# RF TEST REPORT

| | |
|---|---|
| **Report No.:** | SET2015-18870 |
| **Product Name:** | Digital camera |
| **FCC ID:** | 2AE44IRIS4G |
| **Model No. :** | IRIS4G |
| **Applicant:** | Sioeye, Inc. |
| **Address:** | 1518 First Avenue S.Suite 200 Seattle Washington USA |
| **Dates of Testing:** | 06/02/2015 — 06/19/2015 |
| **Issued by:** | CCIC-SET |
| **Lab Location:** | Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055, P. R. China<br>**Tel:** 86 755 26627338 **Fax:** 86 755 26627238 |

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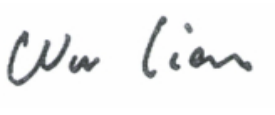
# Test Report

| | |
|---|---|
| **Product Name ..... :** | Digital camera |
| **Brand Name..... :** | Sioeye |
| **Trade Name ..... :** | Sioeye |
| **Applicant ..... :** | Sioeye, Inc. |
| **Applicant Address ..... :** | 1518 First Avenue S.Suite 200 Seattle Washington USA |
| **Manufacturer ..... :** | CK Telecom Limited |
| **Manufacturer Address..... :** | Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China. |
| **Test Standards ..... :** | 47 CFR Part 15 Subpart C 2013：Radio Frequency Devices<br>ANSI C63.10:2009：American National Standard for Testing Unlicensed Wireless Devices<br>KDB558074 D01 DTS Meas Guidance v03r02 |
| **Test Result..... :** | PASS |
| **Tested by ..... :** |  2015.12.18<br>Lu Lei，Test Engineer |
| **Reviewed by..... :** |  2015.12.18<br>Zhu Qi, Senior Egineer |
| **Approved by..... :** |  2015.12.18<br>Wu Li'an，Manager |

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|---|---|---|
| Issue | Date | Reason for change |
| 1.0 | 2015.12.18 | First edition |
| | | |
| | | |

# 1. GENERAL INFORMATION

## 1.1 EUT Description

| | | |
|---|---|---|
| EUT Type | : | Digital camera |
| Hardware Version | : | HICAM-V2.0 |
| Software Version | : | HICAM01A-S10A_Sioeye_L2EN_140_150618 |
| Frequency Range | : | 802.11b/g/n-20MHz: 2.412GHz - 2.462GHz<br>802.11n-40MHz: 2.422GHz - 2.452GHz |
| Channel Number | : | 802.11b/g/n-20MHz: 11<br>802.11n-40MHz: 7 |
| Modulation Type | : | DSSS (802.11b), OFDM (802.11g/n) |
| Antenna Type | : | PIFI Antenna |
| Antenna Gain | : | -3dBi |

Note 1: The EUT is LTE camera, it contains WIFI operating at 2.4GHz ISM band; it supports 802.11b, 802.11g, 802.11n and they are all tested in this report.

Note 2: The frequencies allocated is F (MHz) =2412+5*(n-1) (1<=n<=11). The lowest, middle, highest channel numbers of the EUT used and tested in this report are separately 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz).

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 4: The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%."

## 1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Wi-Fi, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 15 Subpart C 2013 | Radio Frequency Devices |
| 2 | ANSI C63.10 2009 | American National Standard for Testing Unlicensed Wireless Devices |

Test detailed items/section required by FCC rules and results are as below:

| No. | Section | Description | Result |
|---|---|---|---|
| 1 | 15.203 | Antenna Requirement | PASS |
| 2 | 15.247(b) | Peak Output Power | PASS |
| 3 | 15.247(a) | Bandwidth | PASS |
| 4 | 15.247(d) | Conducted Spurious Emission | PASS |
| 5 | 15.247(d) | Band Edge | PASS |
| 6 | 15.207 | Conducted Emission | PASS |
| 7 | 15.209 ,15.247(c) | Radiated Emission | PASS |
| 8 | 15.247(e) | Power spectral density (PSD) | PASS |

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2009.

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(Mbps) | Channel |
|---|---|---|---|
| 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 | 1 | 1/6/11 |
| | 11g/OFDM | 6 | 1/6/11 |
| | 11n(20MHz)/OFDM | MCS0 | 1/6/11 |
| | 11n(40MHz)/OFDM | MCS0 | 3/6/9 |
| Band Edge | 11b/DSSS | 1 | 1/11 |
| | 11g/OFDM | 6 | 1/11 |
| | 11n(20MHz)/OFDM | MCS0 | 1/11 |
| | 11n(40MHz)/OFDM | MCS0 | 3/9 |

## 1.3 Facilities and Accreditations

### 1.3.1 Facilities

**CNAS-Lab Code: L1659**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

**FCC-Registration No.: 406086**

CCIC Southern Electronic Product Testing (Shenzhen) 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 406086, valid time is until October 28, 2017.

**IC-Registration No.: 11185A-1**

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on July. 15, 2013, valid time is until July. 15, 2016.

### 1.3.2 Test Environment Conditions

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

| | |
|---|---|
| Temperature (°C): | 15°C - 35°C |
| Relative Humidity (%): | 30% -60% |
| Atmospheric Pressure (kPa): | 86KPa-106KPa |

# 2. 47 CFR PART 15C REQUIREMENTS

## 2.1 Antenna requirement

### 2.1.1 Applicable Standard

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

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.

### 2.1.2 Antenna Information

**Antenna Category:** External antenna
An External antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

**Antenna General Information:**

| No. | EUT Model | Ant. Cat. | Ant. Type | Gain(dBi) |
|---|---|---|---|---|
| 1 | LTE Mobile Phone | External | PIFI | -3 |

### 2.1.3 Result: comply

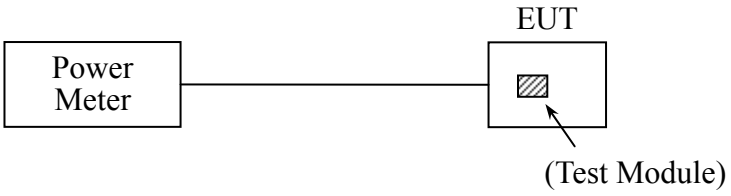
The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

## 2.2 Peak Output Power

### 2.2.1 Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed1 Watt.

### 2.2.2 Test Description




The measured output power was calculated by the reading of the spectrum analyzer and calibration.

**A. Test Setup:**

The EUT (Equipment under the test) which is powered by the Battery is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in Power Meter.

**B. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Power Meter | Anritsu | ML2495A | 1421017 | 2015.06.02 | 2016.06.01 |
| Power Sensor | Anritsu | MA2411B | 1417208 | 2015.06.02 | 2016.06.01 |

### 2.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

#### 2.2.3.1 802.11b Test mode

**Test Verdict:**

| Channel | Frequency (MHz) | Measured Output Peak Power(dBm) | Limits (dBm) | Result |
|---|---|---|---|---|
| 1 | 2412 | 16.88 | 30 | PASS |
| 6 | 2437 | 17.20 | 30 | PASS |
| 11 | 2462 | 16.94 | 30 | PASS |

#### 2.2.3.2 802.11g Test mode

**Test Verdict:**

| Channel | Frequency (MHz) | Measured Output Peak Power (dBm) | Limits (dBm) | Result |
|---|---|---|---|---|
| 1 | 2412 | 16.40 | 30 | PASS |
| 6 | 2437 | 16.63 | 30 | PASS |
| 11 | 2462 | 16.51 | 30 | PASS |

### 2.2.3.3 802.11n-20MHz Test mode

**Test Verdict:**

| Channel | Frequency (MHz) | Measured Output Peak Power(dBm) | Limits (dBm) | Result |
|---|---|---|---|---|
| 1 | 2412 | 16.01 | 30 | PASS |
| 6 | 2437 | 16.21 | 30 | PASS |
| 11 | 2462 | 16.10 | 30 | PASS |

### 2.2.3.4 802.11n-40MHz Test mode

**Test Verdict:**

| Channel | Frequency (MHz) | Measured Output Peak Power(dBm) | Limits (dBm) | Result |
|---|---|---|---|---|
| 3 | 2422 | 15.70 | 30 | PASS |
| 6 | 2437 | 15.77 | 30 | PASS |
| 9 | 2452 | 15.62 | 30 | PASS |

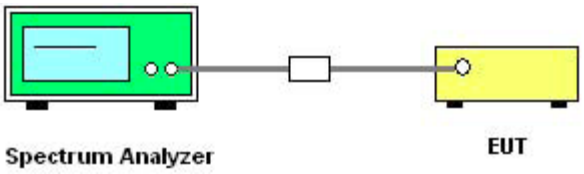
## 2.3 Bandwidth

### 2.3.1 Requirement

According to FCC section 15.247(a) (2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 2.3.2 Test Description

**A. Test Set:**




The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss and Atten as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. (VBW) = 300 kHz In order to make an accurate measurement, set the span greater than EBW.

**B. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal.Date | Cal.Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 1164.4391.40 | 2014.07.07 | 2015.07.06 |

### 2.3.3 Test Result

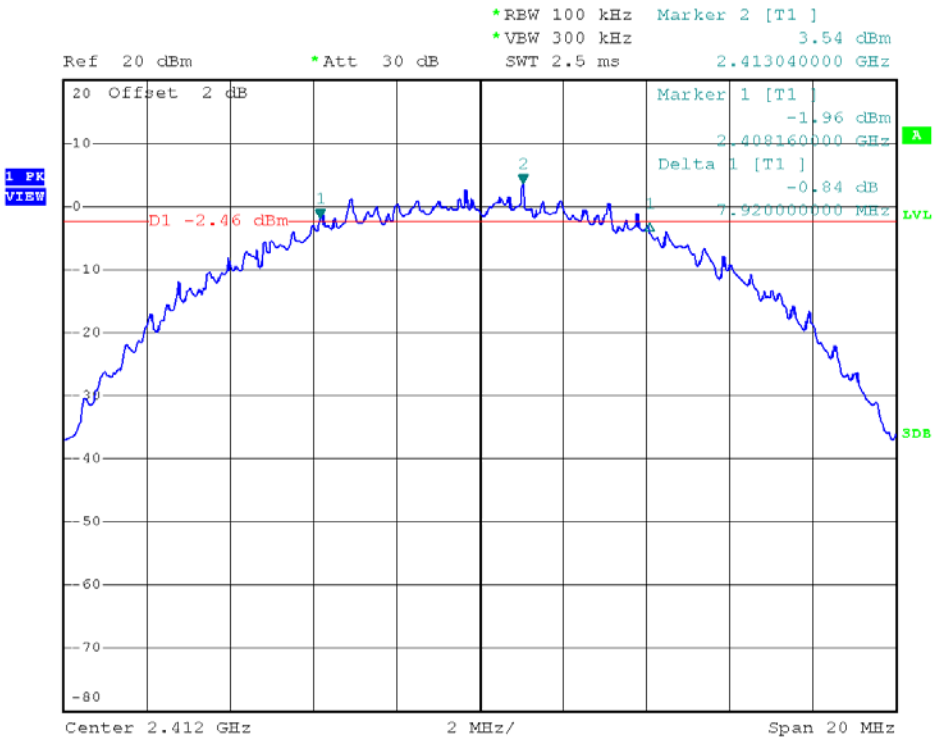
The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

### 2.3.3.1 802.11b Test mode

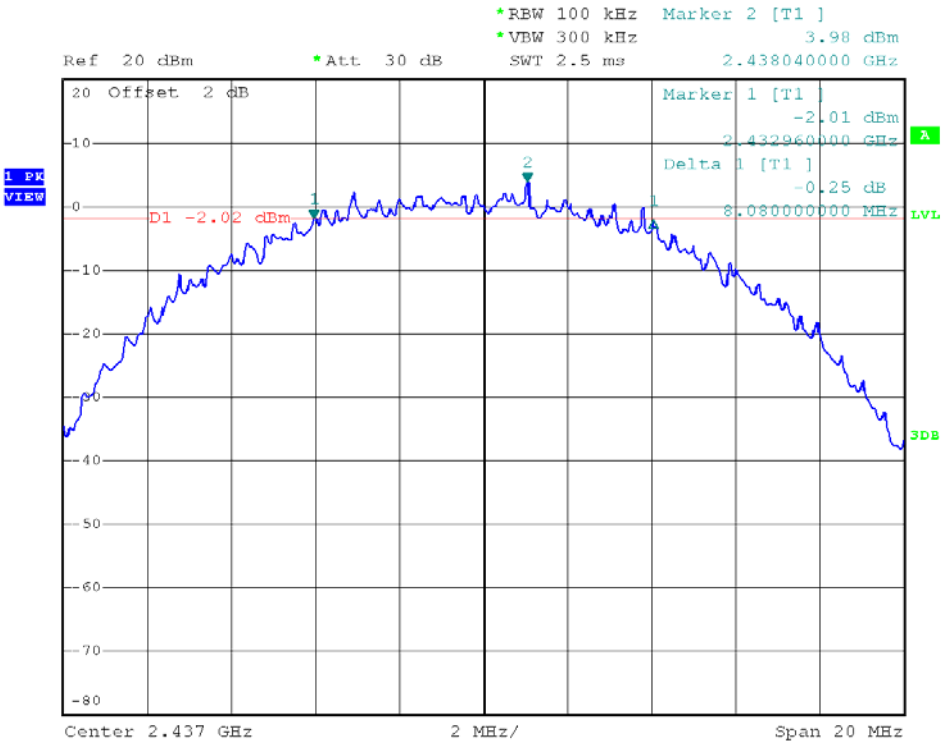
**A. Test Verdict:**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Refer to Plot | Limits(kHz) | Result |
|---|---|---|---|---|---|
| 1 | 2412 | 7.92 | Plot 2.3 A | ≥500 | PASS |
| 6 | 2437 | 8.08 | Plot 2.3 B | ≥500 | PASS |
| 11 | 2462 | 7.20 | Plot 2.3 C | ≥500 | PASS |

