



## FCC PART 15 SUBPART C TEST REPORT

### FCC PART 15.247

Report Reference No.: TRE1203014501

FCC ID.: N6QPT7131W

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Date of issue: July 05, 2012

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd

Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name: TENNIS TECHNOLOGY CO LTD

Address: 301. building 6 No:3 Pu Xia Xia'an street, LiuYue Community.  
HengGang Town LongGang District Shenzhen China

#### Test specification:

Standard: FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

TRF Originator: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF: Dated 2006-06

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Test item description: IP CAMERA

Trade Mark: /

Model/Type reference: PT7131W

Listed Models: JPT3815W

Operation Frequency: From 2400MHz to 2483.5MHz

Result: Positive

**T E S T   R E P O R T**

|                                               |                                |
|-----------------------------------------------|--------------------------------|
| <b>Test Report No. :</b> <b>TRE1203014501</b> | July 05, 2012<br>Date of issue |
|-----------------------------------------------|--------------------------------|

Equipment under Test                      :            IP CAMERA

Model /Type                                        :            PT7131W

Listed Models                                        :            JPT3815W

**Applicant**                                                :            **TENVIS TECHNOLOGY CO LTD**

Address                                                :            301.building 6 No:3 Pu Xia Xia'an street,LiuYue  
Community. HengGang Town LongGang District  
Shenzhen China

**Manufacturer**                                                :            **TENVIS TECHNOLOGY CO LTD**

Address                                                :            301.building 6 No:3 Pu Xia Xia'an street,LiuYue  
Community. HengGang Town LongGang District  
Shenzhen China

|                                                             |                 |
|-------------------------------------------------------------|-----------------|
| <b>Test Result</b> according to the<br>standards on page 4: | <b>Positive</b> |
|-------------------------------------------------------------|-----------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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## **1. TEST STANDARDS**

The tests were performed according to following standards:

**FCC Rules Part 15.247:** Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

**ANSI C63.10:** American National Standard for Testing Unlicensed Wireless Devices

**KDB558074:** DTS Meas Guidance v01 of Measurement Procedure

## 2. SUMMARY

### 2.1. General Remarks

|                                |   |               |
|--------------------------------|---|---------------|
| Date of receipt of test sample | : | Mar 30, 2012  |
|                                |   |               |
| Testing commenced on           | : | Mar 30, 2012  |
|                                |   |               |
| Testing concluded on           | : | July 05, 2012 |

### 2.2. Equipment Under Test

#### Power supply system utilised

|                      |   |                                                        |                                   |
|----------------------|---|--------------------------------------------------------|-----------------------------------|
| Power supply voltage | : | <input checked="" type="radio"/> 120V / 60 Hz          | <input type="radio"/> 115V / 60Hz |
|                      |   | <input type="radio"/> 12 V DC                          | <input type="radio"/> 24 V DC     |
|                      |   | <input type="radio"/> Other (specified in blank below) |                                   |

/

#### Description of the test mode

IEEE 802.11b/g/n: Eleven channels are provided to the EUT.

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

### 2.3. Short description of the Equipment under Test (EUT)

2.4GHz (IP CAMERA (PT7131W))

Antenna port: Female RP-SMA

Antenna model:SF-2.4G-SMAG

For more details, refer to the user's manual of the EUT.

Serial number: Prototype

### 2.4. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides command to control the EUT for staying in continuous transmitting and receiving mode for testing.

## 2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

|   |             |                |   |
|---|-------------|----------------|---|
| ○ | Power Cable | Length (m) :   | / |
|   |             | Shield :       | / |
|   |             | Detachable :   | / |
| ○ | Multimeter  | Manufacturer : | / |
|   |             | Model No. :    | / |

● AC Adapter

MODEL:NLB150050W1A

INPUT:100-240V~50/60Hz 0.4A

OUTPUT:5.0V DC 1.5A

Power Cable:150cm

◇ Shielded

◆ Unshielded

## 2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: N6QPT7131W** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

## 2.7. Modifications

No modifications were implemented to meet testing criteria.

## 2.8. NOTE

1. The EUT is a 802.11b/g/n IP CAMERA, The functions of the EUT listed as below:

|                  | Test Standards                           | Reference Report |
|------------------|------------------------------------------|------------------|
| WLAN 802.11b/g/n | FCC Part 15 Subpart C<br>(Section15.247) | TRE1203014501    |
| MPE REPORT       | FCC Per 47 CFR 2.1091(b)                 | TRE1203014502    |
| EMC REPORT       | FCC PART 15 Subpart B                    | TRE1203014503    |

2. The frequency bands used in this EUT are listed as follows:

| Frequency Band(MHz) | 2400-2483.5 | 5150-5350 | 5470-5725 | 5725-5850 |
|---------------------|-------------|-----------|-----------|-----------|
| 802.11b             | ✓           | —         | —         | —         |
| 802.11g             | ✓           | —         | —         | —         |
| 802.11n(20MHz)      | ✓           | —         | —         | —         |
| 802.11n(40MHz)      | ✓           | —         | —         | —         |

3. The EUT incorporates a SISO function, Physically, the EUT provides one completed transmitter and one completed receiver.

| Modulation Mode | TX Function |
|-----------------|-------------|
| 802.11b         | 1TX         |
| 802.11g         | 1TX         |
| 802.11n (20MHz) | 1TX         |
| 802.11n (40MHz) | 1TX         |

### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

Shenzhen Huatongwei International Inspection Co., Ltd  
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China  
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

#### **3.2. Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

##### **CNAS-Lab Code: L1225**

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

##### **A2LA-Lab Cert. No. 2243.01**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

##### **FCC-Registration No.: 662850**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date Jul. 01, 2009, valid time is until Jun. 30, 2012.

##### **IC-Registration No.: 5377A**

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

##### **ACA**

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

##### **NEMKO-Aut. No.: ELA125**

Shenzhen Huatongwei International Inspection Co., Ltd has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10, the authorization is valid through July 07, 2013

##### **VCCI**

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2009. Valid time is until Dec. 19, 2012.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2010. Valid time is until May 06, 2013.

### DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2013.

### 3.3. Environmental conditions

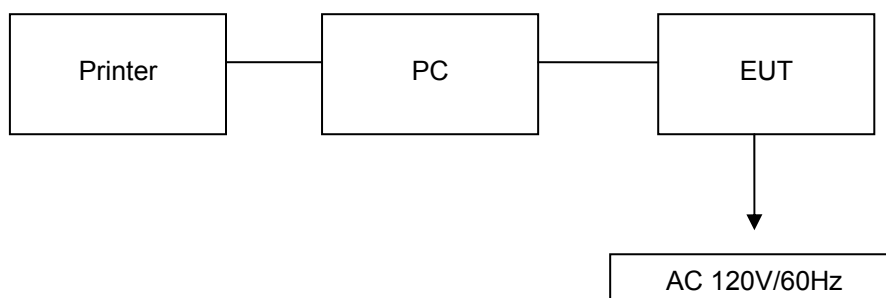
During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

### 3.4. Configuration of Tested System



**Equipment Used in Tested System**

| No. | Equipment | Manufacturer | Model No.         | Serial No.               | Notes |
|-----|-----------|--------------|-------------------|--------------------------|-------|
| 1   | PC        | DELL         | DIMENSION E520    | CNG8390Q6X               | DOC   |
| 2   | LCD       | DELL         | 1707FPT           | CN-OPO153-64180-59E-00ZP |       |
| 3   | Printer   | HP           | Laserjet 6L C3990 | Laserjet 6L C3990A       | DOC   |

### 3.5. Test Description

| FCC PART 15                     |                                |      |
|---------------------------------|--------------------------------|------|
| FCC Part 15.207                 | AC Power Conducted Emission    | PASS |
| FCC Part 15.247(a)(2)           | 6dB Bandwidth                  | PASS |
| FCC Part 15.247(d)              | Spurious RF Conducted Emission | PASS |
| FCC Part 15.247(b)              | Maximum Peak Output Power      | PASS |
| FCC Part 15.247(e)              | Power Spectral Density         | PASS |
| FCC Part 15.109/ 15.205/ 15.209 | Radiated Emissions             | PASS |
| FCC Part 15.247(d)              | Band Edge                      | PASS |
| FCC Part 15.203/15.247 (b)      | Antenna Requirement            | PASS |
| FCC Part 1.1307 (b)             | MPE Evaluation                 | PASS |

Remark: The measurement uncertainty is not included in the test result.

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

| Test Items                                                                                                                                                                               | Mode            | Data Rate | Channel |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|---------|
| Maximum Peak Conducted Output Power<br>Power Spectral Density<br>6dB Bandwidth<br>Spurious RF conducted emission<br>Radiated Emission 9kHz~1GHz&<br>Radiated Emission 1GHz~10th Harmonic | 11b/DSSS        | 11 Mbps   | 1/6/11  |
|                                                                                                                                                                                          | 11g/OFDM        | 54 Mbps   | 1/6/11  |
|                                                                                                                                                                                          | 11n(20MHz)/OFDM | 65Mbps    | 1/6/11  |
|                                                                                                                                                                                          | 11n(40MHz)/OFDM | 135 Mbps  | 3/6/9   |
| Band Edge                                                                                                                                                                                | 11b/DSSS        | 11 Mbps   | 1/11    |
|                                                                                                                                                                                          | 11g/OFDM        | 54 Mbps   | 1/11    |
|                                                                                                                                                                                          | 11n(20MHz)/OFDM | 65Mbps    | 1/11    |
|                                                                                                                                                                                          | 11n(40MHz)/OFDM | 135 Mbps  | 3/9     |

### 3.6. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

| Test Items                                 | Measurement Uncertainty | Notes |
|--------------------------------------------|-------------------------|-------|
| Frequency stability                        | 150 Hz                  | (1)   |
| Transmitter power conducted                | 0.57 dB                 | (1)   |
| Transmitter power Radiated                 | 2.20 dB                 | (1)   |
| Conducted spurious emission 9KHz-12.75 GHz | 1.60 dB                 | (1)   |
| Radiated spurious emission 9KHz-12.75 GHz  | 2.20 dB                 | (1)   |
| Conducted Emission 9KHz-30MHz              | 3.39 dB                 | (1)   |
| Radiated Emission 30~1000MHz               | 4.24 dB                 | (1)   |
| Radiated Emissio 1~18GHz                   | 5.16 dB                 | (1)   |
| Radiated Emissio 18-40GHz                  | 5.54 dB                 | (1)   |
| Occupied Bandwidth                         | -----                   | (1)   |
| Emission Mask                              | -----                   | (1)   |
| Modulation Characteristic                  | -----                   | (1)   |
| Transmitter Frequency Behavior             | -----                   | (1)   |

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

**3.7. Equipments Used during the Test**

| AC Power Conducted Emission |                   |               |             |            |            |
|-----------------------------|-------------------|---------------|-------------|------------|------------|
| Item                        | Test Equipment    | Manufacturer  | Model No.   | Serial No. | Last Cal.  |
| 1                           | Artificial Mains  | Rohde&Schwarz | ESH2-Z5     | 100028     | 2011/10/23 |
| 2                           | EMI Test Receiver | Rohde&Schwarz | ESCS 30     | 100038     | 2011/10/23 |
| 3                           | Pulse Limiter     | Rohde&Schwarz | ESHSZ2      | 100044     | 2011/10/23 |
| 4                           | EMI Test Software | Rohde&Schwarz | ES-K1 V1.71 | N/A        | 2011/10/23 |

| Radiated Emission |                         |                              |                    |              |            |
|-------------------|-------------------------|------------------------------|--------------------|--------------|------------|
| Item              | Test Equipment          | Manufacturer                 | Model No.          | Serial No.   | Last Cal.  |
| 1                 | ULTRA-BROADBAND ANTENNA | Rohde&Schwarz                | HL562              | 100015       | 2011/10/23 |
| 2                 | EMI TEST RECEIVER       | Rohde&Schwarz                | ESI 26             | 100009       | 2011/10/23 |
| 3                 | RF TEST PANEL           | Rohde&Schwarz                | TS / RSP           | 335015/ 0017 | 2011/10/23 |
| 4                 | TURNTABLE               | ETS                          | 2088               | 2149         | 2011/10/23 |
| 5                 | ANTENNA MAST            | ETS                          | 2075               | 2346         | 2011/10/23 |
| 6                 | EMI TEST SOFTWARE       | Rohde&Schwarz                | ESK1               | N/A          | 2011/10/23 |
| 7                 | HORN ANTENNA            | Rohde&Schwarz                | HF906              | 100039       | 2011/10/23 |
| 8                 | Amplifer                | Sonoma                       | 310N               | E009-13      | 2011/10/23 |
| 9                 | JS amplifier            | Rohde&Schwarz                | JS4-00101800-28-5A | F201504      | 2011/10/23 |
| 10                | High pass filter        | Compliance Direction systems | BSU-6              | 34202        | 2011/10/23 |
| 11                | Horn Antenna            | SCHWARZBECK                  | BBHA9170           | 25841        | 2011/10/23 |
| 12                | Amplifer                | Compliance Direction systems | PAP-1G-40          | 48           | 2011/10/23 |
| 13                | Loop Antenna            | Rohde&Schwarz                | HFH2-Z2            | 100020       | 2011/10/23 |

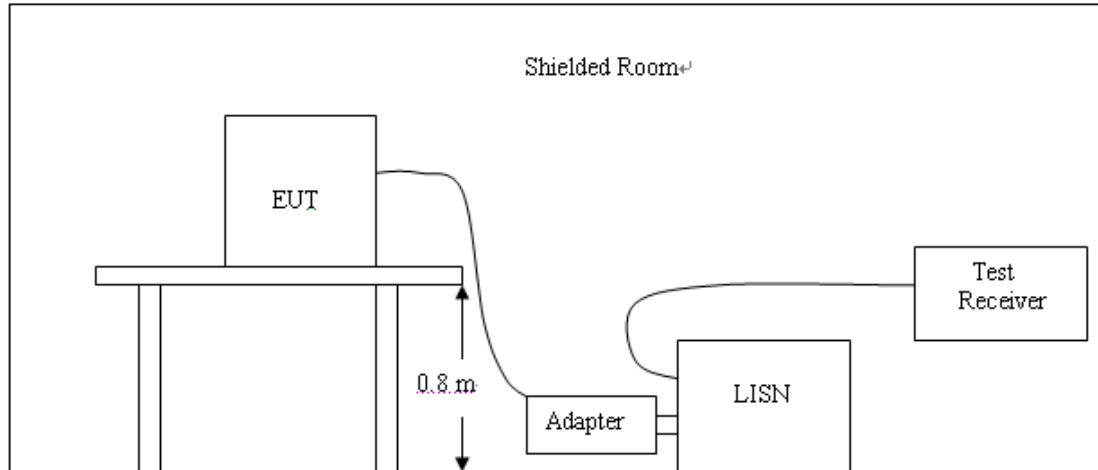
| Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission |                    |               |           |              |            |
|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|-----------|--------------|------------|
| Item                                                                                                                                      | Test Equipment     | Manufacturer  | Model No. | Serial No.   | Last Cal.  |
| 1                                                                                                                                         | EMI TEST RECEIVER  | Rohde&Schwarz | ESI 26    | 100009       | 2011/10/23 |
| 2                                                                                                                                         | Power Meter        | Anritsu       | ML2487A   | 6K00001568   | 2011/10/23 |
| 3                                                                                                                                         | Power Meter Sensor | Anritsu       | ML2491A   | 0630989      | 2011/10/23 |
| 4                                                                                                                                         | Spectrum Analyzer  | Rohde&Schwarz | FSP       | 1164.4391.40 | 2011/10/23 |

The calibration interval was one year.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4-2009.
- 2 Support equipment, if needed, was placed as per ANSI C63.4-2009
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4-2009
- 4 The EUT received DC12V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency<br>(MHz) | Maximum RF Line Voltage (dBµV) |      |         |        |
|--------------------|--------------------------------|------|---------|--------|
|                    | CLASS A                        |      | CLASS B |        |
|                    | Q.P.                           | Ave. | Q.P.    | Ave.   |
| 0.15 - 0.50        | 79                             | 66   | 66-56*  | 56-46* |
| 0.50 - 5.00        | 73                             | 60   | 56      | 46     |
| 5.00 - 30.0        | 73                             | 60   | 60      | 50     |

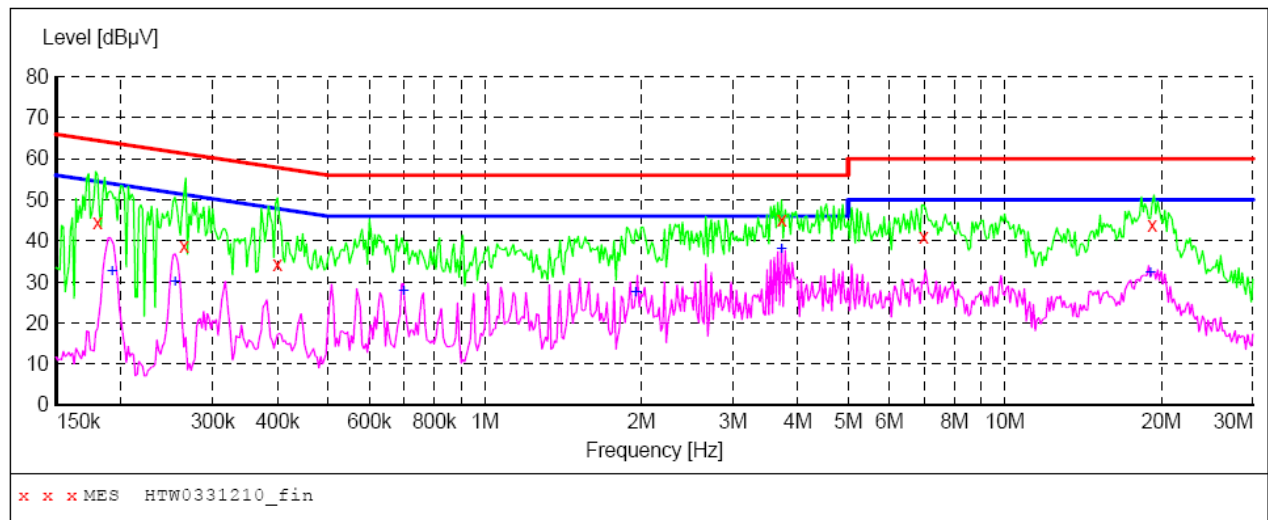
\* Decreasing linearly with the logarithm of the frequency

#### TEST RESULTS

The AC Power Conducted Emission measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode,the middle channel) is the worst case for all the test mode and channel.

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW0331210\_fin"**

3/31/2012 3:30PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.180168         | 44.50         | 10.1         | 65            | 20.0         | QP       | N    | GND |
| 0.264110         | 38.80         | 10.1         | 61            | 22.5         | QP       | N    | GND |
| 0.399702         | 34.40         | 10.1         | 58            | 23.5         | QP       | N    | GND |
| 3.721213         | 45.10         | 10.2         | 56            | 10.9         | QP       | N    | GND |
| 6.983410         | 41.10         | 10.3         | 60            | 18.9         | QP       | N    | GND |
| 19.211230        | 43.90         | 10.9         | 60            | 16.1         | QP       | N    | GND |

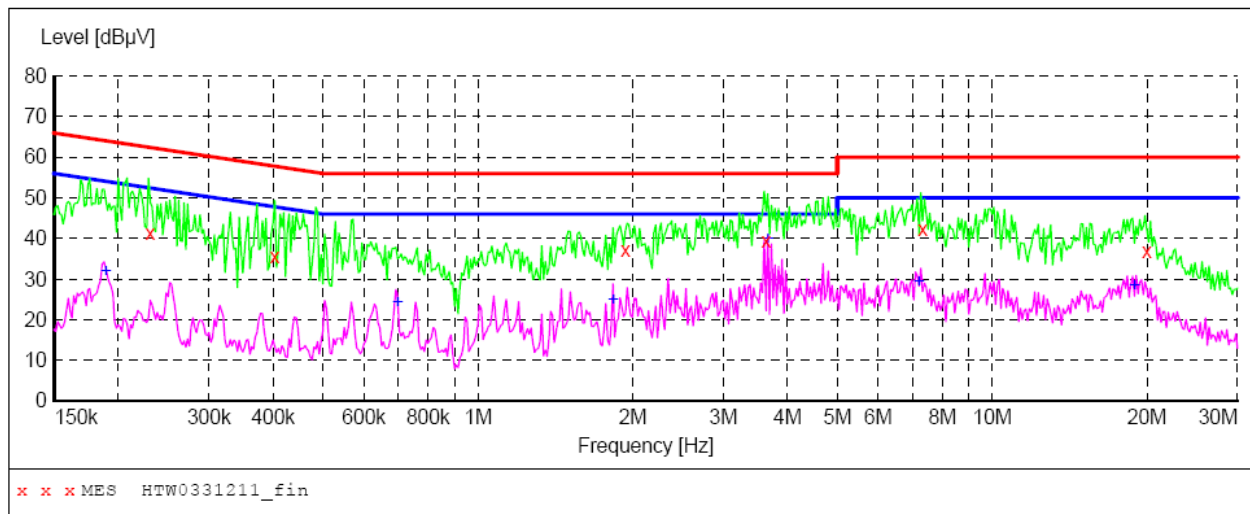
**MEASUREMENT RESULT: "HTW0331210\_fin2"**

3/31/2012 3:30PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.192020         | 32.60         | 10.1         | 54            | 21.3         | AV       | N    | GND |
| 0.253794         | 30.10         | 10.1         | 52            | 21.5         | AV       | N    | GND |
| 0.698188         | 28.00         | 10.1         | 46            | 18.0         | AV       | N    | GND |
| 1.951560         | 27.50         | 10.2         | 46            | 18.5         | AV       | N    | GND |
| 3.721213         | 38.30         | 10.2         | 46            | 7.7          | AV       | N    | GND |
| 19.058760        | 32.40         | 10.9         | 50            | 17.6         | AV       | N    | GND |

**SCAN TABLE: "Voltage (9K-30M)FIN"**

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "HTW0331211\_fin"**

3/31/2012 3:38PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.230647         | 41.30         | 10.1         | 62            | 21.1         | QP       | L1   | GND |
| 0.402898         | 35.50         | 10.1         | 58            | 22.3         | QP       | L1   | GND |
| 1.936070         | 37.10         | 10.2         | 56            | 18.9         | QP       | L1   | GND |
| 3.633320         | 39.30         | 10.2         | 56            | 16.7         | QP       | L1   | GND |
| 7.325385         | 42.40         | 10.4         | 60            | 17.6         | QP       | L1   | GND |
| 19.992070        | 36.80         | 10.9         | 60            | 23.2         | QP       | L1   | GND |

**MEASUREMENT RESULT: "HTW0331211\_fin2"**

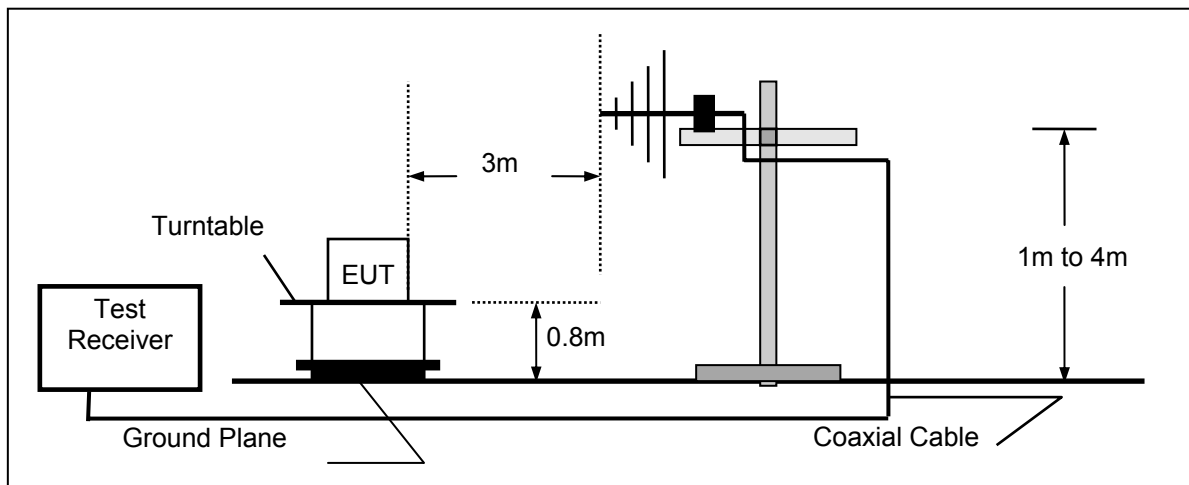
3/31/2012 3:38PM

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Detector | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|----------|------|-----|
| 0.188990         | 32.20         | 10.1         | 54            | 21.9         | AV       | L1   | GND |
| 0.698190         | 24.30         | 10.1         | 46            | 21.7         | AV       | L1   | GND |
| 1.831042         | 25.00         | 10.2         | 46            | 21.0         | AV       | L1   | GND |
| 3.662387         | 40.20         | 10.2         | 46            | 5.8          | AV       | L1   | GND |
| 7.209570         | 29.40         | 10.4         | 50            | 20.6         | AV       | L1   | GND |
| 18.907500        | 28.60         | 10.9         | 50            | 21.4         | AV       | L1   | GND |

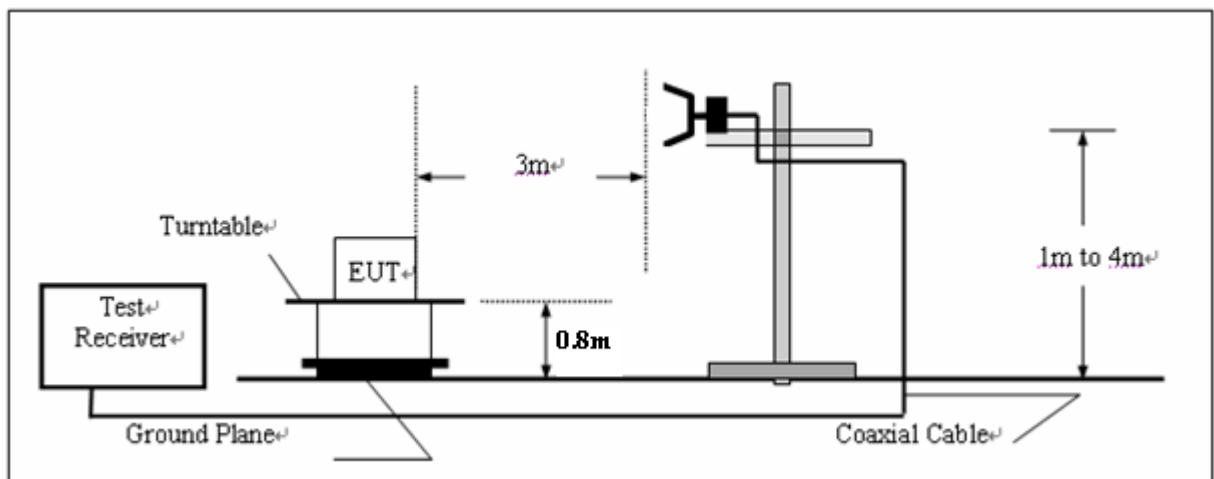
## 4.2. Radiated Emission

### TEST CONFIGURATION

(a) Radiated Emission Test Set-Up, Frequency below 1000MHz



(b) Radiated Emission Test Set-Up, Frequency above 1000MHz



### TEST PROCEDURE

- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
- 2 Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

### Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL + AG$$

|                           |                                            |
|---------------------------|--------------------------------------------|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude    | AG = Amplifier Gain                        |
| AF = Antenna Factor       |                                            |

**RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector, Readings are both peak and average values.

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | Radiated (μV/m) |
|-----------------|-------------------|-------------------|-----------------|
| 30-88           | 3                 | 40.0              | 100             |
| 88-216          | 3                 | 43.5              | 150             |
| 216-960         | 3                 | 46.0              | 200             |
| Above 960       | 3                 | 54.0              | 500             |

**TEST RESULTS**

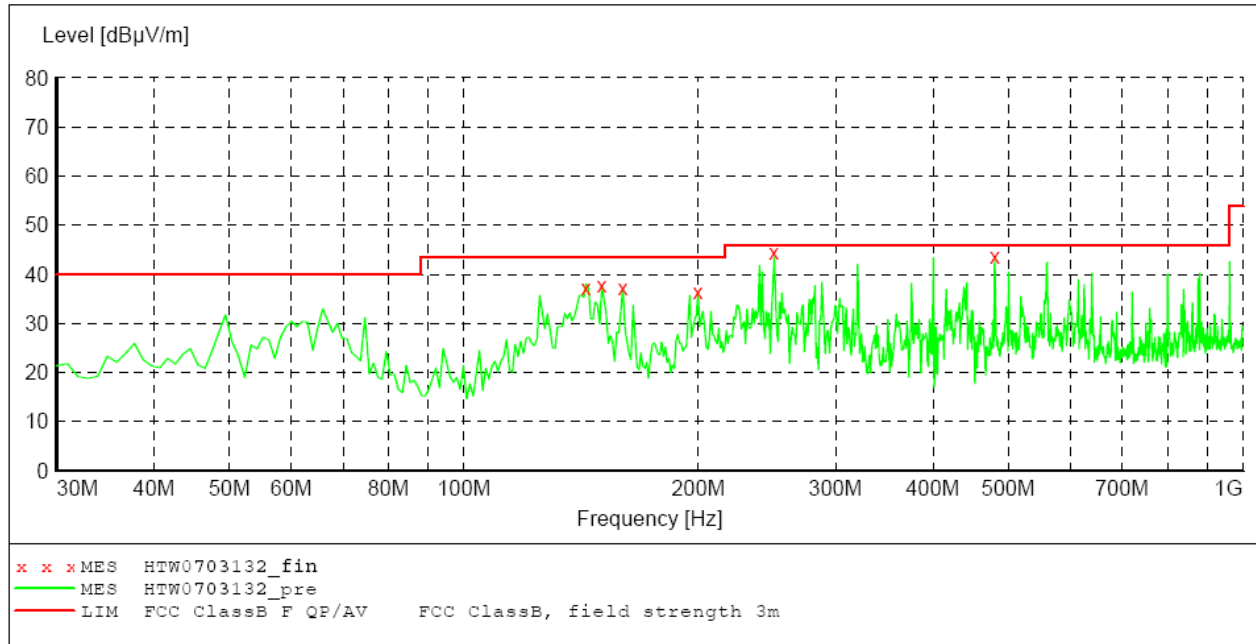
- Note: 1. The radiated measurement are performed the each test mode (b/g/n) and channel (low/mid/high), the datum recorded below (802.11b mode, the middle channel) is the worst case for all the test mode and channel.  
 2. ULTRA-BROADBAND ANTENNA for the radiation emission test below 1G.  
 3. HORN ANTENNA for the radiation emission test above 1G.

