Test Lab
Cert 2951.01

# TEST REPORT

| | |
|---|---|
| Applicant | NETGEAR, Inc. |
| Address | 350 East Plumeria Drive San Jose, CA 95134 |

| | |
|---|---|
| Manufacturer or Supplier | NETGEAR, Inc. |
| Address | 350 East Plumeria Drive San Jose, CA 95134 |
| Product | ADSL2+ Modem Router |
| Brand Name | NETGEAR |
| Model | D2200D-1FRNAS |
| Additional Model & Model Difference | N/A |
| Date of tests | Dec. 17, 2014 ~ Mar. 19, 2015 |

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

| Tested by Yuqiang Yin<br>Project Engineer / EMC Department | Approved by Glyn He<br>Supervisor / EMC Department |
|---|---|
| | Date: Mar. 19, 2015 |

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| RF141216N012 | Original release | Mar. 19, 2015 |

# 1. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) | | | |
|---|---|---|---|
| **STANDARD SECTION** | **TEST TYPE** | **RESULT** | **REMARK** |
| 15.207 | AC Power Conducted Emission | PASS | Meet the requirement of limit. Minimum passing margin is -10.9dB at 0.37656MHz. |
| 15.205 & 209 | Radiated Emissions | PASS | Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.5MHz. |
| 15.247(d) | Band Edge Measurement | PASS | Meet the requirement of limit. |
| 15.247(d) | Conducted Out Of Band Emission Measurement | PASS | Meet the requirement of limit. |
| 15.247(a)(2) | 6dB bandwidth | PASS | Meet the requirement of limit. |
| 15.247(b) | Conducted output power | PASS | Meet the requirement of limit. |
| 15.247(e) | Power Spectral Density | PASS | Meet the requirement of limit. |
| 15.203 | Antenna Requirement | PASS | No antenna connector is used |

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT | FREQUENCY | UNCERTAINTY |
|---|---|---|
| Conducted emissions | 9kHz~30MHz | 2.66dB |
| Radiated emissions | 9KHz ~ 30MHz | 2.74dB |
| | 30MHz ~ 1GMHz | 3.55dB |
| | 1GHz ~ 18GHz | 4.84dB |
| | 18GHz ~ 40GHz | 4.84dB |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

.

# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **EUT** | ADSL2+ Modem Router |
| **MODEL NO.** | D2200D-1FRNAS |
| **FCC ID** | PY314400297 |
| **POWER SUPPLY** | DC 12V by Adapter |
| **MODULATION TYPE** | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM |
| **MODULATION TECHNOLOGY** | DSSS, OFDM |
| **TRANSFER RATE** | 802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps<br>802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 300.0Mbps |
| **OPERATING FREQUENCY** | 2412-2462MHz for 11b/g/n(20MHz)<br>2422-2452MHz for 11n(40MHz) |
| **NUMBER OF CHANNEL** | 11 for 802.11b/g/n (20MHz)<br>7 for 802.11n (40MHz) |
| **AVG. OUTPUT POWER** | 402.717mW |
| **ANTENNA TYPE** | PCB antenna with 1.5dBi gain |
| **DATA CABLE** | 0.9m non-shielded RJ45 cable without core |
| **I/O PORTS** | Refer to user's manual |
| **ACCESSORY DEVICES** | Adapter |

**NOTE:**

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

| MODULATION MODE | TX FUNCTION |
|---|---|
| **802.11b** | 2TX |
| **802.11g** | 2TX |
| **802.11n (20MHz)** | 2TX |
| **802.11n (40MHz)** | 2TX |

2. The EUT consumes power from the following adapter.

| | |
|---|---|
| **Brand** | NETGEAR |
| **Model** | AD2015F23 |
| **Input Power** | AC100-240V~ 50/60Hz Max.0.15A |
| **Output Power** | DC12V, 0.5A |
| **Power Line** | 1.8m/Unshielded, Non-detachable, without core |

| | |
|---|---|
| **Brand** | NETGEAR |
| **Model** | 2AAJ012F 1 NA |
| **Input Power** | AC100-120V~ 50/60Hz Max.0.35A |
| **Output Power** | DC12V, 1.0A |
| **Power Line** | 1.8m/Unshielded, Non-detachable, without core |

EUT had been tested with all of adapter model, and only the worst case was shown in this test report, then the worst case model: 2AAJ012F 1 NA

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

## 2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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

7 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---|---|---|---|
| 3 | 2422MHz | 7 | 2442MHz |
| 4 | 2427MHz | 8 | 2447MHz |
| 5 | 2432MHz | 9 | 2452MHz |
| 6 | 2437MHz | | |

### 2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO | | | | DESCRIPTION |
|---|---|---|---|---|---|
| | RE≥1G | RE<1G | PLC | APCM | |
| A | √ | √ | √ | √ | Powered by adapter+ WIFI link |

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
**PLC:** Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

**NOTE:**
"-" means no effect.

## RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|
| A | 802.11b | 1 to 11 | 1, 6, 11 | DSSS | DBPSK | 1.0 |
| A | 802.11g | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.0 |
| A | 802.11n (20MHz) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 |
| A | 802.11n (40MHz) | 3 to 9 | 3, 6, 9 | OFDM | BPSK | 13.5 |

## RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|
| A | 802.11b | 1 to 11 | 1 | DSSS | DBPSK | 1.0 |

## POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|
| A | 802.11b | 1 to 11 | 1 | OFDM | BPSK | 6.0 |

## BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|
| A | 802.11b | 1 to 11 | 1, 11 | DSSS | DBPSK | 1.0 |
| A | 802.11g | 1 to 11 | 1, 11 | OFDM | BPSK | 6.0 |
| A | 802.11n (20MHz) | 1 to 11 | 1, 11 | OFDM | BPSK | 6.5 |
| A | 802.11n (40MHz) | 3 to 9 | 3, 9 | OFDM | BPSK | 13.5 |

## ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|---|---|---|---|---|---|---|
| A | 802.11b | 1 to 11 | 1, 6, 11 | DSSS | DBPSK | 1.0 |
| A | 802.11g | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.0 |
| A | 802.11n (20MHz) | 1 to 11 | 1, 6, 11 | OFDM | BPSK | 6.5 |
| A | 802.11n (40MHz) | 3 to 9 | 3, 6, 9 | OFDM | BPSK | 13.5 |

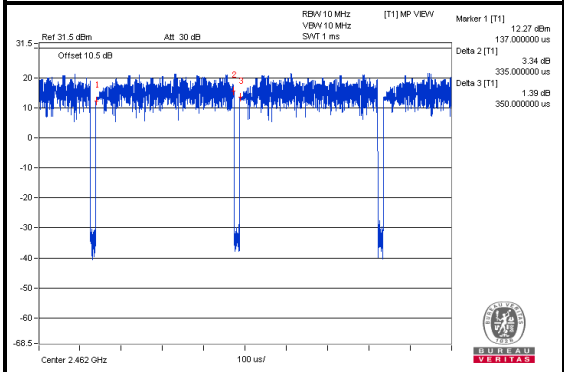
## TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER | TESTED BY |
|---|---|---|---|
| RE≥1G | 20deg. C, 51%RH | DC 12V by Adapter | Sen He |
| RE<1G | 20deg. C, 51%RH | DC 12V by Adapter | Sen He |
| PLC | 20deg. C, 51%RH | DC 12V by Adapter | Sen He |
| APCM | 20deg. C, 60%RH | DC12V by Adapter | Yuqiang Yin |

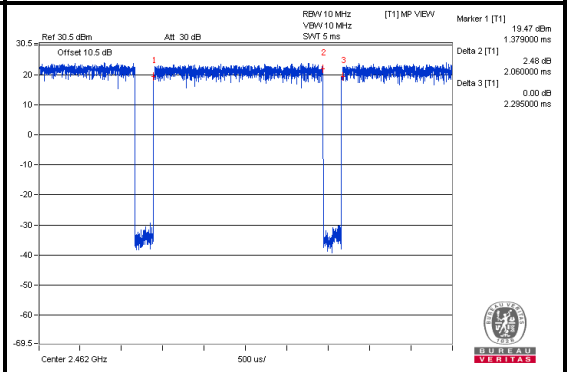
## 2.3 DUTY CYCLE OF TEST SIGNAL

**802.11b:** Duty cycle = 0.335/0.350 = 0.957, Duty factor = 10 * log( 1/0.957) = 0.19
**802.11g:** Duty cycle = 2.060/2.295 = 0.898, Duty factor = 10 * log( 1/0.898) = 0.47
**802.11n (20MHz):** Duty cycle = 1.919/2.139 = 0.897, Duty factor = 10 * log( 1/0.897) = 0.47
**802.11n (40MHz):** Duty cycle = 0.930/1.040 = 0.894, Duty factor = 10 * log( 1/0.894) = 0.49

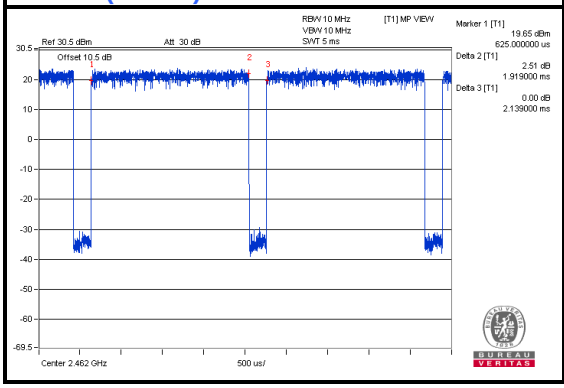
**802.11b**



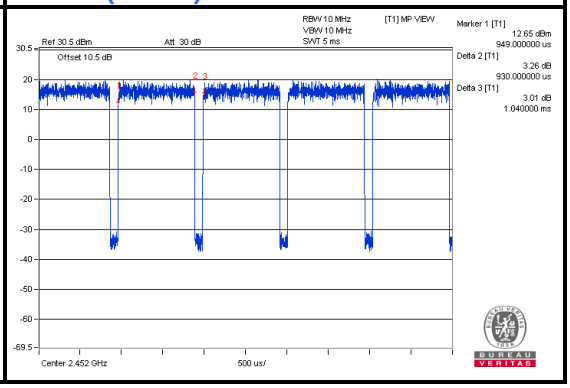

**802.11g**




**802.11n (20MHz)**




**802.11n (40MHz)**



## 2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|---|---|---|---|---|---|
| 1 | Notebook | HP | 4431s | CNU238944Z | N/A |
| | | | | | |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|---|---|
| 1 | AC Cable: Unshielded, Detachable, 1.5m; DC Line: Unshielded, Detachable, 1.5m |
| | |

## 2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.247)**
**558074 D01 DTS Meas Guidance v03r02**
**662911 D01 Multiple Transmitter Output v02r01**
ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

# 3. TEST TYPES AND RESULTS

## 3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

### 3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

| FREQUENCIES (MHz) | FIELD STRENGTH (microvolts/meter) | MEASUREMENT DISTANCE (meters) |
|---|---|---|
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 |
| 1.705 ~ 30.0 | 30 | 30 |
| 30 ~ 88 | 100 | 3 |
| 88 ~ 216 | 150 | 3 |
| 216 ~ 960 | 200 | 3 |
| Above 960 | 500 | 3 |

**NOTE**:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

### 3.1.2 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | MY46180622 | Apr. 29,14 | Apr. 28,15 |
| EMI Test Receiver | Rohde&Schwarz | ESVS10 | 841431/004 | May 17,14 | May 16,15 |
| Loop antenna (9kHz~30MHz) | Daze | ZN30900A | 0708 | Dec. 05,14 | Dec. 04,15 |
| Bilog Antenna | Teseq | CBL 6111D | 30643 | Jul. 25, 14 | Jul. 24, 15 |
| Horn Antenna (1GHz -18GHz) | ETS -Lindgren | 3117 | 00062558 | May 30,14 | May 29,15 |
| Horn Antenna (15GHz-40GHz) | SCHWARZBECK | BBHA 9170 | BBHA9170242 | Feb. 13,15 | Feb. 12,16 |
| Pre-Amplifier (9kHz~1GHz) | SONOMA | 310D | 186955 | Mar. 05,14 | Mar. 04,15 |
| Signal Amplifier | Agilent | 8447D | 2944A10488 | Jun. 25,14 | Jun. 24,15 |
| Pre-Amplifier (100MHz-26.5GHz) | Agilent | 8449B | 3008A00409 | May 13,14 | May 12,15 |
| Pre-Amplifier (18GHz-40GHz) | EMCI | EMC 184045 | 980102 | Nov. 20,14 | Nov. 19,15 |
| 3m Semi-anechoic Chamber | ETS-LINDGREN | 9m*6m*6m | NSEMC003 | Apr. 19,14 | Apr. 18,15 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 27,14 | Oct. 26,15 |
| Test Software | ADT | ADT_Radiated_V7.6.15.9.2 | N/A | N/A | N/A |

**NOTE:**

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The FCC Site Registration No. is 494399.