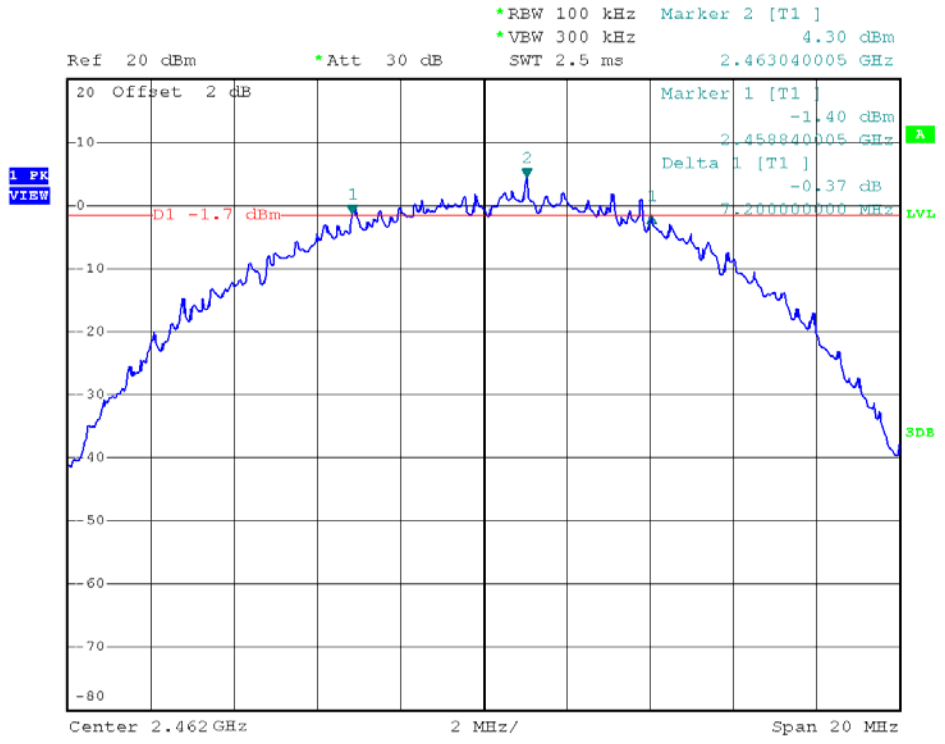
**B. Test Plots:**




(Plot 2.3 A: Channel 1: 2412MHz @ 802.11b)




(Plot 2.3 B: Channel 6: 2437 MHz @ 802.11b)



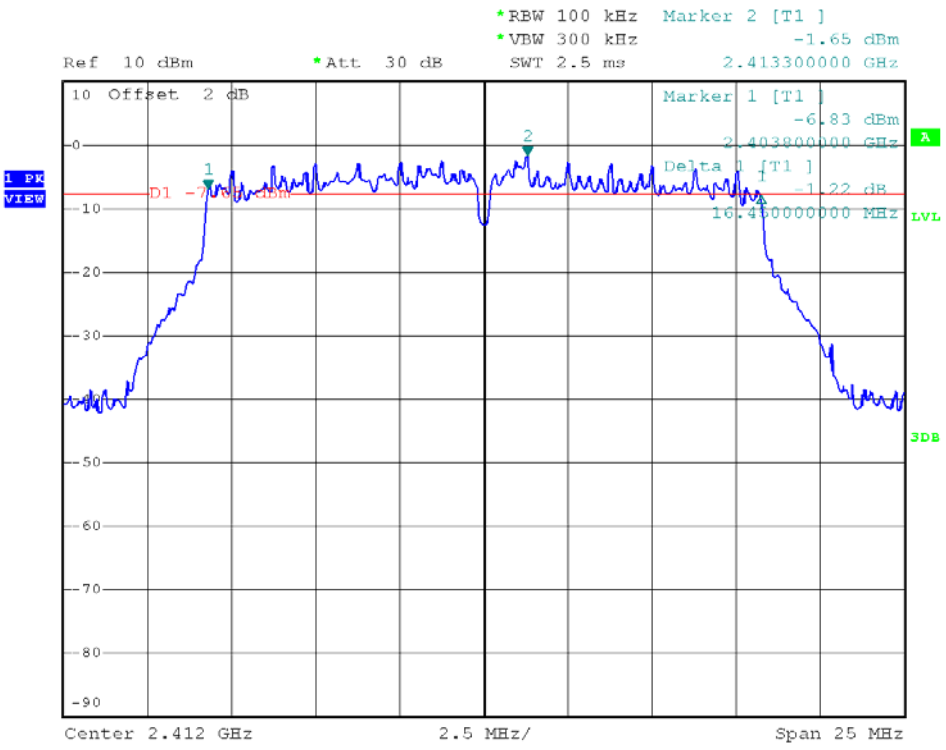

(Plot 2.3 C: Channel 11: 2462MHz @ 802.11b)

### 2.3.3.2 802.11g Test mode

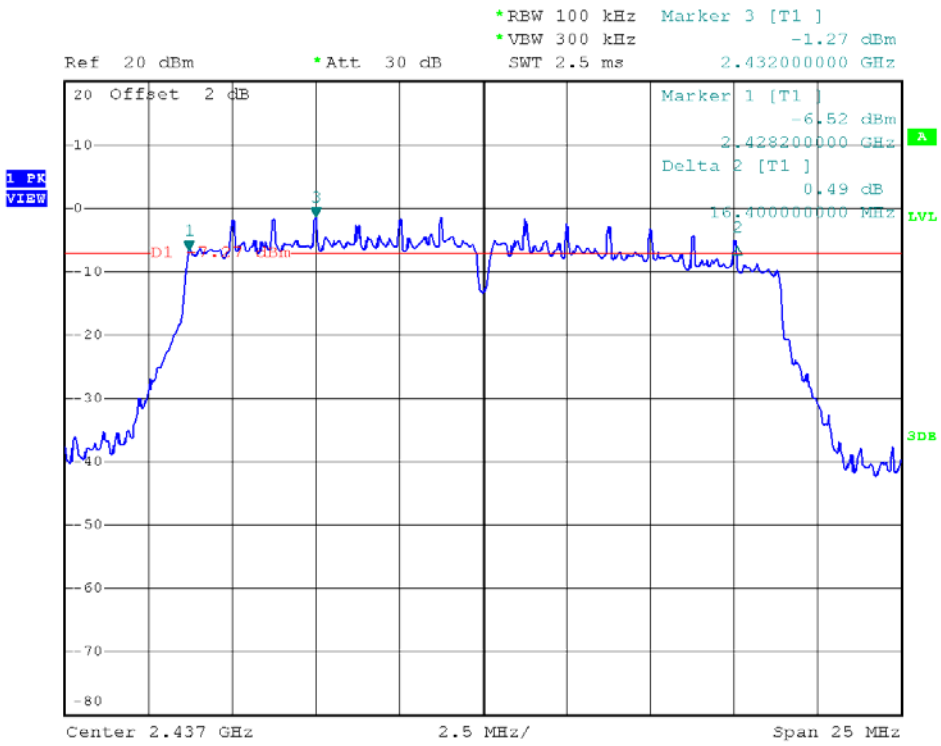
**A. Test Verdict:**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Refer to Plot | Limits (kHz) | Result |
|---|---|---|---|---|---|
| 1 | 2412 | 16.45 | Plot 2.3 D | ≥500 | PASS |
| 6 | 2437 | 16.40 | Plot 2.3 E | ≥500 | PASS |
| 11 | 2462 | 15.70 | Plot 2.3 F | ≥500 | PASS |

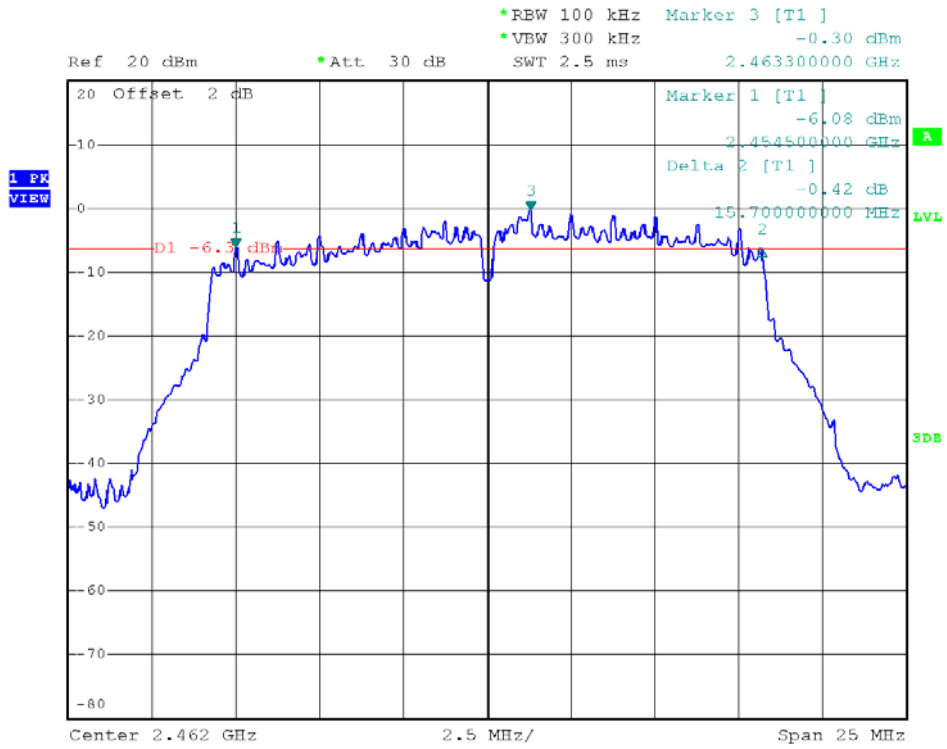
**B. Test Plots:**




(Plot 2.3 D: Channel 1: 2412MHz @ 802.11g)




(Plot 2.3 E: Channel 6: 2437MHz @ 802.11g)



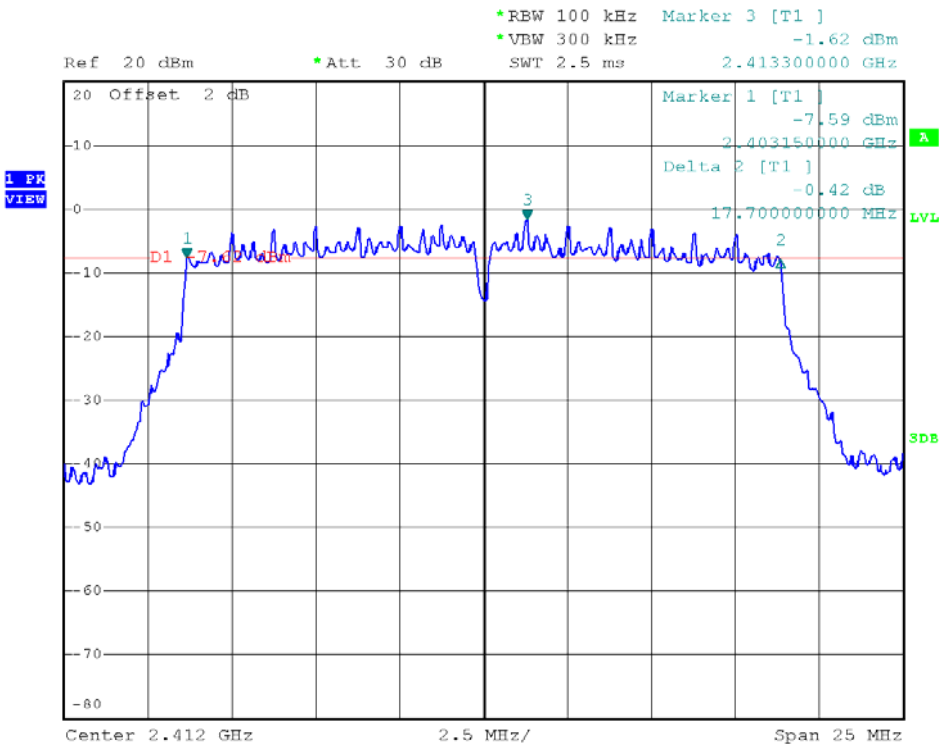

(Plot 2.3 F: Channel 11: 2462MHz @ 802.11g)

### 2.3.3.3 802.11n-20 Test mode

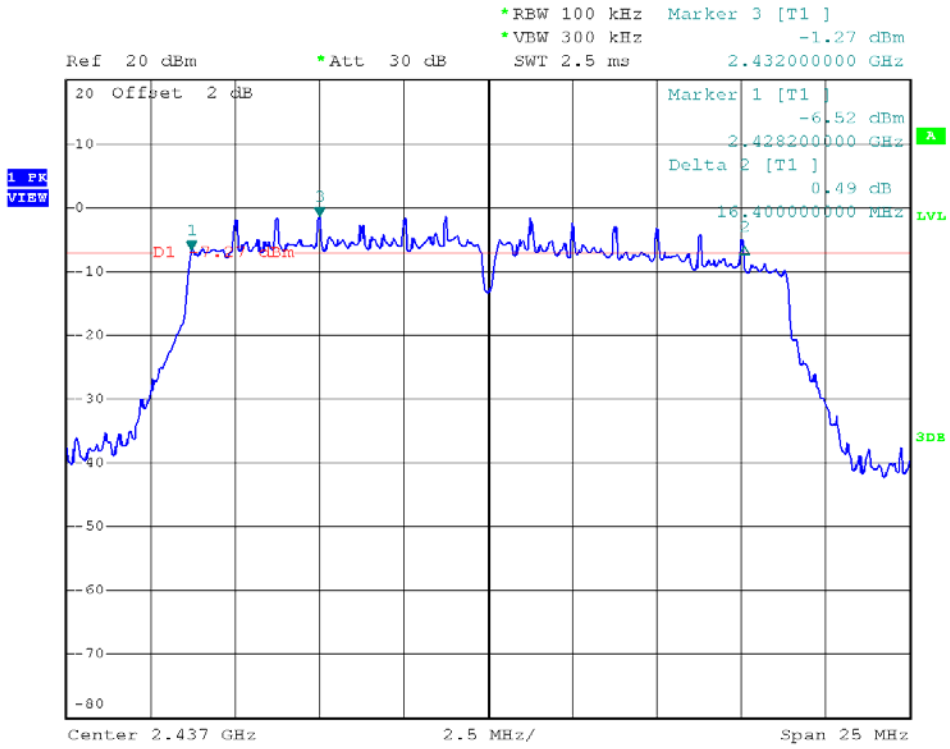
**A. Test Verdict:**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Refer to Plot | Limits (kHz) | Result |
|---|---|---|---|---|---|
| 1 | 2412 | 17.70 | Plot 2.3 G | ≥500 | PASS |
| 6 | 2437 | 16.40 | Plot 2.3 H | ≥500 | PASS |
| 11 | 2462 | 16.00 | Plot 2.3 I | ≥500 | PASS |

