                                                        |                 | 1           | Power Spectral Density (dBm/3kHz) |   |   |   |           |
| Directional Gain (dBi)                                                                             |                 | 5           |                                   |   |   |   |           |
| Modulation Mode                                                                                    | N <sub>TX</sub> | Freq. (MHz) | Sum All Chains                    | - | - | - | PSD Limit |
| 11G-20M                                                                                            | 1               | 2412        | -17.15                            |   |   |   | 8.0       |
| 11G-20M                                                                                            | 1               | 2437        | -16.35                            |   |   |   | 8.0       |
| 11G-20M                                                                                            | 1               | 2462        | -18.30                            |   |   |   | 8.0       |
| Result                                                                                             |                 |             | Complied                          |   |   |   |           |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains                                                |                 |             |                                   |   |   |   |           |
| Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB] |                 |             |                                   |   |   |   |           |

| Power Spectral Density Result                                                                      |                 |             |                                   |   |   |   |           |
|----------------------------------------------------------------------------------------------------|-----------------|-------------|-----------------------------------|---|---|---|-----------|
| Power Level                                                                                        |                 | 1           | Power Spectral Density (dBm/3kHz) |   |   |   |           |
| Directional Gain (dBi)                                                                             |                 | 5           |                                   |   |   |   |           |
| Modulation Mode                                                                                    | N <sub>TX</sub> | Freq. (MHz) | Sum All Chains                    | - | - | - | PSD Limit |
| 11N2.4G-20M                                                                                        | 1               | 2412        | -17.41                            |   |   |   | 8.0       |
| 11N2.4G-20M                                                                                        | 1               | 2437        | -17.57                            |   |   |   | 8.0       |
| 11N2.4G-20M                                                                                        | 1               | 2462        | -17.64                            |   |   |   | 8.0       |
| Result                                                                                             |                 |             | Complied                          |   |   |   |           |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains                                                |                 |             |                                   |   |   |   |           |
| Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB] |                 |             |                                   |   |   |   |           |

| Power Spectral Density Result                                                                      |                 |             |                                   |   |   |   |           |
|----------------------------------------------------------------------------------------------------|-----------------|-------------|-----------------------------------|---|---|---|-----------|
| Power Level                                                                                        |                 | 1           | Power Spectral Density (dBm/3kHz) |   |   |   |           |
| Directional Gain (dBi)                                                                             |                 | 5           |                                   |   |   |   |           |
| Modulation Mode                                                                                    | N <sub>TX</sub> | Freq. (MHz) | Sum All Chains                    | - | - | - | PSD Limit |
| 11N2.4G-40M                                                                                        | 1               | 2422        | -21.71                            |   |   |   | 8.0       |
| 11N2.4G-40M                                                                                        | 1               | 2437        | -19.59                            |   |   |   | 8.0       |
| 11N2.4G-40M                                                                                        | 1               | 2452        | -20.86                            |   |   |   | 8.0       |
| Result                                                                                             |                 |             | Complied                          |   |   |   |           |
| Note 1: N <sub>TX</sub> = Number of Transmit Chains                                                |                 |             |                                   |   |   |   |           |
| Note 2: PSD [dBm/3kHz] = sum each transmit chains by bin-to-bin PSD [dBm/100kHz] + BWFC [-15.2 dB] |                 |             |                                   |   |   |   |           |

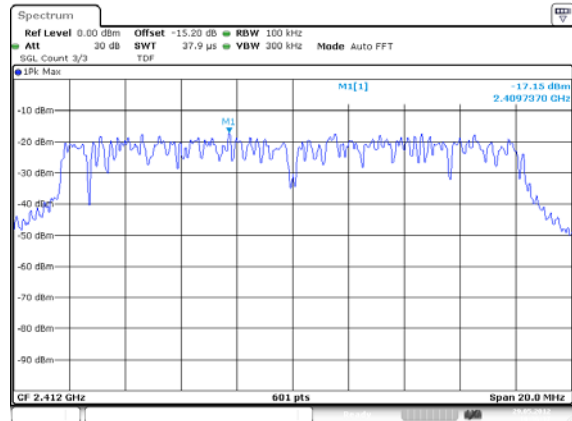
## Power Spectral Density Plots

11B-20M – F1 [Sum All Chains]



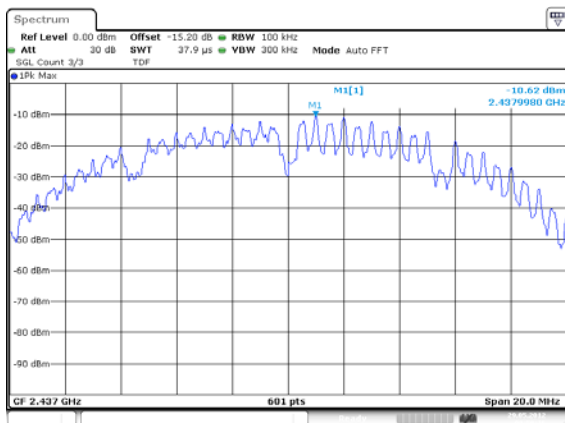
Date: 29.MAY.2012 09:53:47

11G-20M – F1 [Sum All Chains]