**For 9KHz to 30MHz**

| Frequency (MHz) | Corrected Reading (dBμV/m)@3m | FCC Limit (dBμV/m) @3m | Margin (dB) | Detector | Result |
|-----------------|-------------------------------|------------------------|-------------|----------|--------|
| 0.58            | 48.89                         | 73.11                  | 24.22       | QP       | Pass   |
| 1.21            | 42.63                         | 65.87                  | 23.24       | QP       | Pass   |
| 16.06           | 40.89                         | 69.54                  | 28.65       | QP       | Pass   |
| 21.33           | 42.14                         | 69.54                  | 27.40       | QP       | Pass   |

**SCAN TABLE: "test Field (30M-1G) QP"**

| Short Description: |           |          | Field Strength (30M-1G) |       |         |            |
|--------------------|-----------|----------|-------------------------|-------|---------|------------|
| Start              | Stop      | Step     | Detector                | Meas. | IF      | Transducer |
| Frequency          | Frequency | Width    |                         | Time  | Bandw.  |            |
| 30.0 MHz           | 1.0 GHz   | 60.0 kHz | QuasiPeak               | 1.0 s | 120 kHz | HL562      |

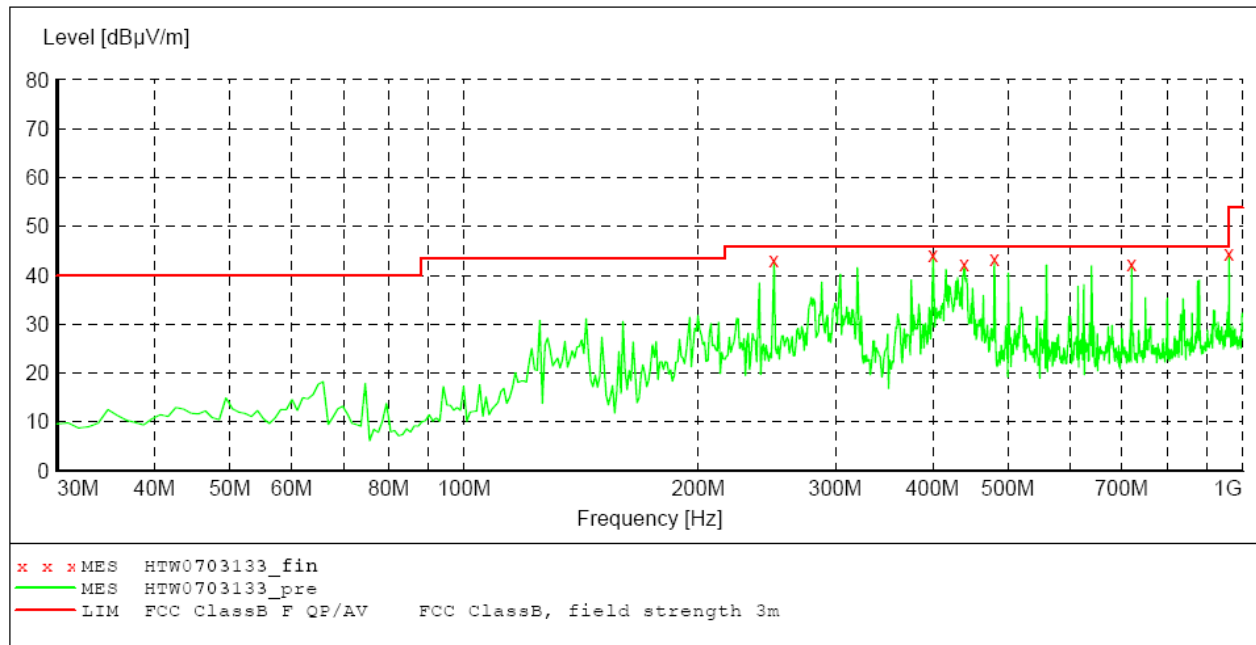
**MEASUREMENT RESULT: "HTW0703132\_fin"**

7/3/2012 12:15PM

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 143.490000       | 37.10           | -19.9        | 43.5            | 6.4          | QP   | 100.0        | 25.00          | VERTICAL     |
| 150.280000       | 37.60           | -19.7        | 43.5            | 5.9          | QP   | 100.0        | 25.00          | VERTICAL     |
| 159.980000       | 37.20           | -19.0        | 43.5            | 6.3          | QP   | 100.0        | 146.00         | VERTICAL     |
| 199.750000       | 36.50           | -16.3        | 43.5            | 7.0          | QP   | 100.0        | 335.00         | VERTICAL     |
| 250.190000       | 44.40           | -14.3        | 46.0            | 1.6          | QP   | 100.0        | 46.00          | VERTICAL     |
| 480.080000       | 43.60           | -9.0         | 46.0            | 3.4          | QP   | 100.0        | 125.00         | VERTICAL     |

**SCAN TABLE: "test Field (30M-1G) QP"**

|                    |           |          |                         |       |         |            |
|--------------------|-----------|----------|-------------------------|-------|---------|------------|
| Short Description: |           |          | Field Strength (30M-1G) |       |         |            |
| Start              | Stop      | Step     | Detector                | Meas. | IF      | Transducer |
| Frequency          | Frequency | Width    |                         | Time  | Bandw.  |            |
| 30.0 MHz           | 1.0 GHz   | 60.0 kHz | QuasiPeak               | 1.0 s | 120 kHz | HL562      |

**MEASUREMENT RESULT: "HTW0703133\_fin"**

7/3/2012 12:13PM

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 250.190000       | 43.00           | -14.3        | 46.0            | 3.0          | QP   | 100.0        | 40.00          | HORIZONTAL   |
| 400.540000       | 44.20           | -10.9        | 46.0            | 1.8          | QP   | 100.0        | 114.00         | HORIZONTAL   |
| 439.340000       | 42.20           | -9.9         | 46.0            | 3.8          | QP   | 300.0        | 97.00          | HORIZONTAL   |
| 480.080000       | 43.30           | -9.0         | 46.0            | 2.7          | QP   | 100.0        | 214.00         | HORIZONTAL   |
| 720.640000       | 42.40           | -4.7         | 46.0            | 3.6          | QP   | 100.0        | 161.00         | HORIZONTAL   |
| 961.200000       | 44.40           | -1.8         | 53.9            | 9.5          | QP   | 100.0        | 204.00         | HORIZONTAL   |

**802.11b Mode(above 1GHz)****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 55.75                  | PK | 74.00          | 18.25       | 1.00 H             | 216                  | 59.15            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 1   | 2390.00         | 46.91                  | AV | 54.00          | 7.09        | 1.00 H             | 216                  | 50.31            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 2   | *2412.00        | 95.64                  | PK |                |             | 1.00 H             | 360                  | 99.04            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 2   | *2412.00        | 89.21                  | AV |                |             | 1.00 H             | 360                  | 92.61            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 3   | 4824.00         | 49.61                  | PK | 74.00          | 24.39       | 1.00 H             | 359                  | 46.41            | 32.7                  | 7.00              | -36.5         | 3.20                     |
| 3   | 4824.00         | 40.63                  | AV | 54.00          | 13.37       | 1.00 H             | 359                  | 37.43            | 32.7                  | 7.00              | -36.5         | 3.20                     |
| 4   | 7236.00         | 51.99                  | PK | 74.00          | 22.01       | 1.00 H             | 152                  | 42.59            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 44.30                  | AV | 54.00          | 9.70        | 1.00 H             | 152                  | 34.90            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 55  | 9648.00         | 51.40                  | PK | 74.00          | 22.60       | 1.00 H             | 140                  | 38.80            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 55  | 9648.00         | 43.72                  | AV | 54.00          | 10.28       | 1.00 H             | 140                  | 31.12            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 55.55                  | PK | 74.00          | 18.45       | 1.00 V             | 192                  | 58.95            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 1   | 2390.00         | 46.35                  | AV | 54.00          | 7.65        | 1.00 V             | 192                  | 49.75            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 2   | *2412.00        | 98.87                  | PK |                |             | 1.00 V             | 124                  | 102.27           | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 2   | *2412.00        | 91.82                  | AV |                |             | 1.00 V             | 124                  | 95.22            | 28.3                  | 4.90              | -36.6         | -3.40                    |
| 3   | 4824.00         | 53.32                  | PK | 74.00          | 20.68       | 1.00 V             | 339                  | 50.12            | 32.7                  | 7.00              | -36.5         | 3.20                     |
| 3   | 4824.00         | 43.74                  | AV | 54.00          | 10.26       | 1.00 V             | 339                  | 40.54            | 32.7                  | 7.00              | -36.5         | 3.20                     |
| 4   | 7236.00         | 53.01                  | PK | 74.00          | 20.99       | 1.00 V             | 340                  | 43.61            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 42.20                  | AV | 54.00          | 11.80       | 1.00 V             | 340                  | 32.80            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 55  | 9648.00         | 54.02                  | PK | 74.00          | 19.98       | 1.00 V             | 20                   | 41.42            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 55  | 9648.00         | 44.04                  | AV | 54.00          | 9.96        | 1.00 V             | 20                   | 31.44            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 99.84                  | PK |                |             | 1.00 H             | 153                  | 103.04           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 90.79                  | AV |                |             | 1.00 H             | 153                  | 93.99            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 46.75                  | PK | 74.00          | 27.25       | 1.00 H             | 202                  | 43.35            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 35.54                  | AV | 54.00          | 18.46       | 1.00 H             | 202                  | 32.14            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 52.18                  | PK | 74.00          | 21.82       | 1.00 H             | 355                  | 42.78            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 40.16                  | AV | 54.00          | 13.84       | 1.00 H             | 355                  | 30.76            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 54.01                  | PK | 74.00          | 19.99       | 1.00 H             | 28                   | 41.41            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 41.67                  | AV | 54.00          | 12.33       | 1.00 H             | 28                   | 29.07            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 101.23                 | PK |                |             | 1.00 V             | 121                  | 104.43           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 90.81                  | AV |                |             | 1.00 V             | 121                  | 94.01            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 47.86                  | PK | 74.00          | 26.14       | 1.00 V             | 97                   | 44.46            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 35.61                  | AV | 54.00          | 18.39       | 1.00 V             | 97                   | 32.21            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 60.34                  | PK | 74.00          | 13.66       | 1.00 V             | 288                  | 50.94            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 40.46                  | AV | 54.00          | 13.54       | 1.00 V             | 288                  | 31.06            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 50.23                  | PK | 74.00          | 23.77       | 1.00 V             | 89                   | 37.63            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 39.02                  | AV | 54.00          | 14.98       | 1.00 V             | 89                   | 26.42            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 93.45                   | PK |                |             | 1.00 H             | 154                  | 96.75            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 1   | *2462.00        | 85.41                   | AV |                |             | 1.00 H             | 154                  | 88.71            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 2   | 2483.50         | 65.80                   | PK | 74.00          | 8.20        | 1.00 H             | 146                  | 69.10            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 2   | 2483.50         | 50.43                   | AV | 54.00          | 3.57        | 1.00 H             | 146                  | 53.73            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 3   | 4924.00         | 50.50                   | PK | 74.00          | 23.50       | 1.00 H             | 100                  | 46.70            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 34.87                   | AV | 54.00          | 19.13       | 1.00 H             | 100                  | 31.07            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 57.43                   | PK | 74.00          | 16.57       | 1.00 H             | 190                  | 48.03            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 43.98                   | AV | 54.00          | 10.02       | 1.00 H             | 190                  | 34.58            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 51.32                   | PK | 74.00          | 22.68       | 1.00 H             | 113                  | 38.72            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9848.00         | 38.46                   | AV | 54.00          | 15.54       | 1.00 H             | 113                  | 25.86            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 98.46                   | PK |                |             | 1.00 V             | 247                  | 101.76           | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 1   | *2462.00        | 90.90                   | AV |                |             | 1.00 V             | 247                  | 94.20            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 2   | 2483.50         | 60.13                   | PK | 74.00          | 13.87       | 1.00 V             | 150                  | 63.43            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 2   | 2483.50         | 45.02                   | AV | 54.00          | 8.98        | 1.00 V             | 150                  | 48.32            | 28.6                  | 4.70              | -36.6         | -3.30                    |
| 3   | 4924.00         | 56.19                   | PK | 74.00          | 17.81       | 1.00 V             | 90                   | 52.39            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 48.79                   | AV | 54.00          | 5.21        | 1.00 V             | 90                   | 44.99            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 65.24                   | PK | 74.00          | 8.76        | 1.00 V             | 29                   | 55.84            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 43.93                   | AV | 54.00          | 10.07       | 1.00 V             | 29                   | 34.53            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 56.98                   | PK | 74.00          | 17.02       | 1.00 V             | 222                  | 44.38            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9848.00         | 41.51                   | AV | 54.00          | 12.49       | 1.00 V             | 222                  | 28.91            | 37.2                  | 10.20             | -34.8         | 12.60                    |

- REMARKS:**
1. Emission level (dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) +Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value- Emission level.
  5. The limit value is defined as per 15.247
  6. “\* “: Fundamental frequency
  7. For Wireless 802.11b mode at 11Mbps.

**802.11g Mode****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 65.24                  | PK | 74.00          | 8.76        | 1.00 H             | 142                  | 68.54            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 50.47                  | AV | 54.00          | 3.53        | 1.00 H             | 142                  | 53.77            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 94.78                  | PK |                |             | 1.00 H             | 123                  | 98.08            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 88.47                  | AV |                |             | 1.00 H             | 123                  | 91.77            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4824.00         | 49.92                  | PK | 74.00          | 24.08       | 1.00 H             | 216                  | 46.12            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4824.00         | 42.10                  | AV | 54.00          | 11.90       | 1.00 H             | 216                  | 38.30            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7236.00         | 56.30                  | PK | 74.00          | 17.70       | 1.00 H             | 176                  | 46.90            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 42.03                  | AV | 54.00          | 11.97       | 1.00 H             | 176                  | 32.63            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9648.00         | 51.18                  | PK | 74.00          | 22.82       | 1.00 H             | 72                   | 38.58            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9648.00         | 42.41                  | AV | 54.00          | 11.59       | 1.00 H             | 72                   | 29.81            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 65.18                  | PK | 74.00          | 8.82        | 1.00 V             | 199                  | 68.48            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 53.40                  | AV | 54.00          | 0.60        | 1.00 V             | 199                  | 56.70            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 101.76                 | PK |                |             | 1.00 V             | 127                  | 105.06           | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 91.69                  | AV |                |             | 1.00 V             | 127                  | 94.99            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4824.00         | 57.35                  | PK | 74.00          | 16.65       | 1.00 V             | 95                   | 53.55            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4824.00         | 45.54                  | AV | 54.00          | 8.46        | 1.00 V             | 95                   | 41.74            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7236.00         | 62.93                  | PK | 74.00          | 11.07       | 1.00 V             | 0                    | 53.53            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 48.83                  | AV | 54.00          | 5.17        | 1.00 V             | 0                    | 39.43            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9648.00         | 61.30                  | PK | 74.00          | 12.70       | 1.00 V             | 264                  | 48.70            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9648.00         | 52.51                  | AV | 54.00          | 1.49        | 1.00 V             | 264                  | 39.91            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 98.12                  | PK |                |             | 1.00 H             | 100                  | 101.32           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 84.01                  | AV |                |             | 1.00 H             | 100                  | 87.21            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 65.12                  | PK | 74.00          | 8.88        | 1.00 H             | 214                  | 61.72            | 32.8                  | 7.10              | -36.5         | 3.40                     |
| 2   | 4874.00         | 47.53                  | AV | 54.00          | 6.47        | 1.00 H             | 214                  | 44.13            | 32.8                  | 7.10              | -36.5         | 3.40                     |
| 3   | 7311.00         | 60.05                  | PK | 74.00          | 13.95       | 1.00 H             | 0                    | 50.65            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 47.27                  | AV | 54.00          | 6.73        | 1.00 H             | 0                    | 37.87            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 51.16                  | PK | 74.00          | 22.84       | 1.00 H             | 163                  | 38.56            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 40.72                  | AV | 54.00          | 13.28       | 1.00 H             | 163                  | 28.12            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 99.79                  | PK |                |             | 1.00 V             | 122                  | 102.99           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 89.34                  | AV |                |             | 1.00 V             | 122                  | 92.54            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 59.98                  | PK | 74.00          | 14.02       | 1.00 V             | 100                  | 56.58            | 32.8                  | 7.10              | -36.5         | 3.40                     |
| 2   | 4874.00         | 43.11                  | AV | 54.00          | 10.89       | 1.00 V             | 100                  | 39.71            | 32.8                  | 7.10              | -36.5         | 3.40                     |
| 3   | 7311.00         | 54.85                  | PK | 74.00          | 19.15       | 1.00 V             | 356                  | 45.45            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 44.36                  | AV | 54.00          | 9.64        | 1.00 V             | 356                  | 34.96            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 50.63                  | PK | 74.00          | 23.37       | 1.00 V             | 26                   | 38.03            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 42.86                  | AV | 54.00          | 11.14       | 1.00 V             | 26                   | 30.26            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11g--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 94.14                   | PK |                |             | 1.00 H             | 156                  | 97.44            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 1   | *2462.00        | 83.24                   | AV |                |             | 1.00 H             | 156                  | 86.54            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 55.98                   | PK | 74.00          | 18.02       | 1.00 H             | 191                  | 59.28            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 48.35                   | AV | 54.00          | 5.65        | 1.00 H             | 191                  | 51.65            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4924.00         | 52.24                   | PK | 74.00          | 21.76       | 1.00 H             | 198                  | 48.44            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 39.43                   | AV | 54.00          | 14.57       | 1.00 H             | 198                  | 35.63            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 56.77                   | PK | 74.00          | 17.23       | 1.00 H             | 90                   | 47.37            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 43.93                   | AV | 54.00          | 10.07       | 1.00 H             | 90                   | 34.53            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 54.23                   | PK | 74.00          | 19.77       | 1.00 H             | 124                  | 41.63            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9848.00         | 47.05                   | AV | 54.00          | 6.95        | 1.00 H             | 124                  | 34.45            | 37.3                  | 10.10             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11g--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 89.34                   | PK |                |             | 1.00 V             | 125                  | 92.64            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 1   | *2462.00        | 81.15                   | AV |                |             | 1.00 V             | 125                  | 84.45            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 57.63                   | PK | 74.00          | 16.37       | 1.00 V             | 348                  | 60.93            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 44.33                   | AV | 54.00          | 9.67        | 1.00 V             | 348                  | 47.63            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4924.00         | 47.97                   | PK | 74.00          | 26.03       | 1.00 V             | 96                   | 44.17            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 36.54                   | AV | 54.00          | 17.46       | 1.00 V             | 96                   | 32.74            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 55.99                   | PK | 74.00          | 18.01       | 1.00 V             | 35                   | 46.59            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 44.23                   | AV | 54.00          | 9.77        | 1.00 V             | 35                   | 34.83            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 47.28                   | PK | 74.00          | 26.72       | 1.00 V             | 37                   | 34.68            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9848.00         | 40.80                   | AV | 54.00          | 13.20       | 1.00 V             | 37                   | 28.20            | 37.3                  | 10.10             | -34.8         | 12.60                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value - Emission level.
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency
  7. For Wireless 802.11g mode at 54Mbps.

**802.11n20 Mode****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 51.76                  | PK | 74.00          | 22.24       | 1.00 H             | 248                  | 55.06            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 40.03                  | AV | 54.00          | 13.97       | 1.00 H             | 248                  | 43.33            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 99.20                  | PK |                |             | 1.00 H             | 100                  | 102.50           | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 88.25                  | AV |                |             | 1.00 H             | 100                  | 91.55            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4824.00         | 57.19                  | PK | 74.00          | 16.81       | 1.00 H             | 204                  | 53.39            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4824.00         | 43.37                  | AV | 54.00          | 10.63       | 1.00 H             | 204                  | 39.57            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7236.00         | 58.34                  | PK | 74.00          | 15.66       | 1.00 H             | 114                  | 48.94            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 42.81                  | AV | 54.00          | 11.19       | 1.00 H             | 114                  | 33.41            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9648.00         | 50.59                  | PK | 74.00          | 23.41       | 1.00 H             | 93                   | 37.99            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9648.00         | 42.16                  | AV | 54.00          | 11.84       | 1.00 H             | 93                   | 29.56            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2412MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 53.28                  | PK | 74.00          | 20.72       | 1.00 V             | 123                  | 56.58            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 40.99                  | AV | 54.00          | 13.01       | 1.00 V             | 123                  | 44.29            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 101.16                 | PK |                |             | 1.00 V             | 123                  | 104.46           | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2412.00        | 91.10                  | AV |                |             | 1.00 V             | 123                  | 94.40            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4824.00         | 59.05                  | PK | 74.00          | 14.95       | 1.00 V             | 100                  | 55.25            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4824.00         | 45.05                  | AV | 54.00          | 8.95        | 1.00 V             | 100                  | 41.25            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7236.00         | 60.96                  | PK | 74.00          | 13.04       | 1.00 V             | 236                  | 51.56            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7236.00         | 46.55                  | AV | 54.00          | 7.45        | 1.00 V             | 236                  | 37.15            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9648.00         | 57.25                  | PK | 74.00          | 16.75       | 1.00 V             | 1163                 | 44.65            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9648.00         | 47.04                  | AV | 54.00          | 6.96        | 1.00 V             | 116                  | 34.44            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 94.16                  | PK |                |             | 1.00 H             | 120                  | 97.36            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 85.08                  | AV |                |             | 1.00 H             | 120                  | 88.28            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 51.25                  | PK | 74.00          | 22.75       | 1.00 H             | 194                  | 47.85            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 41.10                  | AV | 54.00          | 12.90       | 1.00 H             | 194                  | 37.70            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 53.94                  | PK | 74.00          | 20.06       | 1.00 H             | 248                  | 44.54            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 45.37                  | AV | 54.00          | 8.63        | 1.00 H             | 248                  | 35.97            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 50.43                  | PK | 74.00          | 23.57       | 1.00 H             | 36                   | 37.83            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 43.01                  | AV | 54.00          | 10.99       | 1.00 H             | 36                   | 30.41            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 97.10                  | PK |                |             | 1.00 V             | 122                  | 100.30           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 87.22                  | AV |                |             | 1.00 V             | 122                  | 90.42            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 53.27                  | PK | 74.00          | 20.73       | 1.00 V             | 181                  | 49.87            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 42.00                  | AV | 54.00          | 12.00       | 1.00 V             | 181                  | 38.60            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 60.38                  | PK | 74.00          | 13.62       | 1.00 V             | 346                  | 50.98            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 43.24                  | AV | 54.00          | 10.76       | 1.00 V             | 346                  | 33.84            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 53.63                  | PK | 74.00          | 20.37       | 1.00 V             | 335                  | 41.03            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 47.03                  | AV | 54.00          | 6.97        | 1.00 V             | 335                  | 34.43            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n20--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 92.88                   | PK |                |             | 1.00 H             | 122                  | 96.18            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 1   | *2462.00        | 84.10                   | AV |                |             | 1.00 H             | 122                  | 87.40            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 59.40                   | PK | 74.00          | 14.60       | 1.00 H             | 354                  | 62.70            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 47.77                   | AV | 54.00          | 6.23        | 1.00 H             | 354                  | 51.07            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4924.00         | 51.52                   | PK | 74.00          | 22.48       | 1.00 H             | 217                  | 47.72            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 39.00                   | AV | 54.00          | 15.00       | 1.00 H             | 217                  | 35.20            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 56.04                   | PK | 74.00          | 17.96       | 1.00 H             | 0                    | 46.64            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 44.89                   | AV | 54.00          | 9.11        | 1.00 H             | 0                    | 35.49            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 51.59                   | PK | 74.00          | 22.41       | 1.00 H             | 118                  | 38.99            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9848.00         | 44.32                   | AV | 54.00          | 9.68        | 1.00 H             | 118                  | 31.72            | 37.3                  | 10.10             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n20--2462MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2462.00        | 95.10                   | PK |                |             | 1.00 V             | 125                  | 98.40            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 1   | *2462.00        | 85.12                   | AV |                |             | 1.00 V             | 125                  | 88.42            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 61.05                   | PK | 74.00          | 12.95       | 1.00 V             | 153                  | 64.35            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 47.77                   | AV | 54.00          | 6.23        | 1.00 V             | 153                  | 51.07            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4924.00         | 47.14                   | PK | 74.00          | 26.86       | 1.00 V             | 100                  | 43.34            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4924.00         | 35.04                   | AV | 54.00          | 18.96       | 1.00 V             | 100                  | 31.24            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7386.00         | 55.17                   | PK | 74.00          | 18.83       | 1.00 V             | 0                    | 45.77            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7386.00         | 43.24                   | AV | 54.00          | 10.76       | 1.00 V             | 0                    | 33.84            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9848.00         | 50.18                   | PK | 74.00          | 23.82       | 1.00 V             | 187                  | 37.58            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9848.00         | 39.42                   | AV | 54.00          | 14.58       | 1.00 V             | 187                  | 26.82            | 37.3                  | 10.10             | -34.8         | 12.60                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value - Emission level.
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency
  7. For Wireless 802.11n (20MHz) mode at 65Mbps.