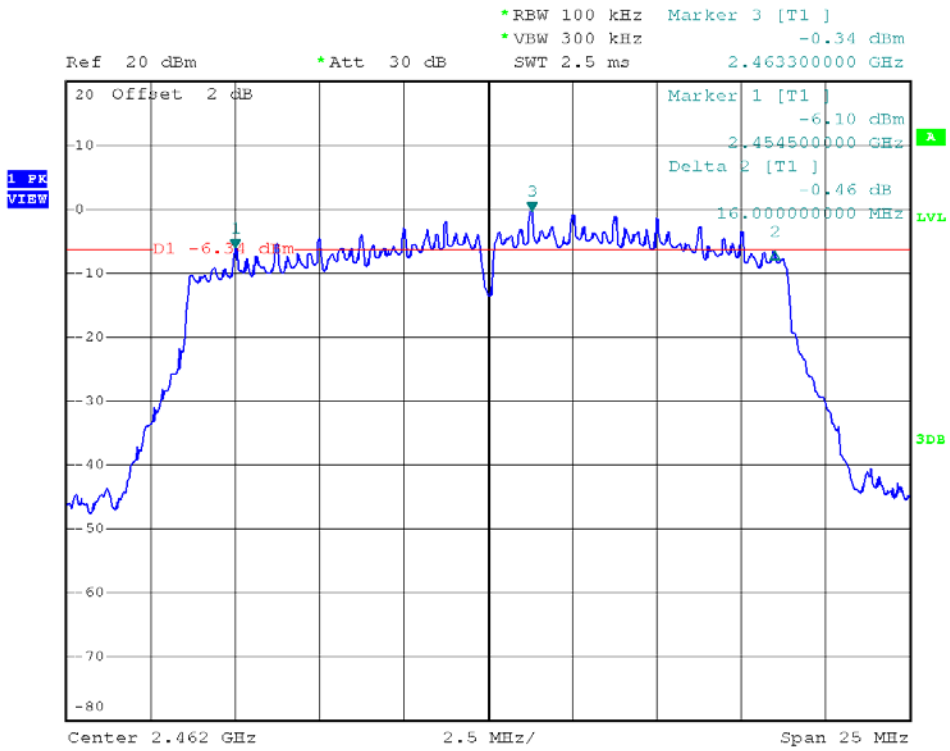
**B. Test Plots:**




(Plot 2.3 G: Channel 1: 2412MHz @ 802.11n-20)




(Plot 2.3 H: Channel 6: 2437MHz @ 802.11n-20)



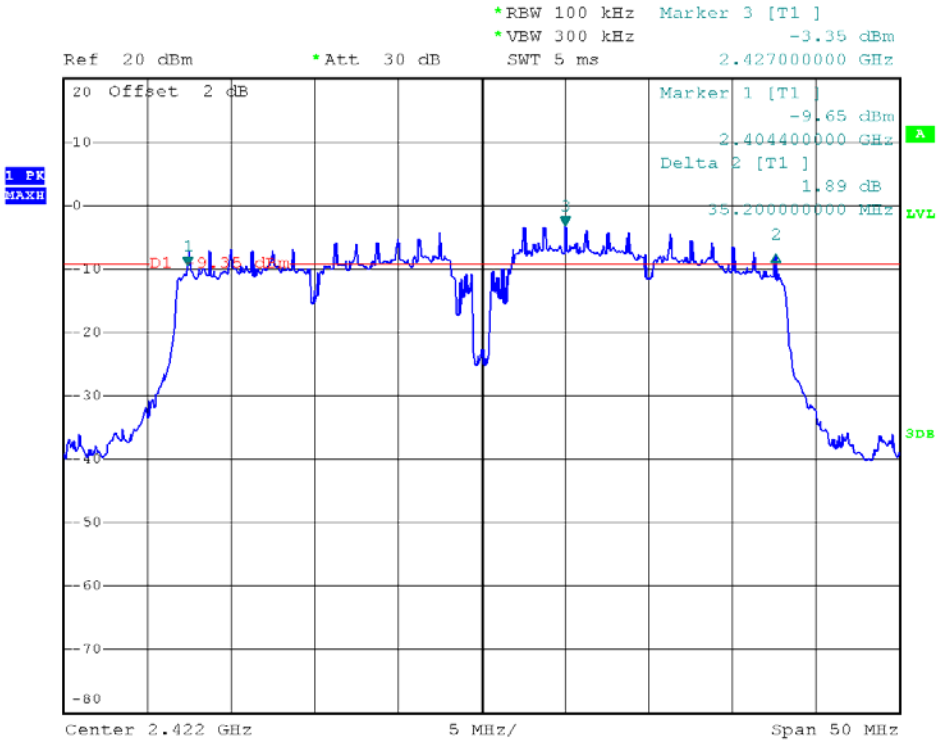

(Plot 2.3 I: Channel 11: 2462MHz @ 802.11n-20)

### 2.3.3.4 802.11n-40 Test mode

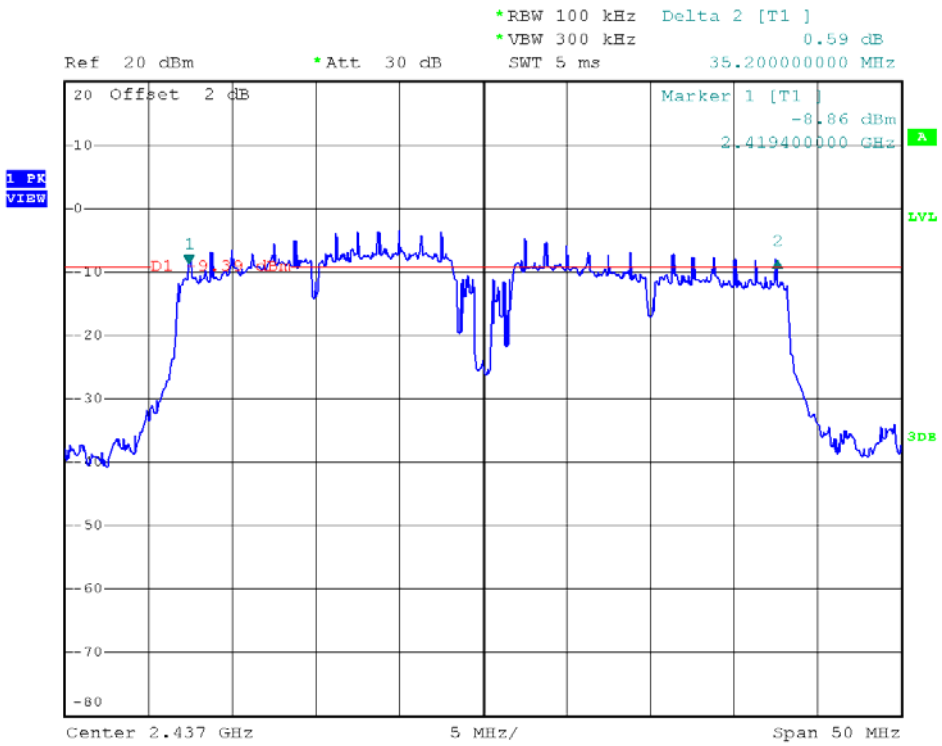
**A. Test Verdict:**

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Refer to Plot | Limits (kHz) | Result |
|---|---|---|---|---|---|
| 3 | 2422 | 35.20 | Plot 2.3 J | ≥500 | PASS |
| 6 | 2437 | 35.20 | Plot 2.3 K | ≥500 | PASS |
| 9 | 2452 | 35.50 | Plot 2.3 L | ≥500 | PASS |

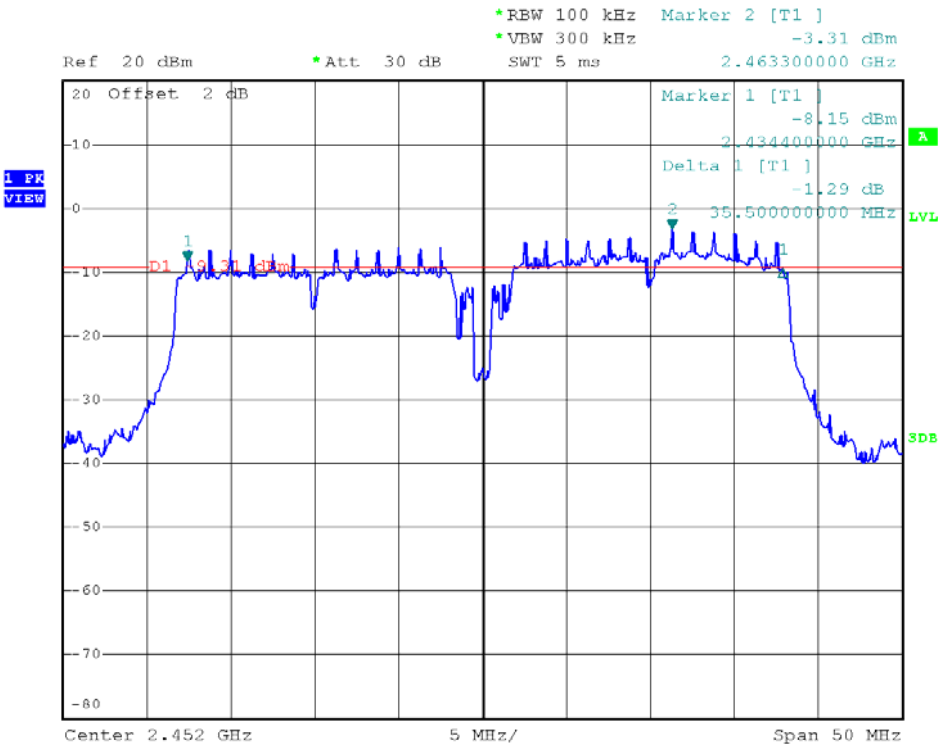
**B. Test Plots:**




(Plot 2.3 J: Channel 3: 2422MHz @ 802.11n-40)




(Plot 2.3 K: Channel 6: 2437MHz @ 802.11n-40)




(Plot 2.3 L: Channel 9: 2452MHz @ 802.11n-40)

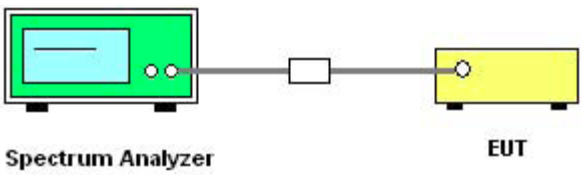
## 2.4 Conducted Spurious Emissions

### 2.4.1 Requirement

According to FCC section 15.247(c), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 2.4.2 Test Description

**A. Test Set:**




The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss and Atten as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

**B. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 1164.4391.40 | 2014.07.07 | 2015.07.06 |

### 2.4.3 Test Result

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

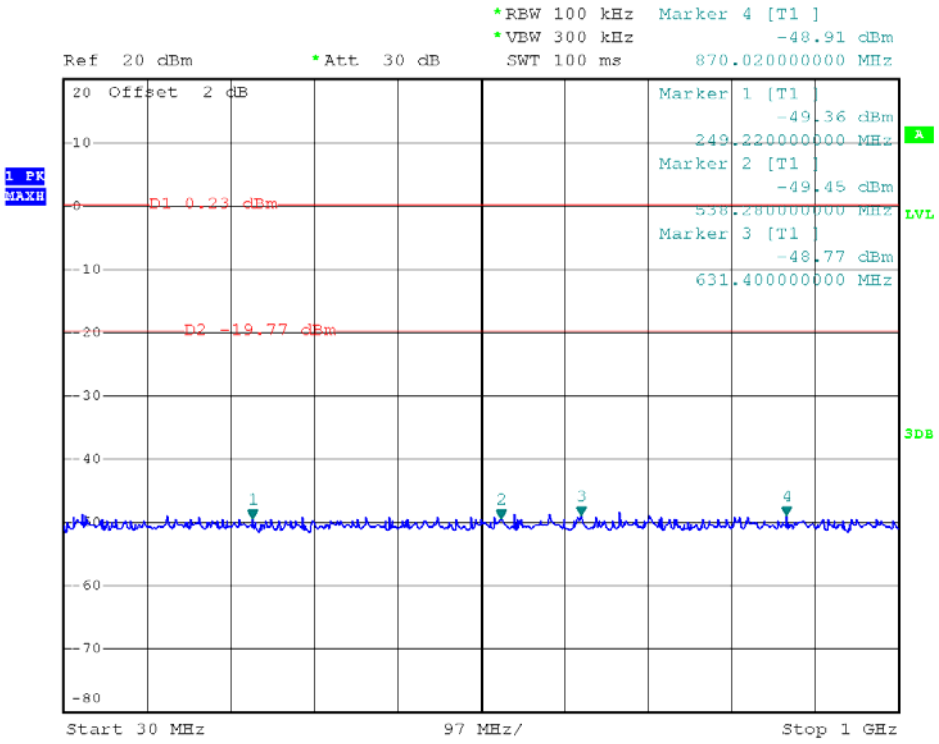
#### 2.4.3.1 802.11b Test mode

**A. Test Verdict:**

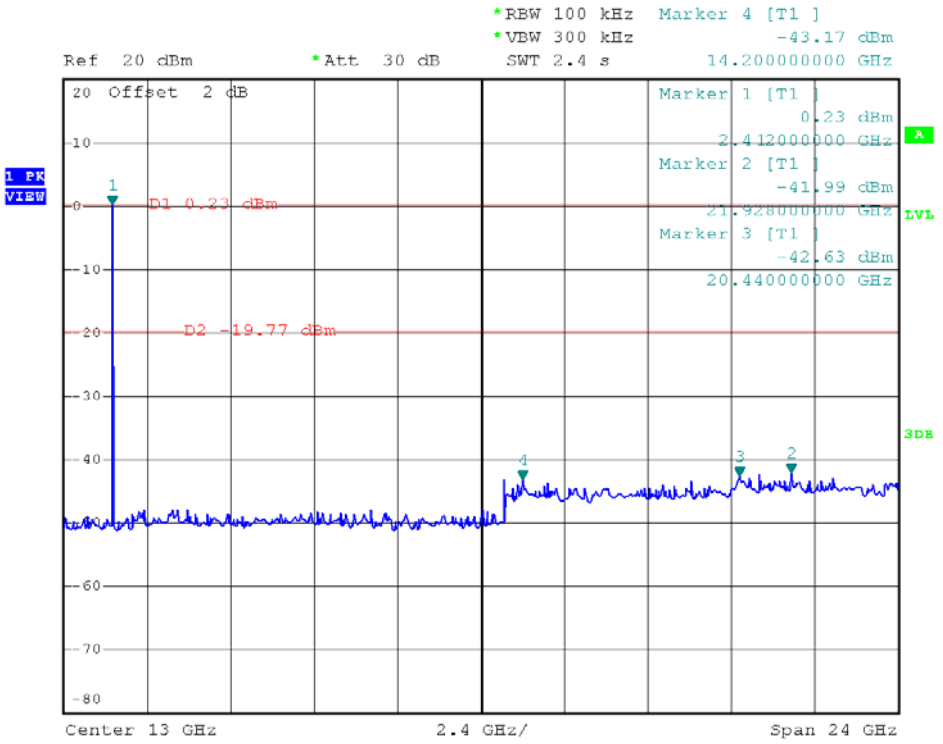
| Channel | Frequency (MHz) | Refer to Plot | Limit (dBc) | Verdict |
|---|---|---|---|---|
| 1 | 2412 | Plot 2.4 A.1 to A.2 | -20 | PASS |
| 6 | 2437 | Plot 2.4 B.1 to B.2 | -20 | PASS |
| 11 | 2462 | Plot 2.4 C.1 to C.2 | -20 | PASS |