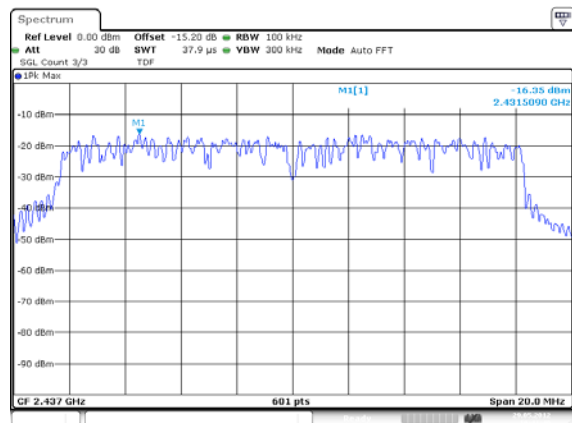
Date: 29.MAY.2012 10:36:37

11B-20M – F2 [Sum All Chains]



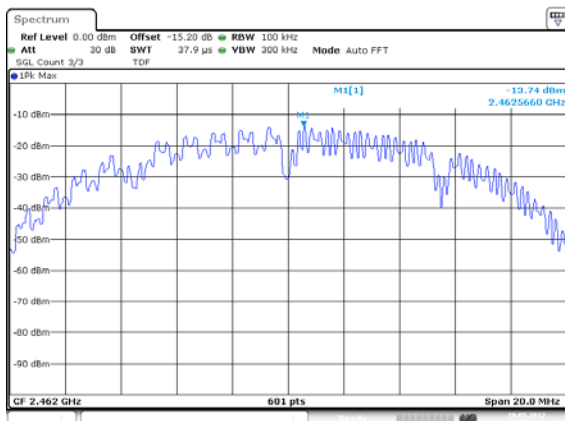
Date: 29.MAY.2012 09:58:16

11G-20M – F2 [Sum All Chains]



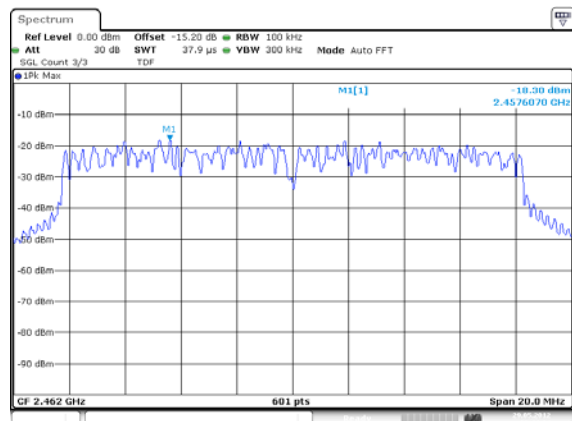
Date: 29.MAY.2012 10:41:40

11B-20M – F3 [Sum All Chains]



Date: 29.MAY.2012 10:20:21

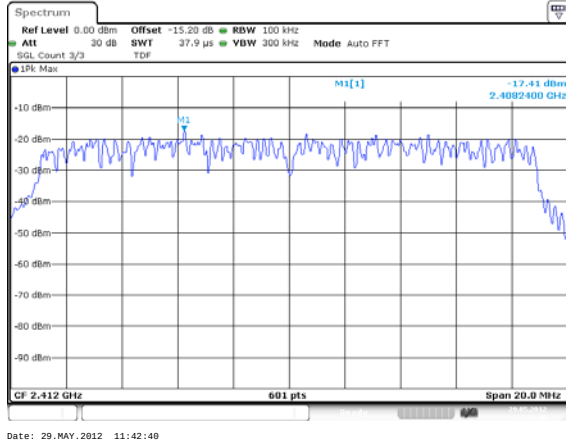
11G-20M – F3 [Sum All Chains]