**802.11n40 Mode****ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2422MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 52.77                  | PK | 74.00          | 21.23       | 1.00 H             | 222                  | 56.07            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 41.46                  | AV | 54.00          | 12.54       | 1.00 H             | 222                  | 44.76            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2422.00        | 98.10                  | PK |                |             | 1.00 H             | 123                  | 101.40           | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2422.00        | 84.97                  | AV |                |             | 1.00 H             | 123                  | 88.27            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4844.00         | 53.27                  | PK | 74.00          | 20.73       | 1.00 H             | 91                   | 49.47            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4844.00         | 38.33                  | AV | 54.00          | 15.67       | 1.00 H             | 91                   | 34.53            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7266.00         | 46.77                  | PK | 74.00          | 27.23       | 1.00 H             | 266                  | 37.37            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7266.00         | 38.37                  | AV | 54.00          | 15.63       | 1.00 H             | 266                  | 28.97            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9688.00         | 52.97                  | PK | 74.00          | 21.03       | 1.00 H             | 337                  | 40.37            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9688.00         | 43.32                  | AV | 54.00          | 10.68       | 1.00 H             | 337                  | 30.72            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2422MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | 2390.00         | 57.23                  | PK | 74.00          | 16.77       | 1.00 V             | 80                   | 60.53            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 1   | 2390.00         | 43.33                  | AV | 54.00          | 10.67       | 1.00 V             | 80                   | 46.63            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2422.00        | 97.08                  | PK |                |             | 1.00 V             | 127                  | 100.38           | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 2   | *2422.00        | 86.64                  | AV |                |             | 1.00 V             | 127                  | 89.94            | 28.3                  | 5.00              | -36.6         | -3.30                    |
| 3   | 4844.00         | 52.12                  | PK | 74.00          | 21.88       | 1.00 V             | 211                  | 48.32            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 3   | 4844.00         | 39.67                  | AV | 54.00          | 14.33       | 1.00 V             | 211                  | 35.87            | 32.7                  | 7.30              | -36.2         | 3.80                     |
| 4   | 7266.00         | 61.34                  | PK | 74.00          | 12.66       | 1.00 V             | 57                   | 51.94            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 4   | 7266.00         | 46.57                  | AV | 54.00          | 7.43        | 1.00 V             | 57                   | 37.17            | 35.8                  | 8.90              | -35.3         | 9.40                     |
| 5   | 9688.00         | 51.07                  | PK | 74.00          | 22.93       | 1.00 V             | 249                  | 38.47            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 5   | 9688.00         | 42.35                  | AV | 54.00          | 11.65       | 1.00 V             | 249                  | 29.75            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 94.73                  | PK |                |             | 1.00 H             | 100                  | 97.93            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 86.72                  | AV |                |             | 1.00 H             | 100                  | 89.92            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 53.24                  | PK | 74.00          | 20.76       | 1.00 H             | 198                  | 49.84            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 41.00                  | AV | 54.00          | 13.00       | 1.00 H             | 198                  | 37.60            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 57.04                  | PK | 74.00          | 16.96       | 1.00 H             | 203                  | 47.64            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 42.24                  | AV | 54.00          | 11.76       | 1.00 H             | 203                  | 32.84            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 50.48                  | PK | 74.00          | 23.52       | 1.00 H             | 56                   | 37.88            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 42.46                  | AV | 54.00          | 11.54       | 1.00 H             | 56                   | 29.86            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2437MHz)**

| No. | Frequency (MHz) | Emssion Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2437.00        | 98.43                  | PK |                |             | 1.00 V             | 122                  | 101.63           | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 1   | *2437.00        | 88.07                  | AV |                |             | 1.00 V             | 122                  | 91.27            | 28.3                  | 5.10              | -36.6         | -3.20                    |
| 2   | 4874.00         | 51.25                  | PK | 74.00          | 22.75       | 1.00 V             | 96                   | 47.85            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 2   | 4874.00         | 44.14                  | AV | 54.00          | 9.86        | 1.00 V             | 96                   | 40.74            | 32.3                  | 7.60              | -36.5         | 3.40                     |
| 3   | 7311.00         | 56.40                  | PK | 74.00          | 17.60       | 1.00 V             | 26                   | 47.00            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 3   | 7311.00         | 42.93                  | AV | 54.00          | 11.07       | 1.00 V             | 26                   | 33.53            | 36.1                  | 8.60              | -35.3         | 9.40                     |
| 4   | 9748.00         | 48.90                  | PK | 74.00          | 25.10       | 1.00 V             | 299                  | 36.30            | 37.2                  | 10.20             | -34.8         | 12.60                    |
| 4   | 9748.00         | 38.67                  | AV | 54.00          | 15.33       | 1.00 V             | 299                  | 26.07            | 37.2                  | 10.20             | -34.8         | 12.60                    |

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11n40--2452MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2452.00        | 95.19                   | PK |                |             | 1.00 H             | 153                  | 98.39            | 28.2                  | 5.20              | -36.6         | -3.20                    |
| 1   | *2452.00        | 84.70                   | AV |                |             | 1.00 H             | 153                  | 87.90            | 28.2                  | 5.20              | -36.6         | -3.20                    |
| 2   | 2483.50         | 58.58                   | PK | 74.00          | 15.42       | 1.00 H             | 127                  | 61.88            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 44.46                   | AV | 54.00          | 9.54        | 1.00 H             | 127                  | 47.76            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4904.00         | 51.21                   | PK | 74.00          | 22.79       | 1.00 H             | 204                  | 47.41            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4904.00         | 38.63                   | AV | 54.00          | 15.37       | 1.00 H             | 204                  | 34.83            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7356.00         | 57.56                   | PK | 74.00          | 16.44       | 1.00 H             | 301                  | 48.16            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7356.00         | 43.93                   | AV | 54.00          | 10.07       | 1.00 H             | 301                  | 34.53            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9808.00         | 50.64                   | PK | 74.00          | 23.36       | 1.00 H             | 118                  | 38.04            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9808.00         | 41.05                   | AV | 54.00          | 12.95       | 1.00 H             | 118                  | 28.45            | 37.3                  | 10.10             | -34.8         | 12.60                    |

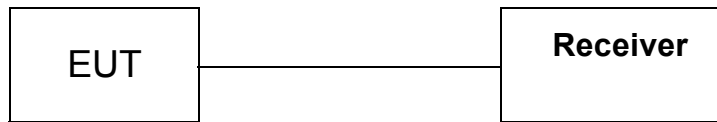
**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11n40--2452MHz)**

| No. | Frequency (MHz) | Emission Level (dBuV/m) |    | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Antenna Factor (dB/m) | Cable Factor (dB) | Pre-amplifier | Correction Factor (dB/m) |
|-----|-----------------|-------------------------|----|----------------|-------------|--------------------|----------------------|------------------|-----------------------|-------------------|---------------|--------------------------|
| 1   | *2452.00        | 99.24                   | PK |                |             | 1.00 V             | 125                  | 102.44           | 28.2                  | 5.20              | -36.6         | -3.20                    |
| 1   | *2452.00        | 86.12                   | AV |                |             | 1.00 V             | 125                  | 89.32            | 28.2                  | 5.20              | -36.6         | -3.20                    |
| 2   | 2483.50         | 50.15                   | PK | 74.00          | 23.85       | 1.00 V             | 143                  | 53.45            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 2   | 2483.50         | 38.83                   | AV | 54.00          | 15.17       | 1.00 V             | 143                  | 42.13            | 28.2                  | 5.10              | -36.6         | -3.30                    |
| 3   | 4904.00         | 55.77                   | PK | 74.00          | 18.23       | 1.00 V             | 177                  | 51.97            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 3   | 4904.00         | 40.95                   | AV | 54.00          | 13.05       | 1.00 V             | 177                  | 37.15            | 33.0                  | 7.00              | -36.2         | 3.80                     |
| 4   | 7356.00         | 60.91                   | PK | 74.00          | 13.09       | 1.00 V             | 0                    | 51.51            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 4   | 7356.00         | 44.99                   | AV | 54.00          | 9.01        | 1.00 V             | 0                    | 35.59            | 36.2                  | 8.50              | -35.3         | 9.40                     |
| 5   | 9808.00         | 53.06                   | PK | 74.00          | 20.94       | 1.00 V             | 315                  | 40.46            | 37.3                  | 10.10             | -34.8         | 12.60                    |
| 5   | 9808.00         | 38.02                   | AV | 54.00          | 15.98       | 1.00 V             | 315                  | 25.42            | 37.3                  | 10.10             | -34.8         | 12.60                    |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
  2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) + Pre-amplifier Factor
  3. The other emission levels were very low against the limit.
  4. Margin value = Limit value- Emission level.
  5. The limit value is defined as per 15.247
  6. " \* " : Fundamental frequency
  7. For Wireless 802.11n (40MHz) mode at 135Mbps.

### 4.3. Maximum Peak Output Power

#### TEST CONFIGURATION



#### TEST PROCEDURE

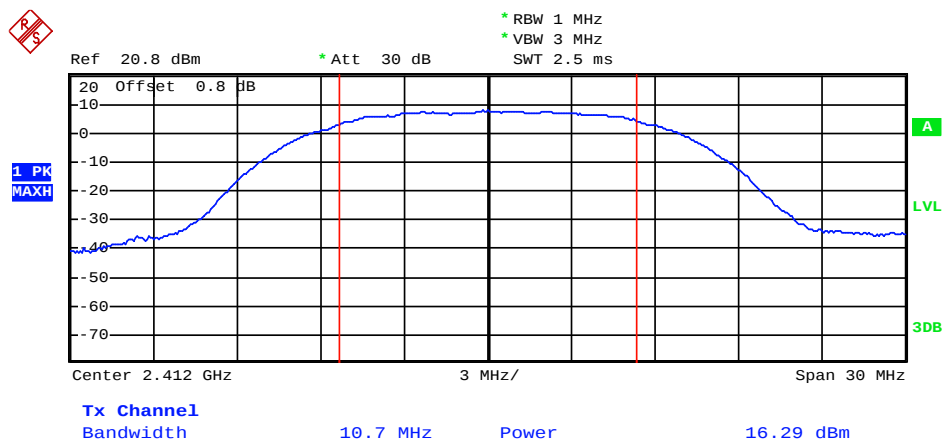
The EUT was directly connected to the power meter and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

#### LIMIT

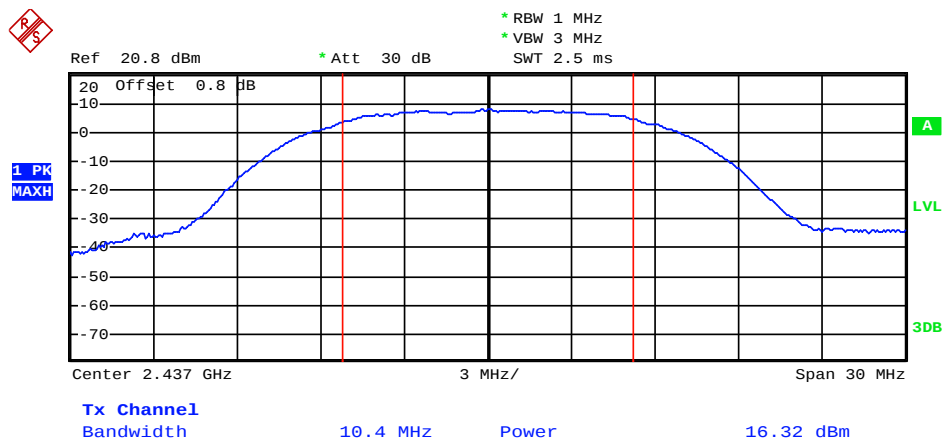
The Maximum Peak Output Power Measurement is 30dBm.

#### TEST RESULTS

| Channel   | Frequency (MHz) | Reading Power Output(dBm) | Limit (dBm) | Pass / Fail |
|-----------|-----------------|---------------------------|-------------|-------------|
| 802.11b   |                 |                           |             |             |
| Low       | 2412            | 16.29                     | 30          | PASS        |
| Middle    | 2437            | 16.32                     | 30          | PASS        |
| High      | 2462            | 16.45                     | 30          | PASS        |
| 802.11g   |                 |                           |             |             |
| Low       | 2412            | 16.27                     | 30          | PASS        |
| Middle    | 2437            | 16.35                     | 30          | PASS        |
| High      | 2462            | 16.75                     | 30          | PASS        |
| 802.11n20 |                 |                           |             |             |
| Low       | 2412            | 15.61                     | 30          | PASS        |
| Middle    | 2437            | 16.02                     | 30          | PASS        |
| High      | 2462            | 16.23                     | 30          | PASS        |
| 802.11n40 |                 |                           |             |             |
| Low       | 2422            | 16.46                     | 30          | PASS        |
| Middle    | 2437            | 16.23                     | 30          | PASS        |
| High      | 2452            | 16.33                     | 30          | PASS        |

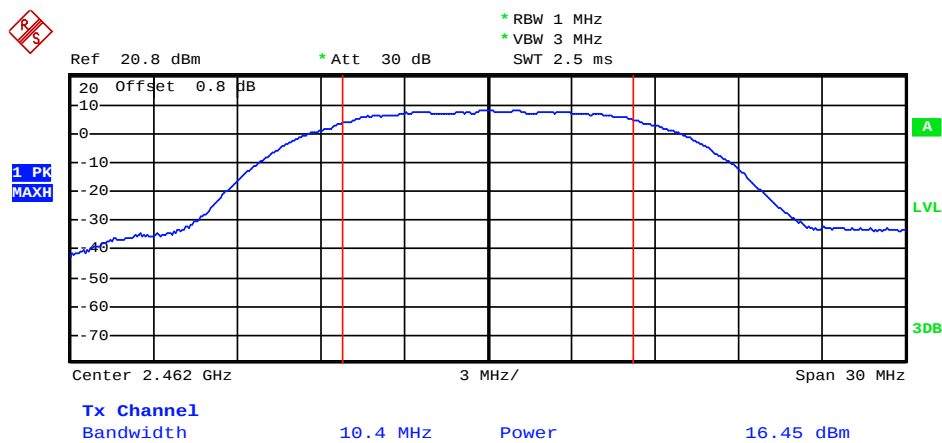
**Photos of Maximum Peak Output Power***802.11b Mode channel 1*

Date: 19.APR.2012 07:54:46

*802.11b Mode channel 6*

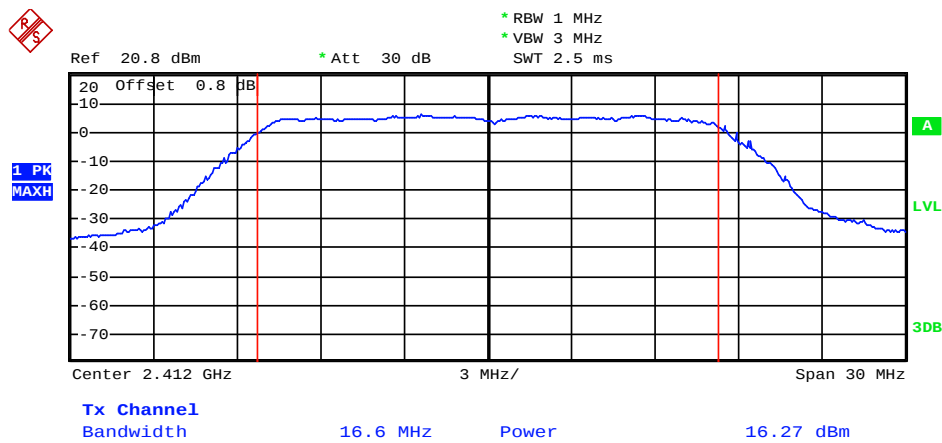
Date: 19.APR.2012 07:55:51

802.11b Mode channel 11



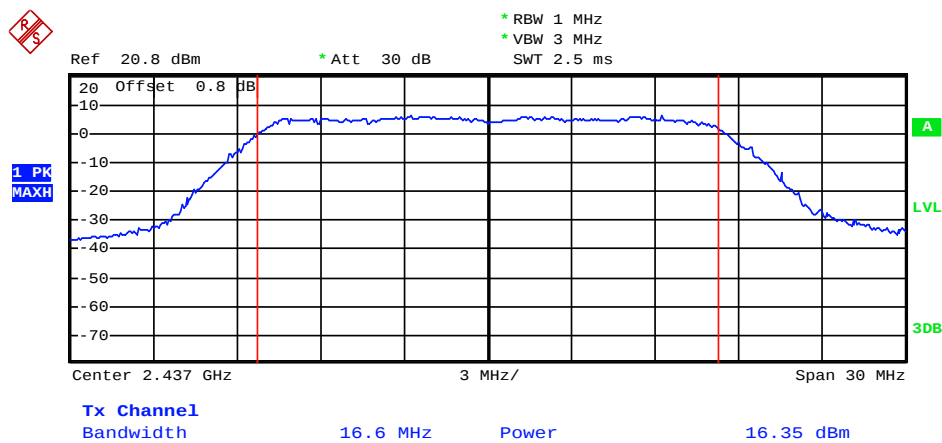
Date: 19.APR.2012 07:56:42

802.11g Mode channel 1



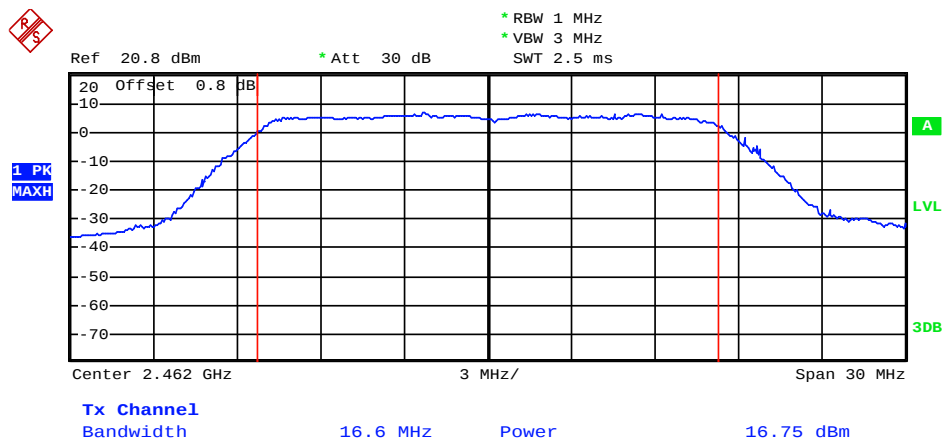
Date: 19.APR.2012 07:47:12

802.11g Mode channel 6



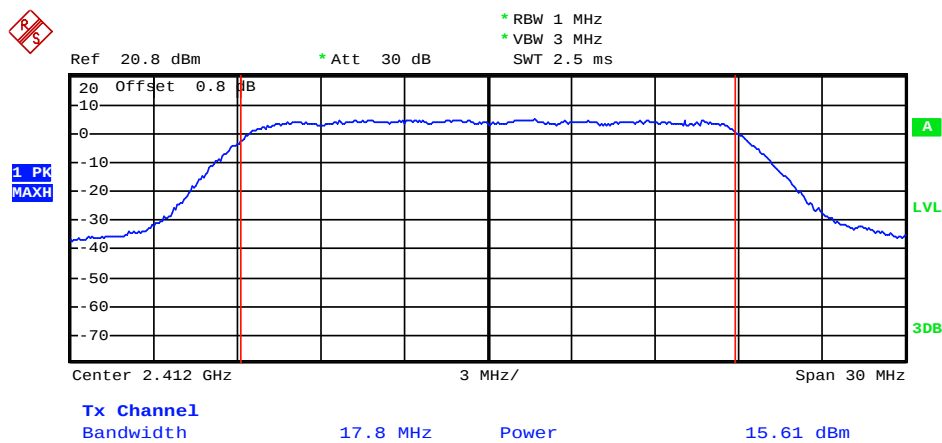
Date: 19.APR.2012 07:47:48

802.11g Mode channel 11



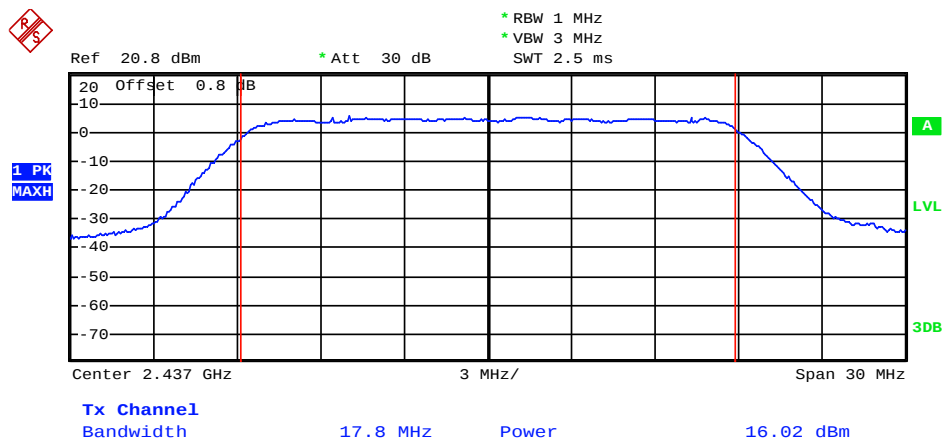
Date: 19.APR.2012 07:48:31

802.11n20 Mode channel 1



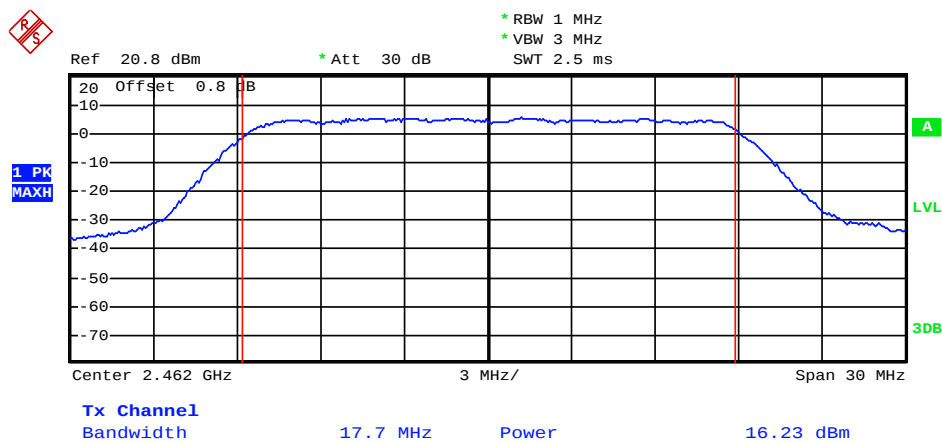
Date: 19.APR.2012 07:57:58

802.11n20 Mode channel 6



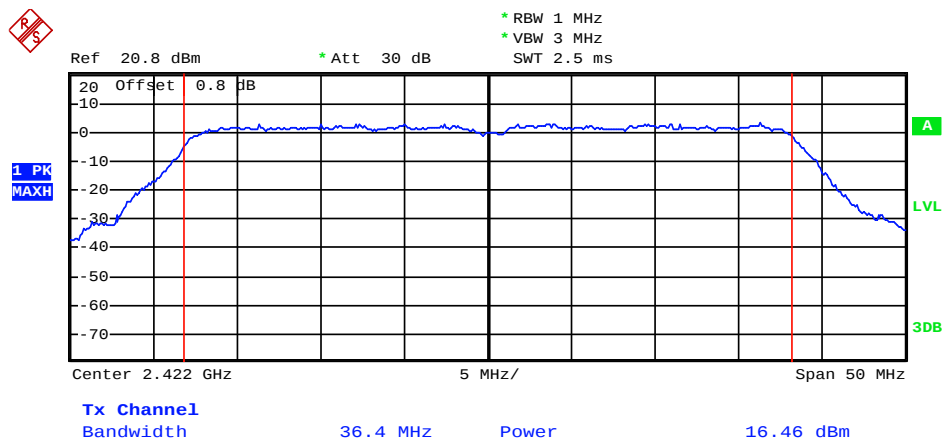
Date: 19.APR.2012 07:58:54

802.11n20 Mode channel 11



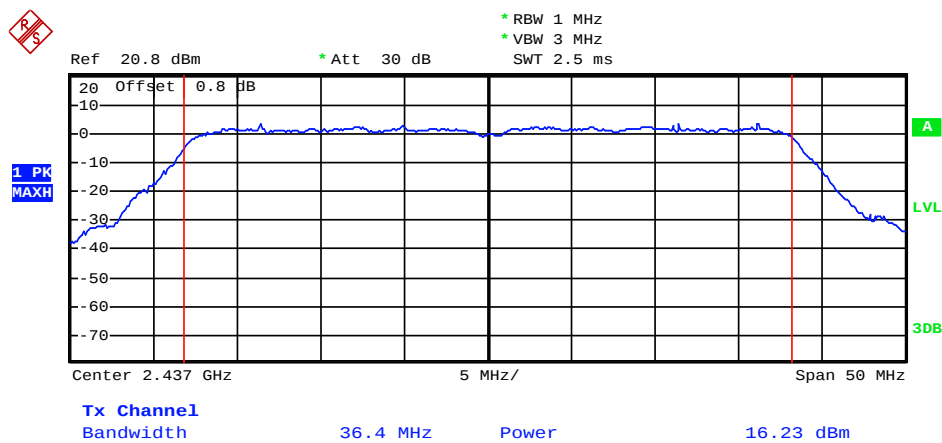
Date: 19.APR.2012 08:00:39

802.11n40 Mode channel 3



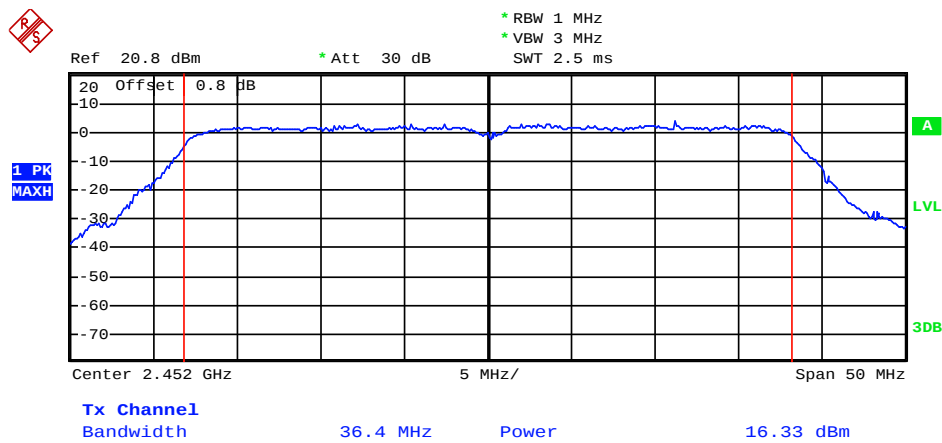
Date: 19.APR.2012 08:11:55

802.11n40 Mode channel 6



Date: 19.APR.2012 08:10:50

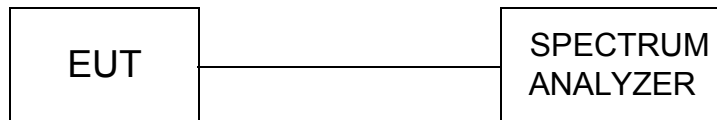
802.11n40 Mode channel 9



Date: 19.APR.2012 08:10:05

#### 4.4. Power Spectral Density

##### TEST CONFIGURATION



##### TEST PROCEDURE

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW 300 kHz.
4. Set the span to 5-30 % greater than the EBW
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100 \text{ kHz}) = -15.2 \text{ dB}$ .
11. The resulting peak PSD level must be 8 dBm.