**B. Test Plots:**

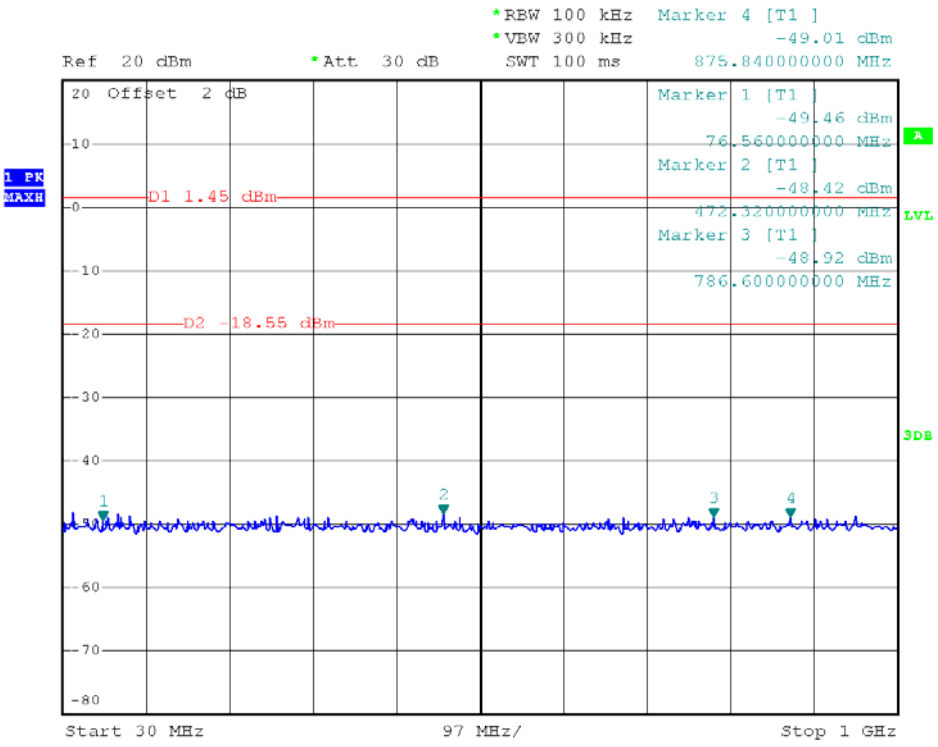
Note: the power of the Module transmitting frequency should be ignored.



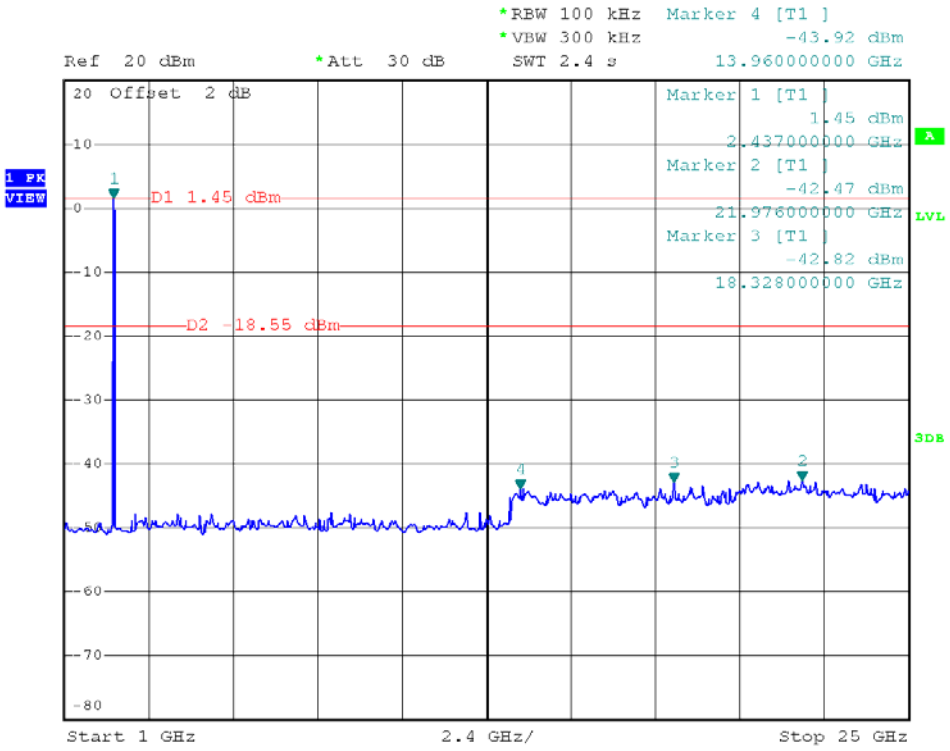

(Plot 2.4 A.1: Channel = 1, 30MHz to 1GHz@ 802.11b)



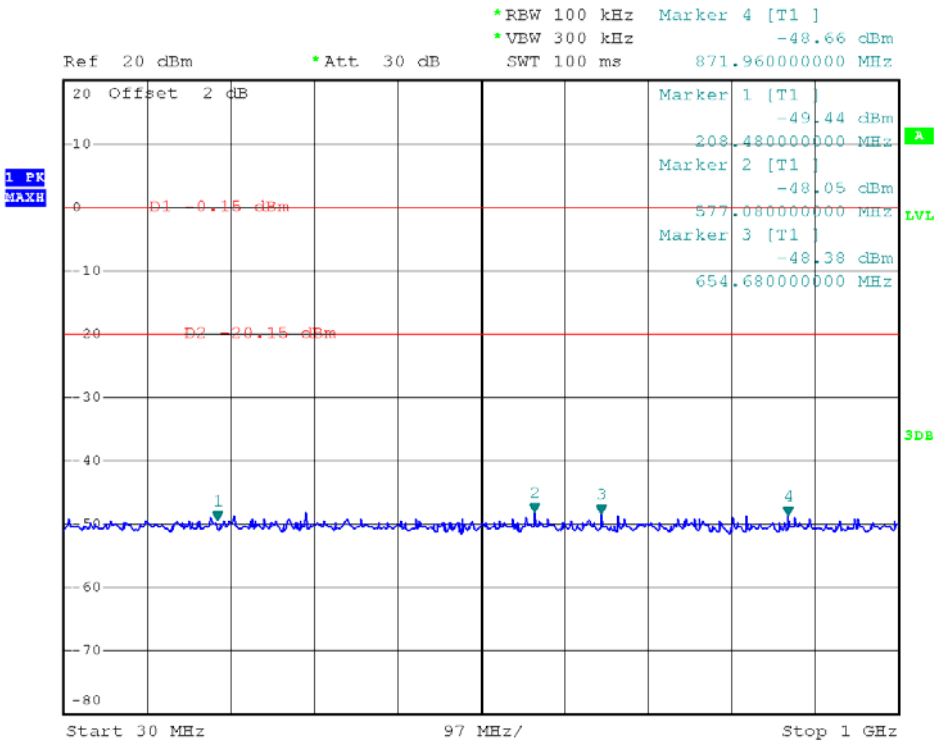

(Plot 2.4 A.2: Channel = 1, 1GHz to 25GHz@ 802.11b)



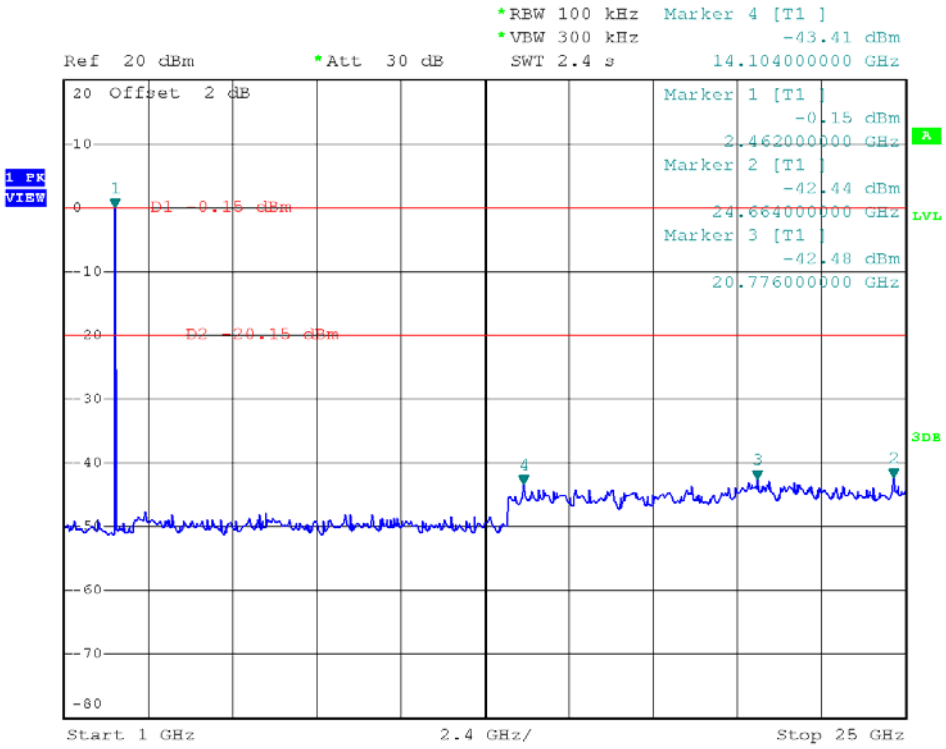

(Plot 2.4 B.1: Channel = 6, 30MHz to 1GHz@ 802.11b)




(Plot 2.4 B.2: Channel = 6, 1GHz to 25GHz@ 802.11b)




(Plot 2.4 C.1: Channel = 11, 30MHz to 1GHz@ 802.11b)




(Plot 2.4 C.2: Channel = 11, 1GHz to 25GHz@ 802.11b)

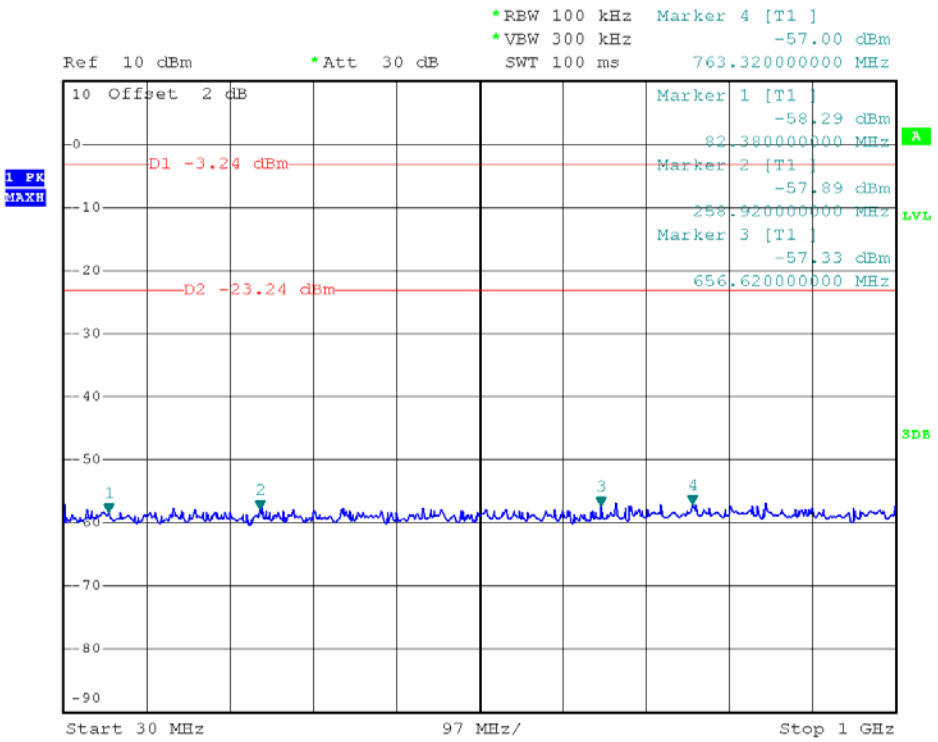
### 2.4.3.2 802.11g Test mode

**A. Test Verdict:**

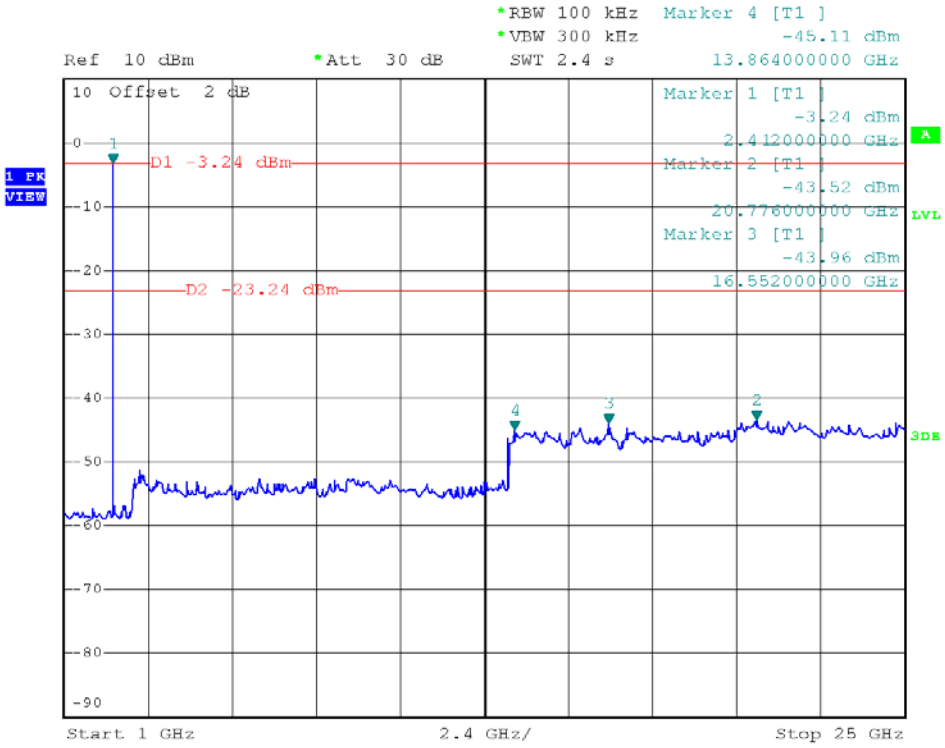
| Channel | Frequency (MHz) | Refer to Plot | Limit (dBc) | Verdict |
|---|---|---|---|---|
| 1 | 2412 | Plot 2.4 D.1 to D.2 | -20 | PASS |
| 6 | 2437 | Plot 2.4 E.1 to E.2 | -20 | PASS |
| 11 | 2462 | Plot 2.4 F.1 to F.2 | -20 | PASS |