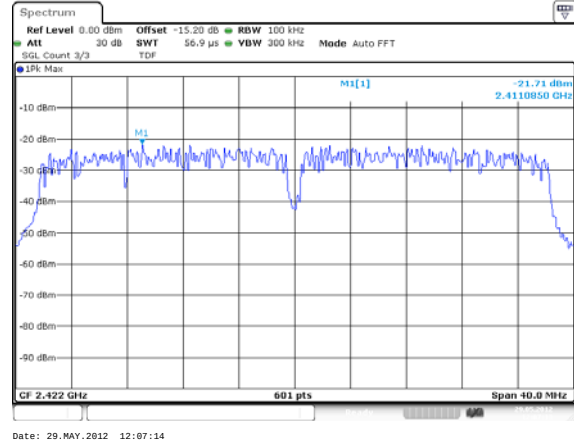
Date: 29.MAY.2012 10:44:05

## Power Spectral Density Plots

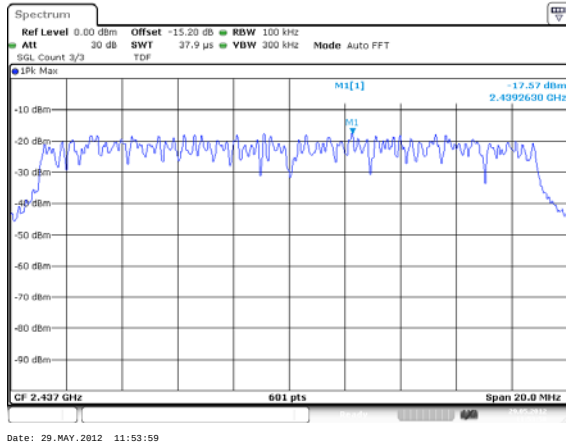
11N2.4G-20M – F1 [Sum All Chains]



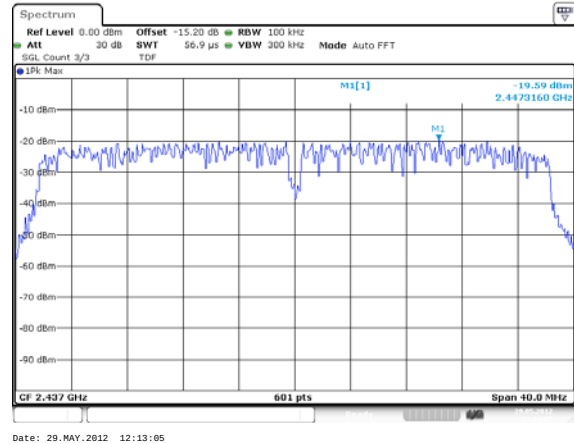
11N2.4G-40M – F4 [Sum All Chains]



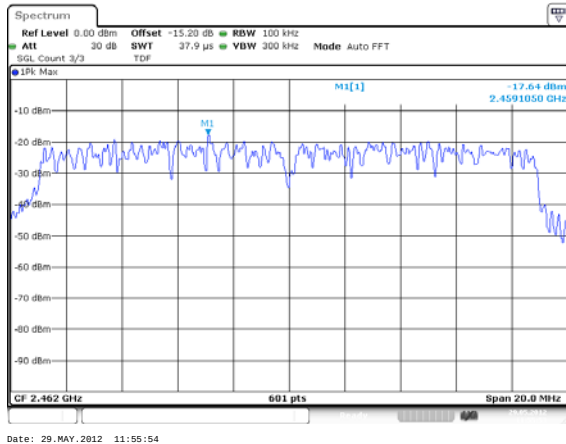
11N2.4G-20M – F2 [Sum All Chains]



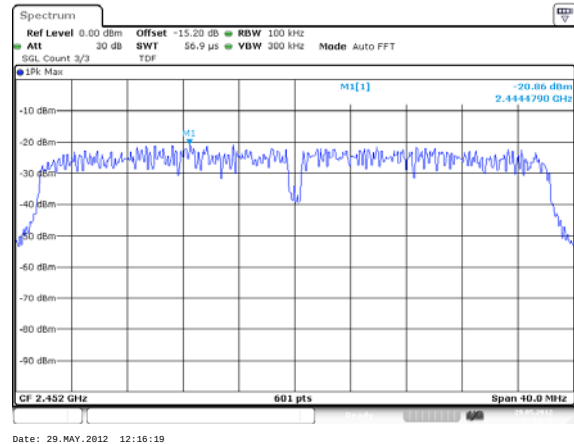
11N2.4G-40M – F5 [Sum All Chains]



11N2.4G-20M – F3 [Sum All Chains]