### 3.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

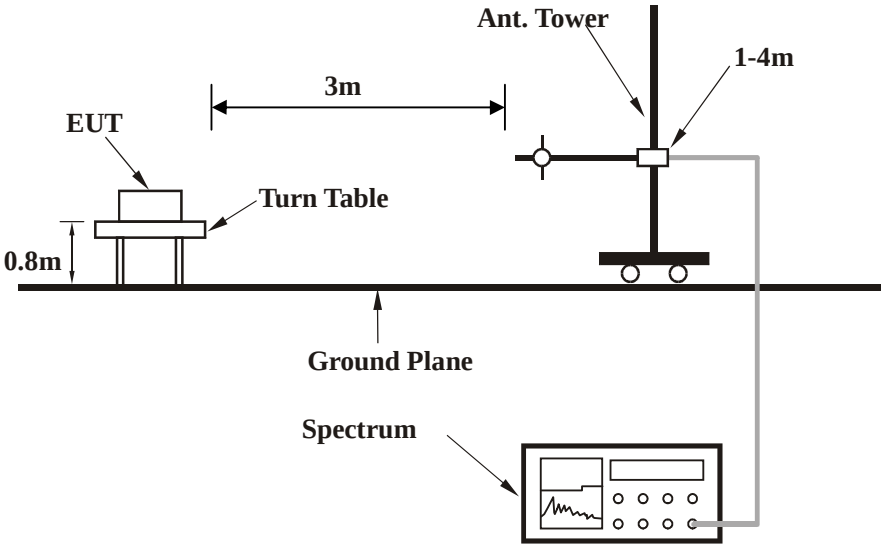
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T(Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.1.5 TEST SETUP




For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Prepared notebooks to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

## 3.1.7 TEST RESULTS

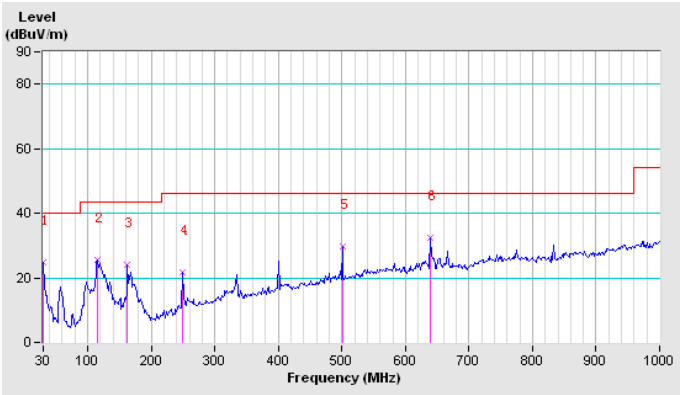
**BELOW 1GHz WORST-CASE DATA: 802.11b- CH1**

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 1 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 30.00 | 24.8 QP | 40.0 | -15.2 | 1.00 H | 0 | 37.39 | -12.55 |
| 2 | 115.68 | 25.6 QP | 43.5 | -17.9 | 1.00 H | 0 | 44.53 | -18.92 |
| 3 | 162.57 | 24.0 QP | 43.5 | -19.6 | 1.00 H | 0 | 43.38 | -19.43 |
| 4 | 249.87 | 21.7 QP | 46.0 | -24.3 | 1.00 H | 0 | 38.52 | -16.86 |
| 5 | 500.45 | 29.9 QP | 46.0 | -16.1 | 1.00 H | 0 | 38.42 | -8.54 |
| 6 | 639.48 | 32.5 QP | 46.0 | -13.5 | 1.00 H | 0 | 38.12 | -5.61 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

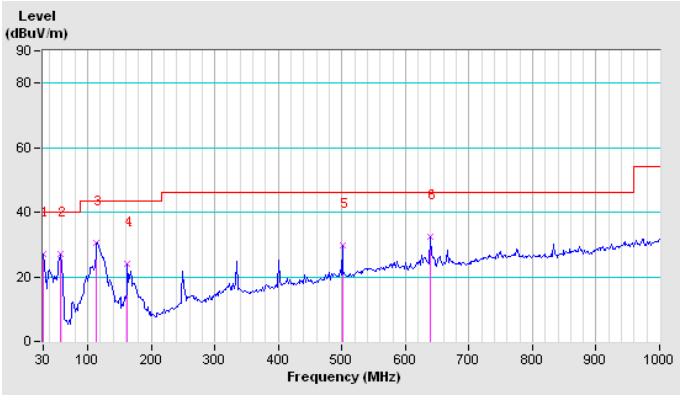


| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 1 | **DETECTOR FUNCTION** | Quasi-Peak (QP) |
| **FREQUENCY RANGE** | 30MHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 30.00 | 27.2 QP | 40.0 | -12.8 | 1.00 V | 0 | 39.72 | -12.55 |
| **2** | **57.48** | **27.2 QP** | **40.0** | **-12.8** | **1.00 V** | **0** | **52.00** | **-24.78** |
| 3 | 114.07 | 30.6 QP | 43.5 | -12.9 | 1.00 V | 0 | 49.67 | -19.03 |
| 4 | 162.57 | 24.0 QP | 43.5 | -19.6 | 1.00 V | 0 | 43.38 | -19.43 |
| 5 | 500.45 | 29.9 QP | 46.0 | -16.1 | 1.00 V | 0 | 38.42 | -8.54 |
| 6 | 639.48 | 32.5 QP | 46.0 | -13.5 | 1.00 V | 0 | 38.12 | -5.61 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



## ABOVE 1GHz DATA

### 802.11b

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 1 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 62.7 PK | 74.0 | -11.3 | 1.06 H | 257 | 58.79 | 3.91 |
| 2 | 2390.00 | 53.8 AV | 54.0 | -0.2 | 1.06 H | 257 | 49.89 | 3.91 |
| 3 | *2412.00 | 106.7 PK | | | 1.06 H | 257 | 102.74 | 3.96 |
| 4 | *2412.00 | 101.5 AV | | | 1.06 H | 257 | 97.54 | 3.96 |
| 5 | 4824.00 | 46.3 PK | 74.0 | -27.7 | 1.07 H | 114 | 36.65 | 9.65 |
| 6 | 4824.00 | 38.2 AV | 54.0 | -15.8 | 1.07 H | 114 | 28.55 | 9.65 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 53.4 PK | 74.0 | -20.6 | 1.09 V | 66 | 49.49 | 3.91 |
| 2 | 2390.00 | 46.7 AV | 54.0 | -7.3 | 1.09 V | 66 | 42.79 | 3.91 |
| 3 | *2412.00 | 98.7 PK | | | 1.09 V | 66 | 94.74 | 3.96 |
| 4 | *2412.00 | 92.4 AV | | | 1.09 V | 66 | 88.44 | 3.96 |
| 5 | 4824.00 | 47.1 PK | 74.0 | -26.9 | 1.04 V | 117 | 37.45 | 9.65 |
| 6 | 4824.00 | 35.2 AV | 54.0 | -18.8 | 1.04 V | 117 | 25.55 | 9.65 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 6 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.6 PK | 74.0 | -23.4 | 1.08 H | 134 | 46.66 | 3.91 |
| 2 | 2390.00 | 38.2 AV | 54.0 | -15.8 | 1.08 H | 134 | 34.29 | 3.91 |
| 3 | *2437.00 | 105.8 PK | | | 1.08 H | 134 | 101.76 | 4.04 |
| 4 | *2437.00 | 100.4 AV | | | 1.08 H | 134 | 96.36 | 4.04 |
| 5 | 2483.50 | 49.6 PK | 74.0 | -24.4 | 1.08 H | 134 | 45.42 | 4.18 |
| 6 | 2483.50 | 38.6 AV | 54.0 | -15.4 | 1.08 H | 134 | 34.42 | 4.18 |
| 7 | 4874.00 | 45.2 PK | 74.0 | -28.8 | 1.03 H | 114 | 35.48 | 9.72 |
| 8 | 4874.00 | 34.5 AV | 54.0 | -19.5 | 1.03 H | 114 | 24.78 | 9.72 |
| 9 | 7311.00 | 45.9 PK | 74.0 | -28.1 | 1.02 H | 57 | 32.75 | 13.15 |
| 10 | 7311.00 | 33.6 AV | 54.0 | -20.4 | 1.02 H | 57 | 20.45 | 13.15 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.7 PK | 74.0 | -23.3 | 1.02 V | 34 | 46.79 | 3.91 |
| 2 | 2390.00 | 38.7 AV | 54.0 | -15.3 | 1.02 V | 34 | 34.79 | 3.91 |
| 3 | *2437.00 | 100.3 PK | | | 1.02 V | 34 | 96.98 | 4.04 |
| 4 | *2437.00 | 93.7 AV | | | 1.02 V | 34 | 90.38 | 4.04 |
| 5 | 2483.50 | 51.4 PK | 74.0 | -22.6 | 1.02 V | 34 | 47.22 | 4.18 |
| 6 | 2483.50 | 40.2 AV | 54.0 | -13.8 | 1.02 V | 34 | 36.02 | 4.18 |
| 7 | 4874.00 | 45.3 PK | 74.0 | -28.7 | 1.00 V | 51 | 35.58 | 9.72 |
| 8 | 4874.00 | 36.8 AV | 54.0 | -17.2 | 1.00 V | 51 | 27.08 | 9.72 |
| 9 | 7311.00 | 46.2 PK | 74.0 | -27.8 | 1.06 V | 24 | 33.05 | 13.15 |
| 10 | 7311.00 | 36.7 AV | 54.0 | -17.3 | 1.06 V | 24 | 23.55 | 13.15 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 11 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 104.8 PK | | | 1.08 H | 112 | 100.69 | 4.11 |
| 2 | *2462.00 | 97.6 AV | | | 1.08 H | 112 | 93.49 | 4.11 |
| 3 | 2483.50 | 64.2 PK | 74.0 | -9.8 | 1.08 H | 112 | 60.02 | 4.18 |
| **4** | **2483.50** | **53.9 AV** | **54.0** | **-0.1** | **1.08 H** | **112** | **49.72** | **4.18** |
| 5 | 4924.00 | 47.3 PK | 74.0 | -26.7 | 1.07 H | 82 | 37.50 | 9.80 |
| 6 | 4924.00 | 36.8 AV | 54.0 | -17.2 | 1.07 H | 82 | 27.00 | 9.80 |
| 7 | 7386.00 | 49.3 PK | 74.0 | -24.7 | 1.00 H | 325 | 36.16 | 13.14 |
| 8 | 7386.00 | 39.2 AV | 54.0 | -14.8 | 1.00 H | 325 | 26.06 | 13.14 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 98.4 PK | | | 1.03 V | 334 | 94.29 | 4.11 |
| 2 | *2462.00 | 90.2 AV | | | 1.03 V | 334 | 86.09 | 4.11 |
| 3 | 2483.50 | 60.0 PK | 74.0 | -14.0 | 1.03 V | 334 | 55.82 | 4.18 |
| 4 | 2483.50 | 48.7 AV | 54.0 | -5.3 | 1.03 V | 334 | 44.52 | 4.18 |
| 5 | 4924.00 | 48.1 PK | 74.0 | -25.9 | 1.04 V | 24 | 38.30 | 9.80 |
| 6 | 4924.00 | 38.2 AV | 54.0 | -15.8 | 1.04 V | 24 | 28.40 | 9.80 |
| 7 | 7386.00 | 49.2 PK | 74.0 | -24.8 | 1.05 V | 58 | 36.06 | 13.14 |
| 8 | 7386.00 | 38.7 AV | 54.0 | -15.3 | 1.05 V | 58 | 25.56 | 13.14 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