**B. Test Plots:**

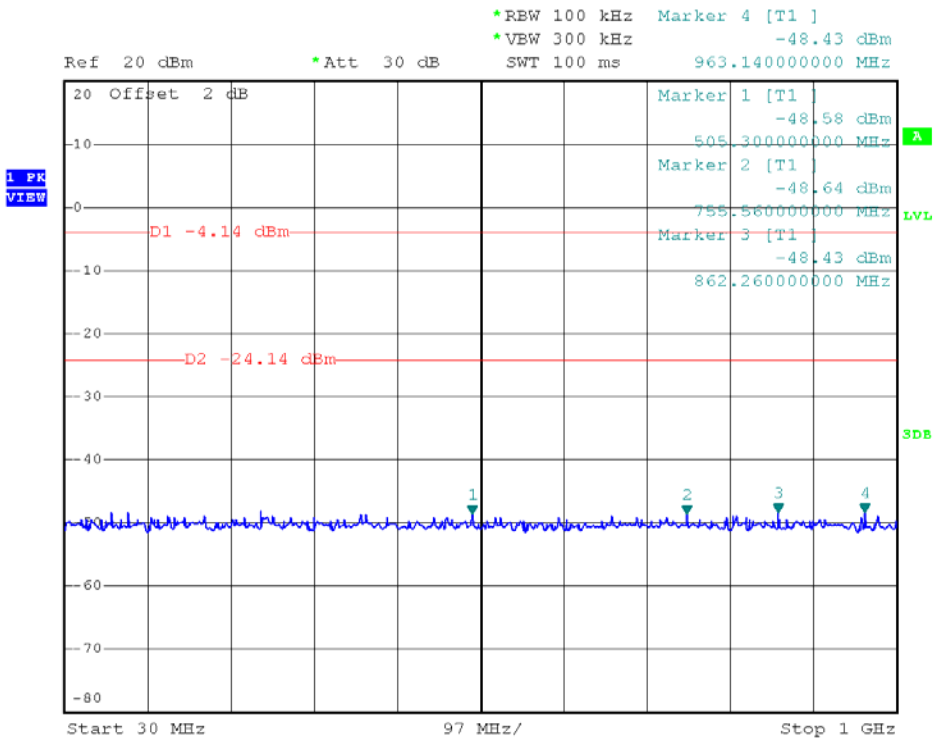
Note: the power of the Module transmitting frequency should be ignored.



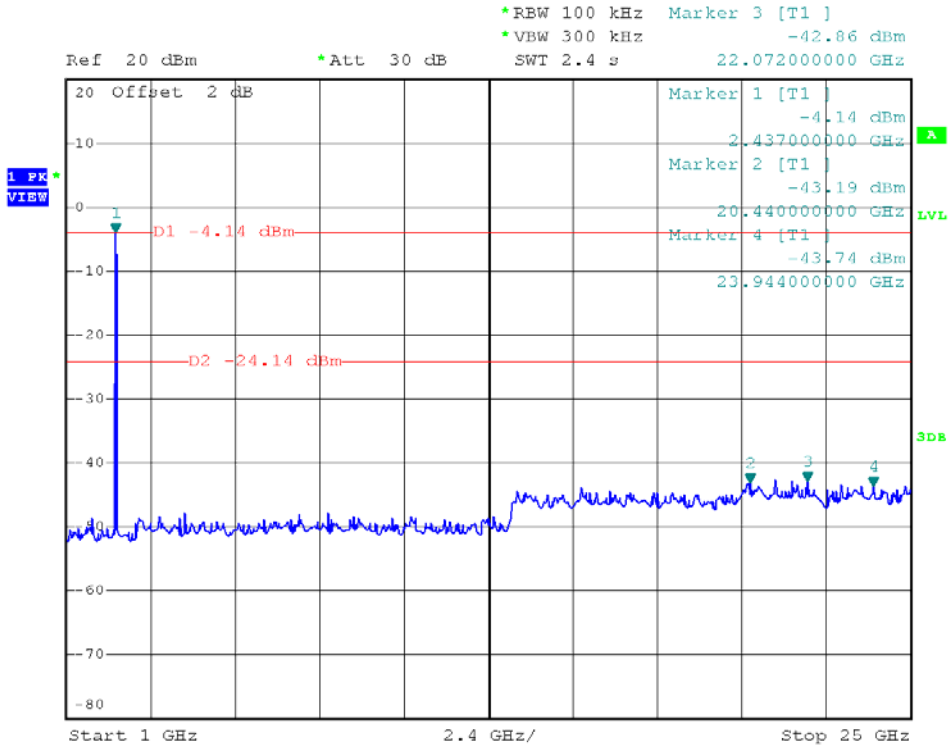

(Plot 2.4 D.1: Channel = 1, 30MHz to 1GHz@ 802.11g)



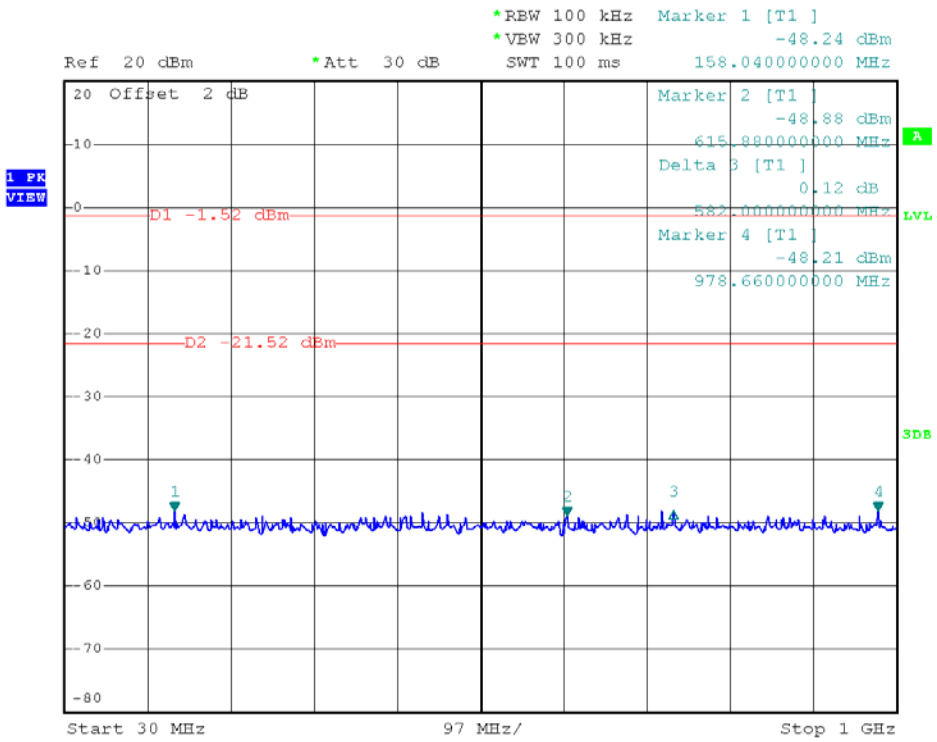

(Plot 2.4 D.2: Channel = 1, 1GHz to 25GHz@ 802.11g)



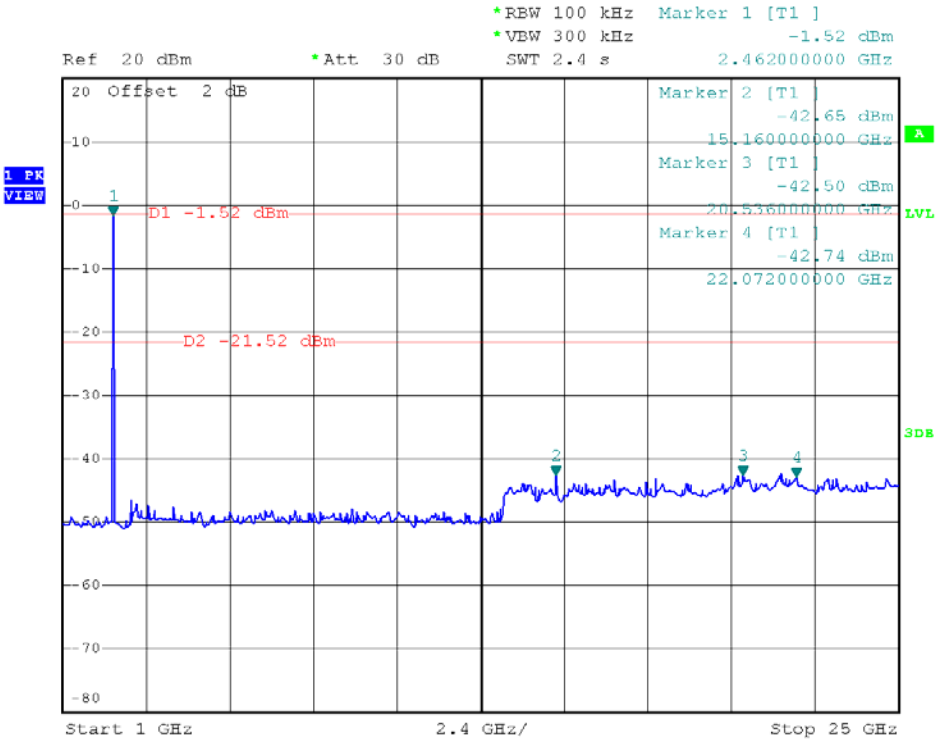

(Plot 2.4 E.1: Channel = 6, 30MHz to 1GHz@ 802.11g)




(Plot 2.4 E.2: Channel = 6, 1GHz to 25GHz@ 802.11g)




(Plot 2.4 F.1: Channel = 11, 30MHz to 1GHz@ 802.11g)




(Plot 2.4 F.2: Channel = 11, 1GHz to 25GHz@ 802.11g)

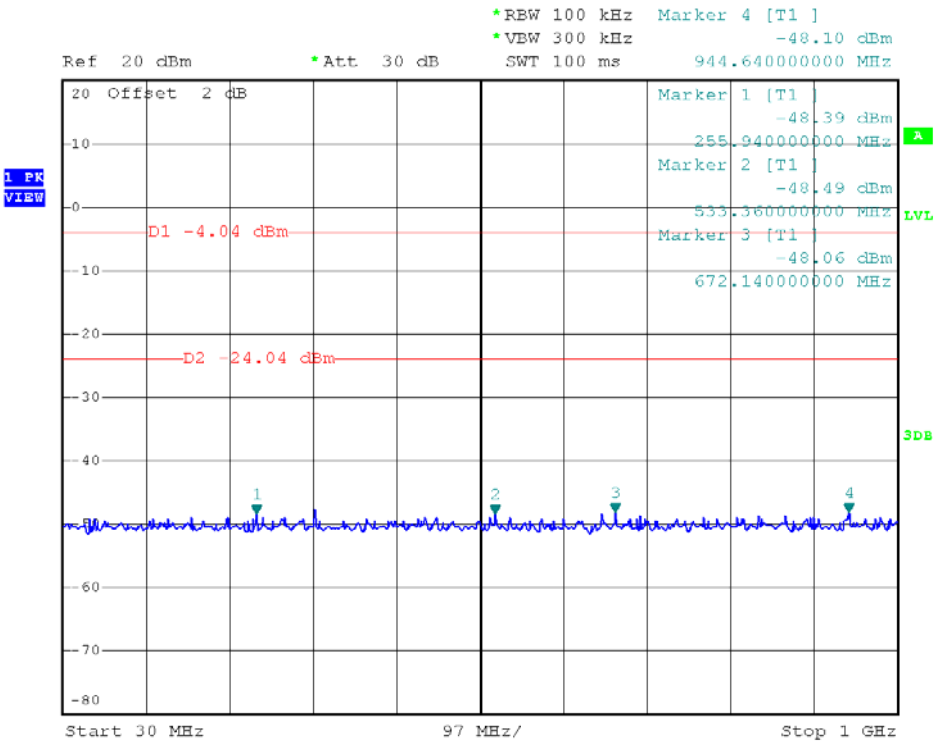
### 2.4.3.3 802.11n -20MHz Test mode

**A. Test Verdict:**

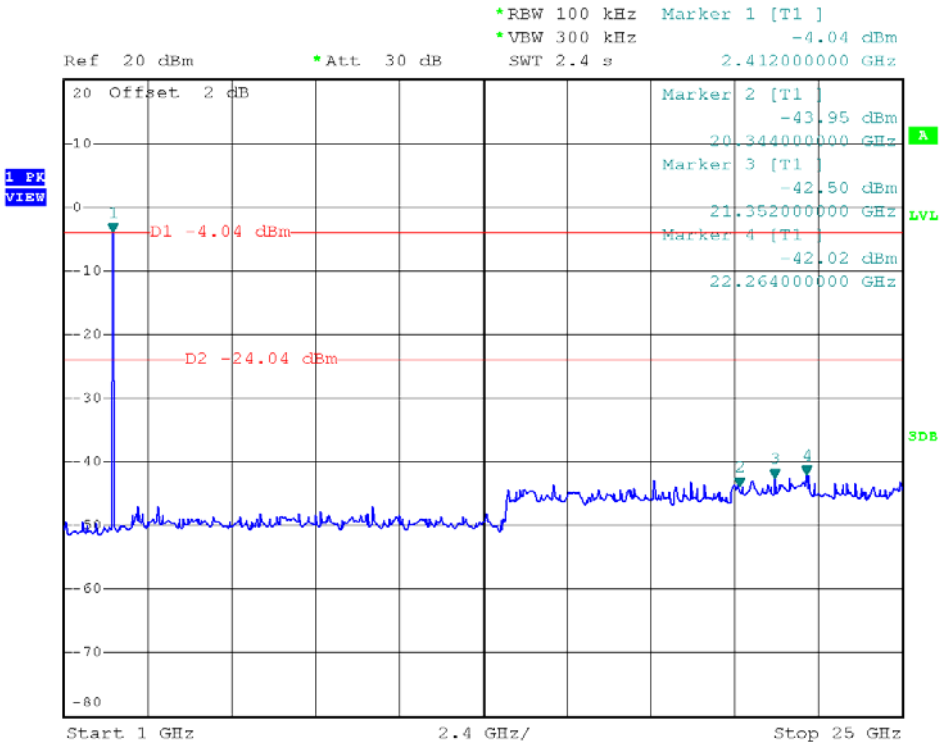
| Channel | Frequency (MHz) | Refer to Plot | Limit (dBc) | Verdict |
|---|---|---|---|---|
| 1 | 2412 | Plot 2.4 G.1 to G.2 | -20 | PASS |
| 6 | 2437 | Plot 2.4 H.1 to H.2 | -20 | PASS |
| 11 | 2462 | Plot 2.4 I.1 to I.2 | -20 | PASS |