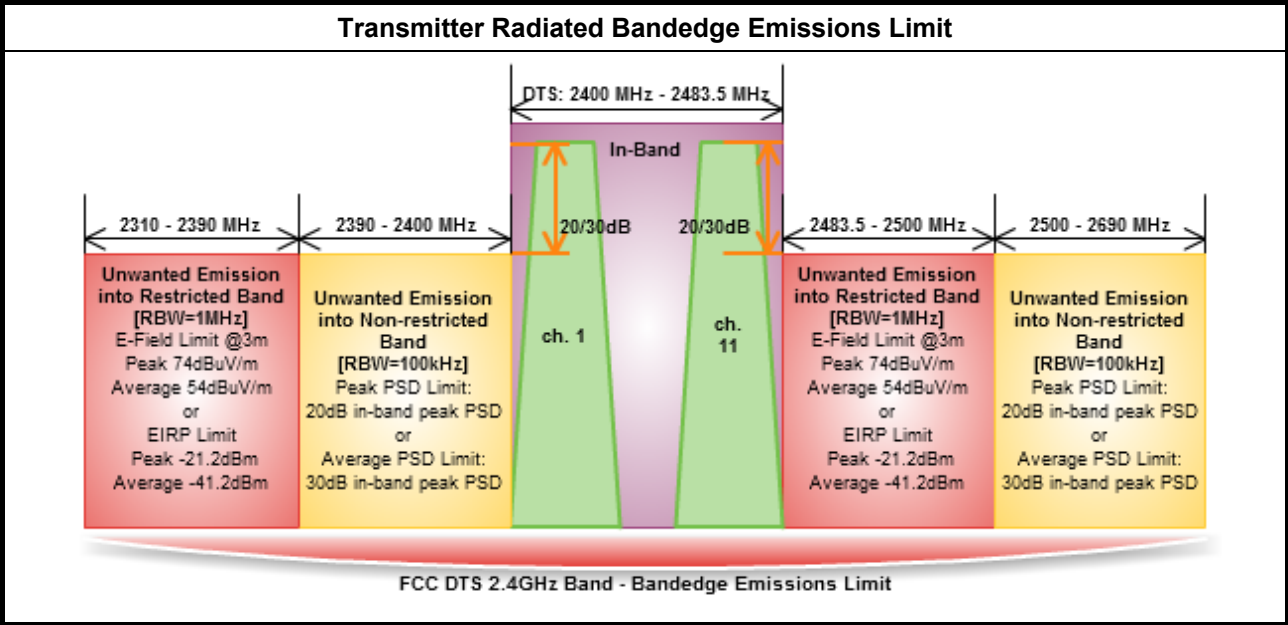


11N2.4G-40M – F6 [Sum All Chains]



3.5 Transmitter Radiated Bandedge Emissions

3.5.1 Transmitter Radiated Bandedge Emissions Limit



3.5.2 Measuring Instruments

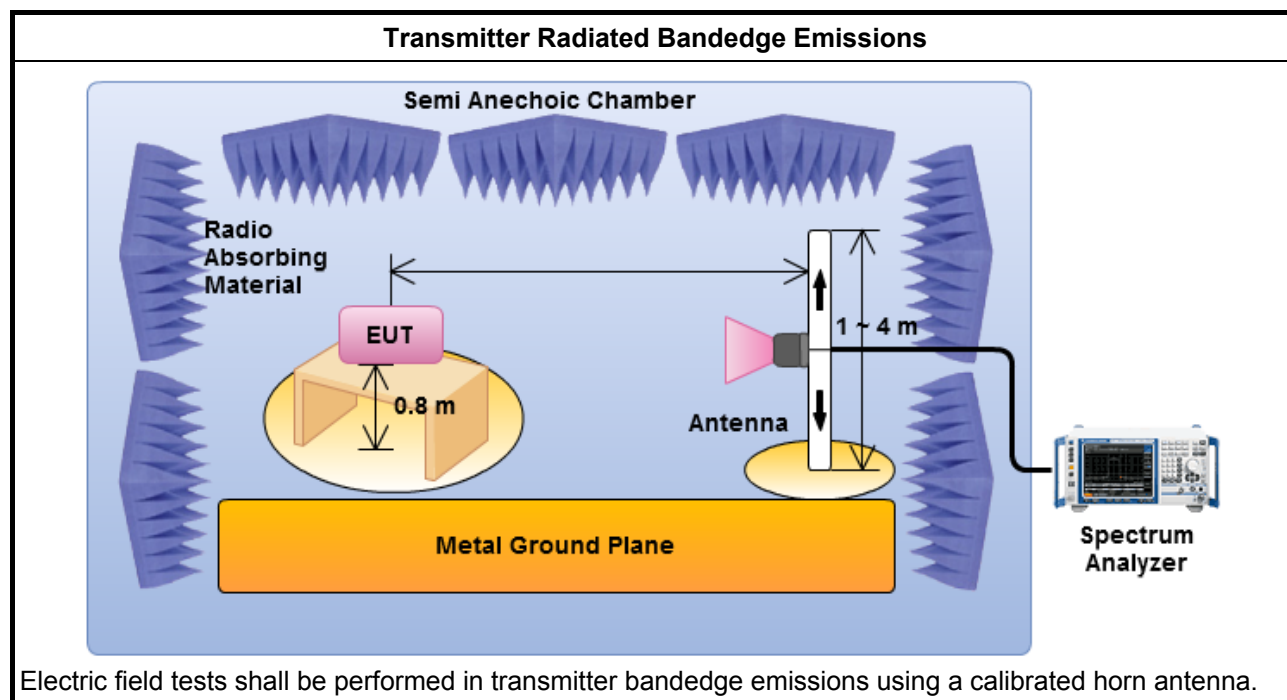
Refer a test equipment and calibration data table in this test report.