## 802.11g

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 1 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 73.0 PK | 74.0 | -1.0 | 4.00 H | 332 | 69.09 | 3.91 |
| **2** | **2390.00** | **53.9 AV** | **54.0** | **-0.1** | **4.00 H** | **332** | **49.99** | **3.91** |
| 3 | *2412.00 | 105.2 PK | | | 1.10 H | 332 | 101.24 | 3.96 |
| 4 | *2412.00 | 93.7 AV | | | 1.10 H | 332 | 89.74 | 3.96 |
| 5 | 4824.00 | 47.3 PK | 74.0 | -26.7 | 1.13 H | 66 | 37.65 | 9.65 |
| 6 | 4824.00 | 36.7 AV | 54.0 | -17.3 | 1.13 H | 66 | 27.05 | 9.65 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 65.3 PK | 74.0 | -8.7 | 1.03 V | 114 | 61.39 | 3.91 |
| 2 | 2390.00 | 51.3 AV | 54.0 | -2.7 | 1.03 V | 114 | 47.39 | 3.91 |
| 3 | *2412.00 | 98.5 PK | | | 1.06 V | 114 | 94.54 | 3.96 |
| 4 | *2412.00 | 88.3 AV | | | 1.06 V | 114 | 84.34 | 3.96 |
| 5 | 4824.00 | 47.2 PK | 74.0 | -26.8 | 1.00 V | 338 | 37.55 | 9.65 |
| 6 | 4824.00 | 36.8 AV | 54.0 | -17.2 | 1.00 V | 338 | 27.15 | 9.65 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 6 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 51.2 PK | 74.0 | -22.8 | 1.04 H | 24 | 47.29 | 3.91 |
| 2 | 2390.00 | 39.4 AV | 54.0 | -14.6 | 1.04 H | 24 | 35.49 | 3.91 |
| 3 | *2437.00 | 109.6 PK | | | 1.04 H | 24 | 105.56 | 4.04 |
| 4 | *2437.00 | 103.7 AV | | | 1.04 H | 24 | 99.66 | 4.04 |
| 5 | 2483.50 | 52.1 PK | 74.0 | -21.9 | 1.04 H | 24 | 47.92 | 4.18 |
| 6 | 2483.50 | 41.0 AV | 54.0 | -13.0 | 1.04 H | 24 | 36.78 | 4.18 |
| 7 | 4874.00 | 45.8 PK | 74.0 | -28.2 | 1.03 H | 77 | 36.06 | 9.72 |
| 8 | 4874.00 | 36.7 AV | 54.0 | -17.3 | 1.03 H | 77 | 26.98 | 9.72 |
| 9 | 7311.00 | 46.8 PK | 74.0 | -27.2 | 1.06 H | 21 | 33.65 | 13.15 |
| 10 | 7311.00 | 37.5 AV | 54.0 | -16.5 | 1.06 H | 21 | 24.35 | 13.15 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.8 PK | 74.0 | -23.2 | 1.00 V | 212 | 46.89 | 3.91 |
| 2 | 2390.00 | 37.5 AV | 54.0 | -16.5 | 1.00 V | 212 | 33.59 | 3.91 |
| 3 | *2437.00 | 103.6 PK | | | 1.00 V | 212 | 99.56 | 4.04 |
| 4 | *2437.00 | 97.8 AV | | | 1.00 V | 212 | 93.76 | 4.04 |
| 5 | 2483.50 | 51.6 PK | 74.0 | -22.4 | 1.00 V | 212 | 47.42 | 4.18 |
| 6 | 2483.50 | 40.3 AV | 54.0 | -13.7 | 1.00 V | 212 | 36.12 | 4.18 |
| 7 | 4874.00 | 45.8 PK | 74.0 | -28.2 | 1.03 V | 64 | 36.08 | 9.72 |
| 8 | 4874.00 | 36.4 AV | 54.0 | -17.6 | 1.03 V | 64 | 26.68 | 9.72 |
| 9 | 7311.00 | 46.2 PK | 74.0 | -27.8 | 1.01 V | 271 | 33.05 | 13.15 |
| 10 | 7311.00 | 35.5 AV | 54.0 | -18.5 | 1.01 V | 271 | 22.35 | 13.15 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 11 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 104.6 PK | | | 1.00 H | 44 | 100.49 | 4.11 |
| 2 | *2462.00 | 93.6 AV | | | 1.00 H | 44 | 89.49 | 4.11 |
| 3 | 2483.50 | 72.3 PK | 74.0 | -1.7 | 1.00 H | 44 | 68.12 | 4.18 |
| **4** | **2483.50** | **53.9 AV** | **54.0** | **-0.1** | **1.00 H** | **44** | **49.72** | **4.18** |
| 5 | 4924.00 | 46.5 PK | 74.0 | -27.5 | 1.03 H | 85 | 36.70 | 9.80 |
| 6 | 4924.00 | 36.9 AV | 54.0 | -17.1 | 1.03 H | 85 | 27.10 | 9.80 |
| 7 | 7386.00 | 48.5 PK | 74.0 | -25.5 | 1.03 H | 225 | 35.36 | 13.14 |
| 8 | 7386.00 | 37.2 AV | 54.0 | -16.8 | 1.03 H | 225 | 24.06 | 13.14 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 97.2 PK | | | 1.00 V | 258 | 93.09 | 4.11 |
| 2 | *2462.00 | 86.3 AV | | | 1.00 V | 258 | 82.19 | 4.11 |
| 3 | 2483.50 | 64.2 PK | 74.0 | -9.8 | 1.00 V | 258 | 60.02 | 4.18 |
| 4 | 2483.50 | 51.3 AV | 54.0 | -2.7 | 1.00 V | 258 | 47.12 | 4.18 |
| 5 | 4924.00 | 49.2 PK | 74.0 | -24.8 | 1.08 V | 22 | 39.40 | 9.80 |
| 6 | 4924.00 | 38.7 AV | 54.0 | -15.3 | 1.08 V | 22 | 28.90 | 9.80 |
| 7 | 7386.00 | 48.7 PK | 74.0 | -25.3 | 1.04 V | 246 | 35.56 | 13.14 |
| 8 | 7386.00 | 38.2 AV | 54.0 | -15.8 | 1.04 V | 246 | 25.06 | 13.14 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

## 802.11n (20MHz)

| CHANNEL | TX Channel 1 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 72.1 PK | 74.0 | -1.9 | 1.03 H | 124 | 68.19 | 3.91 |
| **2** | **2390.00** | **53.9 AV** | **54.0** | **-0.1** | **1.03 H** | **124** | **49.99** | **3.91** |
| 3 | *2412.00 | 104.3 PK | | | 1.03 H | 124 | 100.34 | 3.96 |
| 4 | *2412.00 | 92.3 AV | | | 1.03 H | 124 | 88.34 | 3.96 |
| 5 | 4824.00 | 45.9 PK | 74.0 | -28.1 | 1.06 H | 118 | 36.25 | 9.65 |
| 6 | 4824.00 | 34.5 AV | 54.0 | -19.5 | 1.06 H | 118 | 24.85 | 9.65 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2390.00 | 63.2 PK | 74.0 | -10.8 | 1.02 V | 77 | 59.29 | 3.91 |
| 2 | 2390.00 | 49.8 AV | 54.0 | -4.2 | 1.02 V | 77 | 45.89 | 3.91 |
| 3 | *2412.00 | 97.3 PK | | | 1.02 V | 77 | 93.34 | 3.96 |
| 4 | *2412.00 | 87.2 AV | | | 1.02 V | 77 | 83.24 | 3.96 |
| 5 | 4824.00 | 46.8 PK | 74.0 | -27.2 | 1.00 V | 58 | 37.15 | 9.65 |
| 6 | 4824.00 | 35.9 AV | 54.0 | -18.1 | 1.00 V | 58 | 26.25 | 9.65 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 6 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.4 PK | 74.0 | -23.6 | 1.05 H | 121 | 46.49 | 3.91 |
| 2 | 2390.00 | 38.6 AV | 54.0 | -15.4 | 1.05 H | 121 | 34.69 | 3.91 |
| 3 | *2437.00 | 110.7 PK | | | 1.05 H | 121 | 106.66 | 4.04 |
| 4 | *2437.00 | 99.1 AV | | | 1.05 H | 121 | 95.06 | 4.04 |
| 5 | 2483.50 | 51.4 PK | 74.0 | -22.6 | 1.05 H | 121 | 47.22 | 4.18 |
| 6 | 2483.50 | 41.2 AV | 54.0 | -12.8 | 1.05 H | 121 | 37.02 | 4.18 |
| 7 | 4874.00 | 44.8 PK | 74.0 | -29.2 | 1.05 H | 284 | 35.08 | 9.72 |
| 8 | 4874.00 | 38.2 AV | 54.0 | -15.8 | 1.05 H | 284 | 28.48 | 9.72 |
| 9 | 7311.00 | 46.8 PK | 74.0 | -27.2 | 1.00 H | 63 | 33.65 | 13.15 |
| 10 | 7311.00 | 36.1 AV | 54.0 | -17.9 | 1.00 H | 63 | 22.95 | 13.15 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.4 PK | 74.0 | -23.6 | 1.05 V | 124 | 46.49 | 3.91 |
| 2 | 2390.00 | 38.2 AV | 54.0 | -15.8 | 1.05 V | 124 | 34.29 | 3.91 |
| 3 | *2437.00 | 102.9 PK | | | 1.05 V | 124 | 98.86 | 4.04 |
| 4 | *2437.00 | 93.8 AV | | | 1.05 V | 124 | 89.76 | 4.04 |
| 5 | 2483.50 | 51.2 PK | 74.0 | -22.8 | 1.05 V | 124 | 47.02 | 4.18 |
| 6 | 2483.50 | 40.2 AV | 54.0 | -13.8 | 1.05 V | 124 | 36.02 | 4.18 |
| 7 | 4874.00 | 44.7 PK | 74.0 | -29.3 | 1.01 V | 256 | 34.98 | 9.72 |
| 8 | 4874.00 | 35.2 AV | 54.0 | -18.8 | 1.01 V | 256 | 25.48 | 9.72 |
| 9 | 7311.00 | 44.8 PK | 74.0 | -29.2 | 1.04 V | 248 | 31.65 | 13.15 |
| 10 | 7311.00 | 36.1 AV | 54.0 | -17.9 | 1.04 V | 248 | 22.97 | 13.15 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 11 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 103.8 PK | | | 1.01 H | 99 | 99.69 | 4.11 |
| 2 | *2462.00 | 92.1 AV | | | 1.01 H | 99 | 87.99 | 4.11 |
| 3 | 2483.50 | 70.3 PK | 74.0 | -3.7 | 1.01 H | 99 | 66.12 | 4.18 |
| 4 | 2483.50 | 53.8 AV | 54.0 | -0.2 | 1.01 H | 99 | 49.62 | 4.18 |
| 5 | 4924.00 | 47.3 PK | 74.0 | -26.7 | 1.06 H | 126 | 37.50 | 9.80 |
| 6 | 4924.00 | 36.7 AV | 54.0 | -17.3 | 1.06 H | 126 | 26.90 | 9.80 |
| 7 | 7386.00 | 48.2 PK | 74.0 | -25.8 | 1.02 H | 118 | 35.06 | 13.14 |
| 8 | 7386.00 | 36.7 AV | 54.0 | -17.3 | 1.02 H | 118 | 23.56 | 13.14 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2462.00 | 95.3 PK | | | 1.03 V | 85 | 91.19 | 4.11 |
| 2 | *2462.00 | 85.3 AV | | | 1.03 V | 85 | 81.19 | 4.11 |
| 3 | 2483.50 | 66.3 PK | 74.0 | -7.7 | 1.03 V | 85 | 62.12 | 4.18 |
| 4 | 2483.50 | 50.1 AV | 54.0 | -3.9 | 1.03 V | 85 | 45.92 | 4.18 |
| 5 | 4924.00 | 46.3 PK | 74.0 | -27.7 | 1.03 V | 247 | 36.50 | 9.80 |
| 6 | 4924.00 | 37.2 AV | 54.0 | -16.8 | 1.03 V | 247 | 27.40 | 9.80 |
| 7 | 7386.00 | 48.2 PK | 74.0 | -25.8 | 1.10 V | 332 | 35.06 | 13.14 |
| 8 | 7386.00 | 38.1 AV | 54.0 | -15.9 | 1.10 V | 332 | 24.96 | 13.14 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

## 802.11n (40MHz)

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 3 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 68.0 PK | 74.0 | -6.0 | 1.02 H | 248 | 64.09 | 3.91 |
| 2 | 2390.00 | 53.9 AV | 54.0 | -0.1 | 1.02 H | 248 | 49.99 | 3.91 |
| 3 | *2422.00 | 106.2 PK | | | 1.02 H | 248 | 102.21 | 3.99 |
| 4 | *2422.00 | 93.5 AV | | | 1.02 H | 248 | 89.51 | 3.99 |
| 5 | 4844.00 | 48.2 PK | 74.0 | -25.8 | 1.10 H | 28 | 38.52 | 9.68 |
| 6 | 4844.00 | 38.6 AV | 54.0 | -15.4 | 1.10 H | 28 | 28.92 | 9.68 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 63.0 PK | 74.0 | -11.0 | 1.12 V | 245 | 59.09 | 3.91 |
| 2 | 2390.00 | 50.3 AV | 54.0 | -3.7 | 1.12 V | 245 | 46.39 | 3.91 |
| 3 | *2422.00 | 98.2 PK | | | 1.12 V | 245 | 94.21 | 3.99 |
| 4 | *2422.00 | 89.3 AV | | | 1.12 V | 245 | 85.31 | 3.99 |
| 5 | 4844.00 | 46.9 PK | 74.0 | -27.1 | 1.00 V | 88 | 37.22 | 9.68 |
| 6 | 4844.00 | 35.2 AV | 54.0 | -18.8 | 1.00 V | 88 | 25.52 | 9.68 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 6 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 58.2 PK | 74.0 | -15.8 | 1.00 H | 48 | 54.31 | 3.91 |
| 2 | 2390.00 | 39.2 AV | 54.0 | -14.8 | 1.00 H | 48 | 35.31 | 3.91 |
| 3 | *2437.00 | 109.1 PK | | | 1.00 H | 48 | 105.05 | 4.04 |
| 4 | *2437.00 | 89.6 AV | | | 1.00 H | 48 | 85.59 | 4.04 |
| 5 | 2483.50 | 58.2 PK | 74.0 | -15.8 | 1.00 H | 48 | 53.99 | 4.18 |
| 6 | 2483.50 | 39.5 AV | 54.0 | -14.5 | 1.00 H | 48 | 35.29 | 4.18 |
| 7 | 4874.00 | 46.8 PK | 74.0 | -27.2 | 1.05 H | 99 | 37.08 | 9.72 |
| 8 | 4874.00 | 38.5 AV | 54.0 | -15.5 | 1.05 H | 99 | 28.78 | 9.72 |
| 9 | 7311.00 | 47.5 PK | 74.0 | -26.5 | 1.07 H | 321 | 34.35 | 13.15 |
| 10 | 7311.00 | 38.5 AV | 54.0 | -15.5 | 1.07 H | 321 | 25.35 | 13.15 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | 2390.00 | 50.8 PK | 74.0 | -23.2 | 1.04 V | 212 | 46.89 | 3.91 |
| 2 | 2390.00 | 38.9 AV | 54.0 | -15.1 | 1.04 V | 212 | 34.99 | 3.91 |
| 3 | *2437.00 | 107.3 PK | | | 1.04 V | 212 | 103.26 | 4.04 |
| 4 | *2437.00 | 95.9 AV | | | 1.04 V | 212 | 91.86 | 4.04 |
| 5 | 2483.50 | 52.3 PK | 74.0 | -21.7 | 1.04 V | 212 | 48.12 | 4.18 |
| 6 | 2483.50 | 41.3 AV | 54.0 | -12.7 | 1.04 V | 212 | 37.12 | 4.18 |
| 7 | 4874.00 | 44.8 PK | 74.0 | -29.2 | 1.00 V | 28 | 35.08 | 9.72 |
| 8 | 4874.00 | 36.2 AV | 54.0 | -17.8 | 1.00 V | 28 | 26.48 | 9.72 |
| 9 | 7311.00 | 45.7 PK | 74.0 | -28.3 | 1.02 V | 66 | 32.55 | 13.15 |
| 10 | 7311.00 | 36.2 AV | 54.0 | -17.8 | 1.02 V | 66 | 23.05 | 13.15 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