**B. Test Plots:**

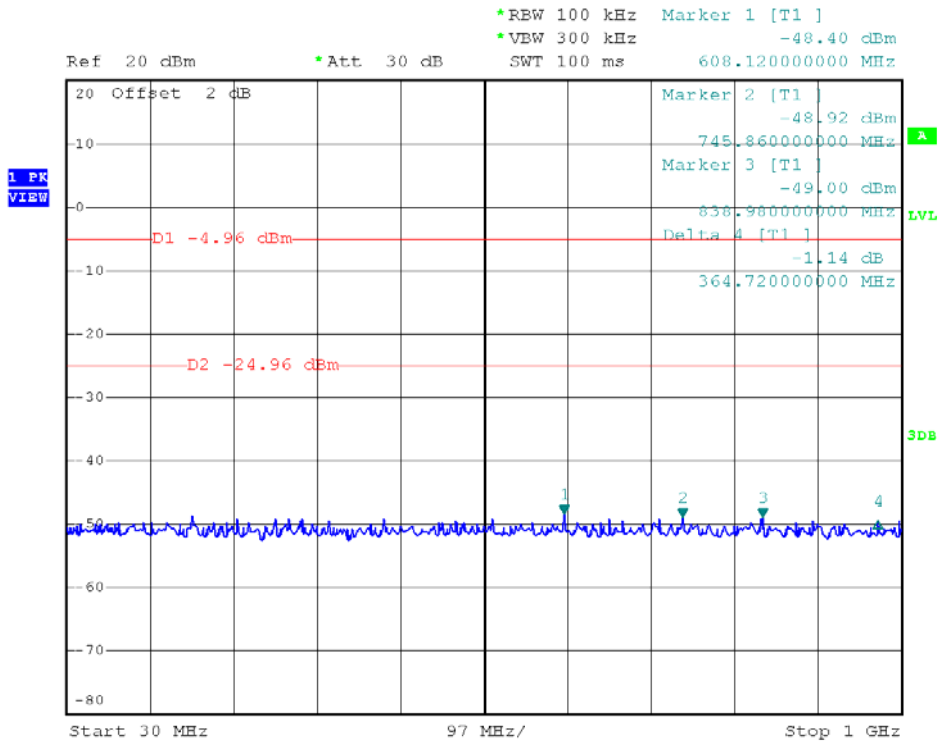
Note: the power of the Module transmitting frequency should be ignored.



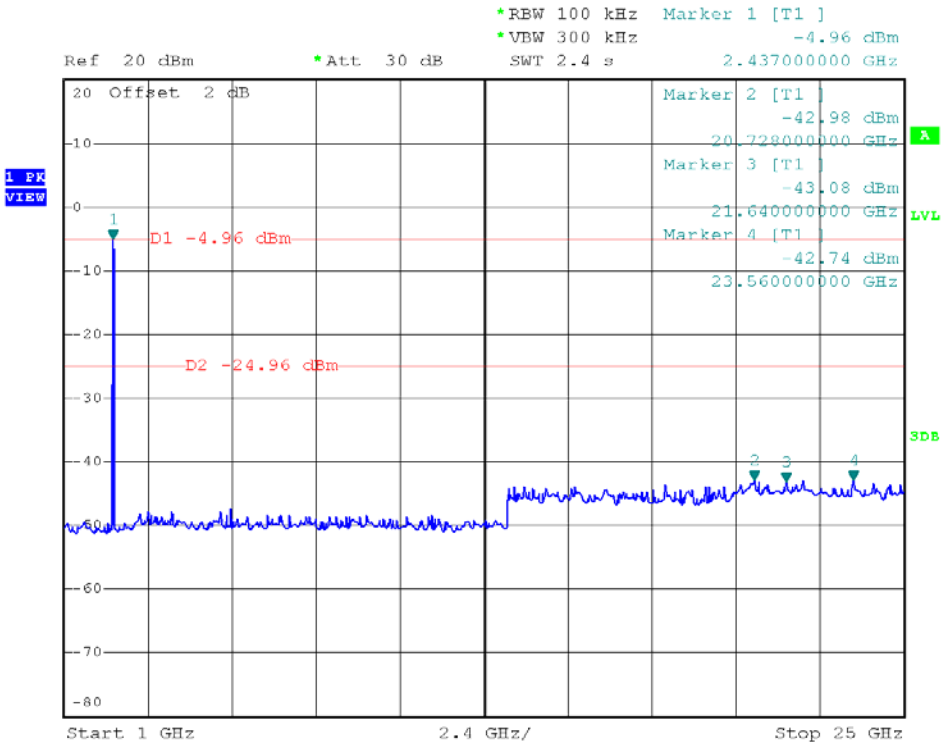

(Plot 2.4 G.1: Channel = 1, 30MHz to 1GHz@ 802.11n-20)



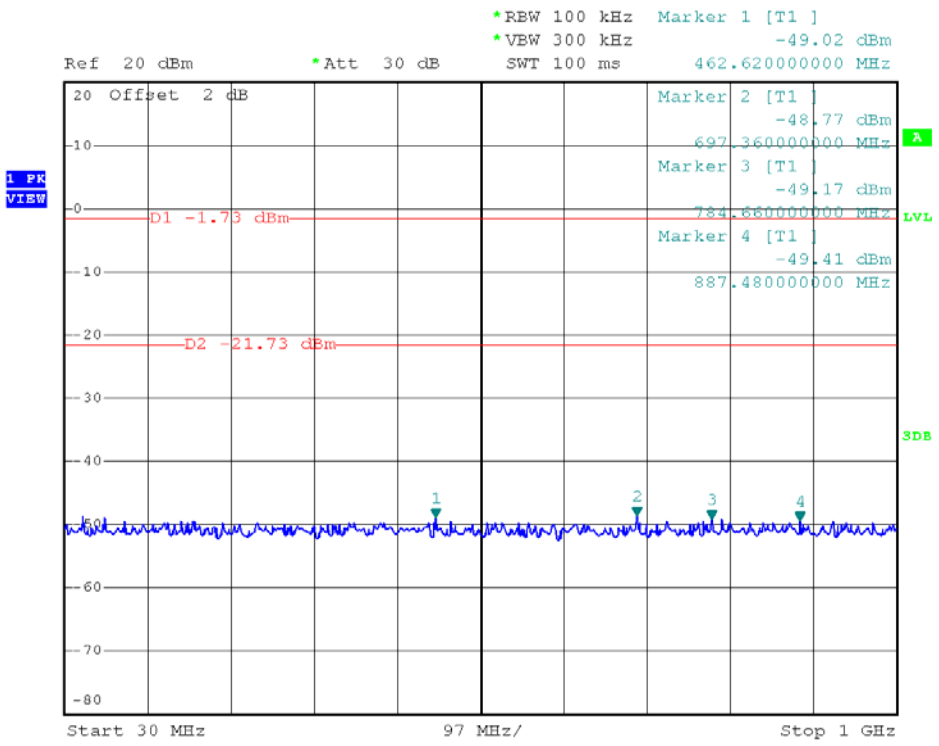

(Plot 2.4 G.2: Channel = 1, 1GHz to 25GHz@ 802.11n-20)



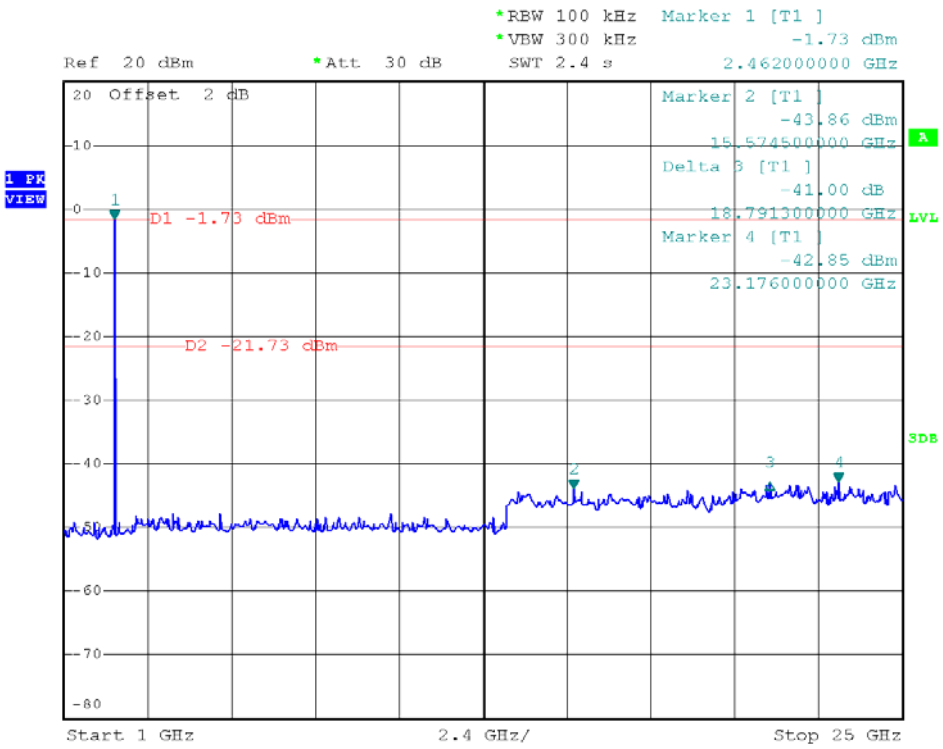

(Plot 2.4 H.1: Channel = 6, 30MHz to 1GHz@ 802.11n-20)




(Plot 2.4 H.2: Channel = 6, 1GHz to 25GHz@ 802.11n-20)




(Plot 2.4 I.1: Channel = 11, 30MHz to 1GHz@ 802.11n-20)




(Plot 2.4 I.2: Channel = 11, 1GHz to 25GHz@ 802.11n-20)

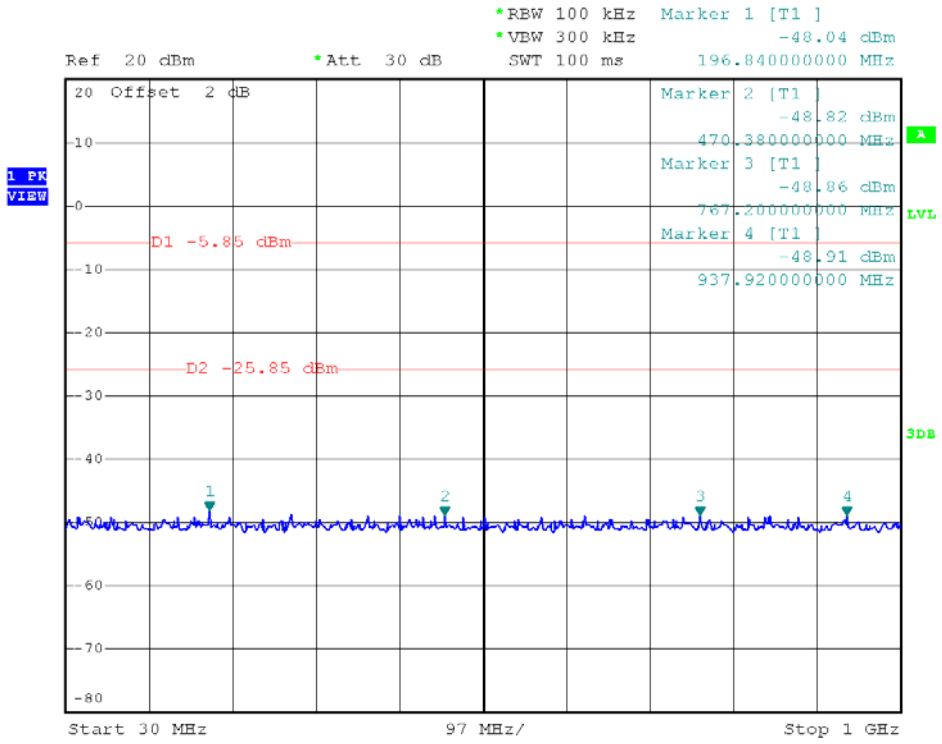
### 2.4.3.4 802.11n -40MHz Test mode

**A. Test Verdict:**

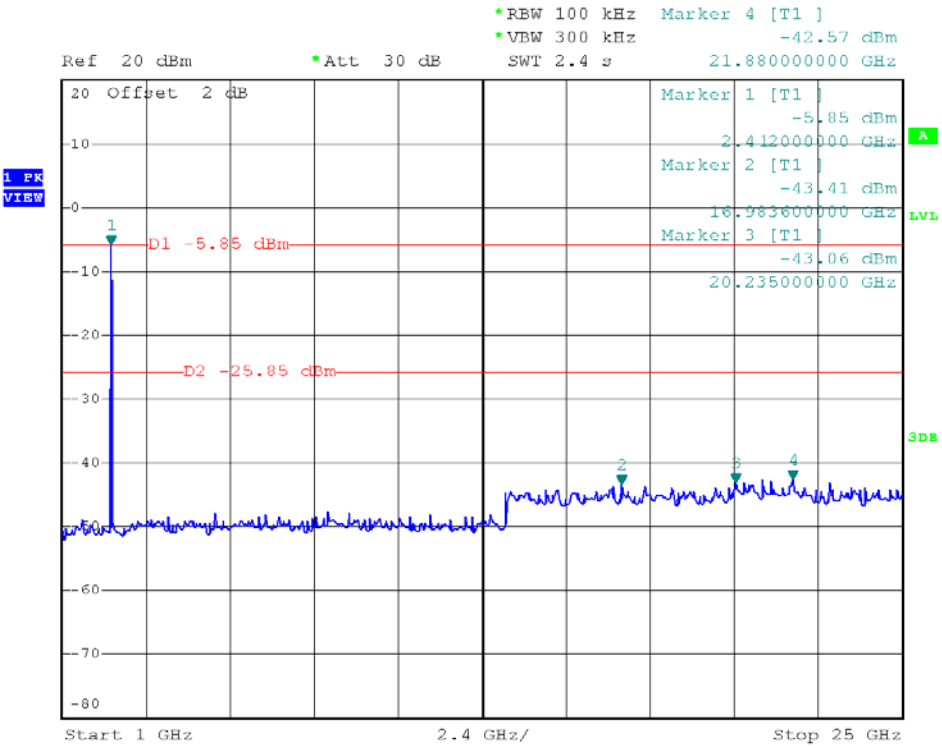
| Channel | Frequency (MHz) | Refer to Plot | Limit (dBc) | Verdict |
|---|---|---|---|---|
| 3 | 2422 | Plot 2.4 J.1 to J.2 | -20 | PASS |
| 6 | 2437 | Plot 2.4 K1. to K.2 | -20 | PASS |
| 9 | 2452 | Plot 2.4 L.1 to L.2 | -20 | PASS |