## 3.5.3 Test Procedures

| Test Method – General Information   |                                                                                                                                                                           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].                                                                                   |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band. |
| <input checked="" type="checkbox"/> | For the transmitter unwanted emissions shall be measured using following options below:                                                                                   |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.4.1 for unwanted emissions into non-restricted bands.                                                                                   |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.4.2 for unwanted emissions into restricted bands.                                                                                       |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.2.1 Option 1 (Power Averaging).                                                                                                   |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.2.2 Option 2 (Trace Averaging).                                                                                                   |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.2.2 Option 3 (Reduced VBW).                                                                                                       |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). – Duty cycle $\geq$ 98%.                                                                                            |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.                                                                                                 |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 7.4.2.2.3 measurement procedure peak limit.                                                                                               |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.                                                                                                  |
| <input checked="" type="checkbox"/> | For the transmitter bandedge emissions shall be measured using following options below:                                                                                   |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.4 for narrower resolution bandwidth using the band power and summing the spectral levels (i.e., 100 kHz or 1 MHz).                |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.                                                                                                                 |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.                                                                                    |

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 3 for conducted measurement.                                                                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | For unwanted emissions into non-restricted bands (relative emission limits).                                                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | For conducted measurements on devices with multiple transmit chains:<br>Refer as FCC KDB 662911, when testing out-of-band and spurious emissions against relative emission limits, tests may be performed on each output individually without summing or adding $10 \log(N)$ if the measurements are made relative to the in-band emissions on the individual outputs. |
| <input type="checkbox"/>            | For unwanted emissions into restricted bands. Test conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation).                                                                                                                                                                          |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.1 unwanted emissions in restricted bands on frequencies $\leq 1000$ MHz                                                                                                                                                                                                                                                        |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 7.4.2.2.2 unwanted emissions in restricted bands on frequencies $> 1000$ MHz                                                                                                                                                                                                                                                           |
| <input type="checkbox"/>            | For conducted measurements on devices with multiple transmit chains using options given below:                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, out-of-band and spurious emission measurement. The trace data for each transmit chain has to be individually recorded and each transmit chain trace data shall be added and compared with the limit.                                                                                |
| <input type="checkbox"/>            | Option 2: Measure and add $10 \log(N)$ dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with $10 \log(N)$ . Or each transmit chains shall be add $10 \log(N)$ to compared with the limit.    |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 3 for radiated measurement.                                                                                                                                                                                                                                                                                                            |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.                                                                                                                                                                                                                                                                                             |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.                                                                                                                                                                                                                                                                                       |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.                                                                                                                                                                                                                                                                                              |

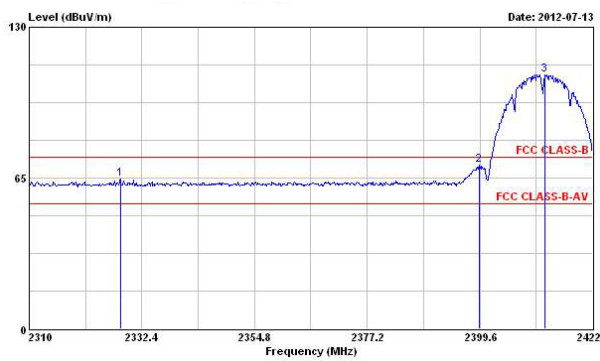
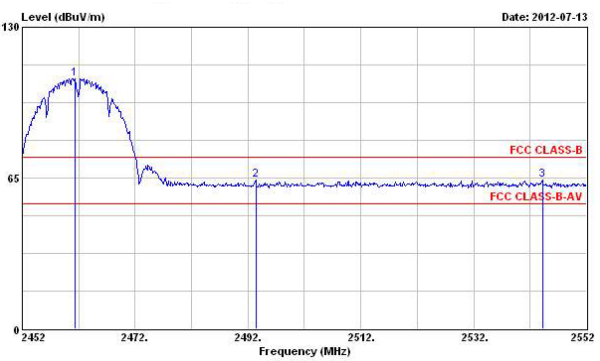
### 3.5.4 Test Setup