Follow KDB 558074 D01 DTS Meas Guidance v01 of measurement procedure PKPSD

##### LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

##### TEST RESULTS

| CHANNEL NUMBER | FREQUENCY (MHz ) | PSD (dBm/100KHz) | PSD (dBm/3KHz) | LIMIT (dBm/3KHz) | PASS/FAIL |
|----------------|------------------|------------------|----------------|------------------|-----------|
| 1              | 2412             | 1.40             | -13.80         | 8                | PASS      |
| 6              | 2437             | 1.93             | -13.27         | 8                | PASS      |
| 11             | 2462             | 2.19             | -13.01         | 8                | PASS      |

Note: 1. For 802.11b mode at final test to get the worst-case emission at 11Mbps.  
2. The test results including the cable lose.

| CHANNEL NUMBER | FREQUENCY (MHz ) | PSD (dBm/100KHz) | PSD (dBm/3KHz) | LIMIT (dBm/3KHz) | PASS/FAIL |
|----------------|------------------|------------------|----------------|------------------|-----------|
| 1              | 2412             | -3.94            | -19.14         | 8                | PASS      |
| 6              | 2437             | -3.31            | -18.51         | 8                | PASS      |
| 11             | 2462             | -3.07            | -18.27         | 8                | PASS      |

Note: 1. For 802.11g mode at final test to get the worst-case emission at 54Mbps.  
2. The test results including the cable lose.

| CHANNEL NUMBER | FREQUENCY (MHz ) | PSD (dBm/100KHz) | PSD (dBm/3KHz) | LIMIT (dBm/3KHz) | PASS/FAIL |
|----------------|------------------|------------------|----------------|------------------|-----------|
| 1              | 2412             | -3.86            | -19.06         | 8                | PASS      |
| 6              | 2437             | -3.44            | -18.64         | 8                | PASS      |
| 11             | 2462             | -3.05            | -18.25         | 8                | PASS      |

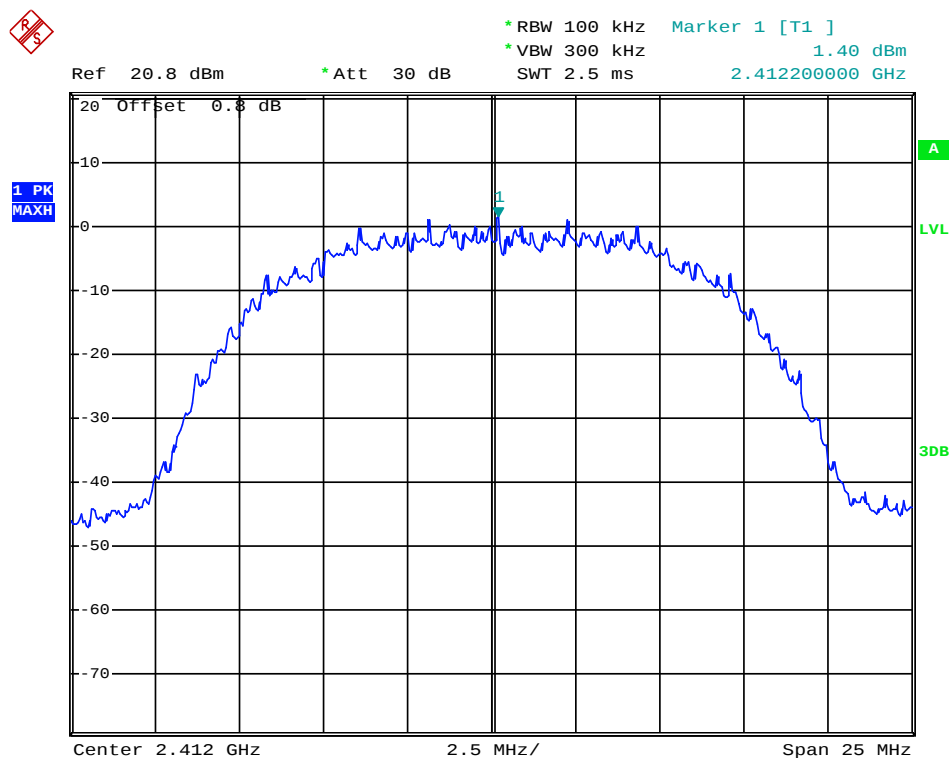
Note: 1. For 802.11n(20MHz) mode at final test to get the worst-case emission at 65 Mbps.  
2. The test results including the cable lose.

| CHANNEL NUMBER | FREQUENCY (MHz ) | PSD (dBm/100KHz) | PSD (dBm/3KHz) | LIMIT (dBm/3KHz) | PASS/FAIL |
|----------------|------------------|------------------|----------------|------------------|-----------|
| 3              | 2422             | -6.63            | -21.83         | 8                | PASS      |
| 6              | 2437             | -6.35            | -21.55         | 8                | PASS      |
| 9              | 2452             | -6.25            | -21.45         | 8                | PASS      |

Note: 1. For 802.11n(40MHz) mode at final test to get the worst-case emission at 135Mbps.  
2. The test results including the cable lose.

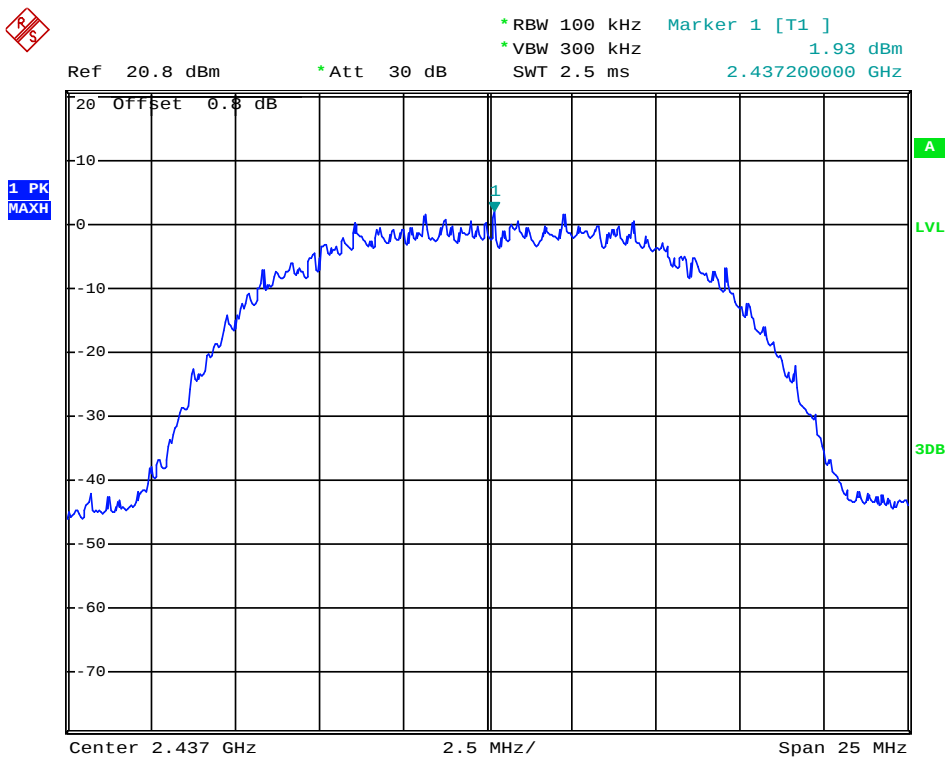
### Photos of Power Spectral Density Measurement

802.11b Mode channel 1



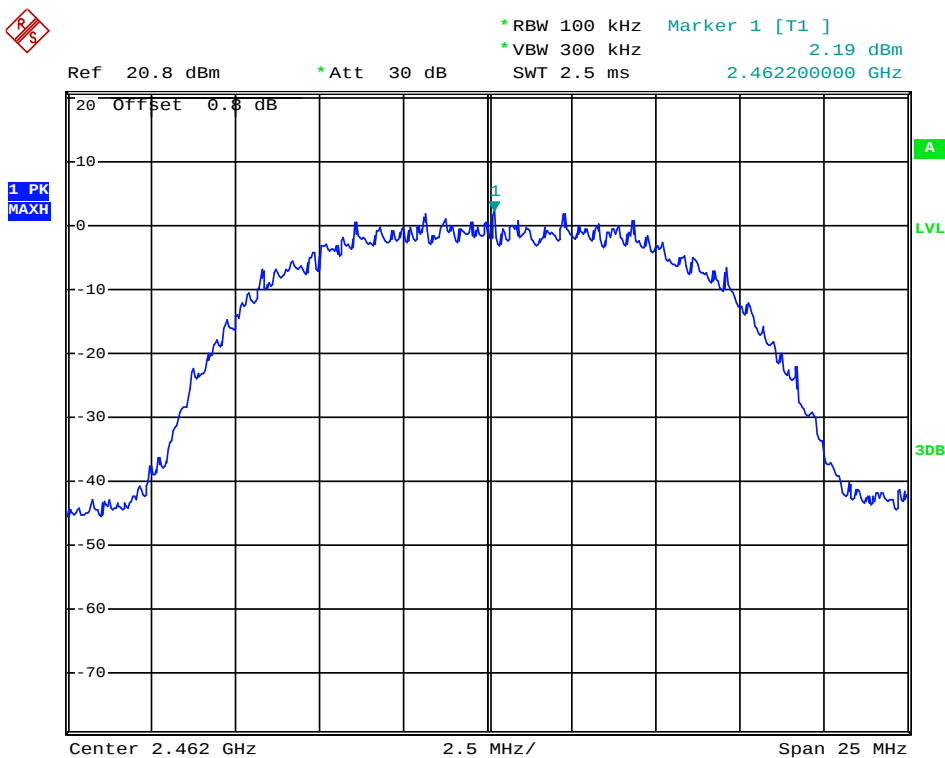
Date: 10.APR.2012 11:07:46

802.11b Mode channel 6



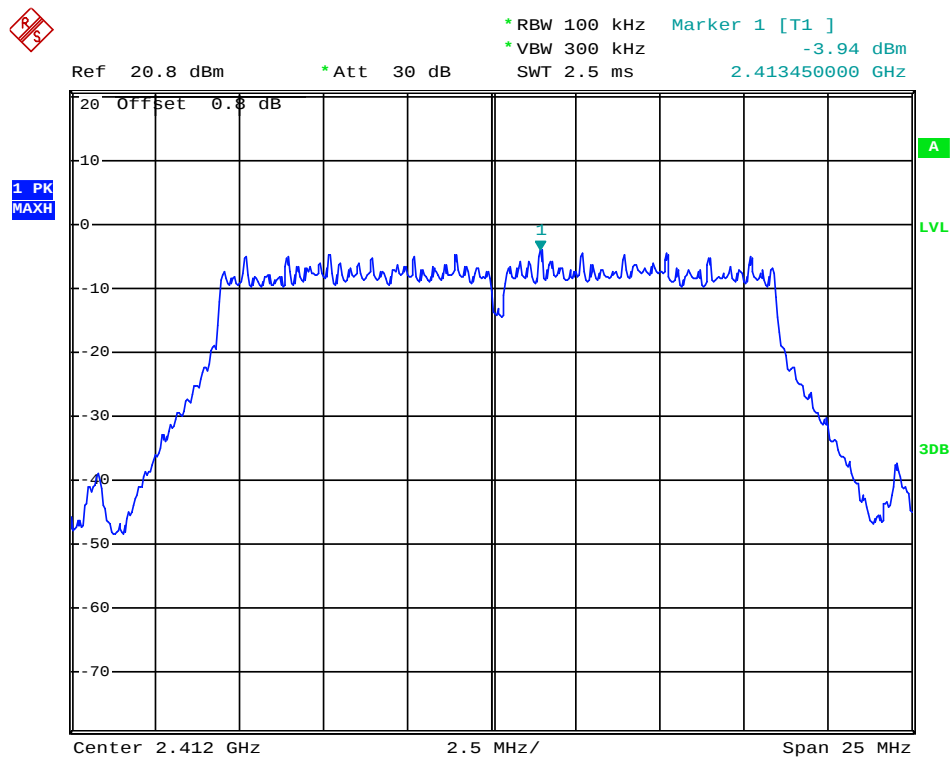
Date: 10.APR.2012 11:12:36

802.11b Mode channel 11



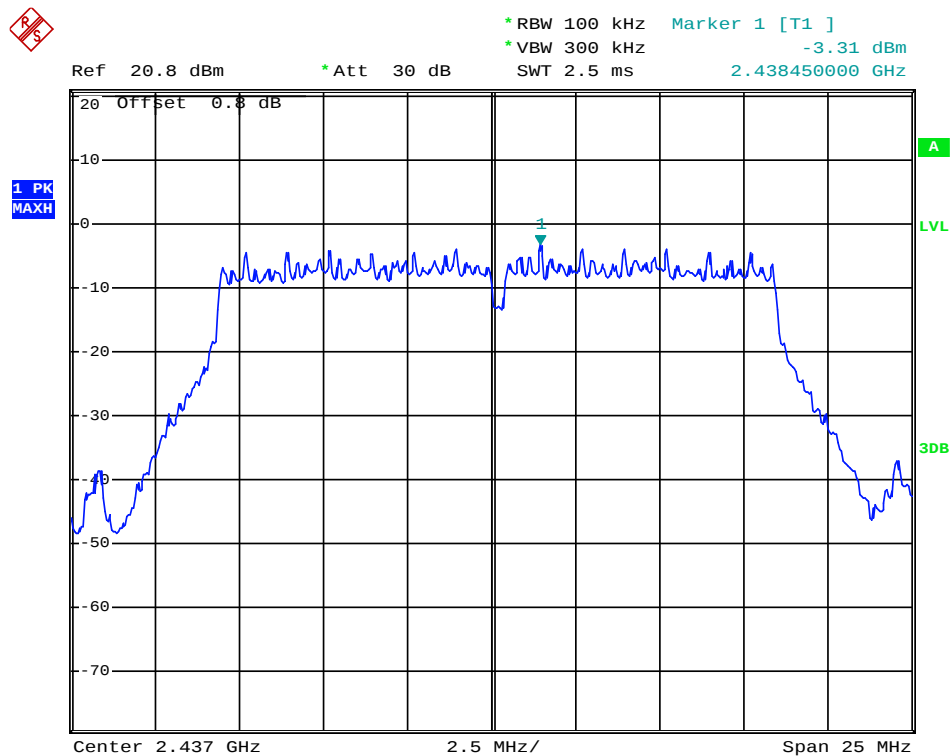
Date: 10.APR.2012 11:13:22

## 802.11g Mode channel 1



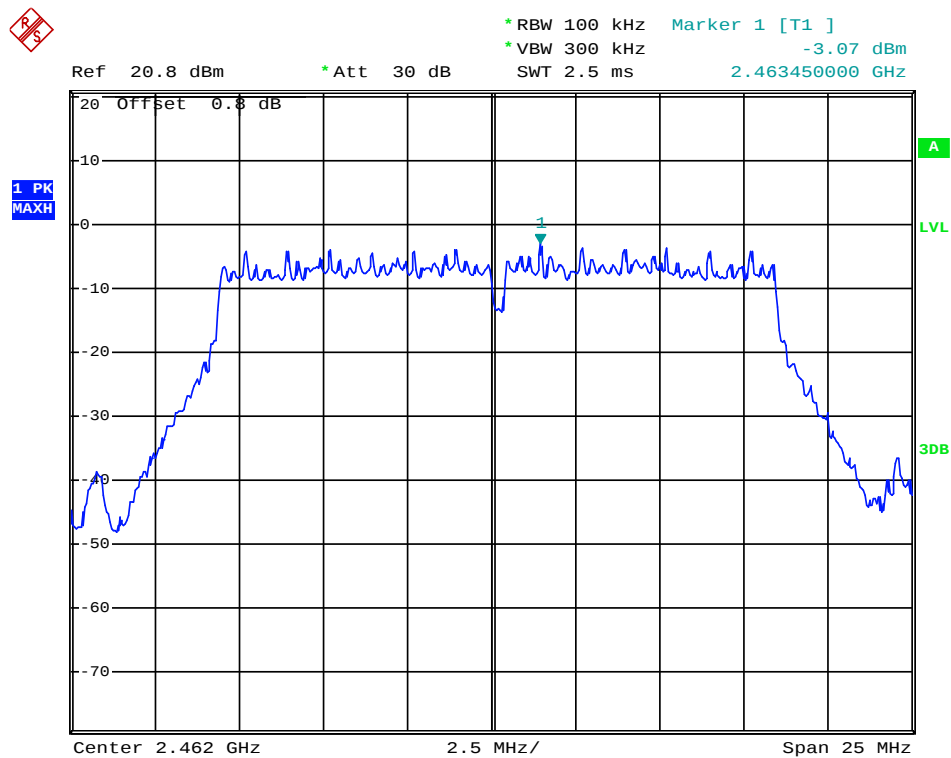
Date: 10.APR.2012 11:08:32

## 802.11g Mode channel 6



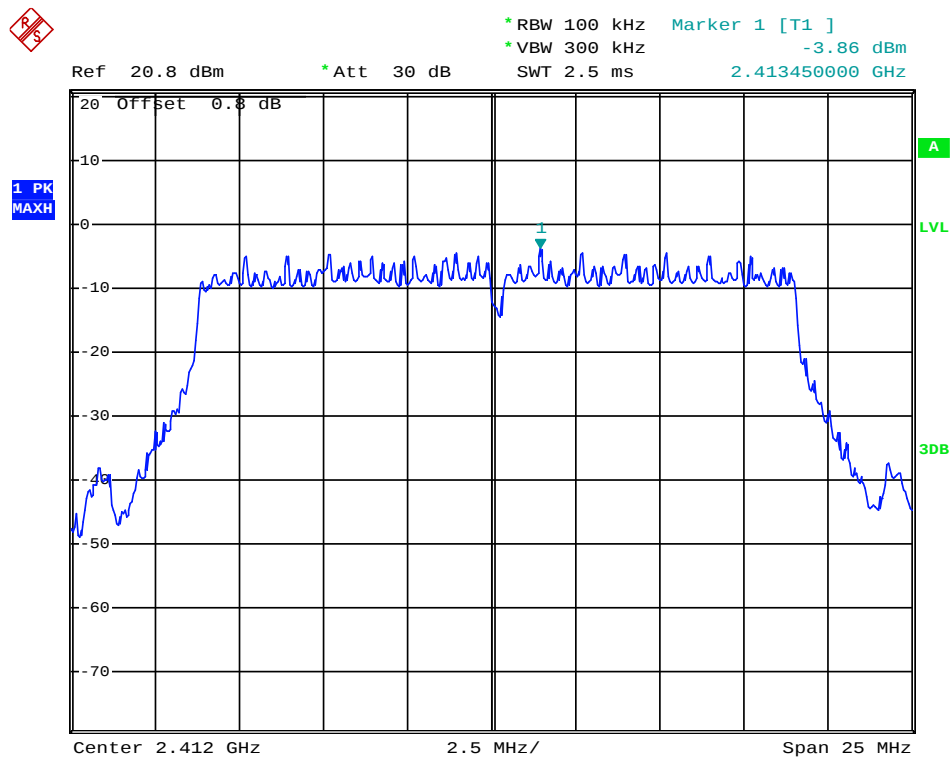
Date: 10.APR.2012 11:11:56

## 802.11g Mode channel 11



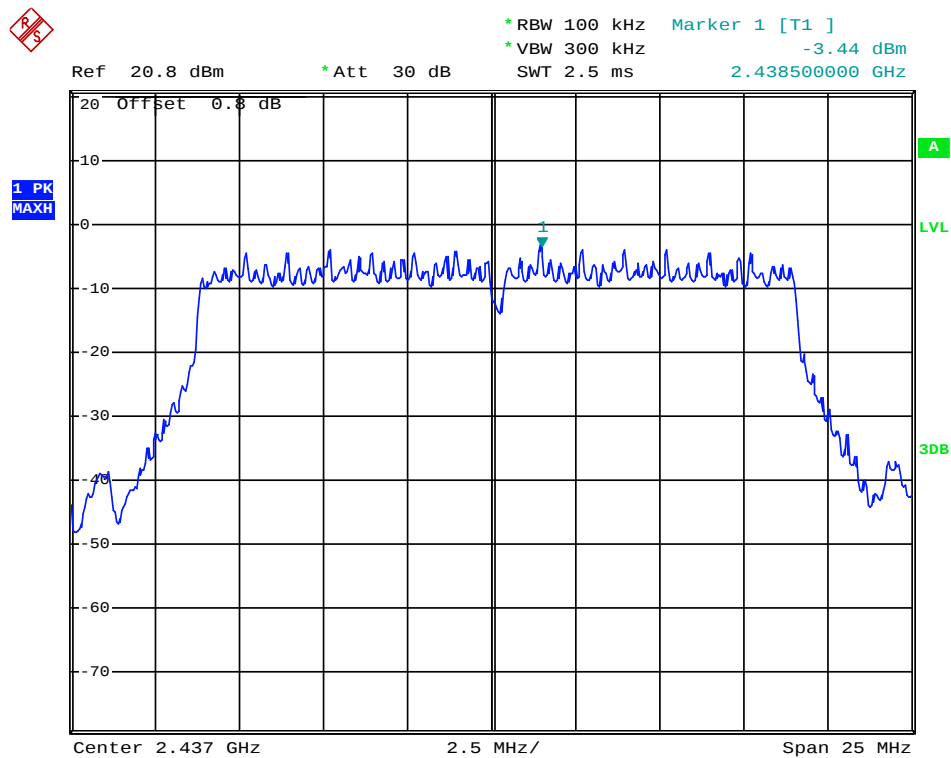
Date: 10.APR.2012 11:13:44

## 802.11n20 Mode channel 1



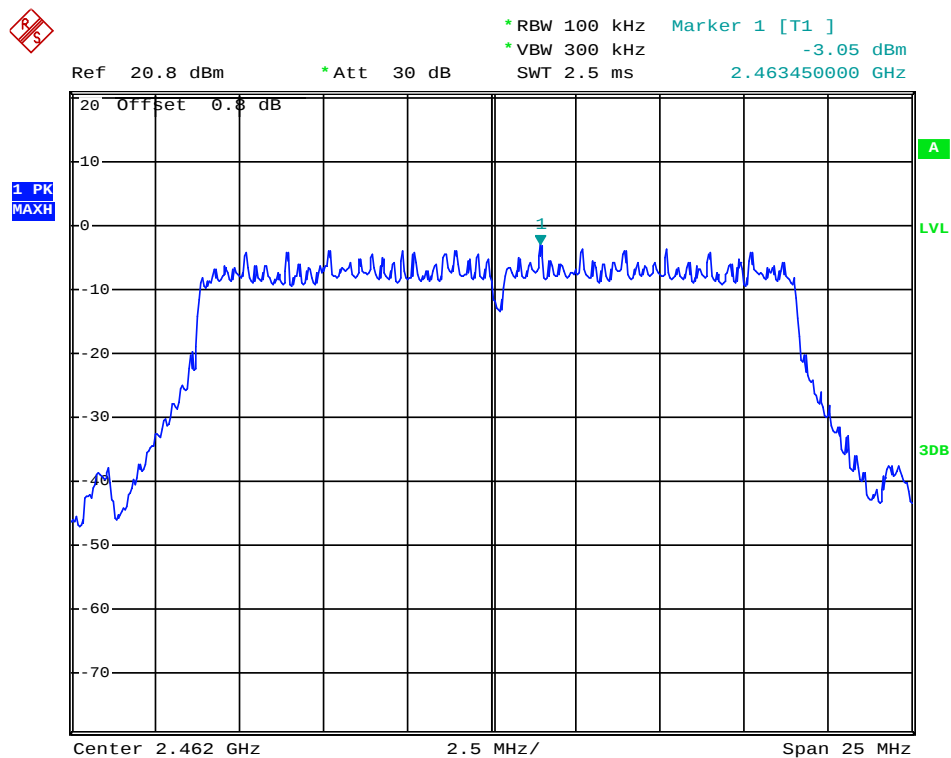
Date: 10.APR.2012 11:09:02

## 802.11n20 Mode channel 6



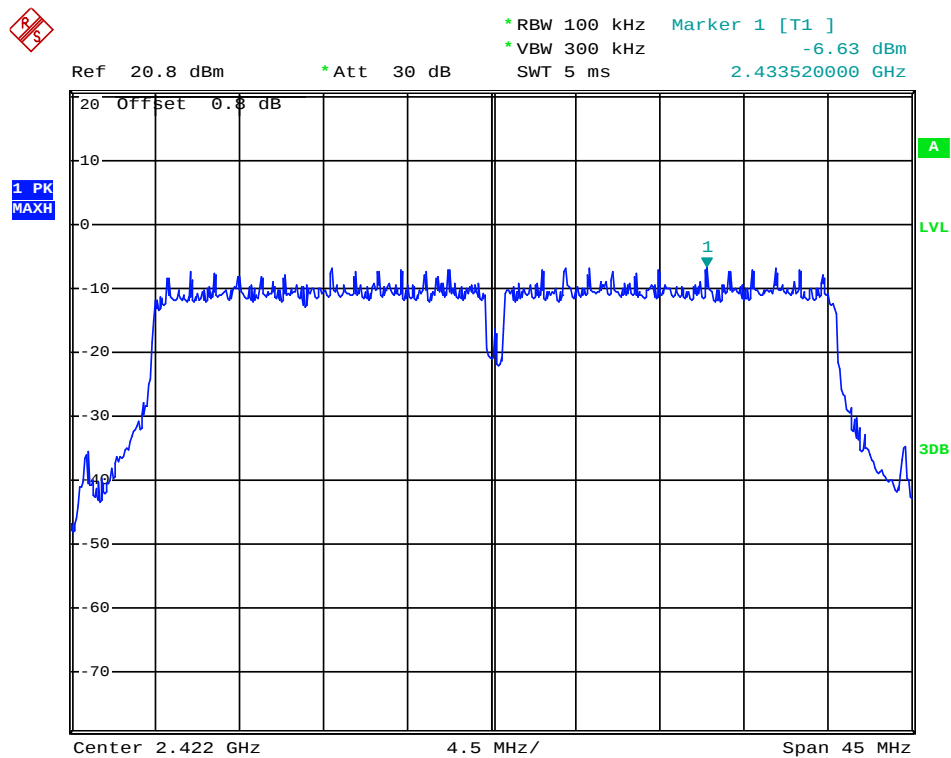
Date: 10.APR.2012 11:11:33

## 802.11n20 Mode channel 11



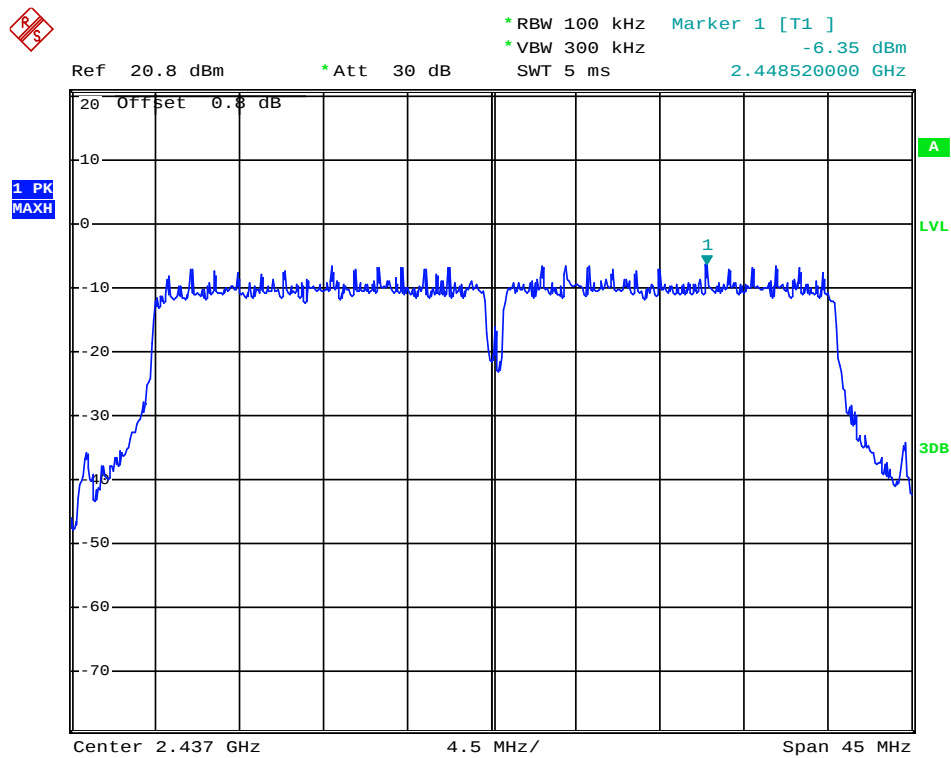
Date: 10.APR.2012 11:14:10

## 802.11n40 Mode channel 3



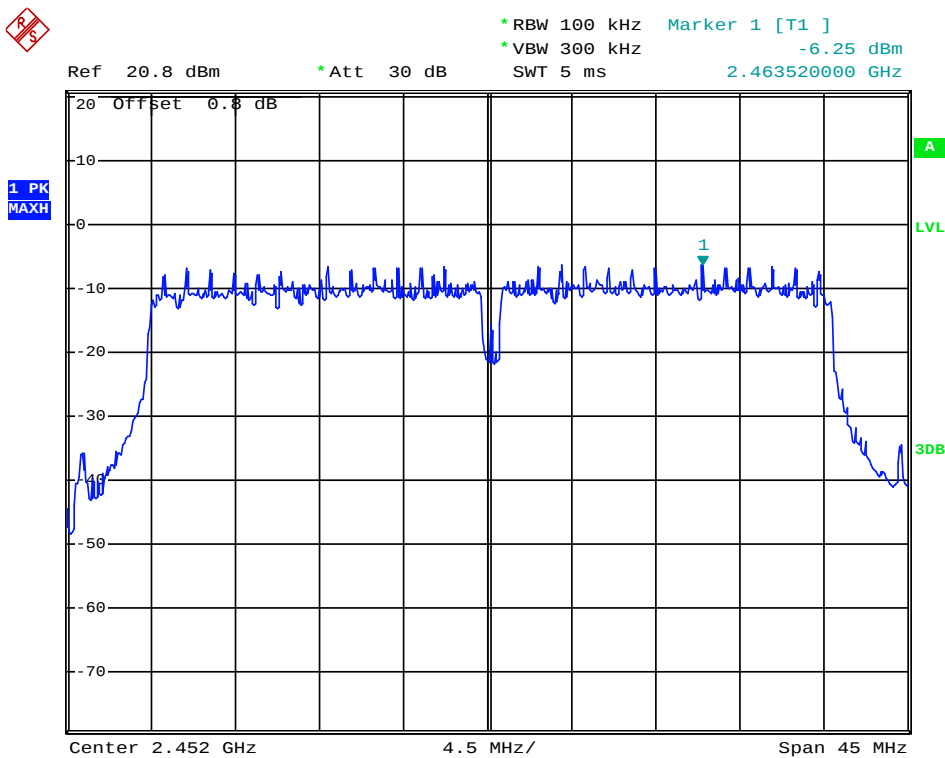
Date: 10.APR.2012 11:10:04

## 802.11n40 Mode channel 6



Date: 10.APR.2012 11:11:02

802.11n40 Mode channel 9



Date: 10.APR.2012 11:14:58

## 4.5. Band Edge Compliance of RF Emission

### Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=10Hz for average detector.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

### LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209(see Section 15.205(c)).

| Frequency (MHz)            | Limit Average (dBuV/m) | Limit Peak (dBuV/m) |
|----------------------------|------------------------|---------------------|
| Below 2390 or Above 2483.5 | 54                     | 74                  |

### TEST RESULTS

Both radiated and conducted band edge were measurement for 802.11b,802.11g,802.11n(20MHz) and 802.11n(40MHz) mode,recording worst case in test report.