**B. Test Plots:**

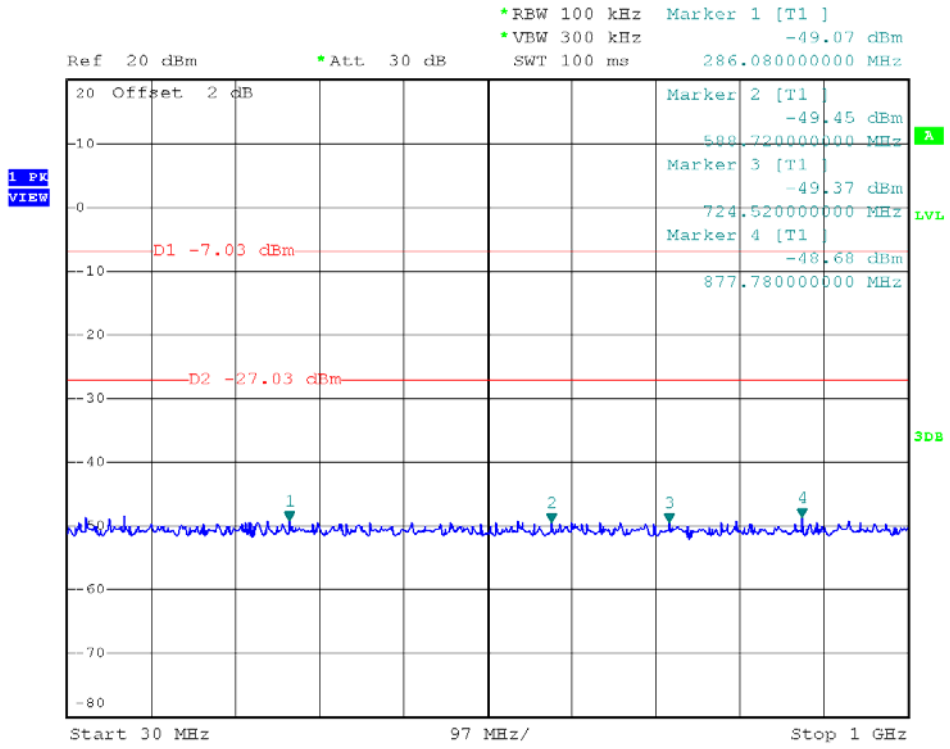
Note: the power of the Module transmitting frequency should be ignored.



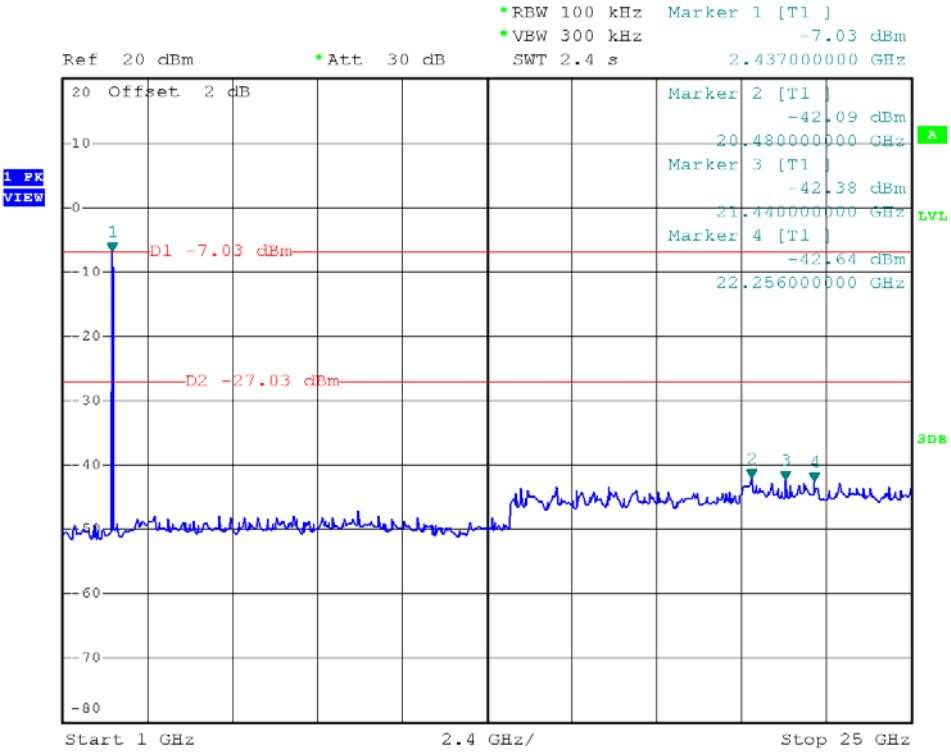

(Plot 2.4 J.1: Channel = 3, 30MHz to 1GHz@ 802.11n-40)



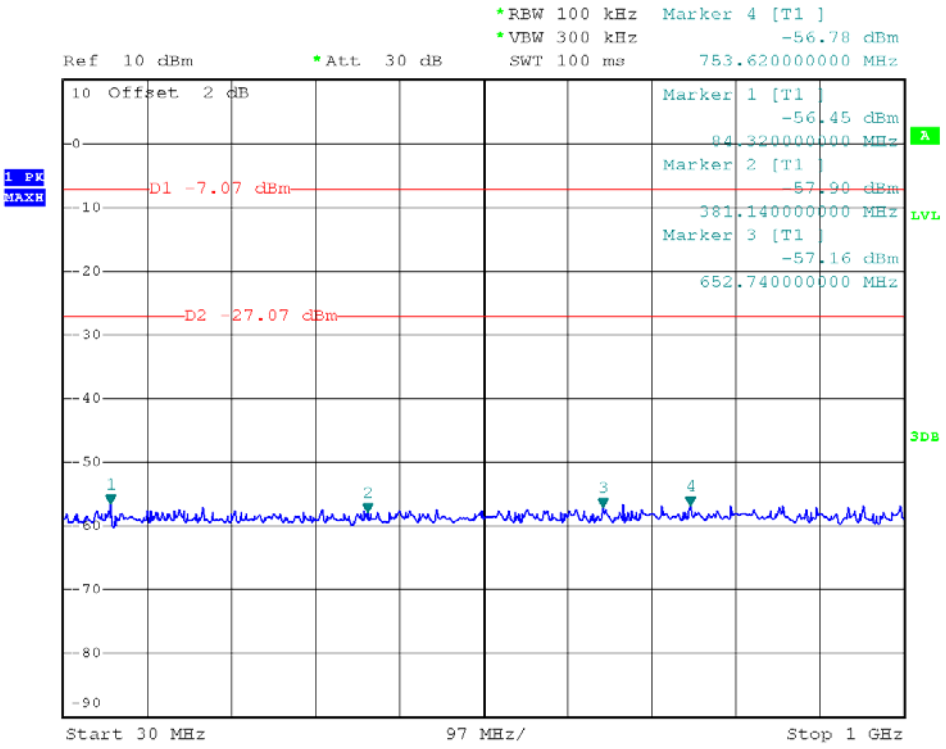

(Plot 2.4 J.2: Channel = 3, 1GHz to 25GHz@ 802.11n-40)



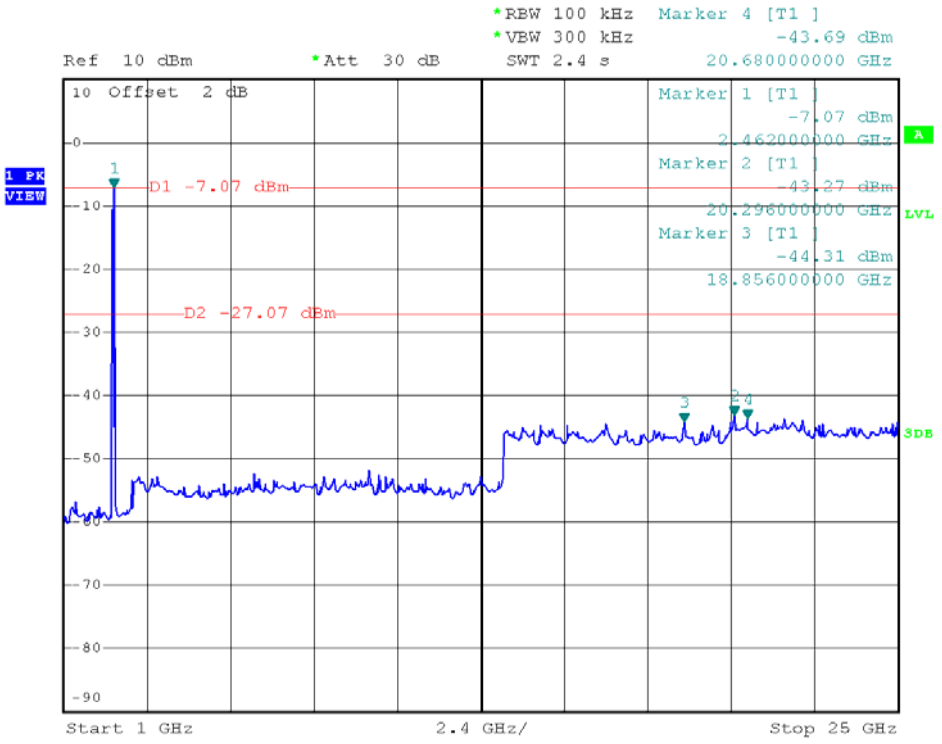

(Plot 2.4 K.1: Channel = 6, 30MHz to 1GHz@ 802.11n-40)




(Plot 2.4 K.2: Channel = 6, 1GHz to 25GHz@ 802.11n-40)




(Plot 2.4 L.1: Channel = 9, 30MHz to 1GHz@ 802.11n-40)




(Plot 2.4 L.2: Channel = 9, 1GHz to 25GHz@ 802.11n-40)

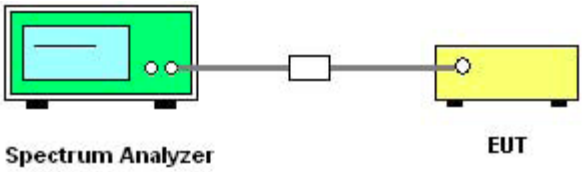
## 2.5 Power spectral density (PSD)

### 2.5.1 Requirement

According to FCC section 15.247(d), the same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

### 2.5.2 Test Description

**A. Test Set:**




The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss and Atten as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

**B. Test Procedure**

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW ≥ 3 x RBW.
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 amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

**C. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 1164.4391.40 | 2014.07.07 | 2015.07.06 |

### 2.5.3 Test Result

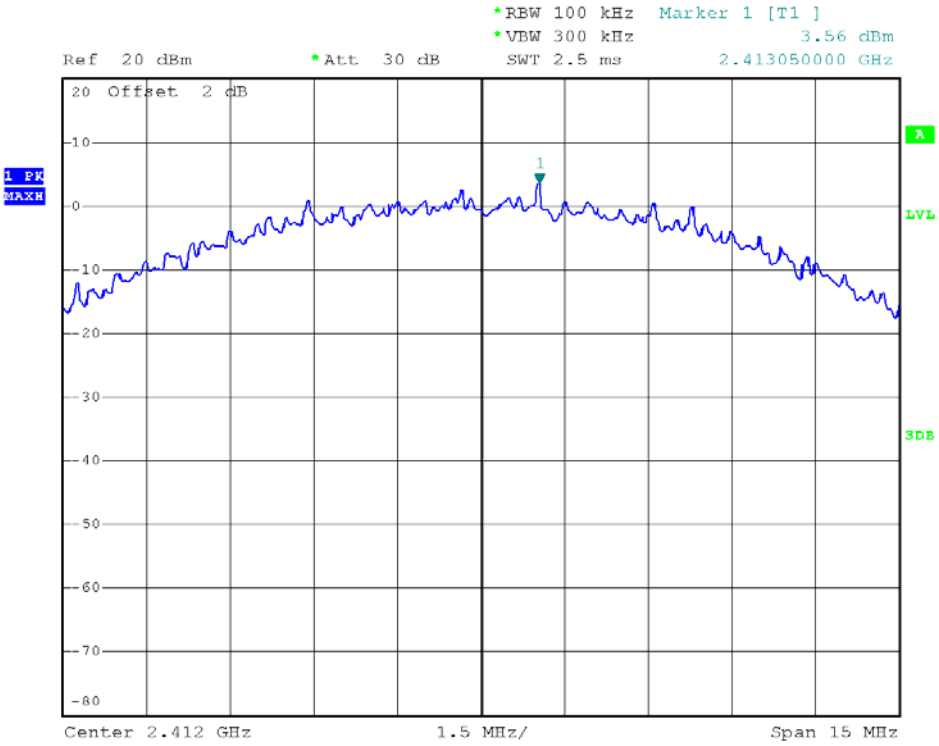
The lowest, middle and highest channels are tested to verify the band edge emissions.
Bandwidth correction: 10log(3kHz/100kHz)=-15.2dB