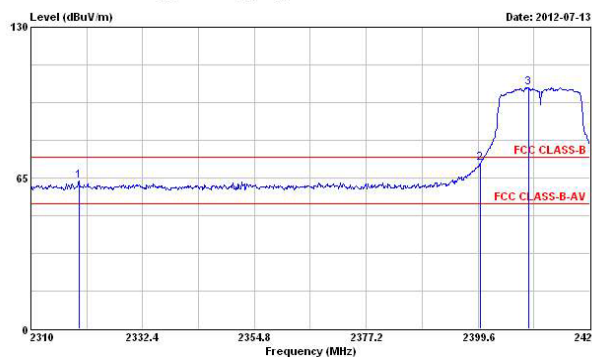
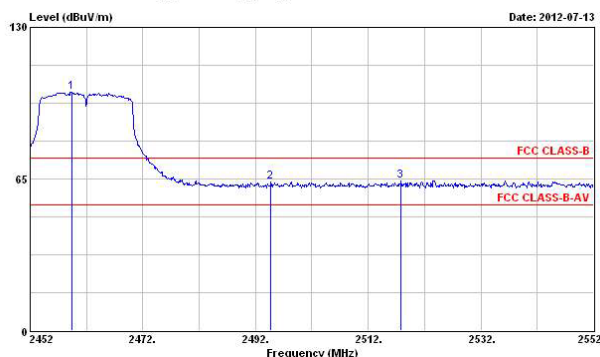
## 3.5.5 Test Result of Transmitter Radiated Bandedge Emissions

| Transmitter Radiated Bandedge Emissions Result |                 |                      |                               |                               |                                |                |            |            |             |
|------------------------------------------------|-----------------|----------------------|-------------------------------|-------------------------------|--------------------------------|----------------|------------|------------|-------------|
| Power Level                                    | 1               | Gain (dBi)           | 5                             | Non-restricted Band Emissions |                                |                |            |            |             |
| Modulation                                     | 11B-20M         |                      |                               |                               |                                |                |            |            |             |
| Non-restricted Band (MHz)                      | N <sub>TX</sub> | Test Ch. Freq. (MHz) | In-band PSD [i] (dBuV/100kHz) | NBE Freq. (MHz)               | Out-band PSD [o] (dBuV/100kHz) | [i] – [o] (dB) | Limit (dB) | Level Type | Pol. note 1 |
| 2390-2400                                      | 1               | 2412                 | 109.60                        | 2399.49                       | 70.38                          | 39.22          | 20         | PK         | V           |
| 2500-2690                                      | 1               | 2462                 | 107.95                        | 2544.20                       | 64.07                          | 43.88          | 20         | PK         | V           |

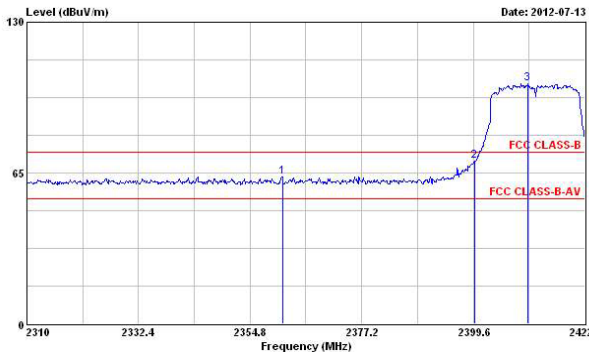
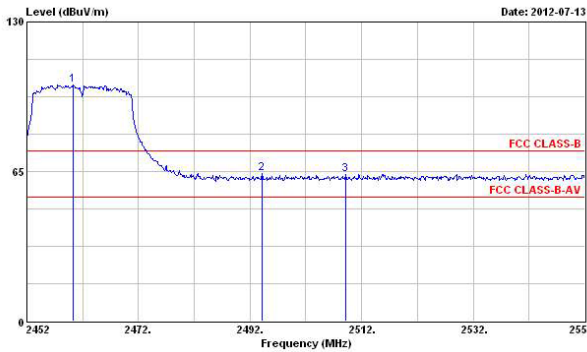
| Low Band                                                                                                                                  | Up Band                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <div><p>Level (dBuV/m)</p><p>Date: 2012-07-13</p></div> | <div><p>Level (dBuV/m)</p><p>Date: 2012-07-13</p></div> |

Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)

| Transmitter Radiated Bandedge Emissions Result                                                       |                 |                       |                                |                           |                      |                         |                |            |                               |
|------------------------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------------------|---------------------------|----------------------|-------------------------|----------------|------------|-------------------------------|
| Power Level                                                                                          | 1               | Gain <sub>(dBi)</sub> | 5                              | Restricted Band Emissions |                      |                         |                |            |                               |
| Modulation                                                                                           | 11B-20M         |                       |                                |                           |                      |                         |                |            |                               |
| Restricted Band (MHz)                                                                                | N <sub>TX</sub> | Test Ch. Freq. (MHz)  | In-band PSD [i]<br>(dBuV/1MHz) | RBE Freq. (MHz)           | Measure Distance (m) | Out-Band Level (dBuV/m) | Limit (dBuV/m) | Level Type | Pol.<br><small>note 1</small> |
| 2310-2390                                                                                            | 1               | 2412                  | 116.27                         | 2368.14                   | 3                    | 63.79                   | 74             | PK         | V                             |
| 2310-2390                                                                                            | 1               | 2412                  | 111.60                         | 2386.38                   | 3                    | 52.30                   | 54             | AV         | V                             |
| 2483.5-2500                                                                                          | 1               | 2462                  | 114.19                         | 2483.85                   | 3                    | 63.27                   | 74             | PK         | V                             |
| 2483.5-2500                                                                                          | 1               | 2462                  | 109.67                         | 2483.50                   | 3                    | 52.91                   | 54             | AV         | V                             |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). |                 |                       |                                |                           |                      |                         |                |            |                               |