| | | | |
|---|---|---|---|
| **CHANNEL** | TX Channel 9 | **DETECTOR FUNCTION** | Peak (PK)<br>Average (AV) |
| **FREQUENCY RANGE** | 1GHz ~ 25GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2452.00 | 105.3 PK | | | 1.07 H | 51 | 101.22 | 4.08 |
| 2 | *2452.00 | 92.5 AV | | | 1.07 H | 51 | 88.42 | 4.08 |
| 3 | 2483.50 | 68.3 PK | 74.0 | -5.7 | 1.07 H | 51 | 64.12 | 4.18 |
| **4** | **2483.50** | **53.9 AV** | **54.0** | **-0.1** | **1.07 H** | **51** | **49.72** | **4.18** |
| 5 | 4904.00 | 48.3 PK | 74.0 | -25.7 | 1.05 H | 98 | 38.53 | 9.77 |
| 6 | 4904.00 | 35.5 AV | 54.0 | -18.5 | 1.05 H | 98 | 25.73 | 9.77 |
| 7 | 7356.00 | 49.2 PK | 74.0 | -24.8 | 1.00 H | 258 | 36.06 | 13.14 |
| 8 | 7356.00 | 36.6 AV | 54.0 | -17.4 | 1.00 H | 258 | 23.46 | 13.14 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M** | | | | | | | | |
| **NO.** | **FREQ. (MHz)** | **EMISSION LEVEL (dBuV/m)** | **LIMIT (dBuV/m)** | **MARGIN (dB)** | **ANTENNA HEIGHT (m)** | **TABLE ANGLE (Degree)** | **RAW VALUE (dBuV)** | **CORRECTION FACTOR (dB/m)** |
| 1 | *2452.00 | 98.2 PK | | | 1.06 V | 52 | 94.12 | 4.08 |
| 2 | *2452.00 | 87.6 AV | | | 1.06 V | 52 | 83.52 | 4.08 |
| 3 | 2483.50 | 60.2 PK | 74.0 | -13.8 | 1.06 V | 52 | 56.02 | 4.18 |
| 4 | 2483.50 | 51.2 AV | 54.0 | -2.8 | 1.06 V | 52 | 47.02 | 4.18 |
| 5 | 4904.00 | 47.6 PK | 74.0 | -26.4 | 1.00 V | 35 | 37.83 | 9.77 |
| 6 | 4904.00 | 38.3 AV | 54.0 | -15.7 | 1.00 V | 35 | 28.53 | 9.77 |
| 7 | 7356.00 | 49.2 PK | 74.0 | -24.8 | 1.04 V | 249 | 36.06 | 13.14 |
| 8 | 7356.00 | 38.1 AV | 54.0 | -15.9 | 1.04 V | 249 | 24.96 | 13.14 |

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

## 3.2 CONDUCTED EMISSION MEASUREMENT

### 3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 ~ 0.5 | 66 to 56 | 56 to 46 |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

**NOTE**: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 3.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|
| EMI Test Receiver Rohde&Schwarz | ESCS30 | 100340 | May 17,14 | May 16,15 |
| Artificial Mains Network Rohde&Schwarz | ENV216 | 101173 | May 13,14 | May 12,15 |
| Artificial Mains Network Rohde&Schwarz | ESH3-Z5 | 100317 | May 13,14 | May 12,15 |
| Test software ADT | ADT_Cond_V7.3.7 | N/A | N/A | N/A |

**NOTE:**

1. The test was performed in shielded room 553.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

### 3.2.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

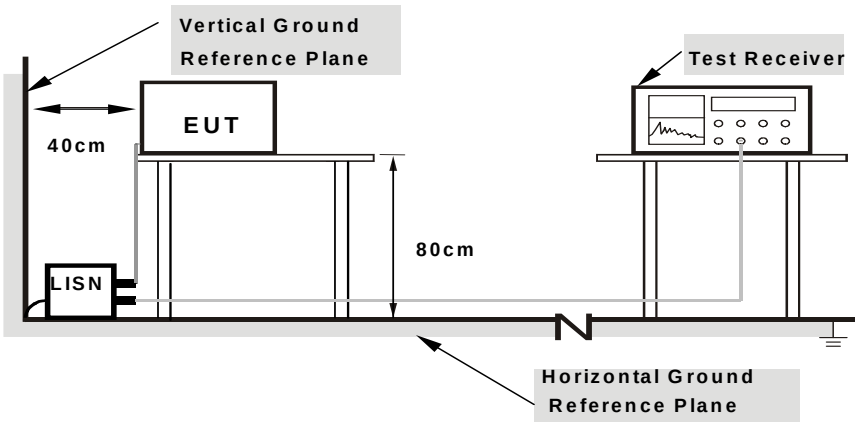
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.2.5 TEST SETUP




Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.2.6 EUT OPERATING CONDITIONS

Same as 3.1.6.

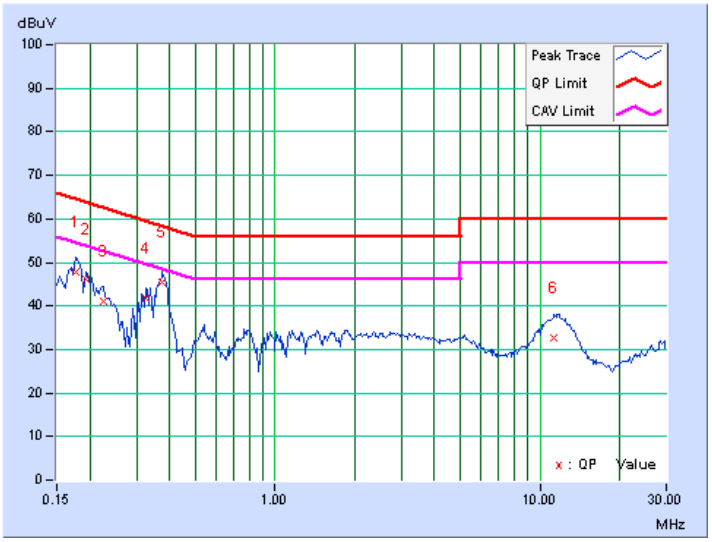
### 3.2.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA：802.11b CH1(Adapter: 2AAJ012F 1 NA)**

| PHASE | Line | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|

| No | Freq. | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.17734 | 10.75 | 37.21 | 27.56 | 47.96 | 38.31 | 64.61 | 54.61 | -16.65 | -16.3 |
| 2 | 0.19297 | 10.69 | 35.31 | 25.5 | 46 | 36.19 | 63.91 | 53.91 | -17.91 | -17.72 |
| 3 | 0.22422 | 10.65 | 30.27 | 22.33 | 40.92 | 32.98 | 62.66 | 52.66 | -21.74 | -19.68 |
| 4 | 0.32578 | 10.65 | 31.08 | 23.76 | 41.73 | 34.41 | 59.56 | 49.56 | -17.83 | -15.15 |
| 5 | 0.37656 | 10.65 | 34.83 | 26.81 | 45.48 | 37.46 | 58.35 | 48.35 | -12.88 | -10.9 |
| 6 | 11.32031 | 10.4 | 22.36 | 14.9 | 32.76 | 25.3 | 60 | 50 | -27.24 | -24.7 |

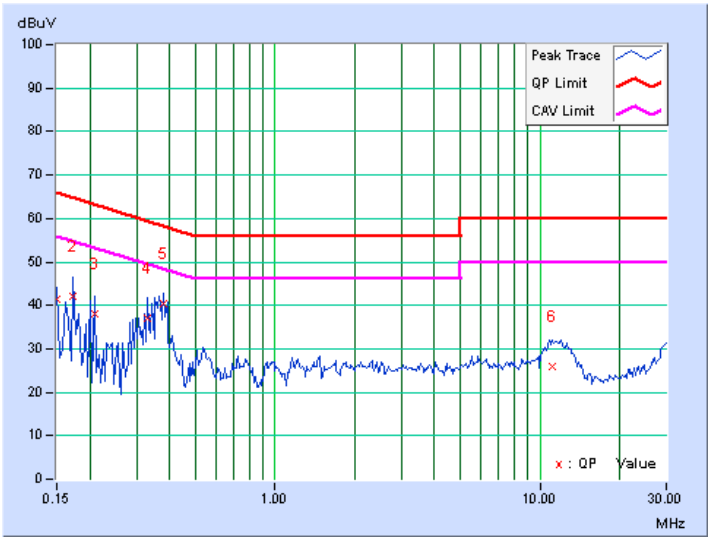
**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



| PHASE | Neutral | 6dB BANDWIDTH | 9kHz |
|---|---|---|---|

| No | Freq. | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15 | 10.65 | 30.7 | 15.05 | 41.35 | 25.7 | 66 | 56 | -24.65 | -30.3 |
| 2 | 0.17344 | 10.6 | 31.6 | 15.21 | 42.2 | 25.81 | 64.79 | 54.79 | -22.59 | -28.98 |
| 3 | 0.20859 | 10.55 | 27.33 | 10.07 | 37.88 | 20.62 | 63.26 | 53.26 | -25.38 | -32.64 |
| 4 | 0.32969 | 10.59 | 26.54 | 17.66 | 37.13 | 28.25 | 59.46 | 49.46 | -22.33 | -21.21 |
| 5 | 0.38047 | 10.61 | 29.88 | 22.01 | 40.49 | 32.62 | 58.27 | 48.27 | -17.78 | -15.65 |
| 6 | 11.14844 | 10.22 | 15.8 | 6.21 | 26.02 | 16.43 | 60 | 50 | -33.98 | -33.57 |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak an d average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

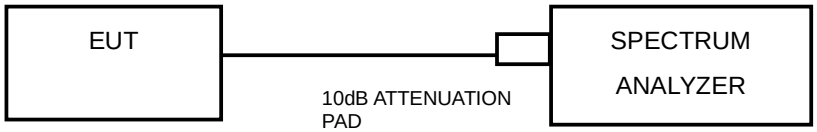


## 3.3 6dB BANDWIDTH MEASUREMENT

### 3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 3.3.2 TEST SETUP




### 3.3.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Spectrum Analyzer (10Hz–40GHz) | Rohde&Schwarz | FSV40 | 101003 | Apr. 09,14 | Apr. 08,15 |
| Digital Multimeter | FLUKE | 15B | A1220010DG | Oct. 27,14 | Oct. 26,15 |
| Humid & Temp Programmable Tester | Haida | HD-2257 | 110807201 | Sep.04,14 | Sep. 03,15 |
| Oscilloscope | Agilent | DSO9254A | MY51260160 | Oct. 17, 14 | Oct. 16, 15 |
| Signal Analyzer | Rohde & Schwarz | FSV7 | 102331 | Nov. 05,14 | Nov. 04,15 |

**NOTE:**

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

### 3.3.4 TEST PROCEDURE

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.3.7 TEST RESULTS

**802.11b**

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|
| 1 | 2412 | 9.10 | 0.5 | PASS |
| 6 | 2437 | 10.07 | 0.5 | PASS |
| 11 | 2462 | 9.11 | 0.5 | PASS |

**802.11g**

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | |
| 1 | 2412 | 15.15 | 15.13 | 0.5 | PASS |
| 6 | 2437 | 15.13 | 15.14 | 0.5 | PASS |
| 11 | 2462 | 15.12 | 15.16 | 0.5 | PASS |

**802.11n (20MHz)**

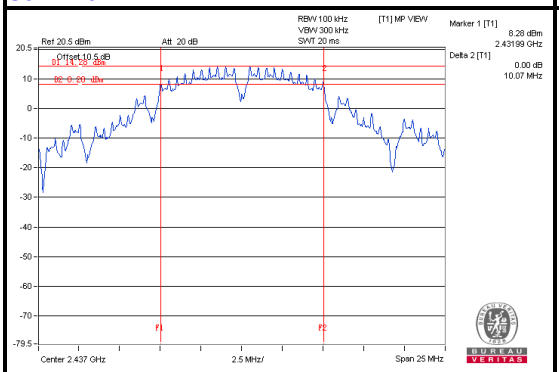
| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | |
| 1 | 2412 | 15.13 | 15.62 | 0.5 | PASS |
| 6 | 2437 | 15.09 | 15.74 | 0.5 | PASS |
| 11 | 2462 | 15.11 | 15.71 | 0.5 | PASS |

## 802.11n (40MHz)

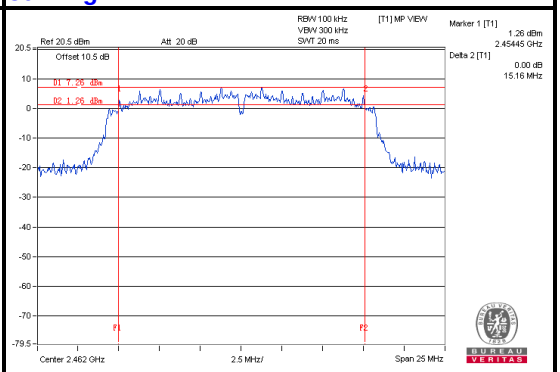
| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | |
| 3 | 2422 | 35.26 | 35.83 | 0.5 | PASS |
| 6 | 2437 | 35.69 | 35.76 | 0.5 | PASS |
| 9 | 2452 | 35.22 | 35.80 | 0.5 | PASS |