## 802.11b

| Frequency (MHz)        | Corrected Reading (dBμV/m)@3m | FCC Limit (dBμV/m) @3m | Margin (dB) | Detector | Polarization |
|------------------------|-------------------------------|------------------------|-------------|----------|--------------|
| Out of left side band  |                               |                        |             |          |              |
| 2390.00                | 55.75                         | 74                     | 18.25       | PK       | Horizontal   |
| 2390.00                | 46.91                         | 54                     | 7.09        | AV       | Horizontal   |
| 2390.00                | 55.55                         | 74                     | 18.45       | PK       | Vertical     |
| 2390.00                | 46.35                         | 54                     | 7.65        | AV       | Vertical     |
| Out of right side band |                               |                        |             |          |              |
| 2483.50                | 65.80                         | 74                     | 8.20        | PK       | Horizontal   |
| 2483.50                | 50.43                         | 54                     | 3.57        | AV       | Horizontal   |
| 2483.50                | 60.13                         | 74                     | 13.87       | PK       | Vertical     |
| 2483.50                | 45.02                         | 54                     | 8.98        | AV       | Vertical     |

## 802.11g

| Frequency (MHz)        | Corrected Reading (dBμV/m)@3m | FCC Limit (dBμV/m) @3m | Margin (dB) | Detector | Polarization |
|------------------------|-------------------------------|------------------------|-------------|----------|--------------|
| Out of left side band  |                               |                        |             |          |              |
| 2390.00                | 65.24                         | 74                     | 8.76        | PK       | Horizontal   |
| 2390.00                | 50.47                         | 54                     | 3.53        | AV       | Horizontal   |
| 2390.00                | 65.18                         | 74                     | 8.82        | PK       | Vertical     |
| 2390.00                | 53.40                         | 54                     | 0.60        | AV       | Vertical     |
| Out of right side band |                               |                        |             |          |              |
| 2483.50                | 55.98                         | 74                     | 18.02       | PK       | Horizontal   |
| 2483.50                | 48.35                         | 54                     | 5.65        | AV       | Horizontal   |
| 2483.50                | 57.63                         | 74                     | 16.37       | PK       | Vertical     |
| 2483.50                | 44.33                         | 54                     | 9.67        | AV       | Vertical     |

**802.11n(20MHz)**

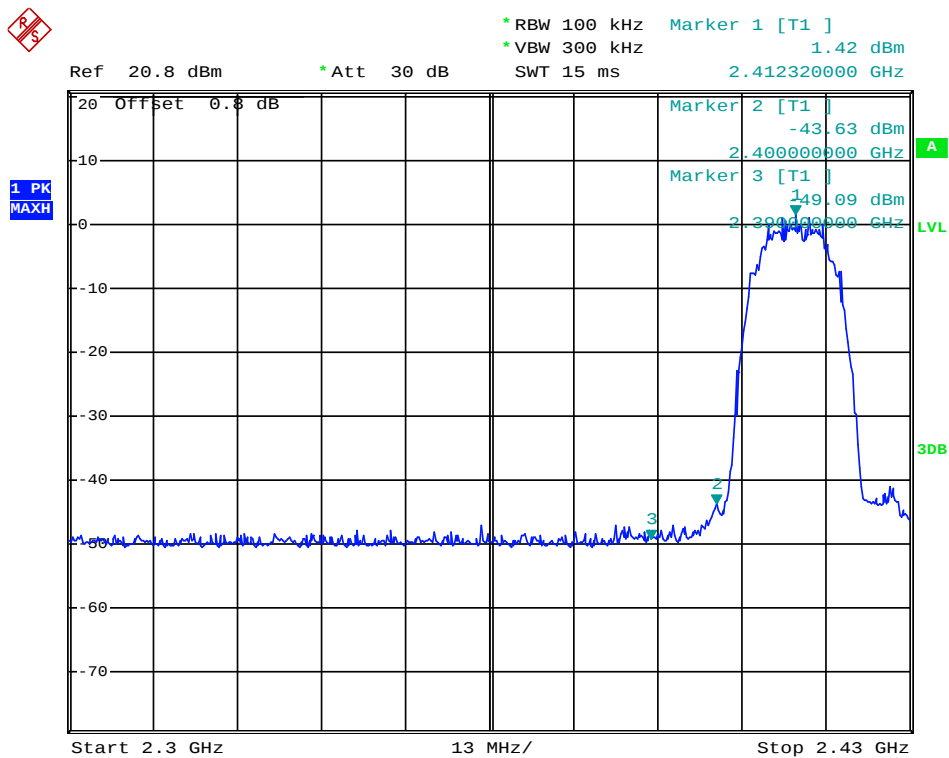
| Frequency (MHz)        | Corrected Reading (dBμV/m)@3m | FCC Limit (dBμV/m) @3m | Margin (dB) | Detector | Polarization |
|------------------------|-------------------------------|------------------------|-------------|----------|--------------|
| Out of left side band  |                               |                        |             |          |              |
| 2390.00                | 51.76                         | 74                     | 22.24       | PK       | Horizontal   |
| 2390.00                | 40.03                         | 54                     | 13.97       | AV       | Horizontal   |
| 2390.00                | 53.28                         | 74                     | 20.72       | PK       | Vertical     |
| 2390.00                | 40.99                         | 54                     | 13.01       | AV       | Vertical     |
| Out of right side band |                               |                        |             |          |              |
| 2483.50                | 59.40                         | 74                     | 14.60       | PK       | Horizontal   |
| 2483.50                | 47.77                         | 54                     | 6.23        | AV       | Horizontal   |
| 2483.50                | 61.05                         | 74                     | 12.95       | PK       | Vertical     |
| 2483.50                | 47.77                         | 54                     | 6.23        | AV       | Vertical     |

**802.11n(40MHz)**

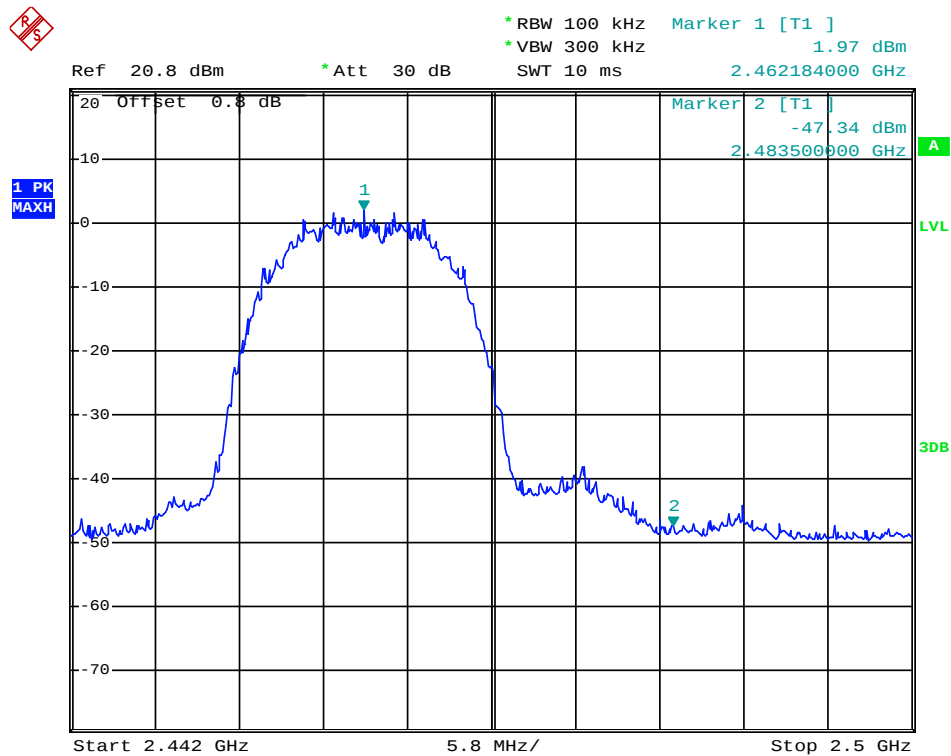
| Frequency (MHz)        | Corrected Reading (dBμV/m)@3m | FCC Limit (dBμV/m) @3m | Margin (dB) | Detector | Polarization |
|------------------------|-------------------------------|------------------------|-------------|----------|--------------|
| Out of left side band  |                               |                        |             |          |              |
| 2390.00                | 52.77                         | 74                     | 21.23       | PK       | Horizontal   |
| 2390.00                | 41.46                         | 54                     | 12.54       | AV       | Horizontal   |
| 2390.00                | 57.23                         | 74                     | 16.77       | PK       | Vertical     |
| 2390.00                | 43.33                         | 54                     | 10.67       | AV       | Vertical     |
| Out of right side band |                               |                        |             |          |              |
| 2483.50                | 58.58                         | 74                     | 15.42       | PK       | Horizontal   |
| 2483.50                | 44.46                         | 54                     | 9.54        | AV       | Horizontal   |
| 2483.50                | 50.15                         | 74                     | 23.85       | PK       | Vertical     |
| 2483.50                | 38.83                         | 54                     | 15.17       | AV       | Vertical     |

**Photos of Conducted Band Edge Measurement**

| CHANNEL NUMBER | CHANNEL FREQUENCY (MHz ) | Delta Peak to Band emission (dBc) | LIMIT (dBc) | PASS/FAIL |
|----------------|--------------------------|-----------------------------------|-------------|-----------|
| 802.11b        |                          |                                   |             |           |
| Low            | 2400.00                  | 45.05                             | 20          | PASS      |
| High           | 2483.50                  | 49.31                             | 20          | PASS      |
| 802.11g        |                          |                                   |             |           |
| Low            | 2400.00                  | 37.36                             | 20          | PASS      |
| High           | 2483.50                  | 44.35                             | 20          | PASS      |
| 802.11n20      |                          |                                   |             |           |
| Low            | 2400.00                  | 38.75                             | 20          | PASS      |
| High           | 2483.50                  | 44.57                             | 20          | PASS      |
| 802.11n40      |                          |                                   |             |           |
| Low            | 2400.00                  | 33.73                             | 20          | PASS      |
| High           | 2483.50                  | 36.60                             | 20          | PASS      |

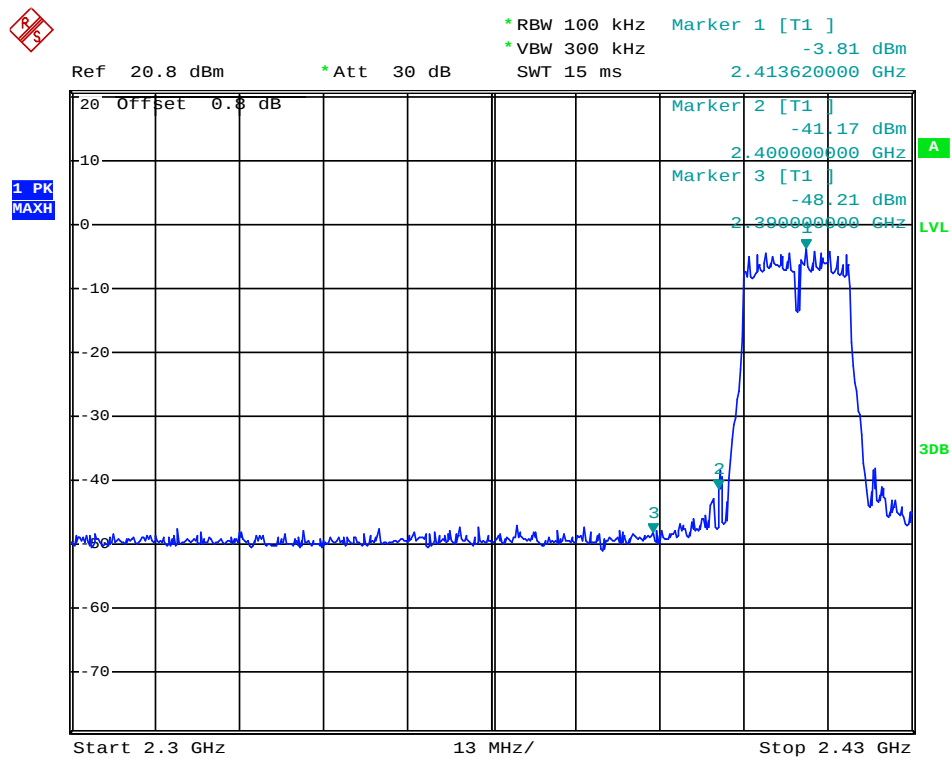
**For 802.11b Mode**

Date: 10.APR.2012 10:56:33

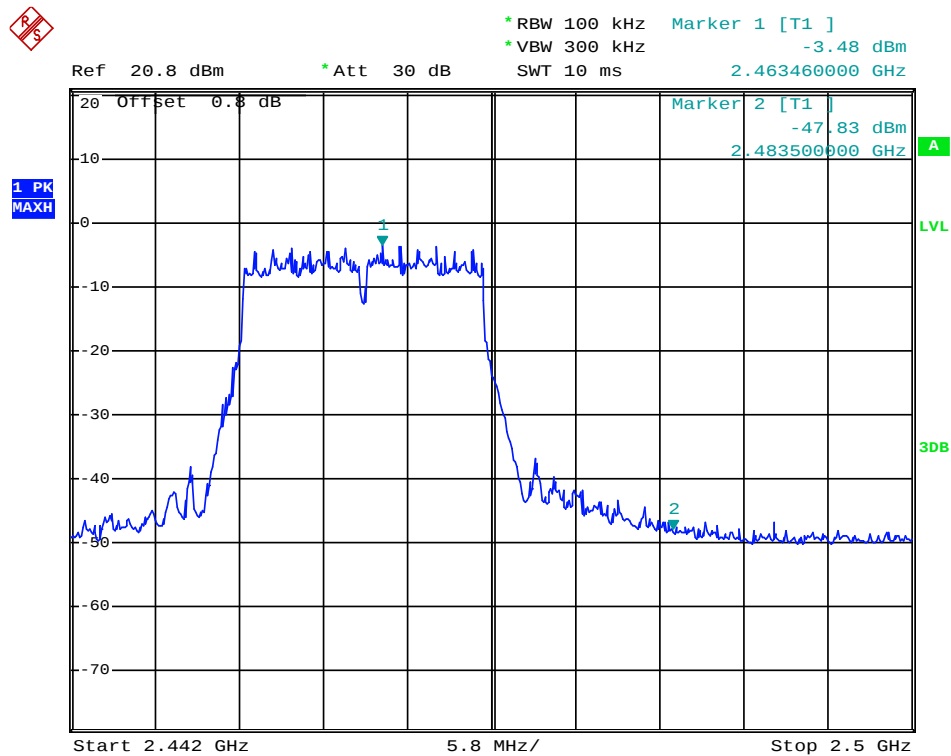


Date: 10.APR.2012 10:58:38

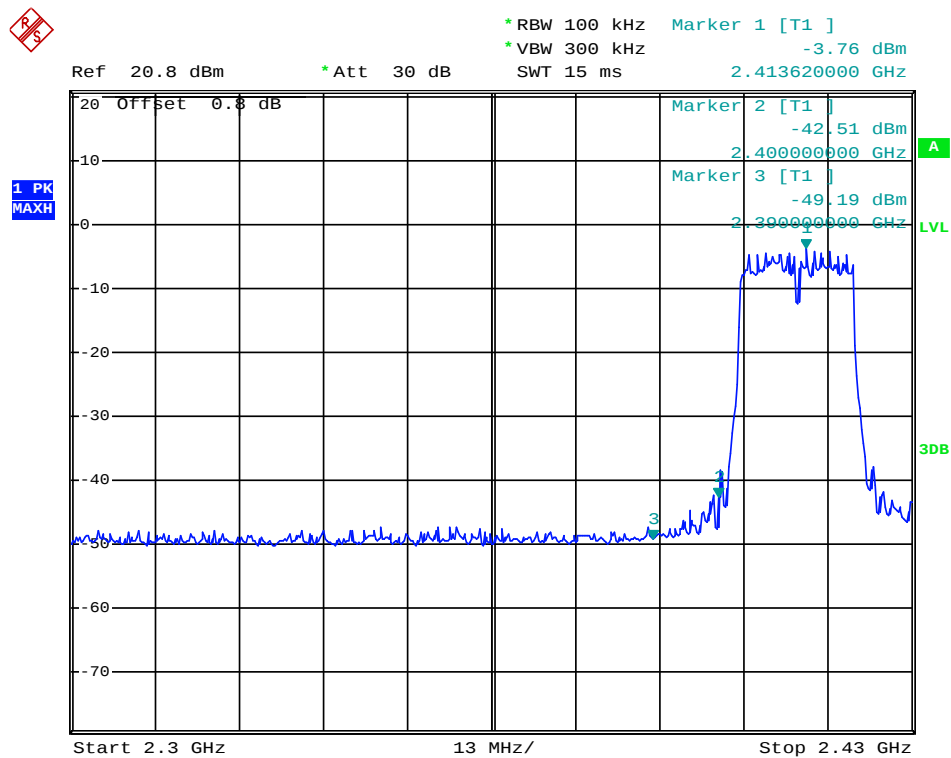
## For 802.11g Mode



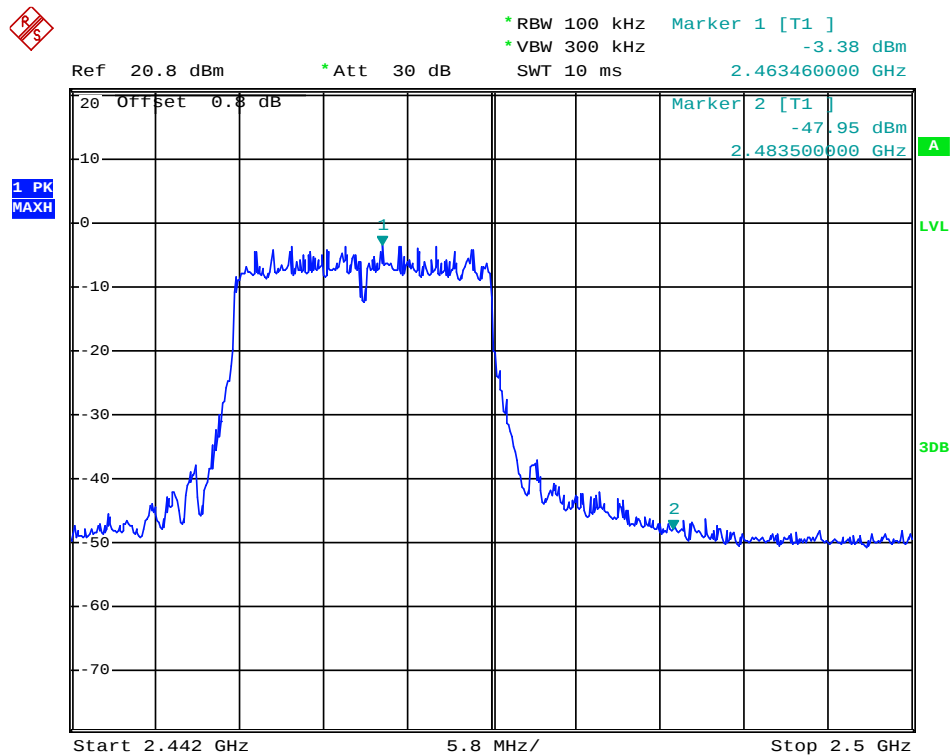
Date: 10.APR.2012 10:56:01



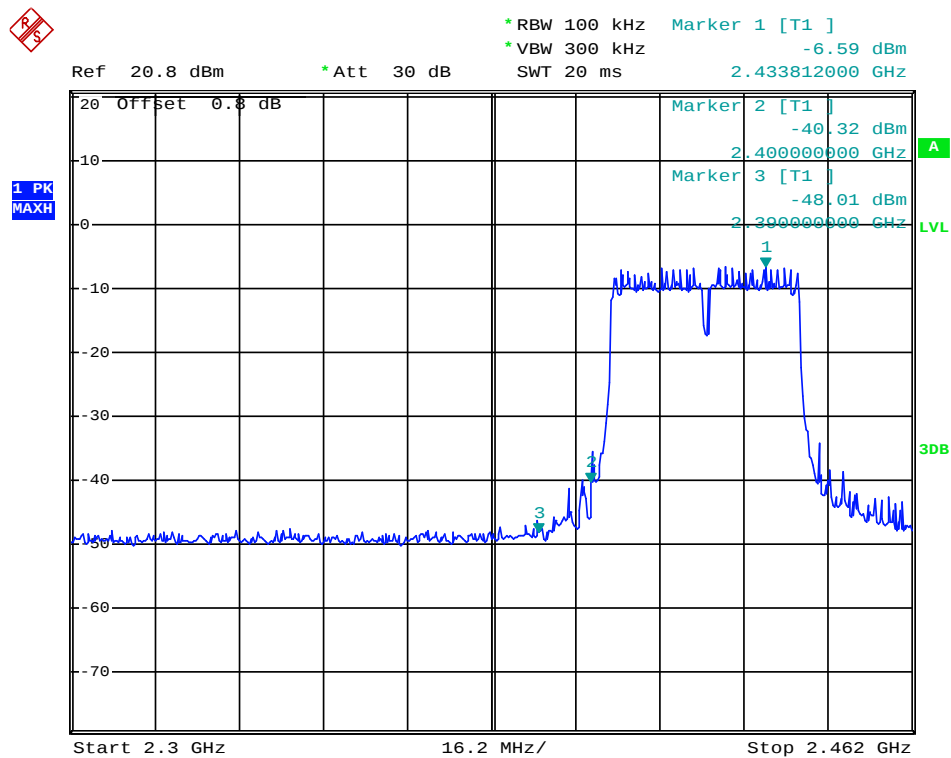
Date: 10.APR.2012 10:59:25

**802.11n (20MHz) Mode**

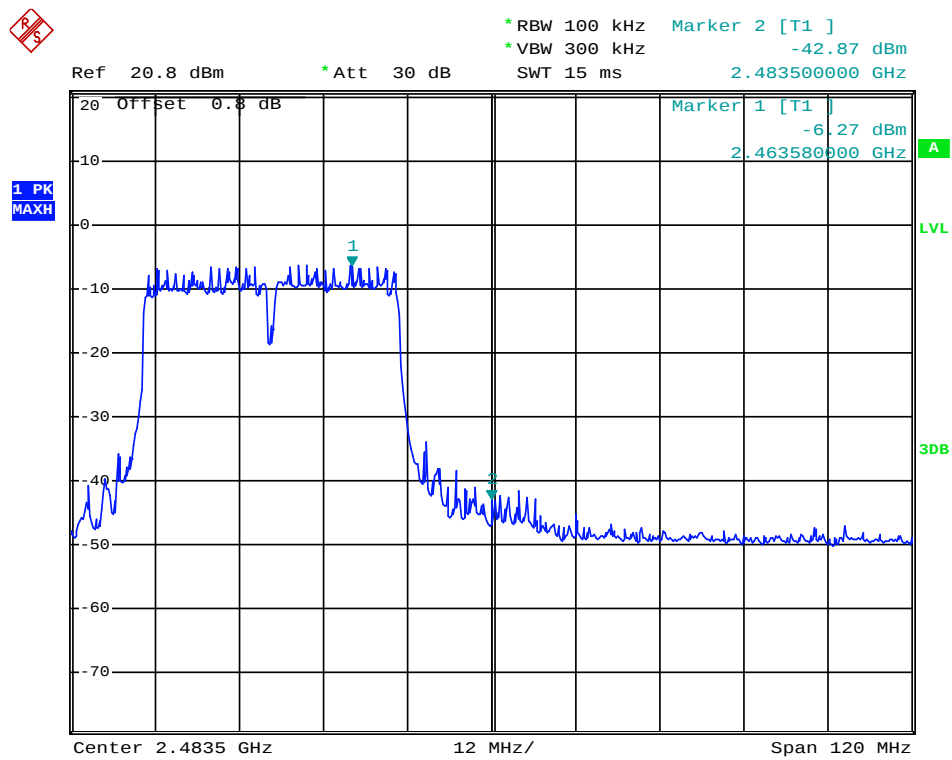
Date: 10.APR.2012 10:55:18



Date: 10.APR.2012 10:59:59

**802.11n (40MHz) Mode**

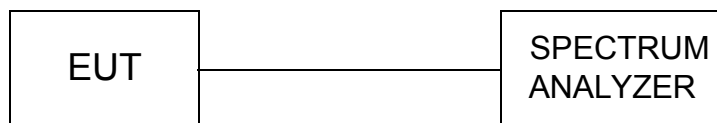
Date: 10.APR.2012 10:53:05



Date: 10.APR.2012 10:49:58

## 4.6. Spurious RF Conducted Emission

### TEST CONFIGURATION



### TEST PROCEDURE

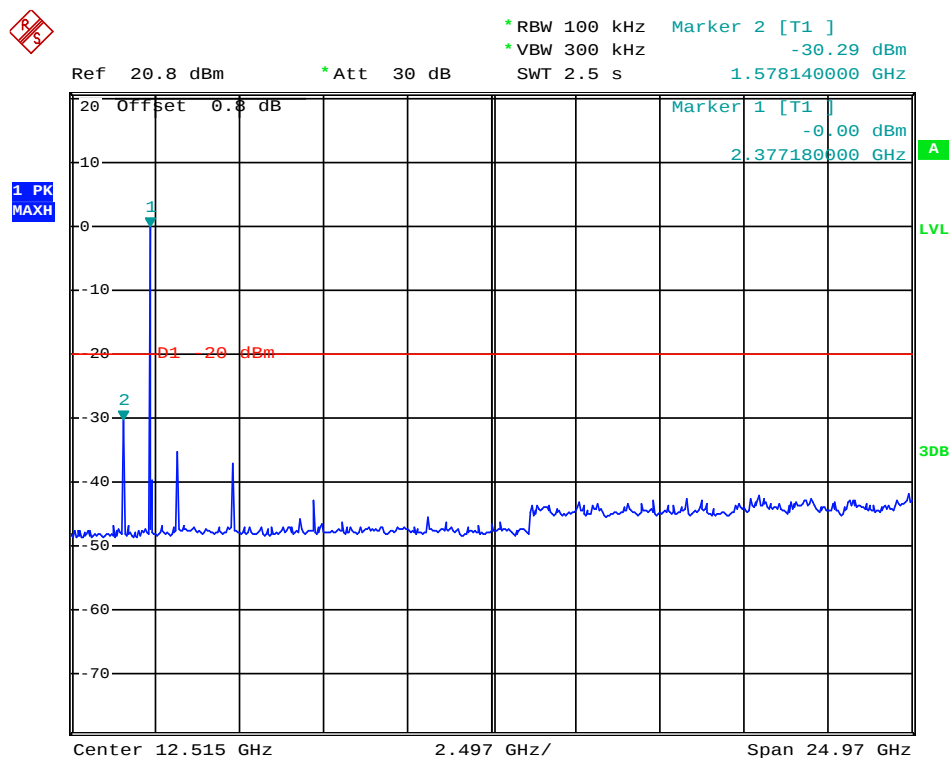
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBM= 300KHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

### LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

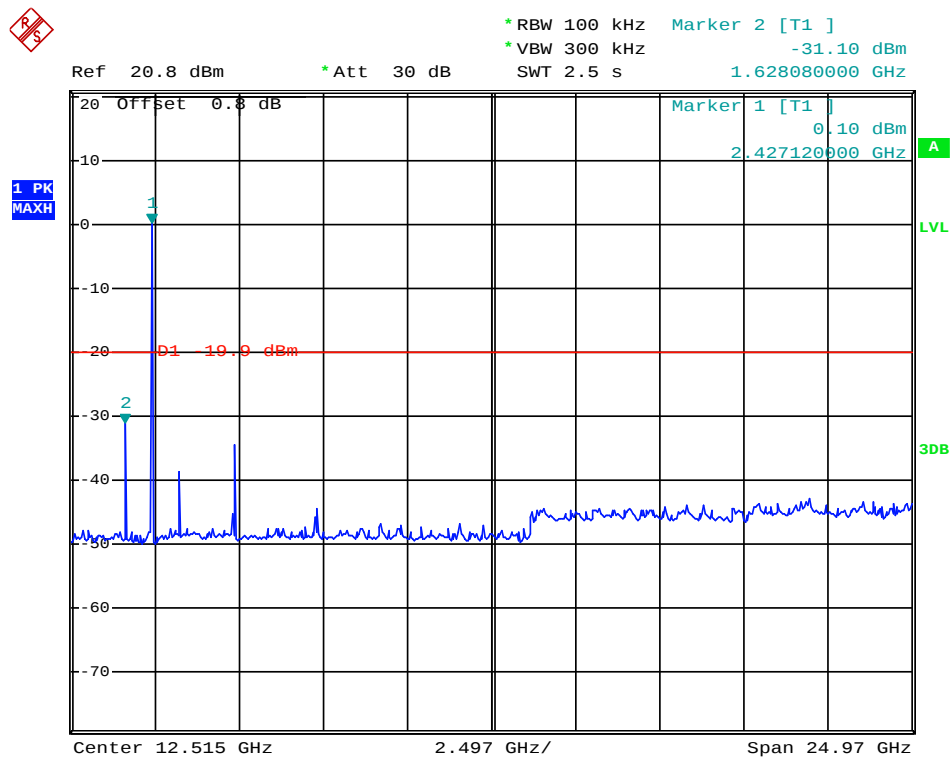
### TEST RESULTS

802.11b Mode channel 1



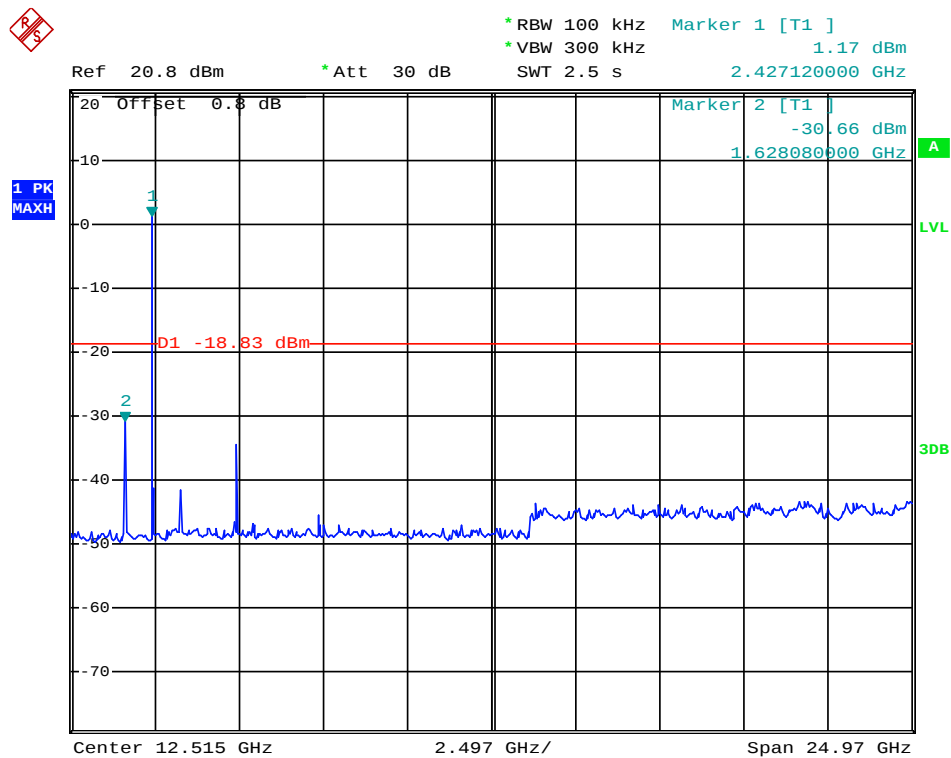
Date: 10.APR.2012 10:13:53

## 802.11b Mode channel 6



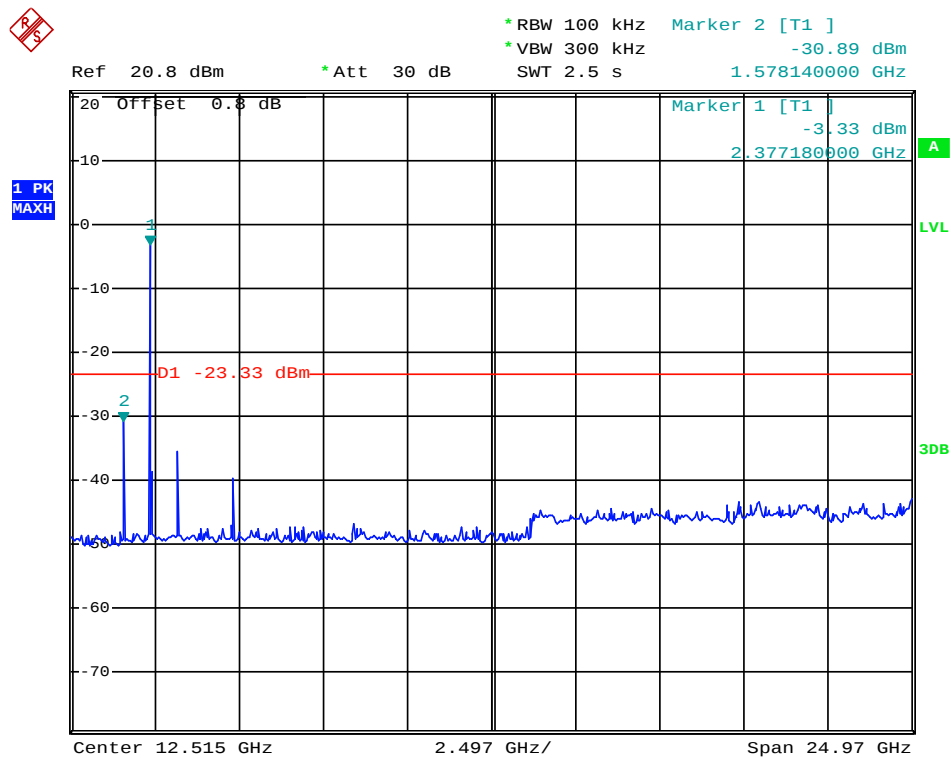
Date: 10.APR.2012 10:16:33

## 802.11b Mode channel 11



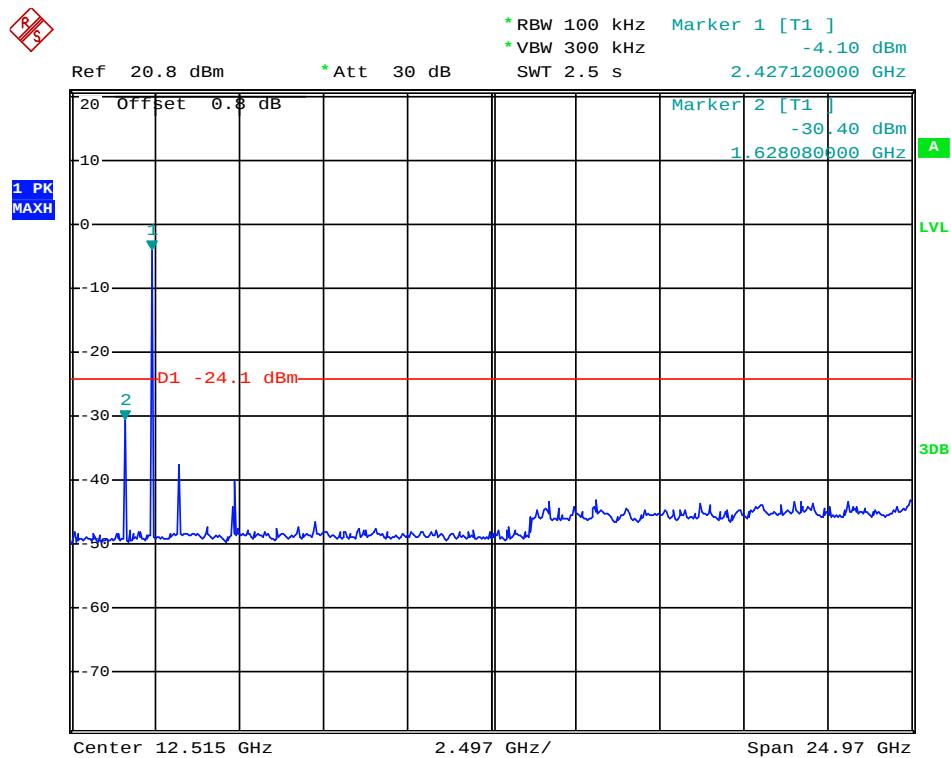
Date: 10.APR.2012 10:22:06

## 802.11g Mode channel 1



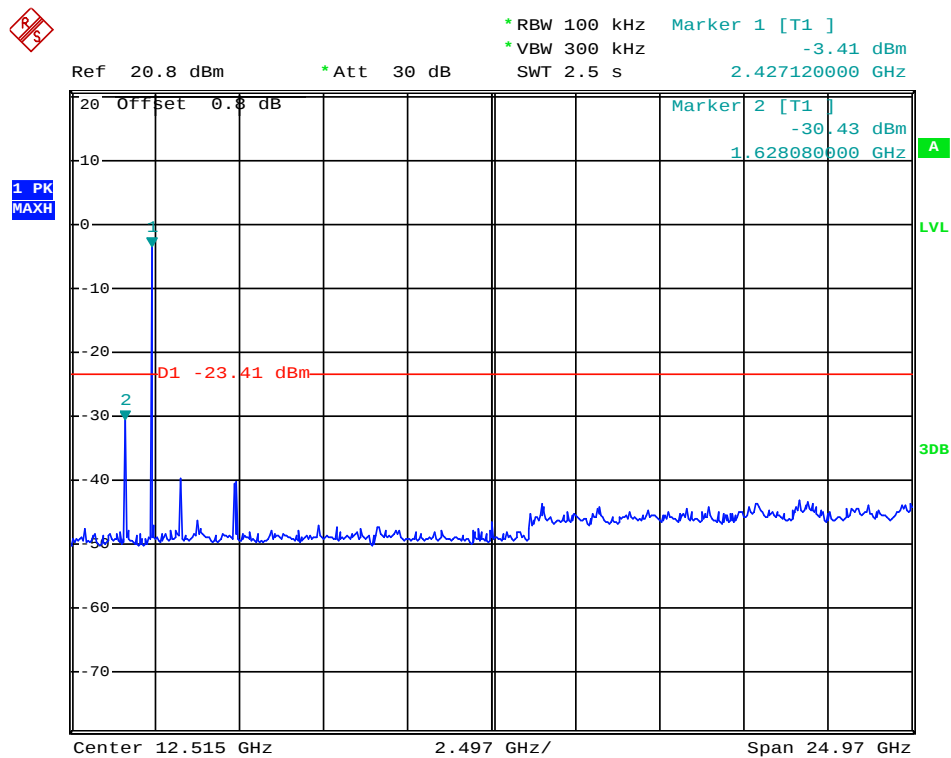
Date: 10.APR.2012 10:31:23

## 802.11g Mode channel 6



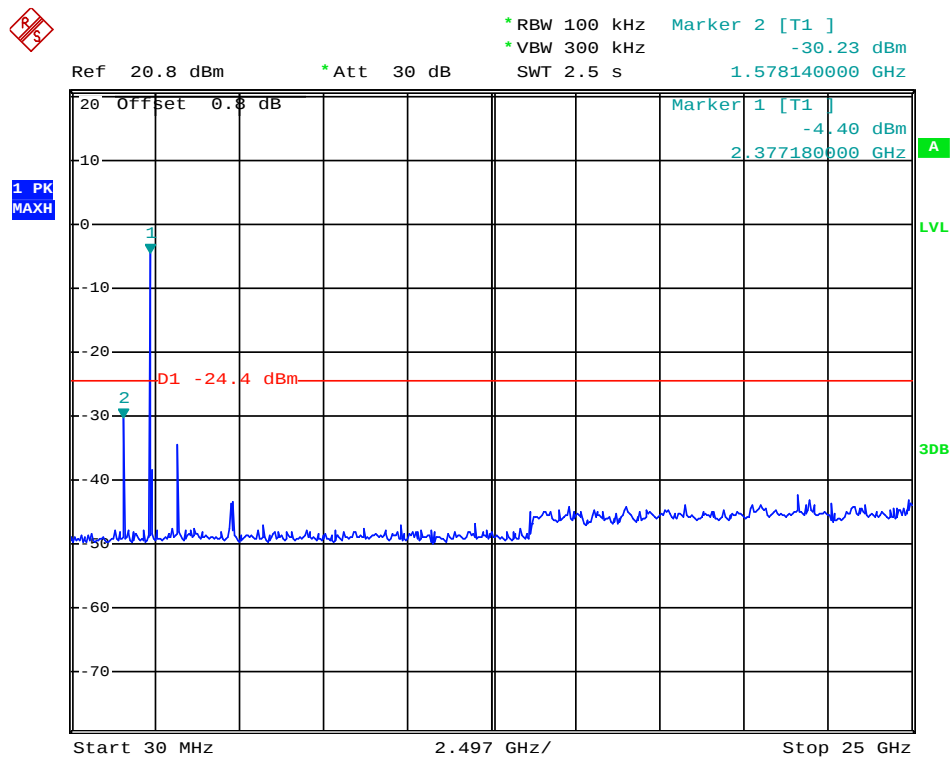
Date: 10.APR.2012 10:32:42

## 802.11g Mode channel 11



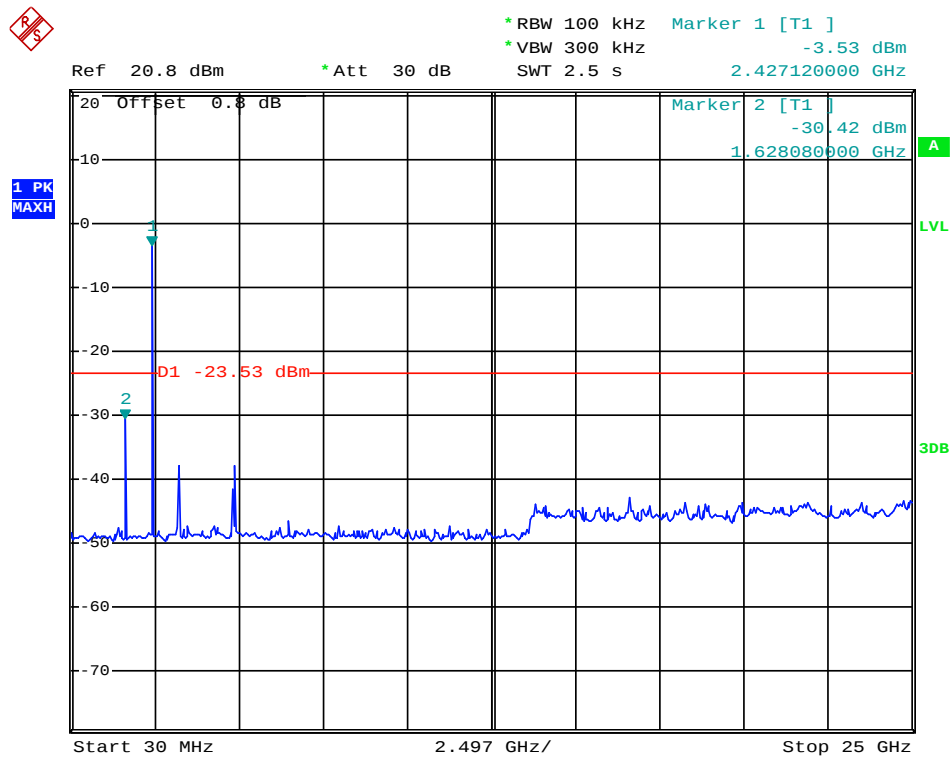
Date: 10.APR.2012 10:33:37

## 802.11n20 Mode channel 1



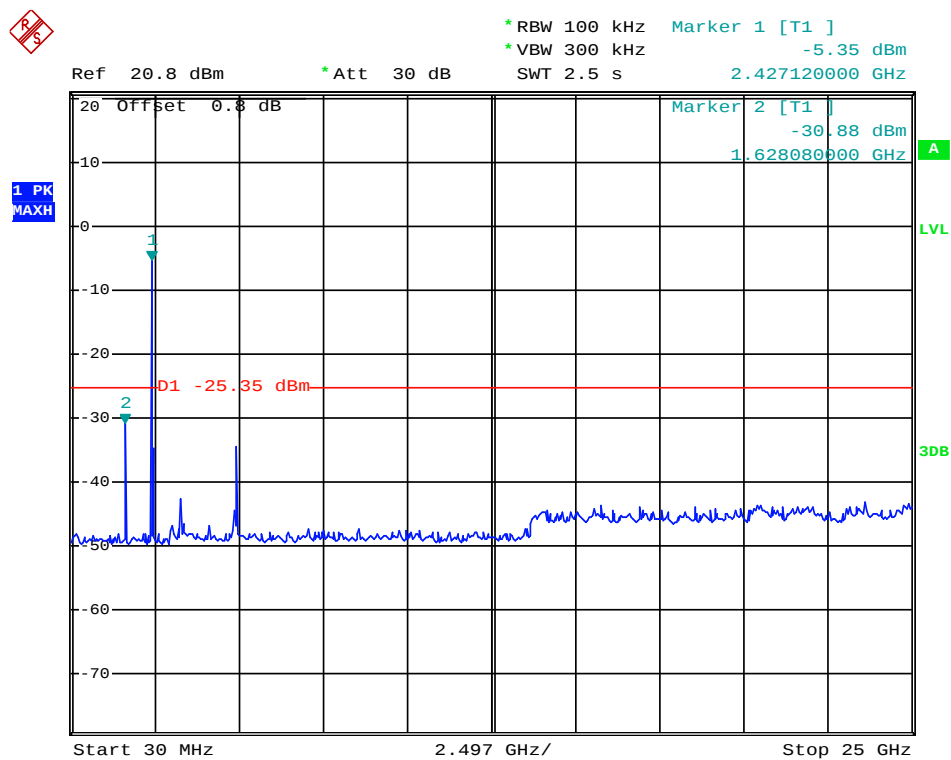
Date: 10.APR.2012 10:39:04

## 802.11n20 Mode channel 6



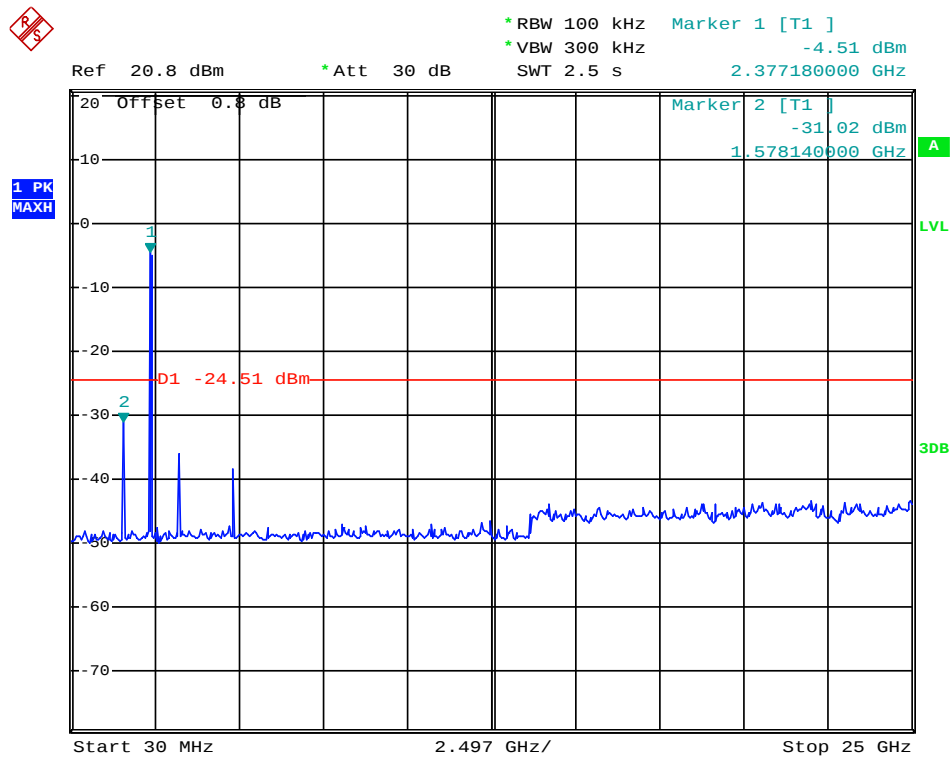
Date: 10.APR.2012 10:37:54

## 802.11n20 Mode channel 11



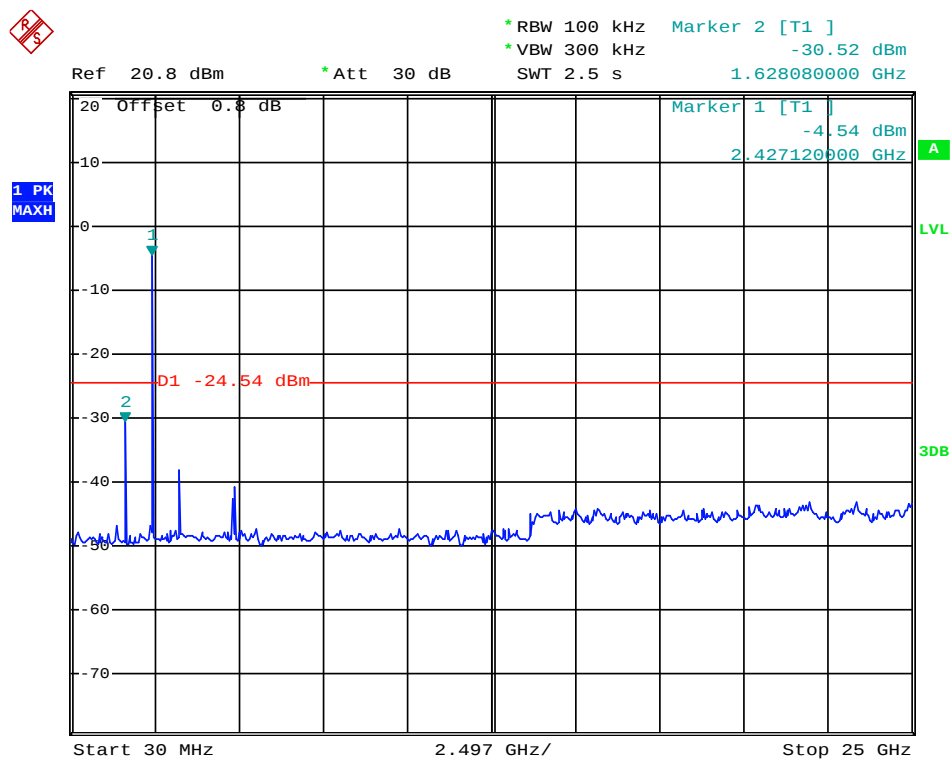
Date: 10.APR.2012 10:36:36

## 802.11n40 Mode channel 3



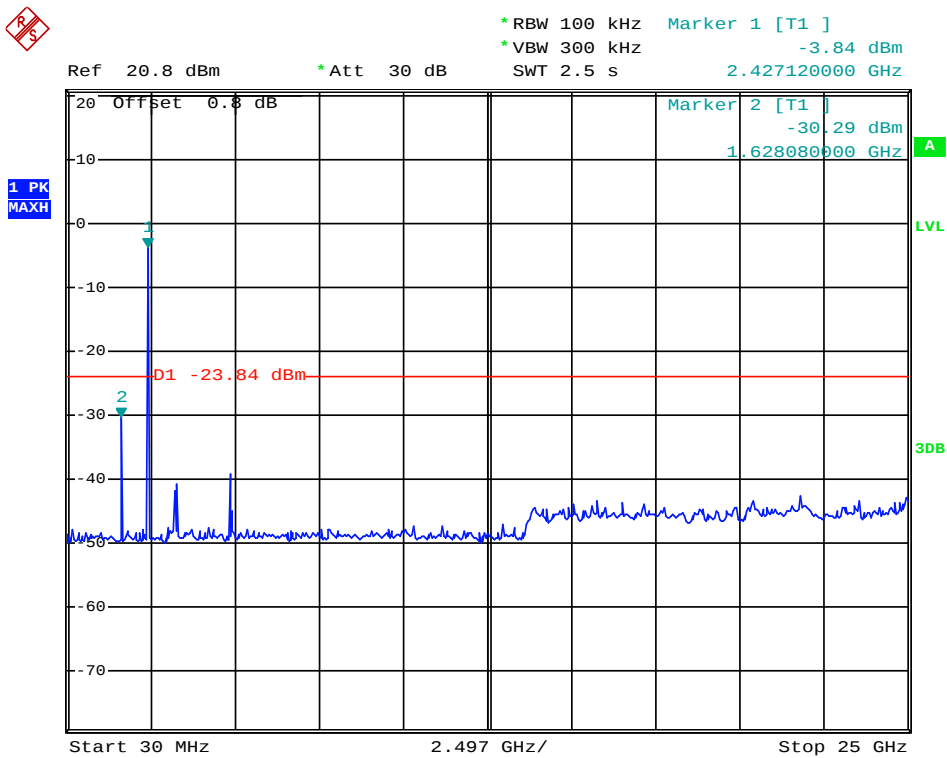
Date: 10.APR.2012 10:40:47

## 802.11n40 Mode channel 6



Date: 10.APR.2012 10:42:10

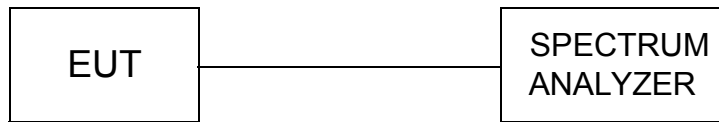
802.11n40 Mode channel 9



Date: 10.APR.2012 10:43:13

#### 4.7. 6dB Bandwidth

##### TEST CONFIGURATION



##### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300KHz VBW.