| Transmitter Radiated Bandedge Emissions Result                                                      |                 |                      |                               |                                                                                     |                                |                |            |            |             |
|-----------------------------------------------------------------------------------------------------|-----------------|----------------------|-------------------------------|-------------------------------------------------------------------------------------|--------------------------------|----------------|------------|------------|-------------|
| Power Level                                                                                         | 1               | Gain (dBi)           | 5                             | Non-restricted Band Emissions                                                       |                                |                |            |            |             |
| Modulation                                                                                          | 11G-20M         |                      |                               |                                                                                     |                                |                |            |            |             |
| Non-restricted Band (MHz)                                                                           | N <sub>TX</sub> | Test Ch. Freq. (MHz) | In-band PSD [i] (dBuV/100kHz) | NBE Freq. (MHz)                                                                     | Out-band PSD [o] (dBuV/100kHz) | [i] – [o] (dB) | Limit (dB) | Level Type | Pol. note 1 |
| 2390-2400                                                                                           | 1               | 2412                 | 103.92                        | 2400.00                                                                             | 71.21                          | 32.71          | 20         | PK         | V           |
| 2500-2690                                                                                           | 1               | 2462                 | 102.21                        | 2517.80                                                                             | 64.15                          | 38.06          | 20         | PK         | V           |
| Low Band                                                                                            |                 |                      |                               | Up Band                                                                             |                                |                |            |            |             |
|                   |                 |                      |                               |  |                                |                |            |            |             |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical) |                 |                      |                               |                                                                                     |                                |                |            |            |             |

| Transmitter Radiated Bandedge Emissions Result                                                       |                 |                       |                                |                           |                      |                         |                   |            |                |
|------------------------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------------------|---------------------------|----------------------|-------------------------|-------------------|------------|----------------|
| Power Level                                                                                          | 1               | Gain <sub>(dBi)</sub> | 5                              | Restricted Band Emissions |                      |                         |                   |            |                |
| Modulation                                                                                           | 11G-20M         |                       |                                |                           |                      |                         |                   |            |                |
| Restricted Band (MHz)                                                                                | N <sub>TX</sub> | Test Ch. Freq. (MHz)  | In-band PSD [i]<br>(dBuV/1MHz) | RBE Freq. (MHz)           | Measure Distance (m) | Out-Band Level (dBuV/m) | Limit<br>(dBuV/m) | Level Type | Pol.<br>note 1 |
| 2310-2390                                                                                            | 1               | 2412                  | 116.10                         | 2389.42                   | 3                    | 69.78                   | 74                | PK         | V              |
| 2310-2390                                                                                            | 1               | 2412                  | 105.69                         | 2390.00                   | 3                    | 52.52                   | 54                | AV         | V              |
| 2483.5-2500                                                                                          | 1               | 2462                  | 114.47                         | 2483.50                   | 3                    | 68.98                   | 74                | PK         | V              |
| 2483.5-2500                                                                                          | 1               | 2462                  | 103.89                         | 2483.50                   | 3                    | 52.43                   | 54                | AV         | V              |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). |                 |                       |                                |                           |                      |                         |                   |            |                |

| Transmitter Radiated Bandedge Emissions Result                                                      |                 |                      |                               |                                                                                     |                                |                |            |            |             |
|-----------------------------------------------------------------------------------------------------|-----------------|----------------------|-------------------------------|-------------------------------------------------------------------------------------|--------------------------------|----------------|------------|------------|-------------|
| Power Level                                                                                         | 1               | Gain (dBi)           | 5                             | Non-restricted Band Emissions                                                       |                                |                |            |            |             |
| Modulation                                                                                          | 11N2.4G-20M     |                      |                               |                                                                                     |                                |                |            |            |             |
| Non-restricted Band (MHz)                                                                           | N <sub>TX</sub> | Test Ch. Freq. (MHz) | In-band PSD [i] (dBuV/100kHz) | NBE Freq. (MHz)                                                                     | Out-band PSD [o] (dBuV/100kHz) | [i] – [o] (dB) | Limit (dB) | Level Type | Pol. note 1 |
| 2390-2400                                                                                           | 1               | 2412                 | 103.40                        | 2399.82                                                                             | 70.28                          | 33.12          | 20         | PK         | V           |
| 2500-2690                                                                                           | 1               | 2462                 | 102.52                        | 2509.10                                                                             | 63.89                          | 38.63          | 20         | PK         | V           |
| Low Band                                                                                            |                 |                      |                               | Up Band                                                                             |                                |                |            |            |             |
|                   |                 |                      |                               |  |                                |                |            |            |             |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical) |                 |                      |                               |                                                                                     |                                |                |            |            |             |