**SPECTRUM PLOT OF WORST VALUE**

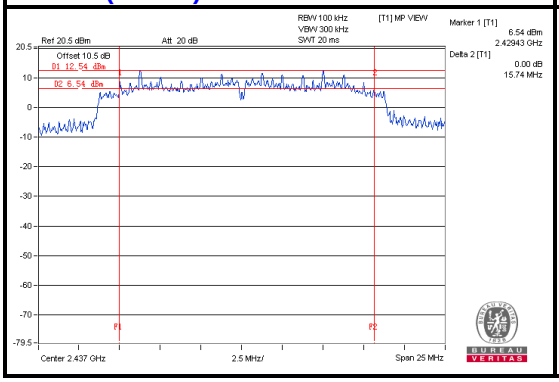
**802.11b**



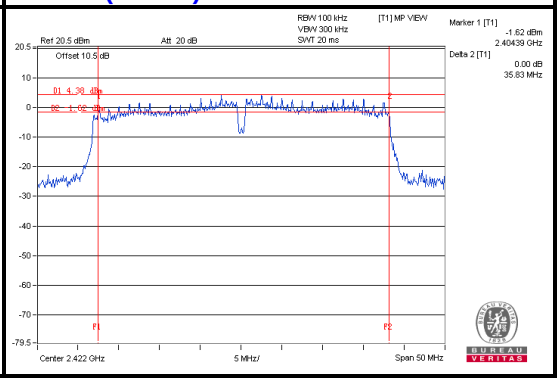

**802.11g**




**802.11n (20MHz)**




**802.11n (40MHz)**



## 3.4 CONDUCTED OUTPUT POWER

### 3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

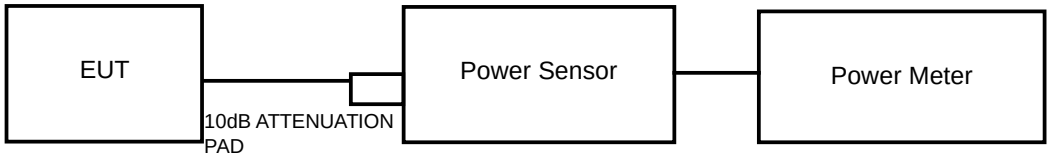
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

### 3.4.2 TEST SETUP




### 3.4.3 TEST INSTRUMENTS

| Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|
| Spectrum Analyzer (10Hz–40GHz) | Rohde&Schwarz | FSV40 | 101003 | Apr. 09,14 | Apr. 08,15 |
| Power Meter | Anritsu | ML2495A | 1139001 | Feb. 21,15 | Feb. 20,16 |
| Power Sensor | Anritsu | MA2411B | 1126068 | Feb. 21,15 | Feb. 20,16 |

**NOTE:**

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

### 3.4.4 TEST PROCEDURES

A average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the average power level.

### 3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.4.7 TEST RESULTS

**FOR AVERAGE POWER**

**802.11b**

| CHAN. | FREQ. (MHz) | AVG. POWER (dBm) | POWER (mW) | LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|
| 1 | 2412 | 18.79 | 75.683 | 30 | PASS |
| 6 | 2437 | 25.17 | 328.852 | 30 | PASS |
| 11 | 2462 | 18.34 | 68.234 | 30 | PASS |

### 802.11g

| CHAN. | FREQ. (MHz) | AVG. POWER (dBm) | | TOTAL POWER (mW) | TOTAL POWER (dBm) | LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | | | |
| 1 | 2412 | 17.61 | 17.60 | 115.345 | 20.62 | 30 | PASS |
| **6** | **2437** | **23.17** | **22.91** | **402.717** | **26.05** | **30** | **PASS** |
| 11 | 2462 | 17.69 | 18.25 | 125.603 | 20.99 | 30 | PASS |

### 802.11n (20MHz)

| CHAN. | FREQ. (MHz) | AVG. POWER (dBm) | | TOTAL POWER (mW) | TOTAL POWER (dBm) | LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | | | |
| 1 | 2412 | 16.23 | 16.21 | 83.753 | 19.23 | 30 | PASS |
| 6 | 2437 | 23.15 | 22.65 | 390.841 | 25.92 | 30 | PASS |
| 11 | 2462 | 17.08 | 17.11 | 102.565 | 20.11 | 30 | PASS |

### 802.11n (40MHz)

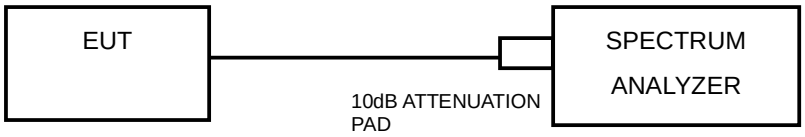
| CHAN. | FREQ. (MHz) | AVG. POWER (dBm) | | TOTAL POWER (mW) | TOTAL POWER (dBm) | LIMIT (dBm) | PASS / FAIL |
|---|---|---|---|---|---|---|---|
| | | CHAIN 0 | CHAIN 1 | | | | |
| 3 | 2422 | 17.36 | 17.68 | 112.980 | 20.53 | 30 | PASS |
| 6 | 2437 | 22.82 | 22.95 | 389.045 | 25.90 | 30 | PASS |
| 9 | 2452 | 17.22 | 17.42 | 107.895 | 20.33 | 30 | PASS |

## 3.5 POWER SPECTRAL DENSITY MEASUREMENT

### 3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 3.5.2 TEST SETUP




### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.5.4 TEST PROCEDURE

a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

### 3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.5.6 EUT OPERATING CONDITION

Same as Item 3.3.6

## 3.5.7 TEST RESULTS

### 802.11b

| TX chain | Channel | Freq. (MHz) | PSD W/O DUTY FACTOR (dBm/3kHz) | PSD WITH DUTY FACTOR (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---|---|---|---|---|---|---|
| 0 | 1 | 2412 | -4.52 | -4.33 | 8 | PASS |
| | 6 | 2437 | -0.17 | 0.02 | 8 | PASS |
| | 11 | 2462 | -4.58 | -4.39 | 8 | PASS |

NOTE: Refer to section 2.3 for duty cycle spectrum plot, Duty factor=0.19

### 802.11g

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | TOTAL PSD W/O DUTY FACTOR (dBm/3kHz) | TOTAL PSD WITH DUTY FACTOR (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2412 | -7.35 | 3.01 | -4.34 | -3.87 | 8 | PASS |
| | 6 | 2437 | -2.58 | 3.01 | 0.43 | 0.90 | 8 | |
| | 11 | 2462 | -7.67 | 3.01 | -4.66 | -4.19 | 8 | PASS |
| 1 | 1 | 2412 | -8.15 | 3.01 | -5.14 | -4.67 | 8 | PASS |
| | 6 | 2437 | -3.11 | 3.01 | -0.10 | 0.37 | 8 | |
| | 11 | 2462 | -7.15 | 3.01 | -4.14 | -3.67 | 8 | PASS |

NOTE: Refer to section 2.3 for duty cycle spectrum plot, Duty factor=0.47

### 802.11n (20MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | TOTAL PSD W/O DUTY FACTOR (dBm/3kHz) | TOTAL PSD WITH DUTY FACTOR (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2412 | -7.78 | 3.01 | -4.77 | -4.30 | 8 | PASS |
| | 6 | 2437 | -2.06 | 3.01 | 0.95 | 1.42 | 8 | |
| | 11 | 2462 | -8.78 | 3.01 | -5.77 | -5.30 | 8 | PASS |
| 1 | 1 | 2412 | -8.65 | 3.01 | -5.64 | -5.17 | 8 | PASS |
| | 6 | 2437 | -3.03 | 3.01 | -0.02 | 0.45 | 8 | |
| | 11 | 2462 | -7.52 | 3.01 | -4.51 | -4.04 | 8 | PASS |

NOTE: Refer to section 2.3 for duty cycle spectrum plot, Duty factor=0.47

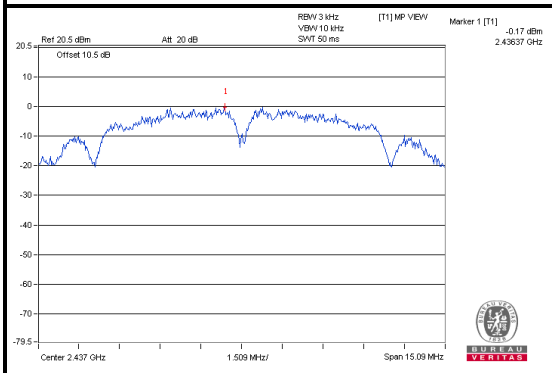
## 802.11n (40MHz)

| TX chain | Channel | Freq. (MHz) | PSD (dBm/3kHz) | 10 log (N=2) dB | TOTAL PSD W/O DUTY FACTOR (dBm/3kHz) | TOTAL PSD WITH DUTY FACTOR (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---|---|---|---|---|---|---|---|---|
| 0 | 3 | 2422 | -11.64 | 3.01 | -8.63 | -8.14 | 8 | PASS |
| | 6 | 2437 | -5.20 | 3.01 | -2.19 | -1.70 | 8 | |
| | 9 | 2452 | -11.31 | 3.01 | -8.30 | -7.81 | 8 | PASS |
| 1 | 3 | 2422 | -11.34 | 3.01 | -8.33 | -7.84 | 8 | PASS |
| | 6 | 2437 | -7.35 | 3.01 | -4.34 | -3.85 | 8 | |
| | 9 | 2452 | -13.11 | 3.01 | -10.10 | -9.61 | 8 | PASS |

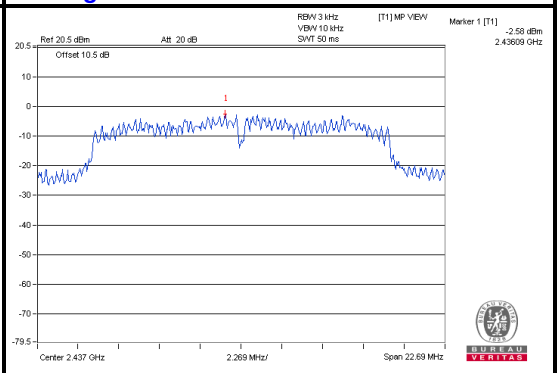
NOTE: Refer to section 2.3 for duty cycle spectrum plot, Duty factor=0.49

**SPECTRUM PLOT OF WORST VALUE**

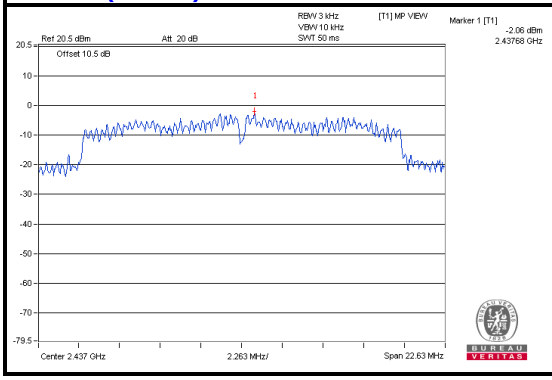
**802.11b**



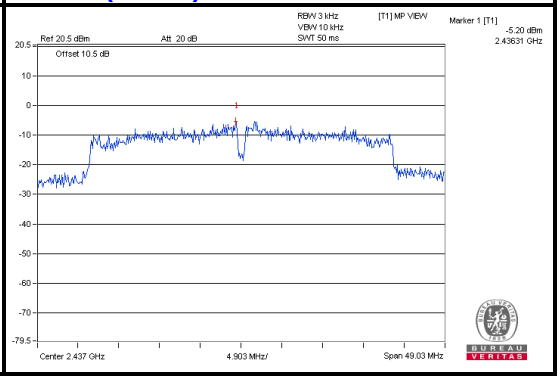

**802.11g**




**802.11n (20MHz)**




**802.11n (40MHz)**

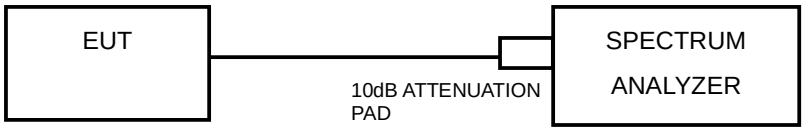


## 3.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 3.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below -30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 3.6.2 TEST SETUP