The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

##### LIMIT

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

##### TEST RESULTS

###### For 802.11b Mode

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 1       | 2412                    | 10.70                | 0.5                 | PASS      |
| 6       | 2437                    | 10.40                | 0.5                 | PASS      |
| 11      | 2462                    | 10.40                | 0.5                 | PASS      |

###### For 802.11g Mode

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 1       | 2412                    | 16.60                | 0.5                 | PASS      |
| 6       | 2437                    | 16.60                | 0.5                 | PASS      |
| 11      | 2462                    | 16.60                | 0.5                 | PASS      |

###### For 802.11n (20MHz) Mode

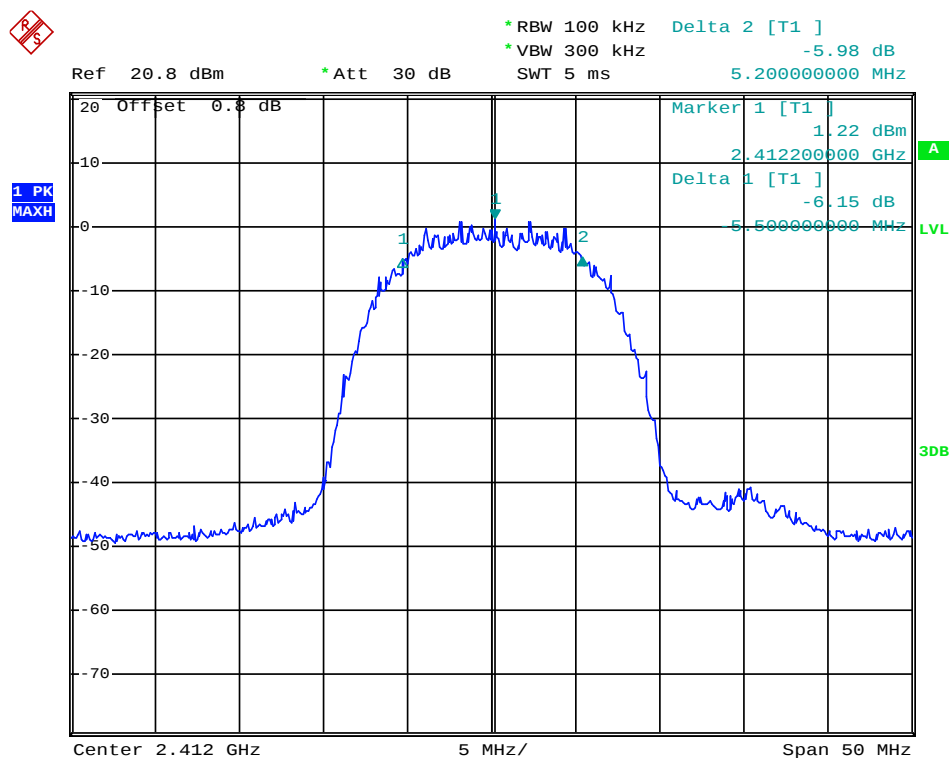
| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 1       | 2412                    | 17.80                | 0.5                 | PASS      |
| 6       | 2437                    | 17.80                | 0.5                 | PASS      |
| 11      | 2462                    | 17.70                | 0.5                 | PASS      |

###### For 802.11n (40MHz) Mode

| CHANNEL | CHANNEL FREQUENCY (MHz) | 6 dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS/FAIL |
|---------|-------------------------|----------------------|---------------------|-----------|
| 3       | 2422                    | 36.40                | 0.5                 | PASS      |
| 6       | 2437                    | 36.10                | 0.5                 | PASS      |
| 9       | 2452                    | 36.60                | 0.5                 | PASS      |

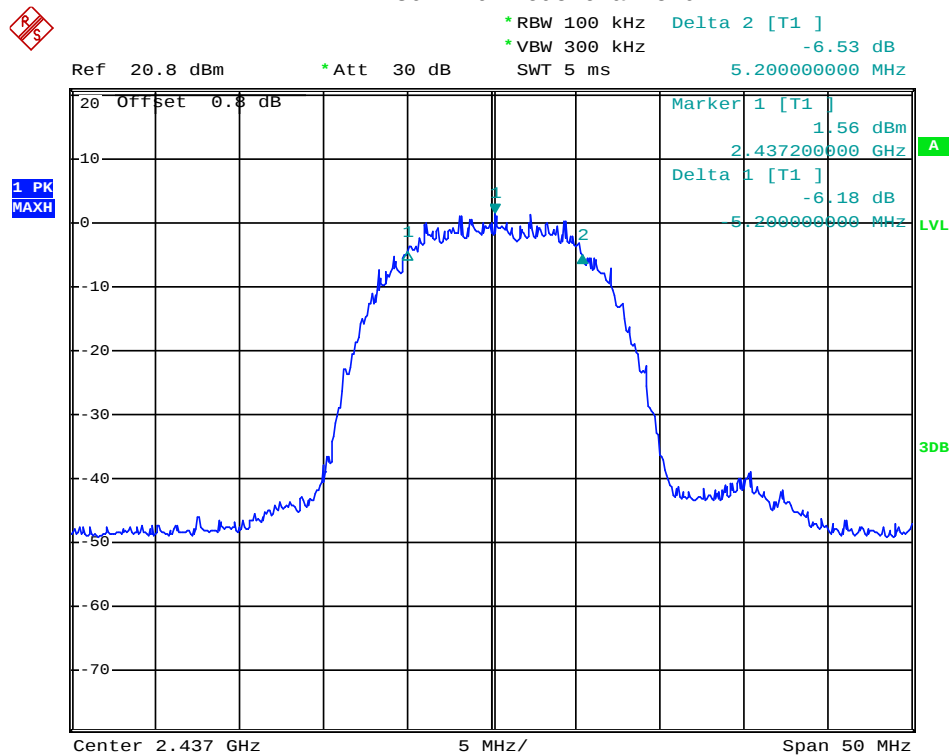
**Photos of 6dB Bandwidth Measurement**

802.11b Mode channel 1



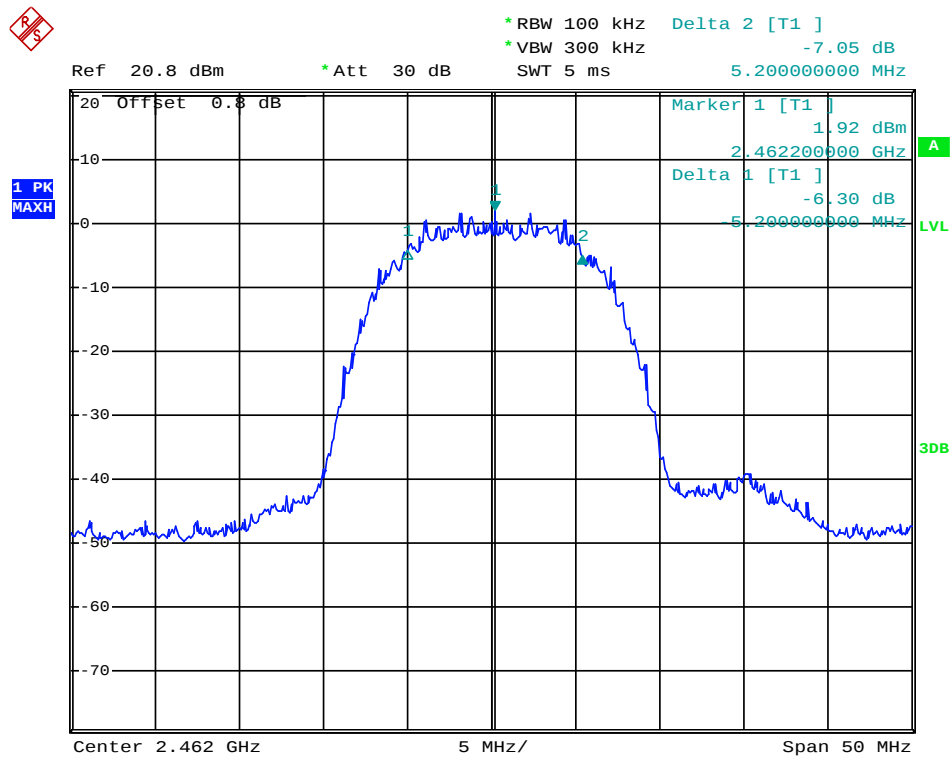
Date: 10.APR.2012 09:20:40

802.11b Mode channel 6



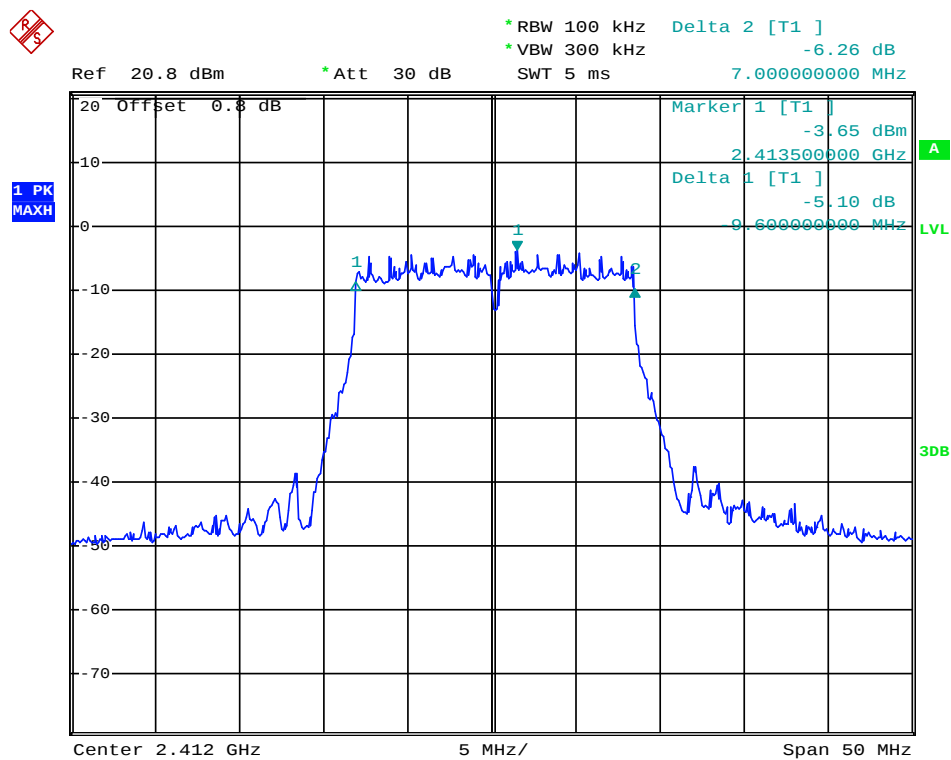
Date: 10.APR.2012 09:22:50

## 802.11b Mode channel 11



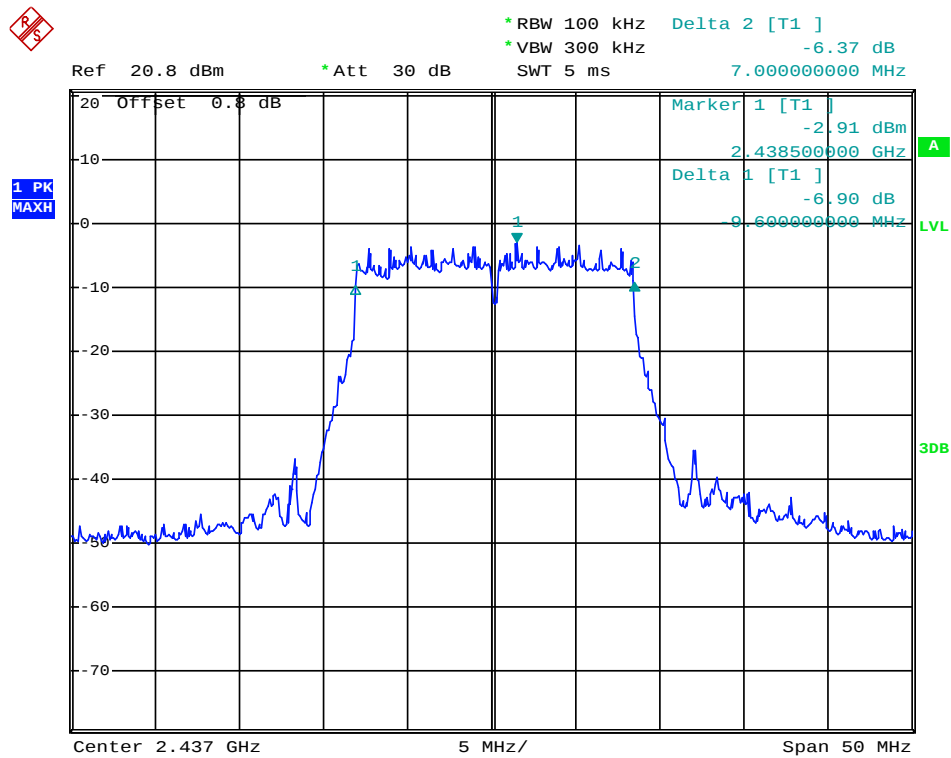
Date: 10.APR.2012 09:24:57

## 802.11g Mode channel 1



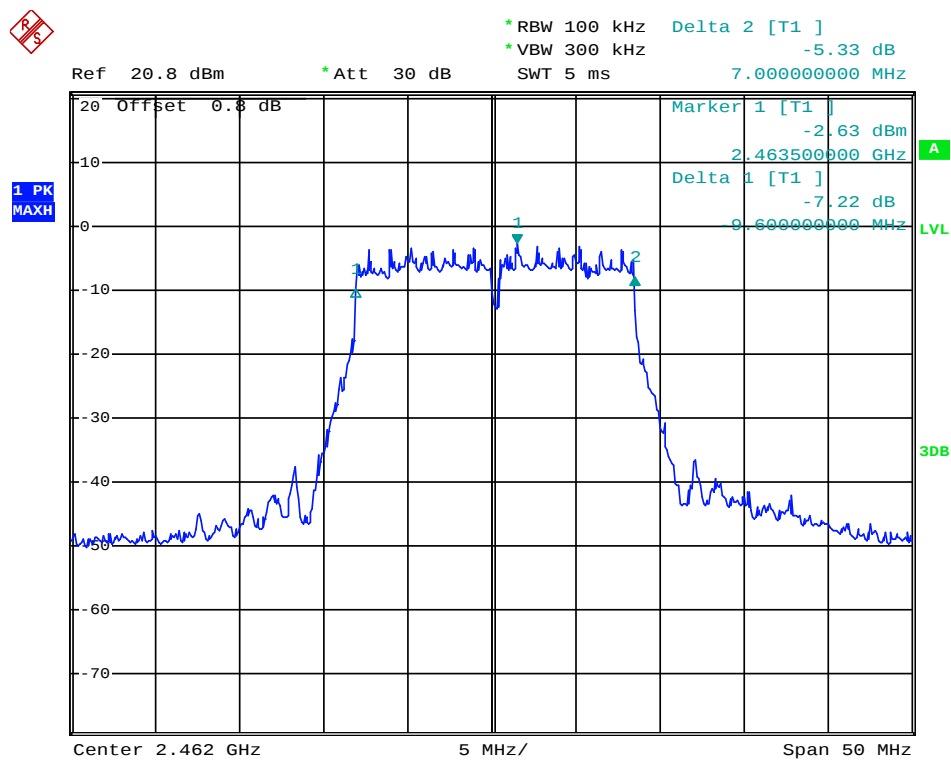
Date: 10.APR.2012 09:26:47

## 802.11g Mode channel 6



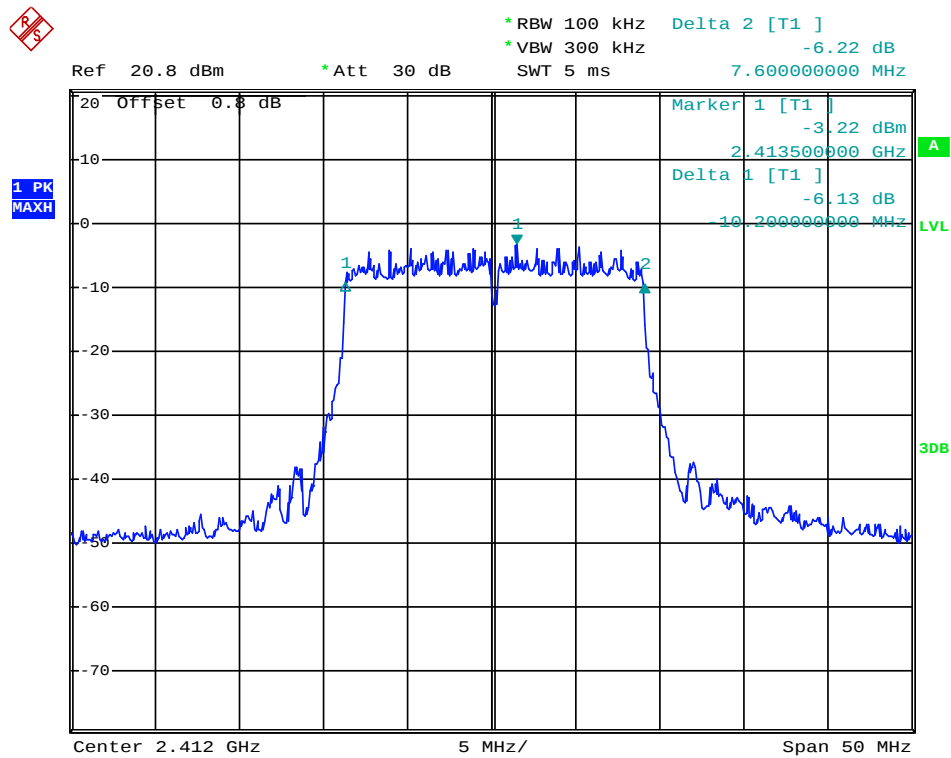
Date: 10.APR.2012 09:30:42

## 802.11g Mode channel 11



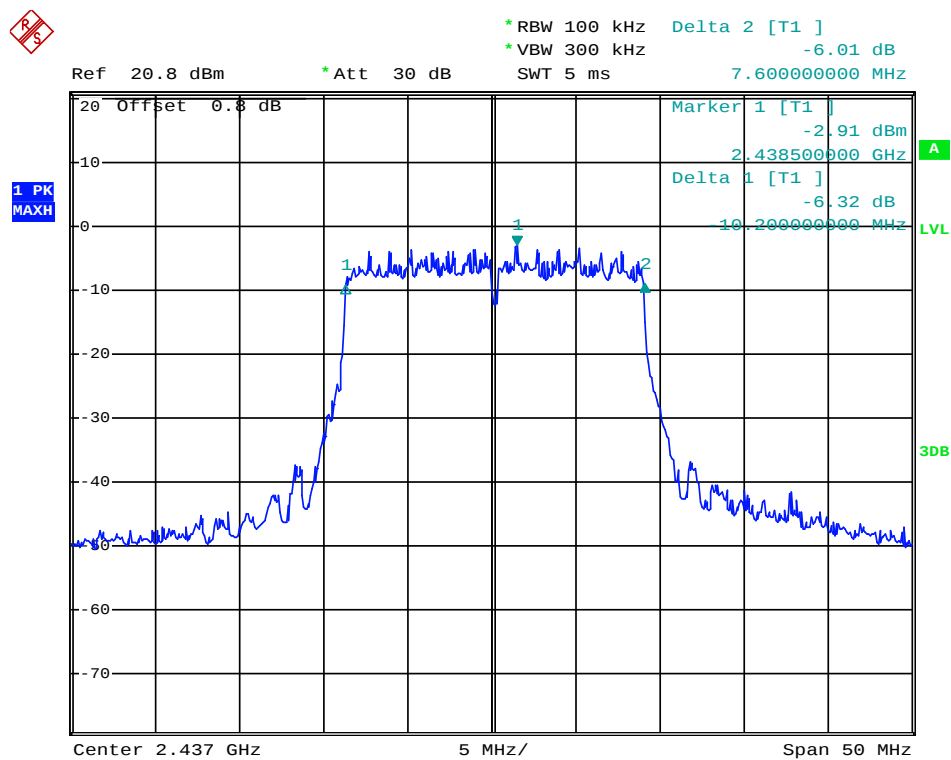
Date: 10.APR.2012 09:32:01

## 802.11n20 Mode channel 1



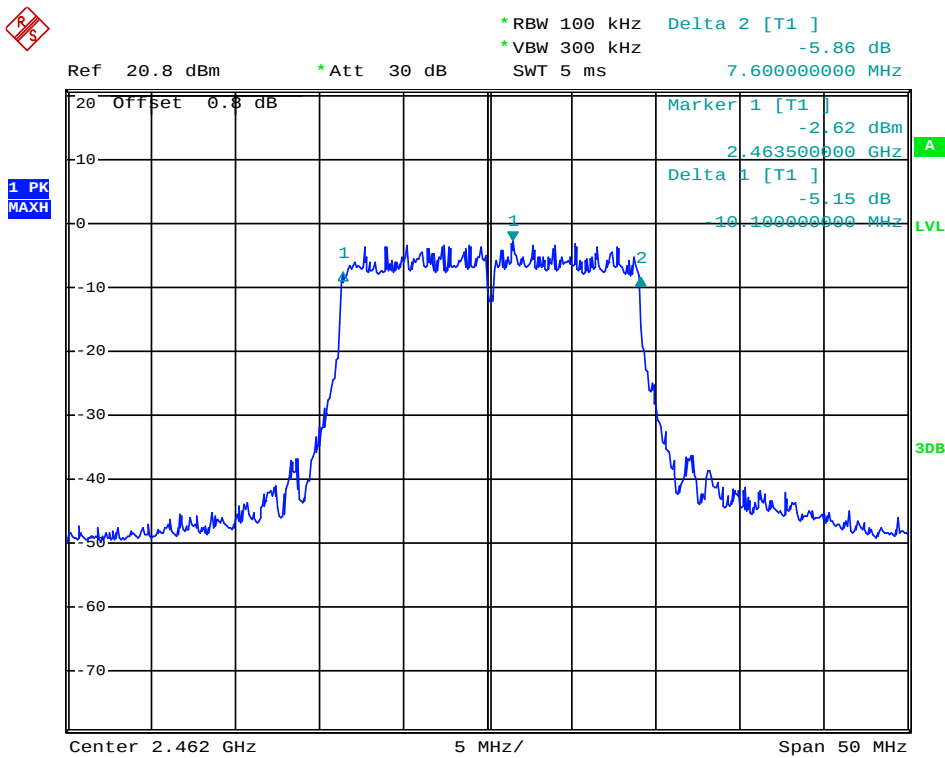
Date: 10.APR.2012 09:42:11

## 802.11n20 Mode channel 6



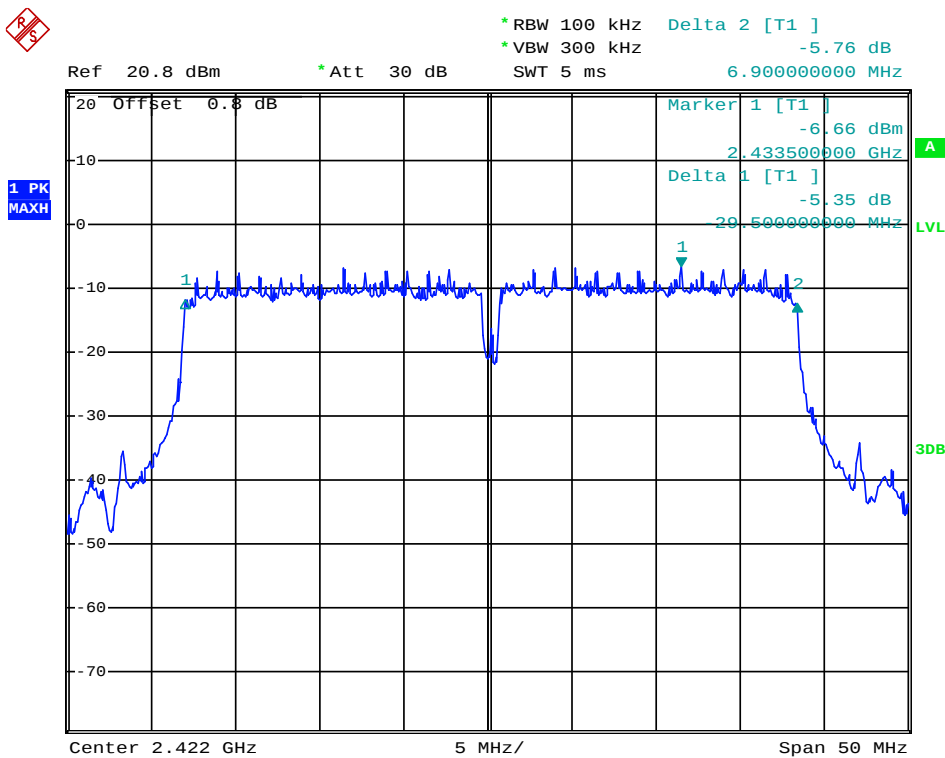
Date: 10.APR.2012 09:43:12

802.11n20 Mode channel 11



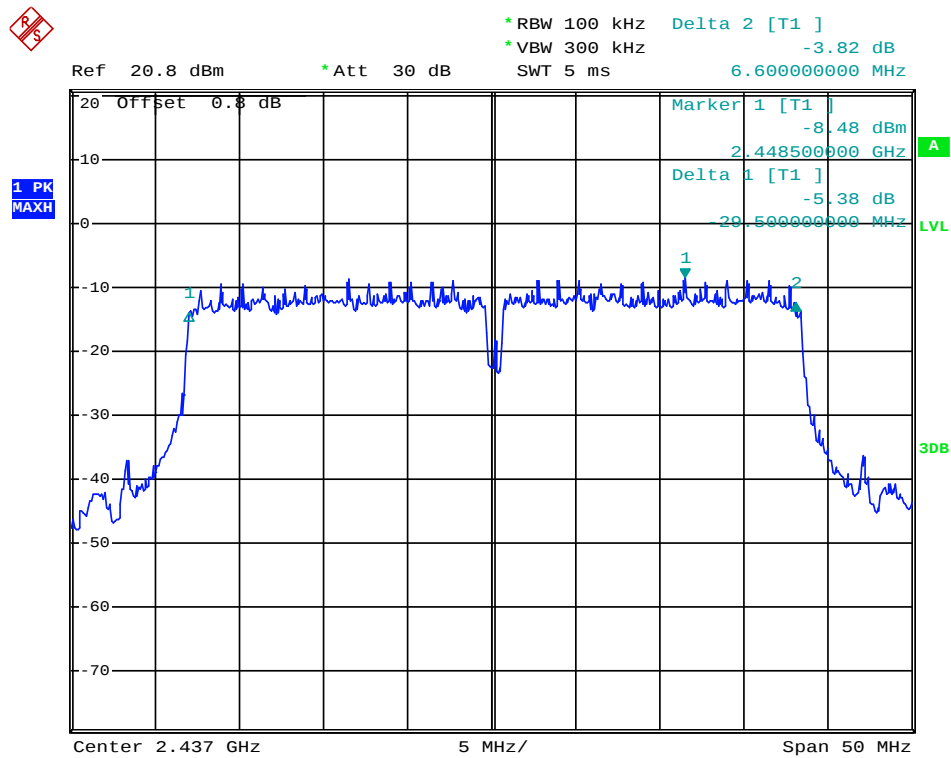
Date: 10.APR.2012 09:44:18

802.11n40 Mode channel 3



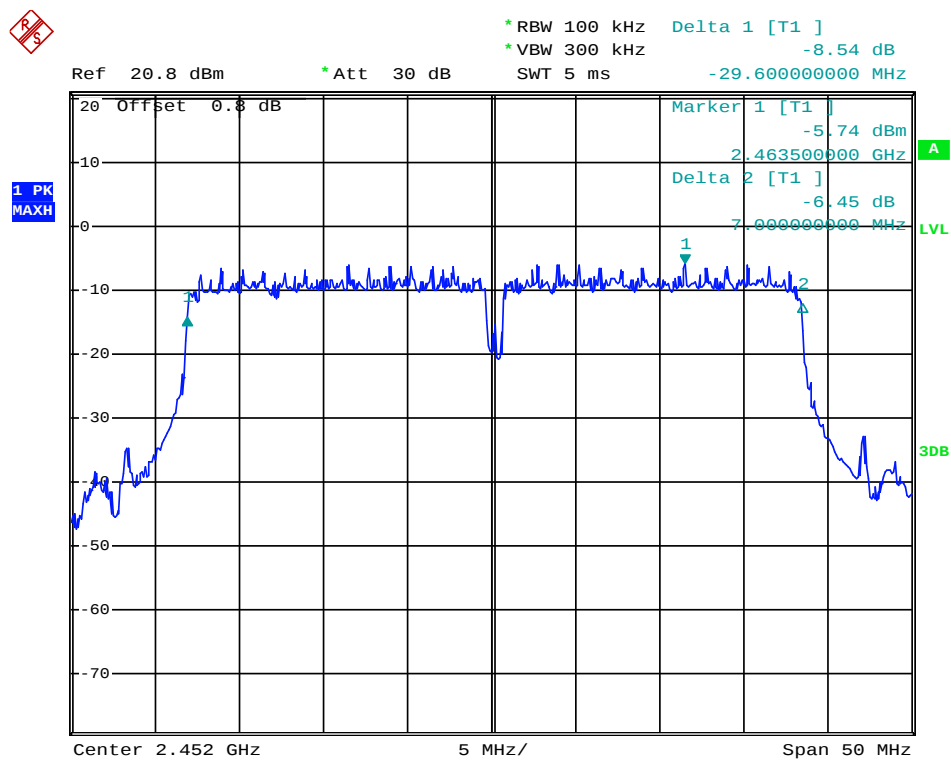
Date: 10.APR.2012 09:46:53

## 802.11n40 Mode channel 6



Date: 10.APR.2012 09:48:38

## 802.11n40 Mode channel 9



Date: 10.APR.2012 09:53:26

## 4.8. Antenna Requirement

### Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

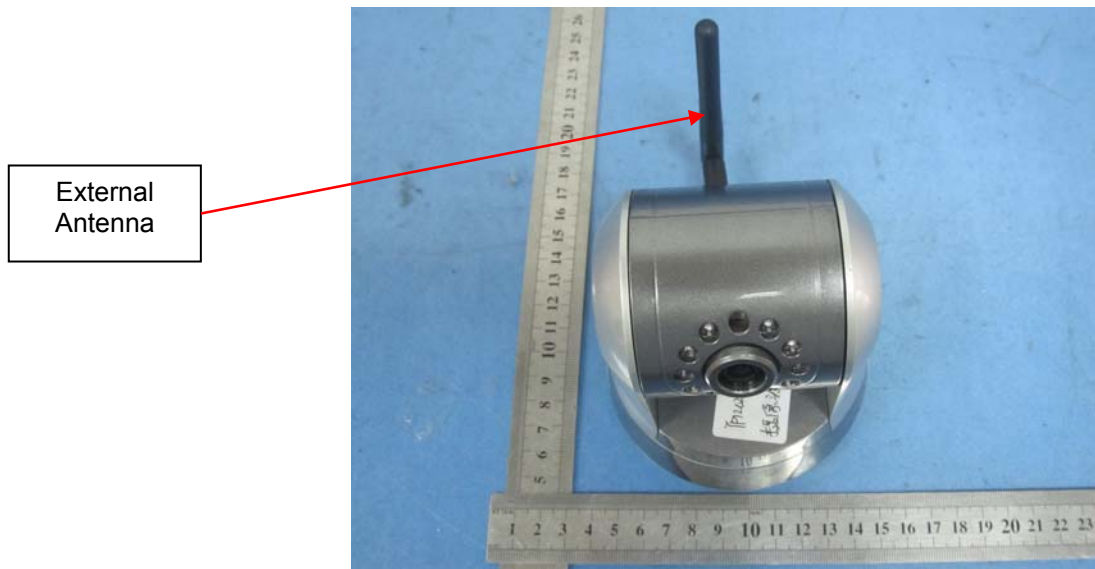
And according to FCC 47 CFR Section 15.247 (c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### Antenna Connected Construction

The Gain of the antenna is 2.0dBi. Antenna model is SF-2.4G-SMAG.