| Transmitter Radiated Bandedge Emissions Result                                                       |                 |                       |                                |                           |                      |                         |                   |            |                |
|------------------------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------------------|---------------------------|----------------------|-------------------------|-------------------|------------|----------------|
| Power Level                                                                                          | 1               | Gain <sub>(dBi)</sub> | 5                              | Restricted Band Emissions |                      |                         |                   |            |                |
| Modulation                                                                                           | 11N2.4G-20M     |                       |                                |                           |                      |                         |                   |            |                |
| Restricted Band (MHz)                                                                                | N <sub>TX</sub> | Test Ch. Freq. (MHz)  | In-band PSD [i]<br>(dBuV/1MHz) | RBE Freq. (MHz)           | Measure Distance (m) | Out-Band Level (dBuV/m) | Limit<br>(dBuV/m) | Level Type | Pol.<br>note 1 |
| 2310-2390                                                                                            | 1               | 2412                  | 116.45                         | 2390.00                   | 3                    | 72.57                   | 74                | PK         | V              |
| 2310-2390                                                                                            | 1               | 2412                  | 104.71                         | 2390.00                   | 3                    | 51.72                   | 54                | AV         | V              |
| 2483.5-2500                                                                                          | 1               | 2462                  | 114.79                         | 2483.66                   | 3                    | 72.03                   | 74                | PK         | V              |
| 2483.5-2500                                                                                          | 1               | 2462                  | 103.31                         | 2483.50                   | 3                    | 52.61                   | 54                | AV         | V              |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). |                 |                       |                                |                           |                      |                         |                   |            |                |

| Transmitter Radiated Bandedge Emissions Result |                 |                      |                               |                               |                                |                |            |            |             |
|------------------------------------------------|-----------------|----------------------|-------------------------------|-------------------------------|--------------------------------|----------------|------------|------------|-------------|
| Power Level                                    | 1               | Gain (dBi)           | 5                             | Non-restricted Band Emissions |                                |                |            |            |             |
| Modulation                                     | 11N2.4G-40M     |                      |                               |                               |                                |                |            |            |             |
| Non-restricted Band (MHz)                      | N <sub>TX</sub> | Test Ch. Freq. (MHz) | In-band PSD [i] (dBuV/100kHz) | NBE Freq. (MHz)               | Out-band PSD [o] (dBuV/100kHz) | [i] – [o] (dB) | Limit (dB) | Level Type | Pol. note 1 |
| 2390-2400                                      | 1               | 2422                 | 99.35                         | 2398.04                       | 66.93                          | 32.42          | 20         | PK         | V           |
| 2500-2690                                      | 1               | 2452                 | 99.94                         | 2539.28                       | 64.81                          | 35.13          | 20         | PK         | V           |

| Low Band | Up Band |
|----------|---------|
|          |         |

Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical)

| Transmitter Radiated Bandedge Emissions Result                                                       |                 |                       |                                |                           |                      |                         |                   |            |                |
|------------------------------------------------------------------------------------------------------|-----------------|-----------------------|--------------------------------|---------------------------|----------------------|-------------------------|-------------------|------------|----------------|
| Power Level                                                                                          | 1               | Gain <sub>(dBi)</sub> | 5                              | Restricted Band Emissions |                      |                         |                   |            |                |
| Modulation                                                                                           | 11N2.4G-40M     |                       |                                |                           |                      |                         |                   |            |                |
| Restricted Band (MHz)                                                                                | N <sub>TX</sub> | Test Ch. Freq. (MHz)  | In-band PSD [i]<br>(dBuV/1MHz) | RBE Freq. (MHz)           | Measure Distance (m) | Out-Band Level (dBuV/m) | Limit<br>(dBuV/m) | Level Type | Pol.<br>note 1 |
| 2310-2390                                                                                            | 1               | 2422                  | 112.16                         | 2388.09                   | 3                    | 70.45                   | 74                | PK         | V              |
| 2310-2390                                                                                            | 1               | 2422                  | 101.07                         | 2390.00                   | 3                    | 52.78                   | 54                | AV         | V              |
| 2483.5-2500                                                                                          | 1               | 2452                  | 112.40                         | 2488.41                   | 3                    | 71.02                   | 74                | PK         | V              |
| 2483.5-2500                                                                                          | 1               | 2452                  | 101.30                         | 2486.89                   | 3                    | 52.99                   | 54                | AV         | V              |
| Note 1: Measurement worst emissions of receive antenna polarization: H (Horizontal) or V (Vertical). |                 |                       |                                |                           |                      |                         |                   |            |                |