### 3.6.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

### 3.6.4 TEST PROCEDURE

**MEASUREMENT PROCEDURE REF**

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

**MEASUREMENT PROCEDURE OOBE**

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

### 3.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 3.6.6 EUT OPERATING CONDITION

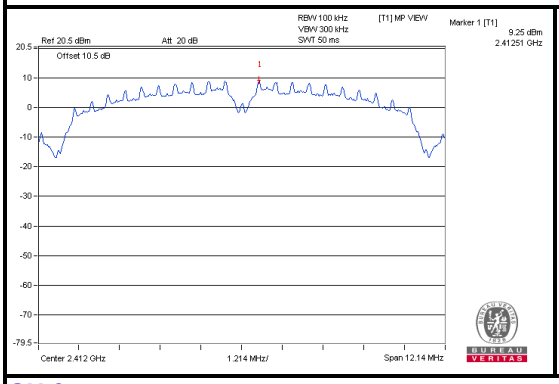
Same as Item 3.3.6

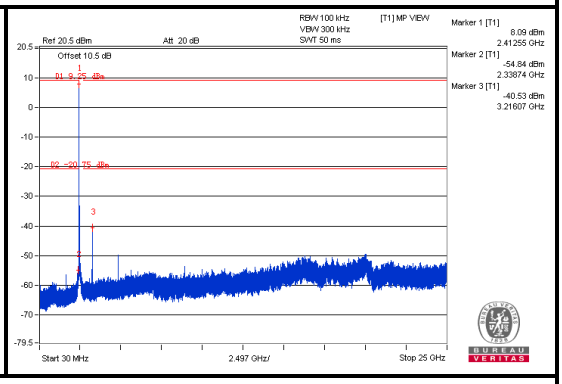
### 3.6.7 TEST RESULTS

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

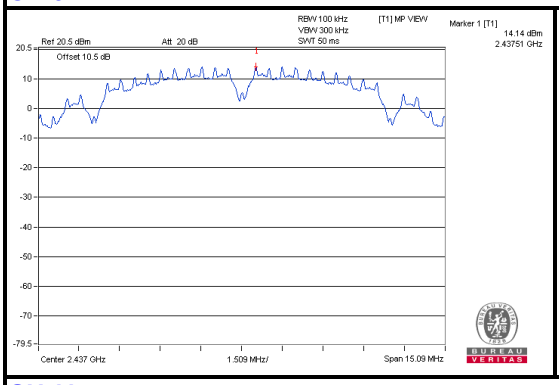
## 802.11b

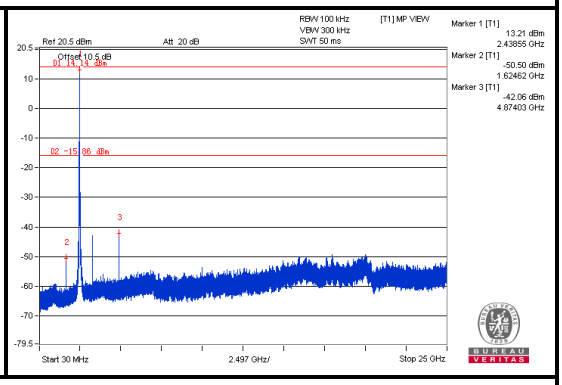
### CH 1



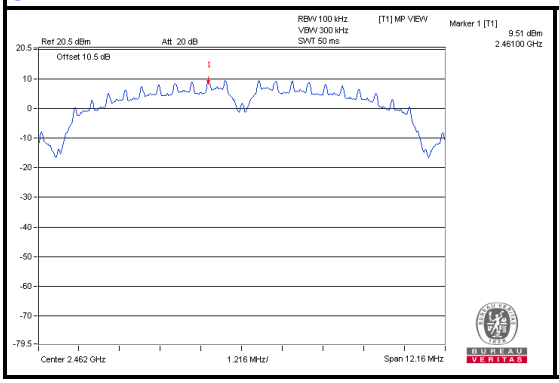



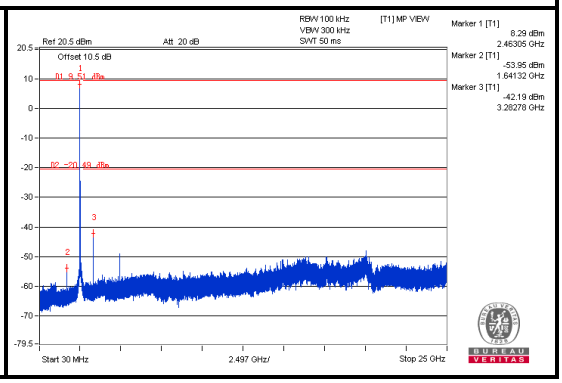

### CH 6



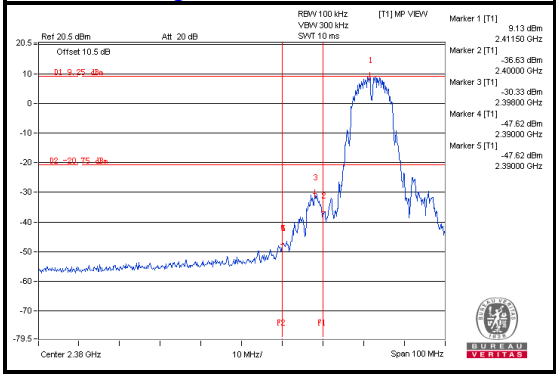




### CH 11

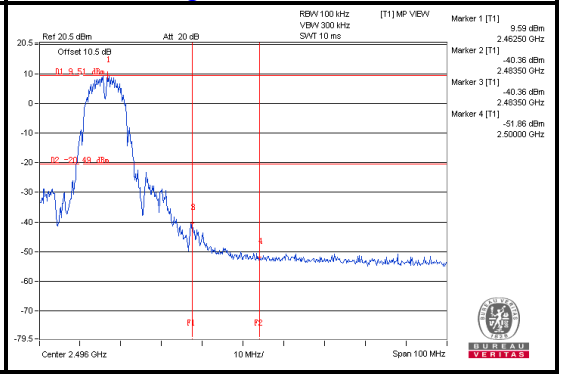


**CH 1 Band edge**

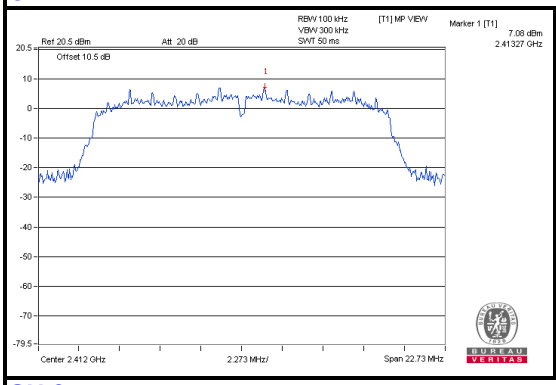


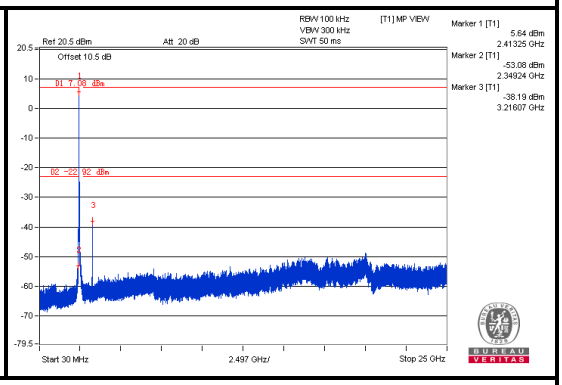

**CH 11 Band edge**



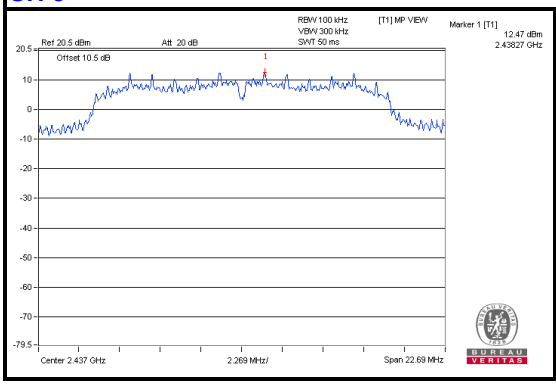

## 802.11g
## CHAIN 0

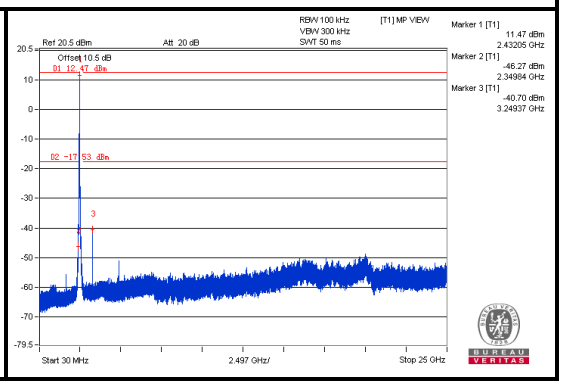
**CH 1**



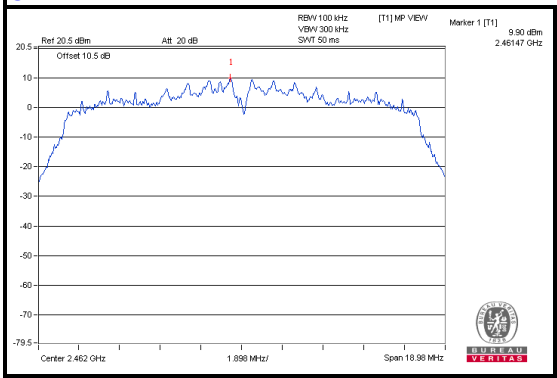



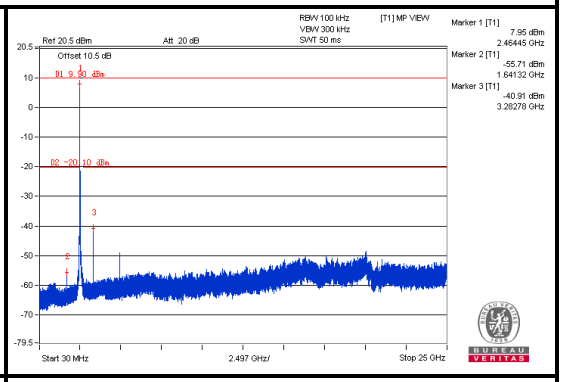

**CH 6**



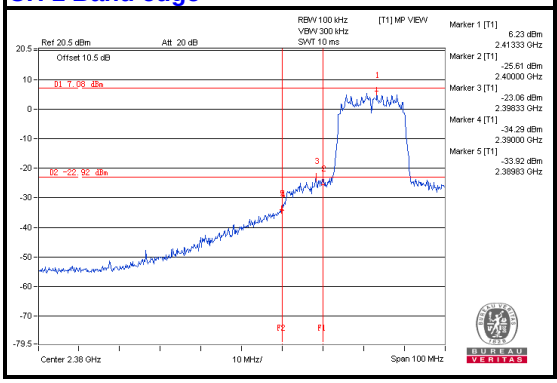