## **5. Test Setup Photos of the EUT**





## 6. External and Internal Photos of the EUT

### External Photos



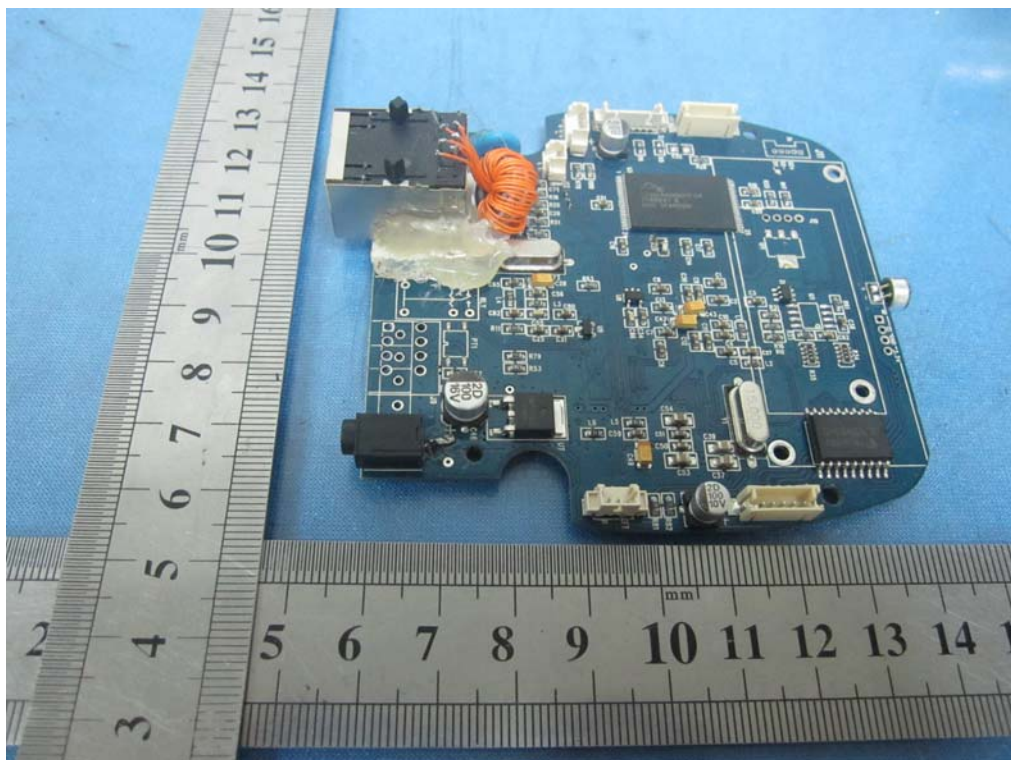
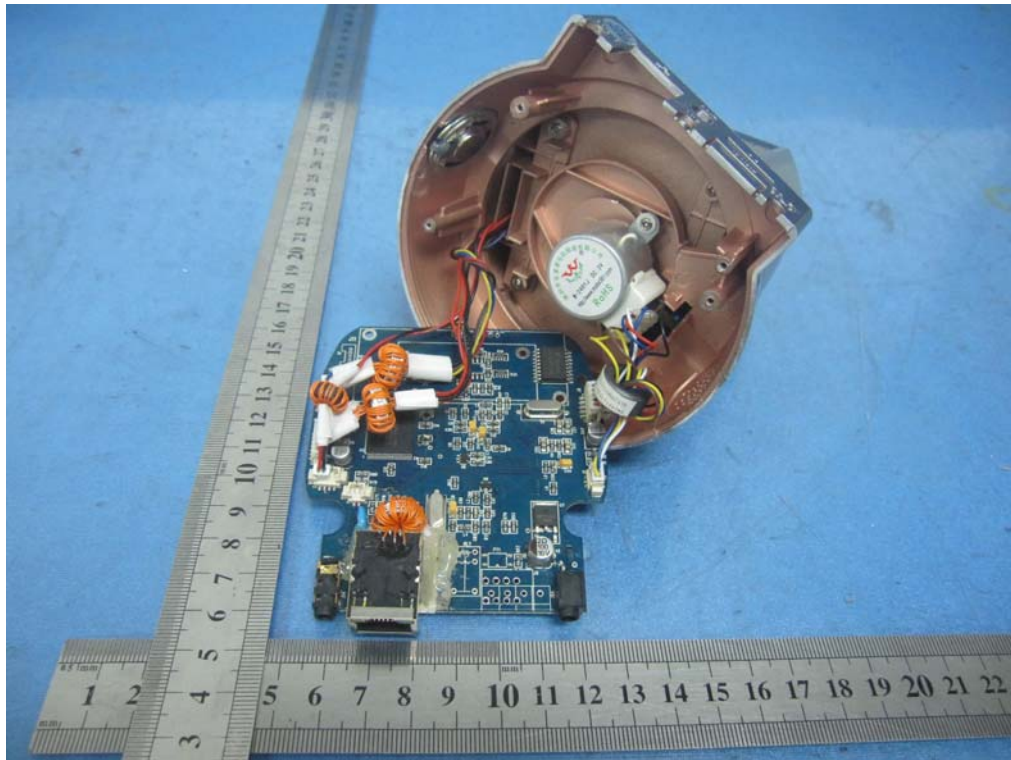


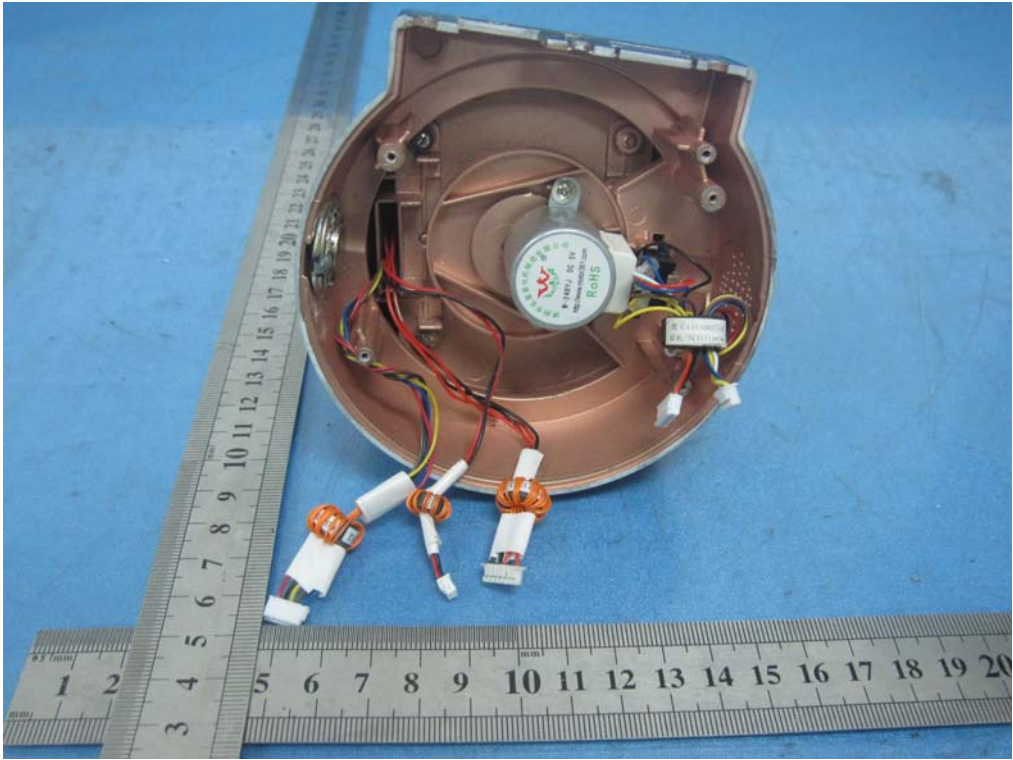
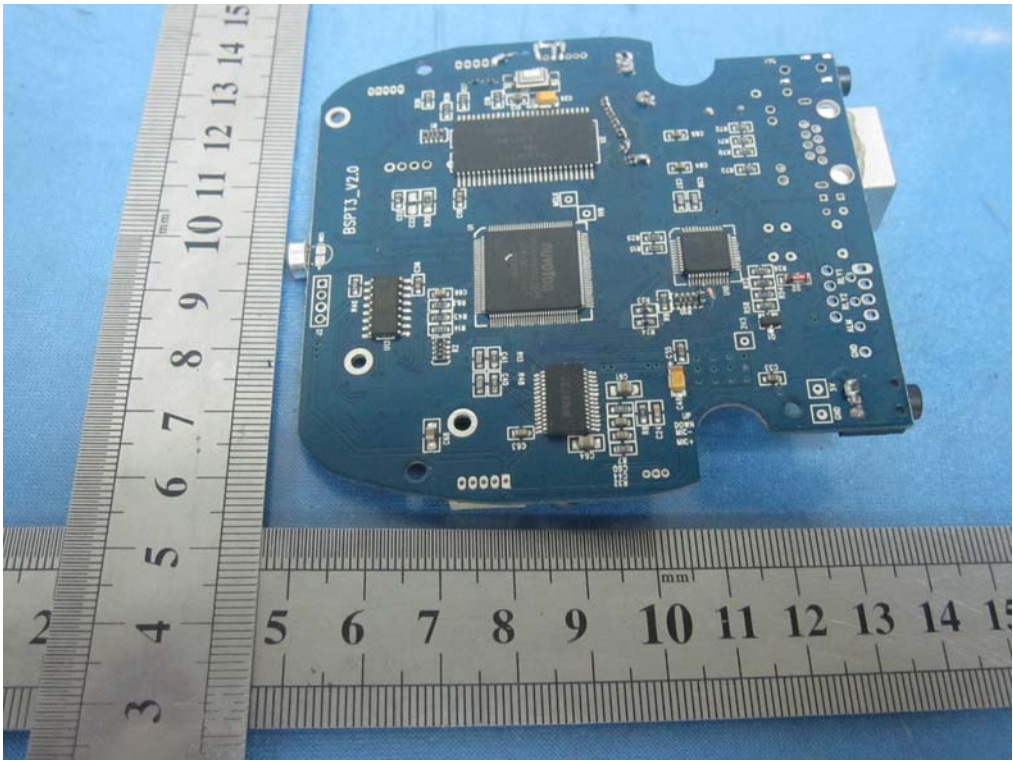


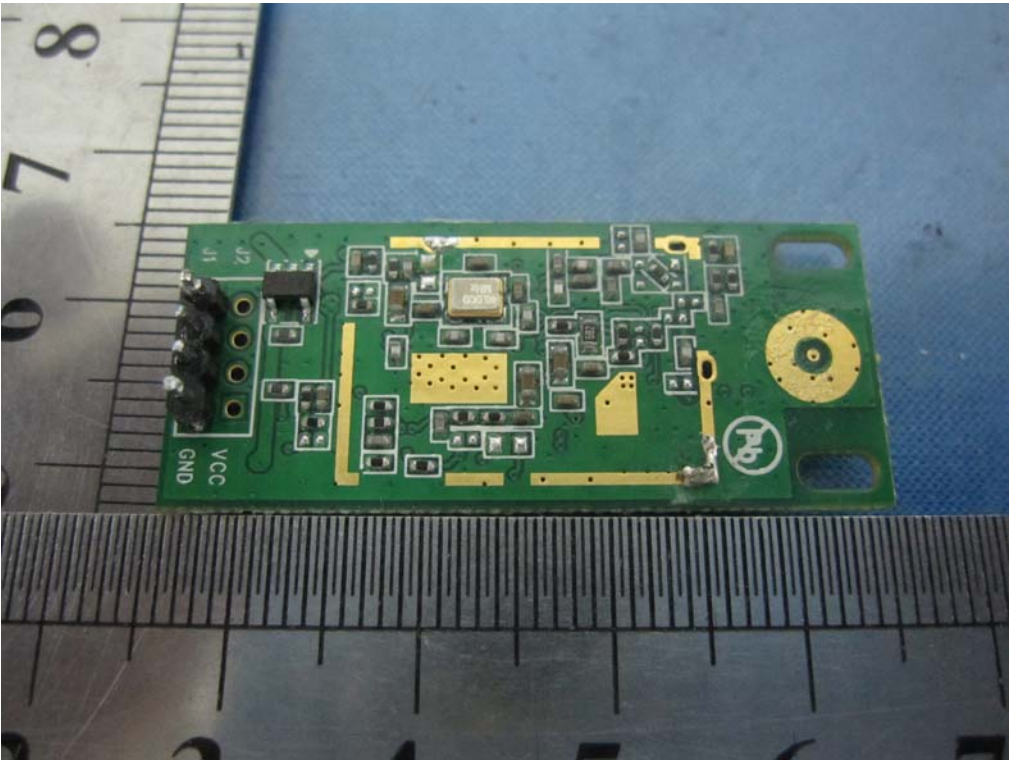
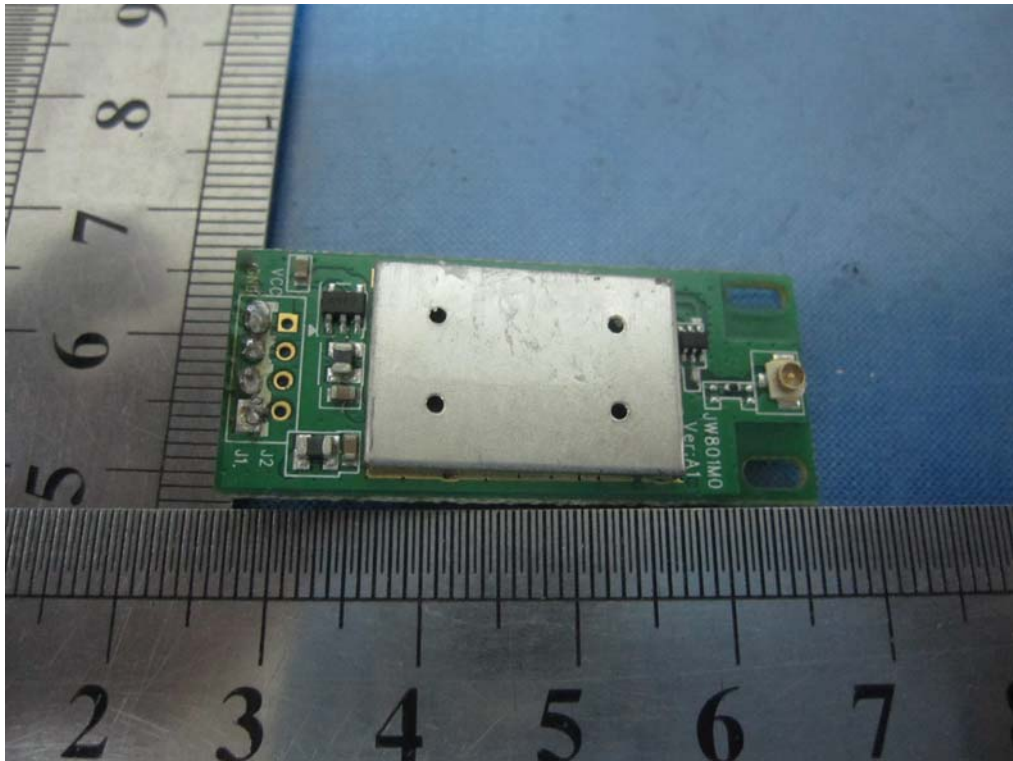


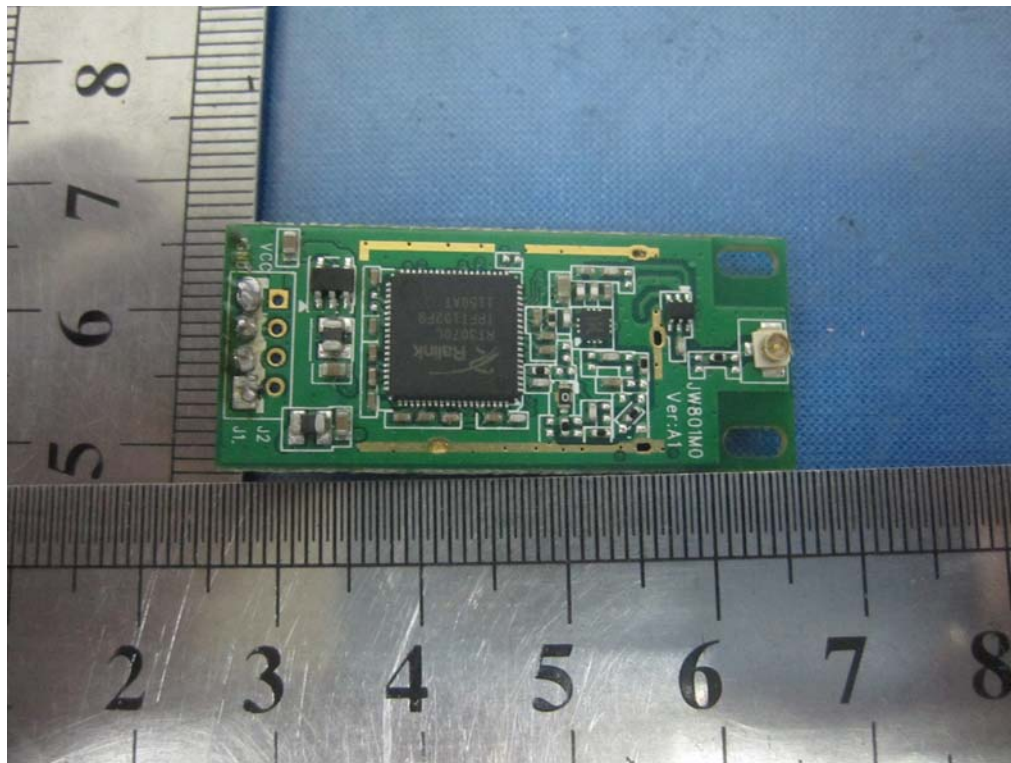


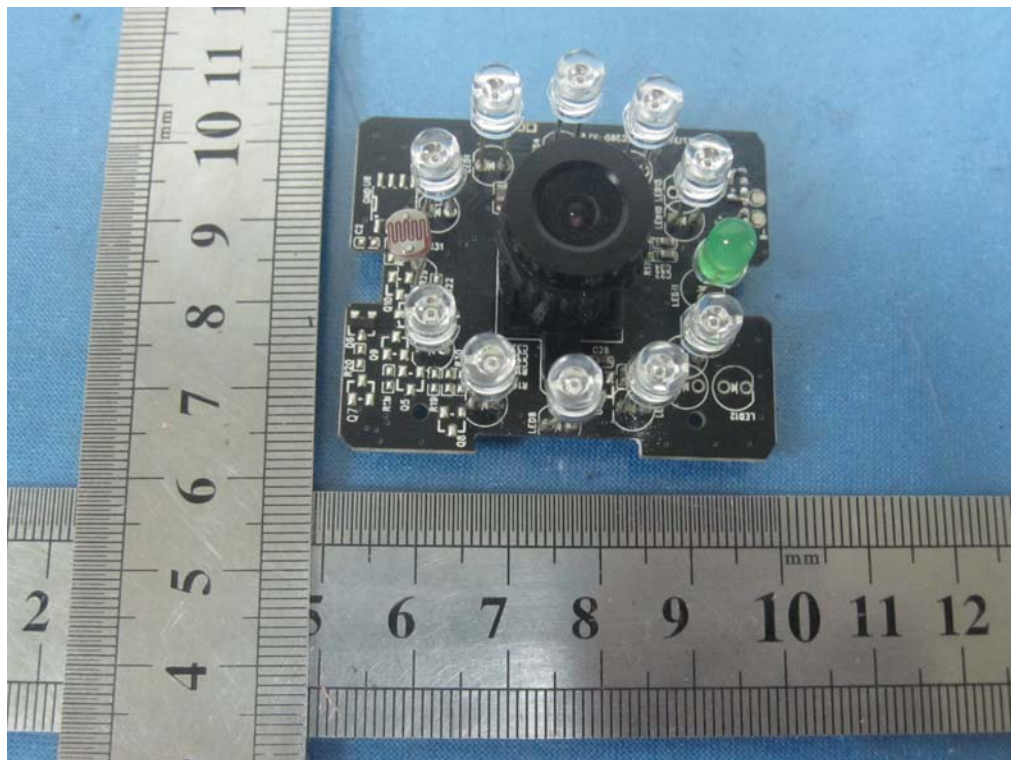
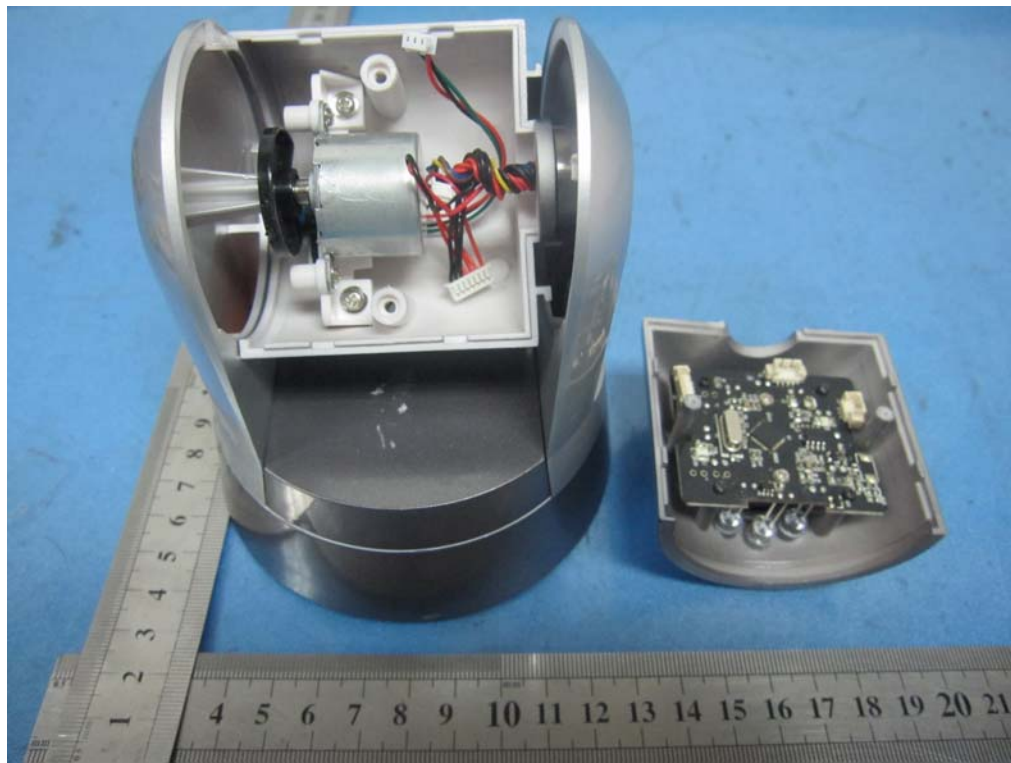
Internal Photos

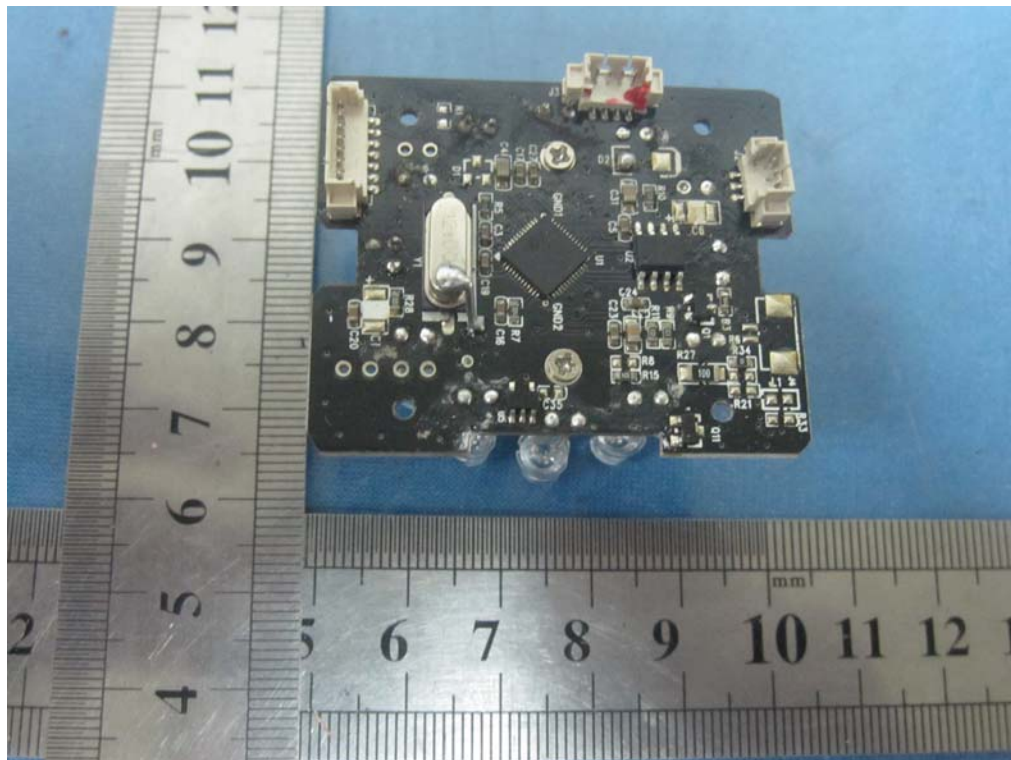












.....End of Report.....