## CH 11

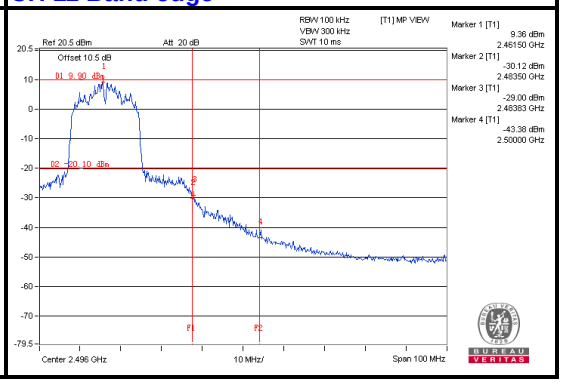



## CH 1 Band edge

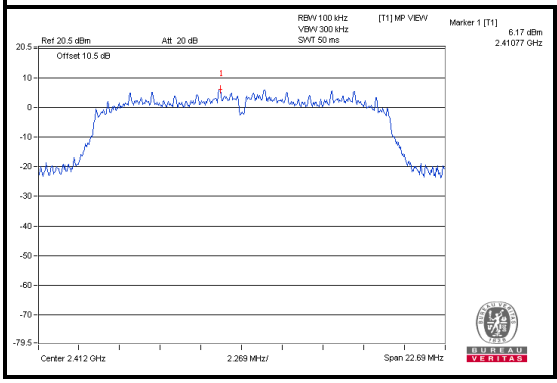


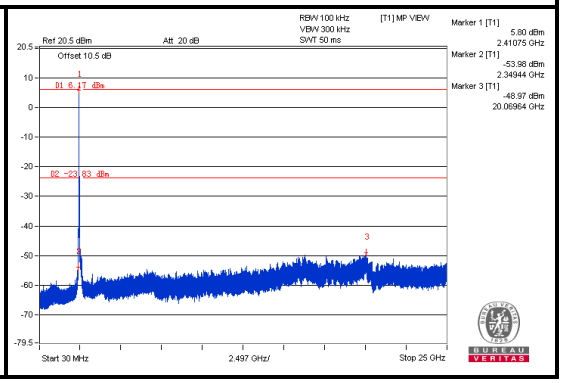

## CH 11 Band edge



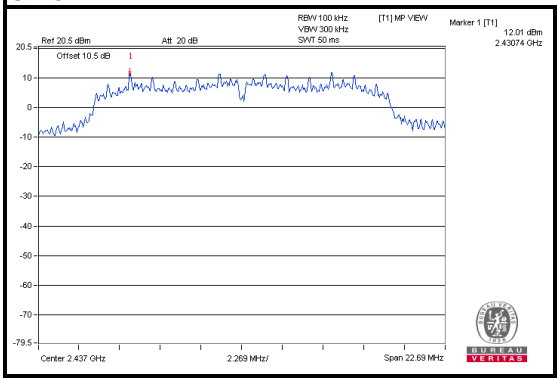

## CHAIN 1

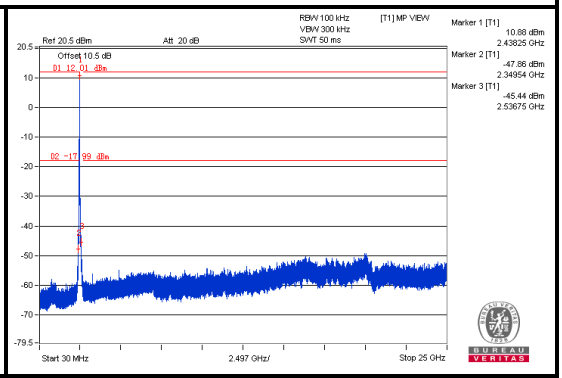
## CH 1



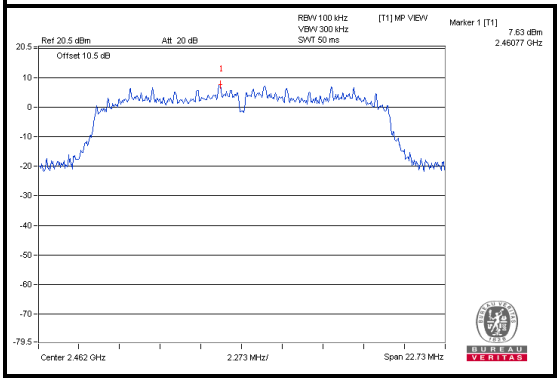



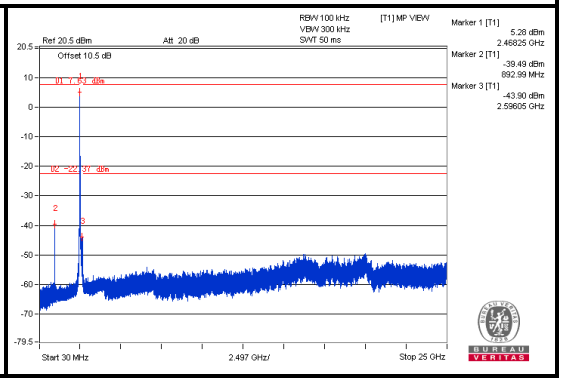
## CH 6



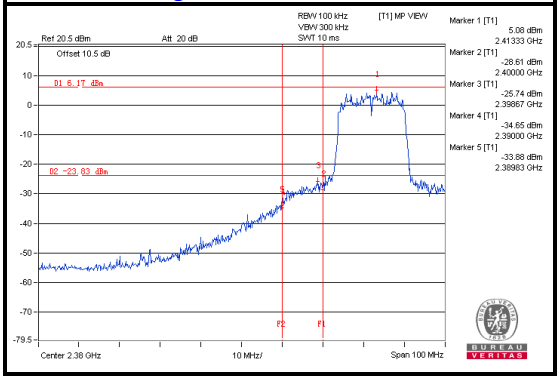




## CH 11

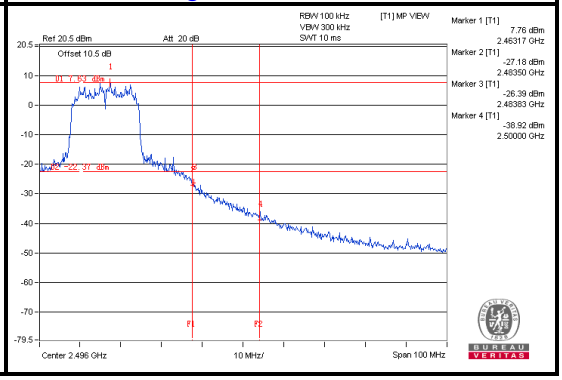



## CH 1 Band edge



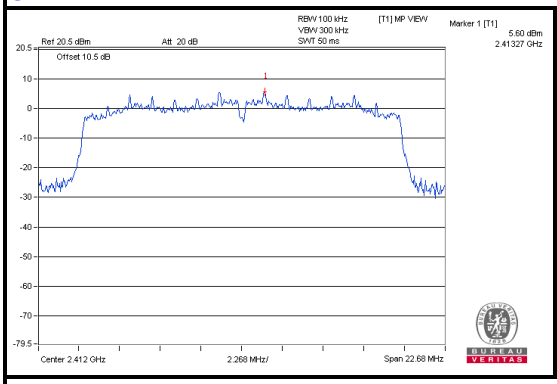

## CH 11 Band edge

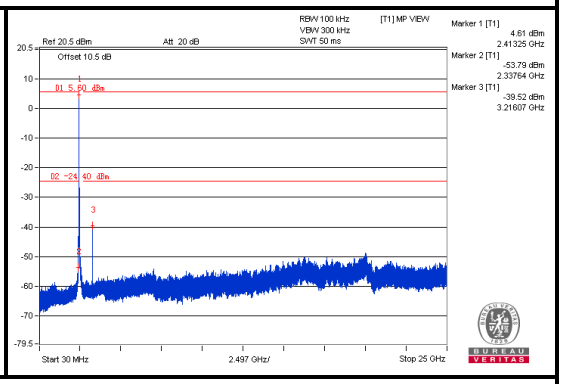


## 802.11n (20MHz)

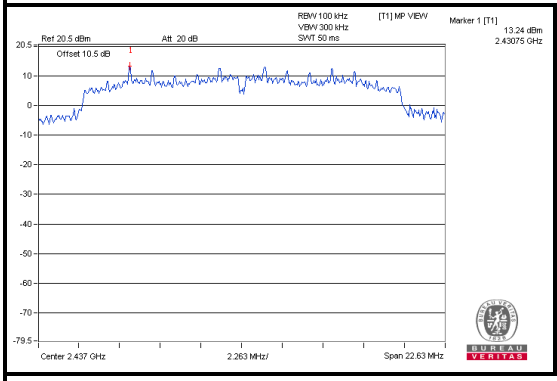
## CHAIN 0

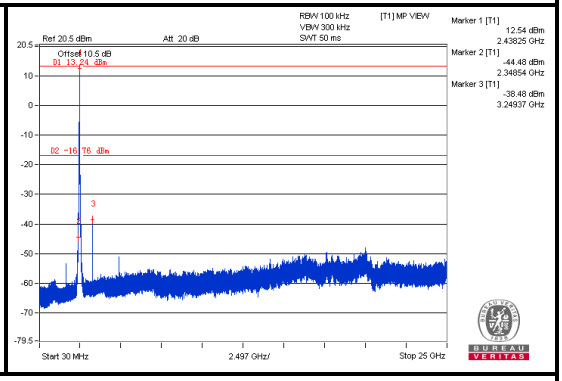
### CH 1



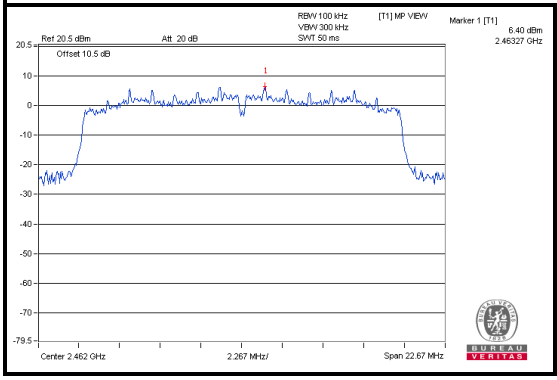



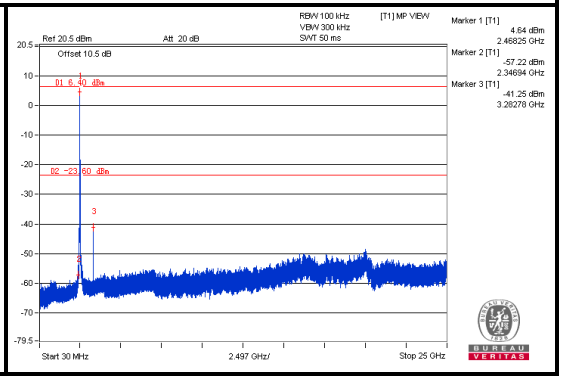

### CH 6



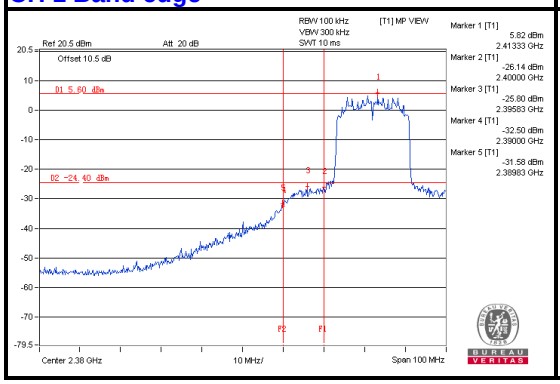




### CH 11

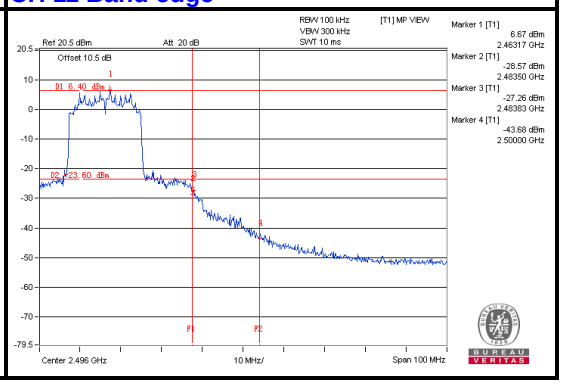


## CH 1 Band edge

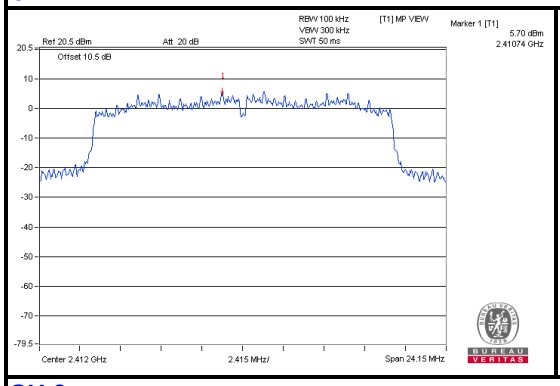


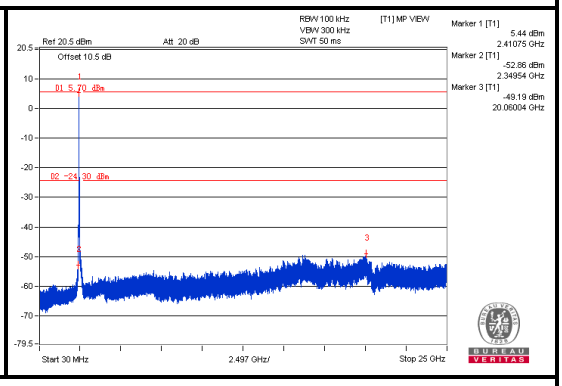

## CH 11 Band edge



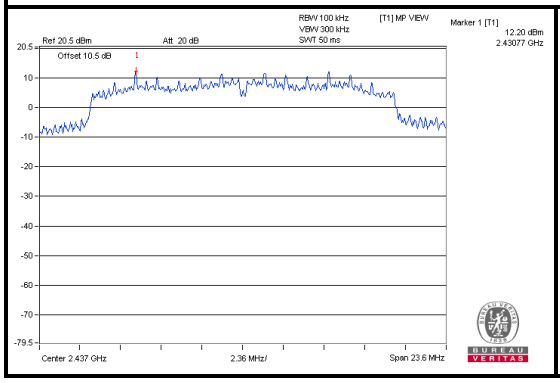

## CHAIN 1

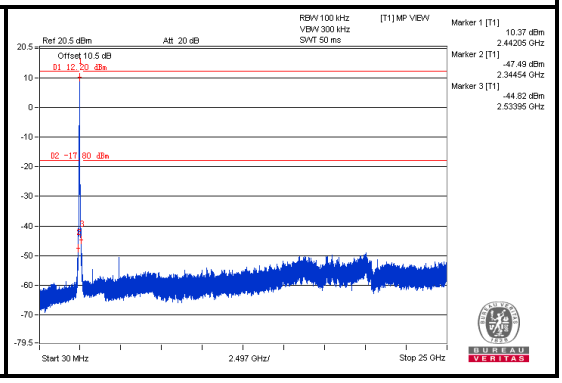
### CH 1



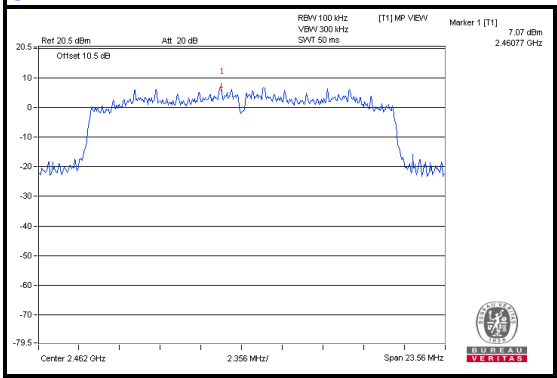



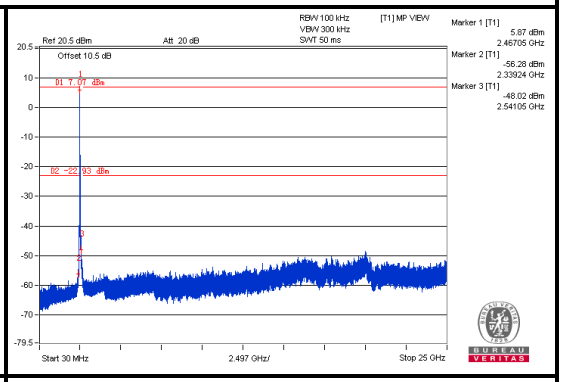

### CH 6



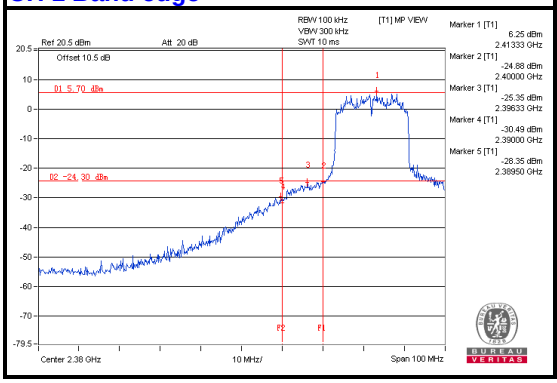



**CH 11**

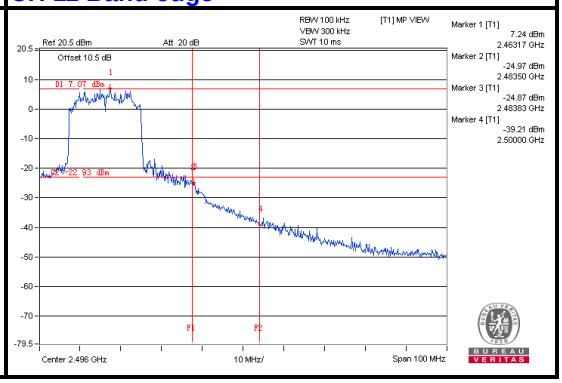



**CH 1 Band edge**



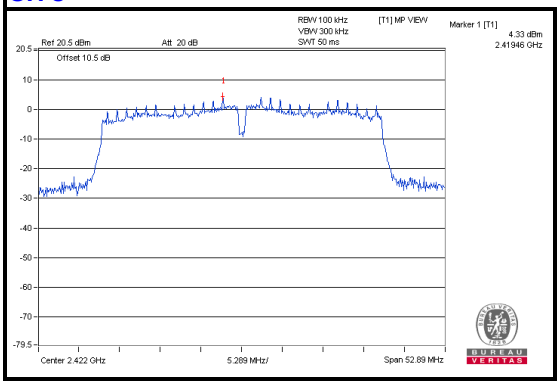

**CH 11 Band edge**

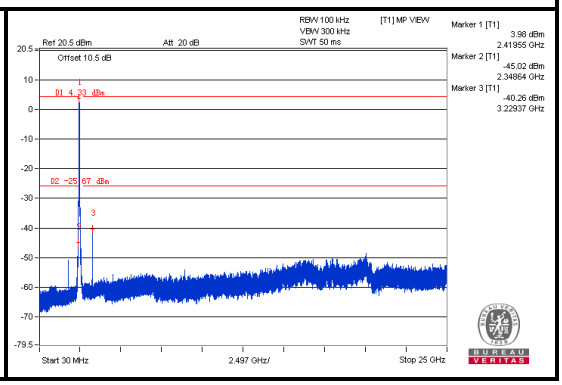



## 802.11n (40MHz)

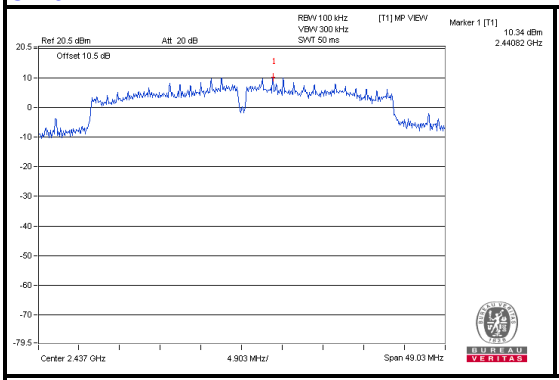
## CHAIN 0

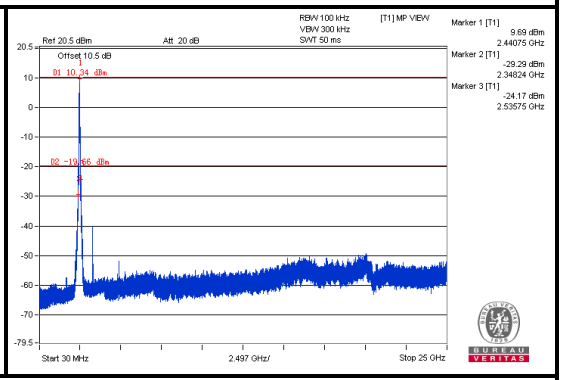
**CH 3**



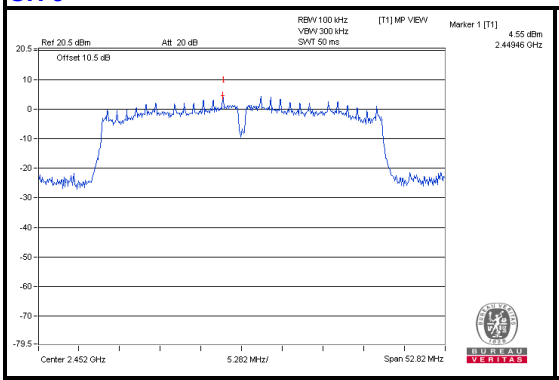



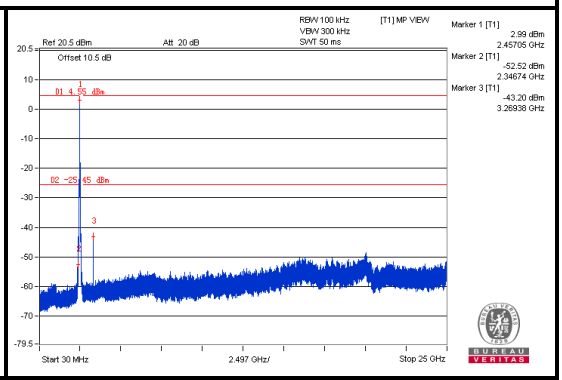
## CH 6



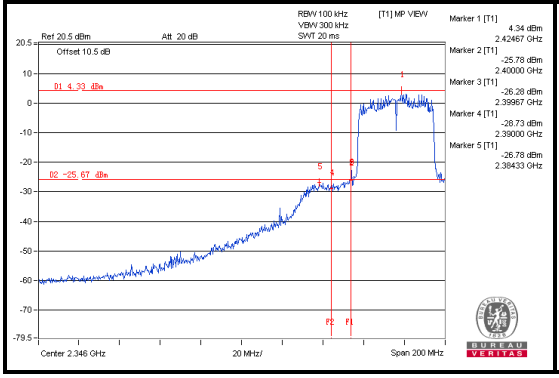




## CH 9

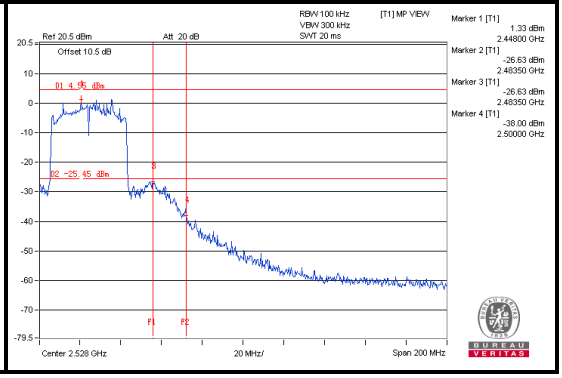



## CH 3 Band edge

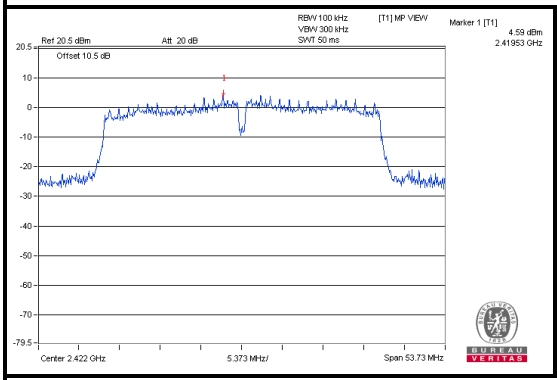


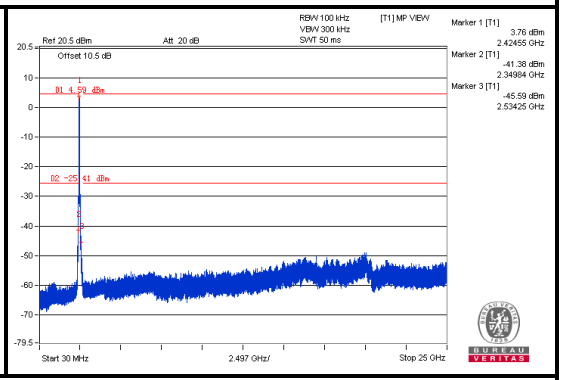

## CH 9 Band edge



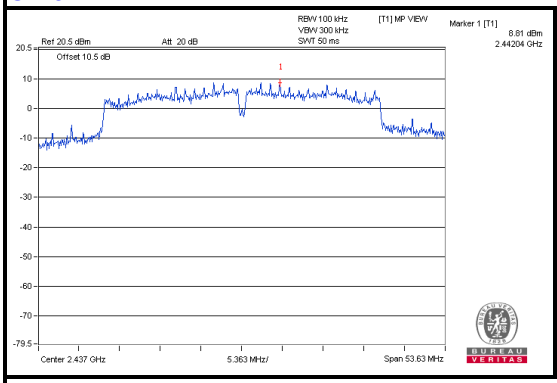
## CHAIN 1

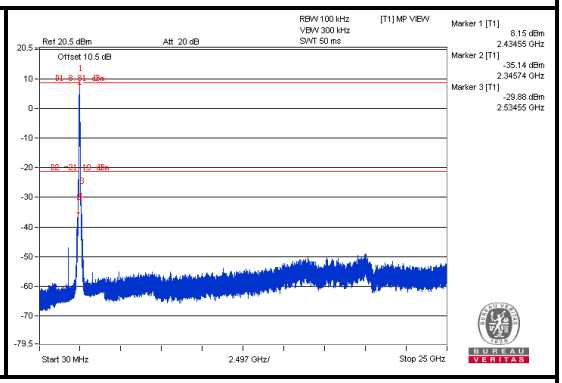
### CH 3



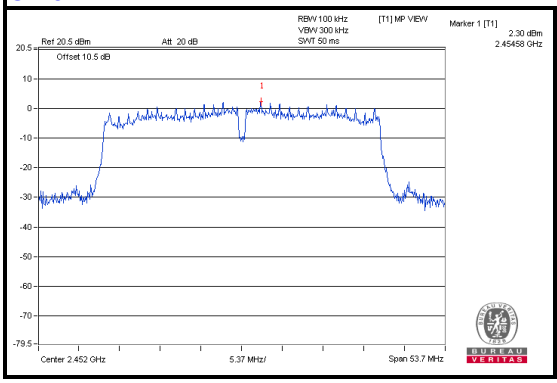



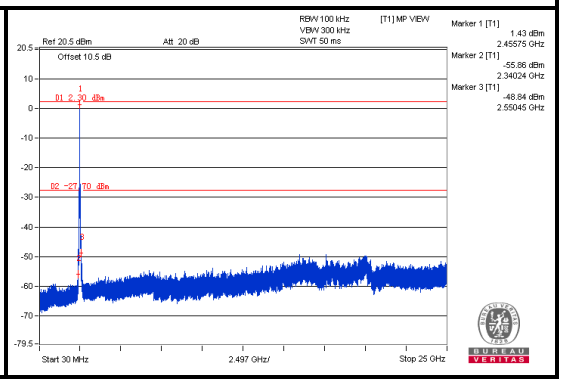

### CH 6

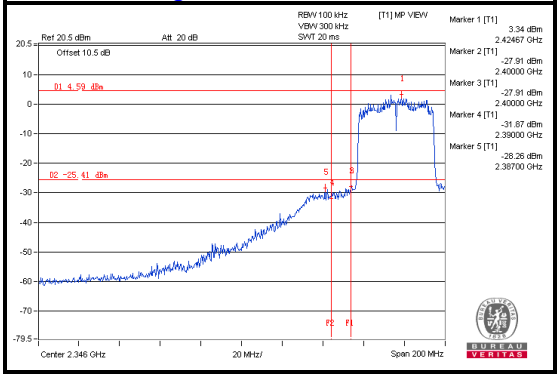
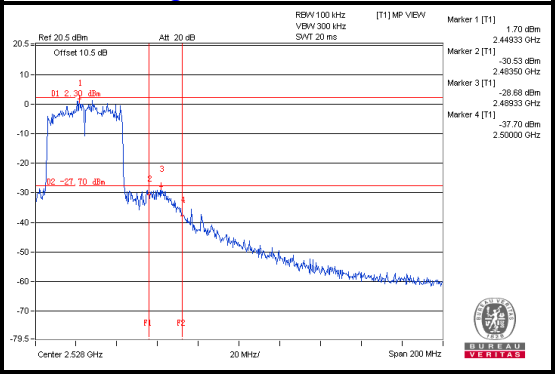



### CH 9



| CH 3 Band edge | CH 9 Band edge |
|---|---|
|  |  |

# 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

# 5 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

**---END---**