#### 2.5.3.1 802.11b Test mode

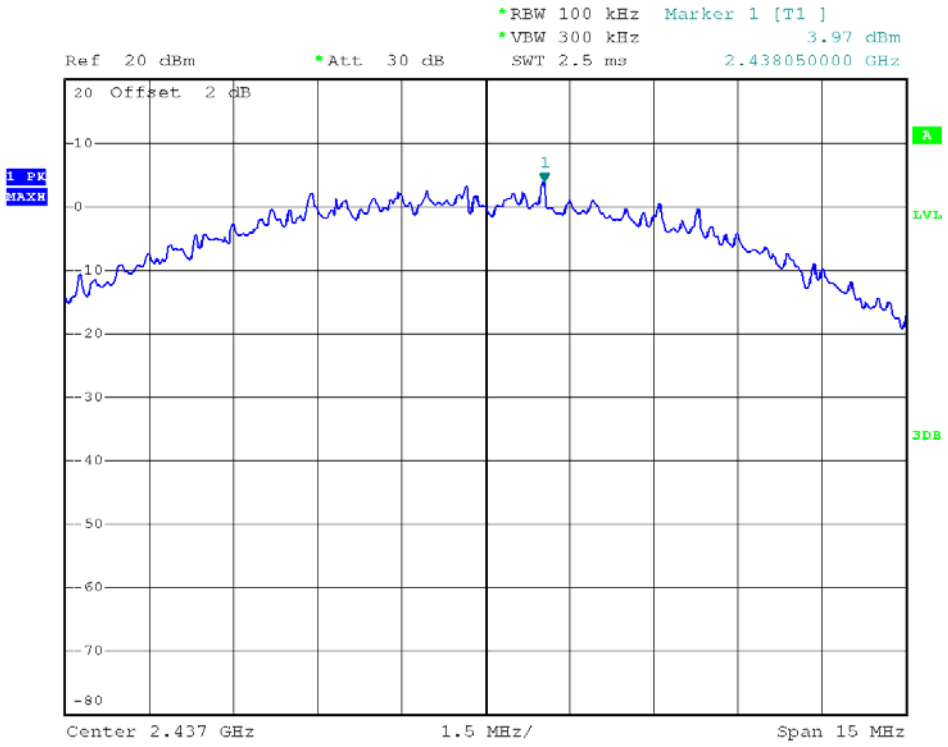
**A. Test Verdict:**

| Spectral power density | | | | | | |
|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Measured PSD (dBm/100kHz) | Measured PSD (dBm/3kHz) | Refer to Plot | Limit (dBm/3kHz) | Verdict |
| 1 | 2412 | 3.56 | -11.64 | Plot 2.5 A | 8 | PASS |
| 6 | 2437 | 3.97 | -11.23 | Plot 2.5 B | 8 | PASS |
| 11 | 2462 | 4.31 | -10.89 | Plot 2.5 C | 8 | PASS |
| Measurement uncertainty: ±1.3dB | | | | | | |

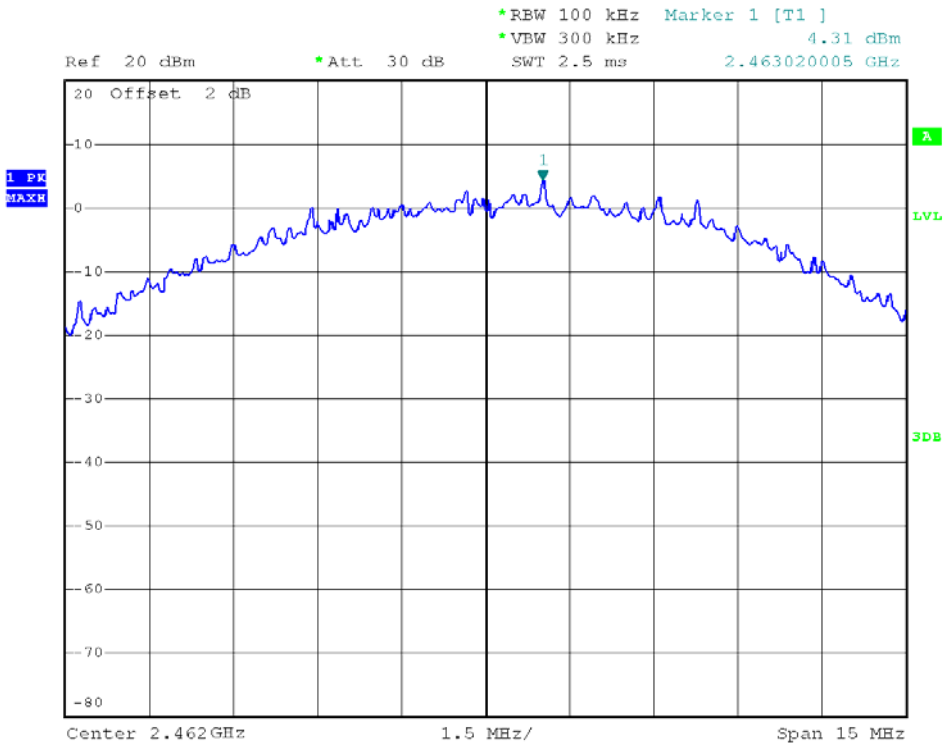
**B. Test Plots:**




(Plot 2.5 A: Channel = 1 @ 802.11b)




(Plot 2.5 B: Channel = 6 @ 802.11b)



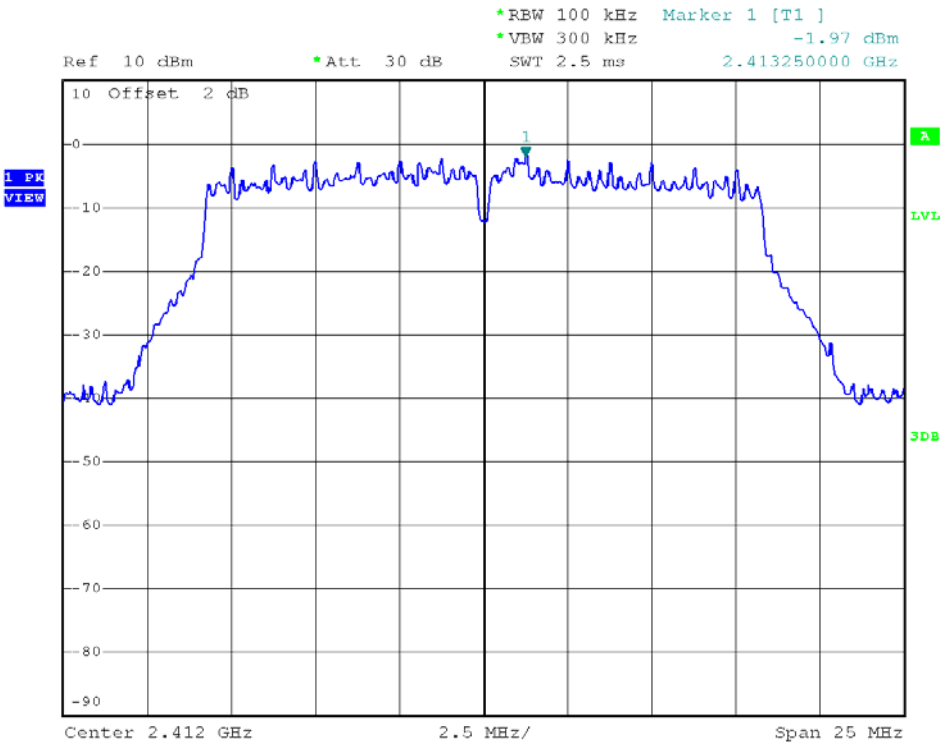

(Plot 2.5 C: Channel = 11 @ 802.11b)

### 2.5.3.2 802.11g Test mode

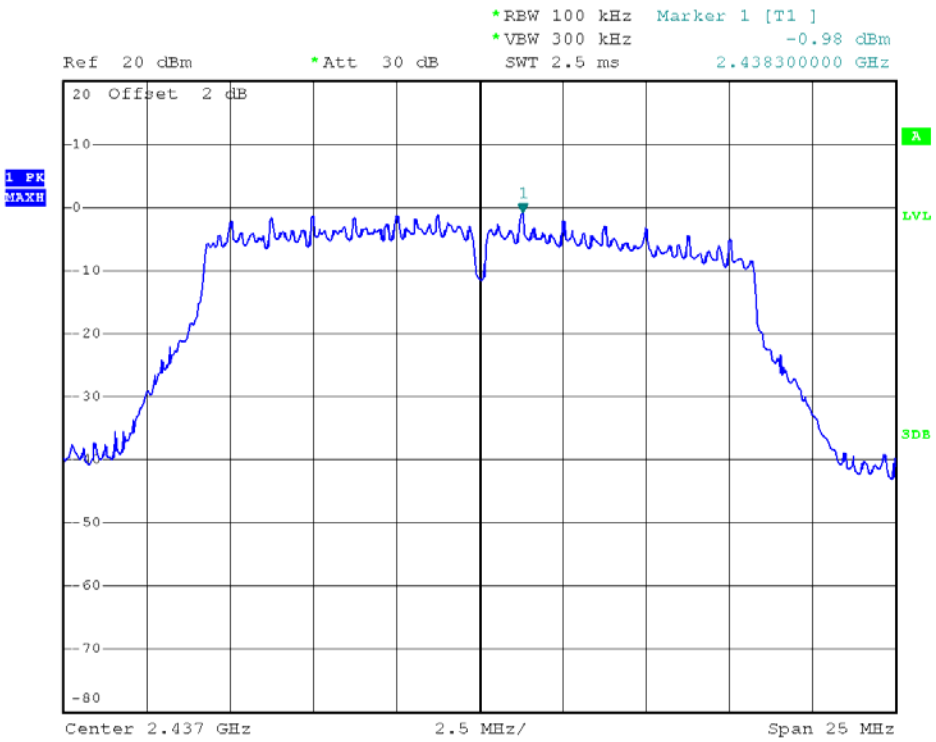
**A. Test Verdict:**

| Spectral power density | | | | | | |
|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Measured PSD (dBm/100kHz) | Measured PSD (dBm/3kHz) | Refer to Plot | Limit (dBm/3kHz) | Verdict |
| 1 | 2412 | -1.97 | -17.17 | Plot 2.5 D | 8 | PASS |
| 6 | 2437 | -0.98 | -16.18 | Plot 2.5 E | 8 | PASS |
| 11 | 2462 | -0.31 | -15.51 | Plot 2.5 F | 8 | PASS |
| Measurement uncertainty: ±1.3dB | | | | | | |

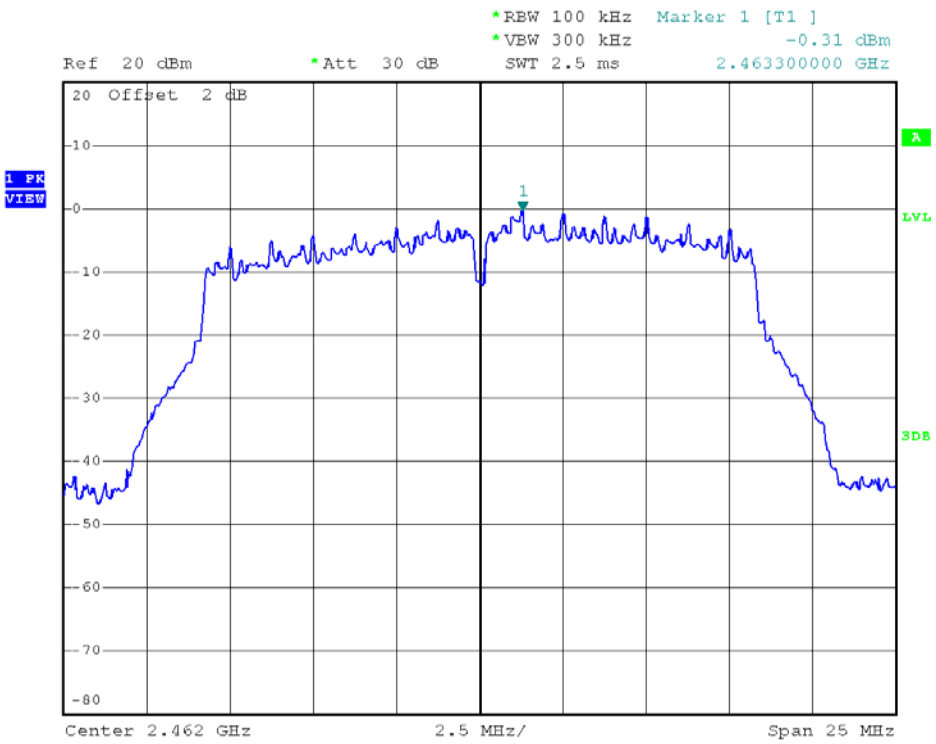
**B. Test Plots:**




(Plot 2.5 D: Channel = 1 @ 802.11g)




(Plot 2.5 E: Channel = 6 @ 802.11g)



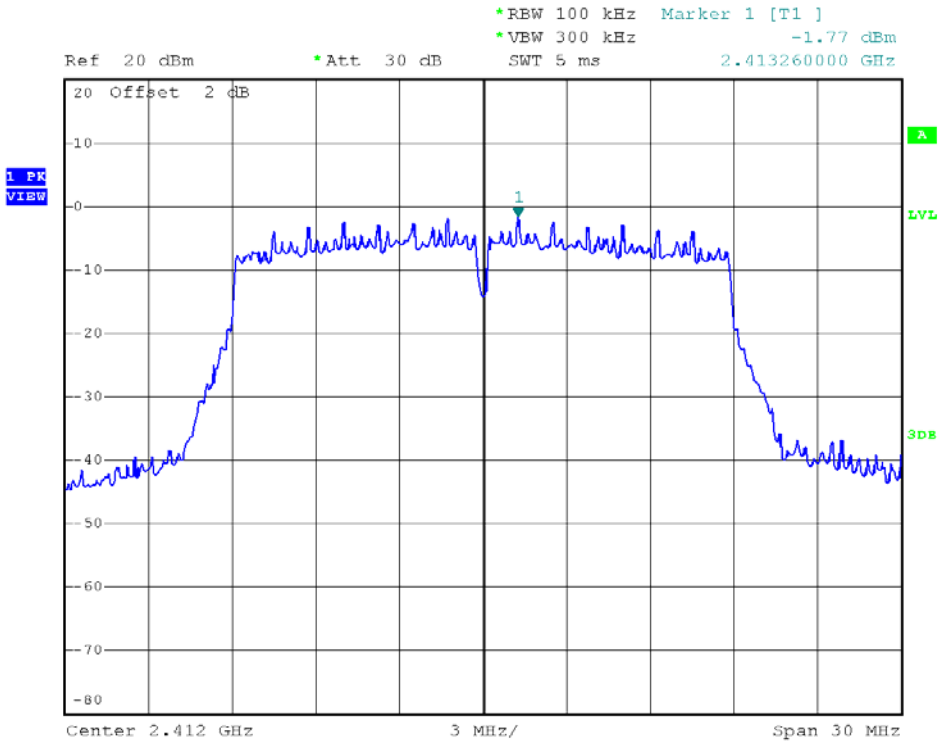

(Plot 2.5 F: Channel = 11 @ 802.11g)

### 2.5.3.3 802.11n-20 Test mode

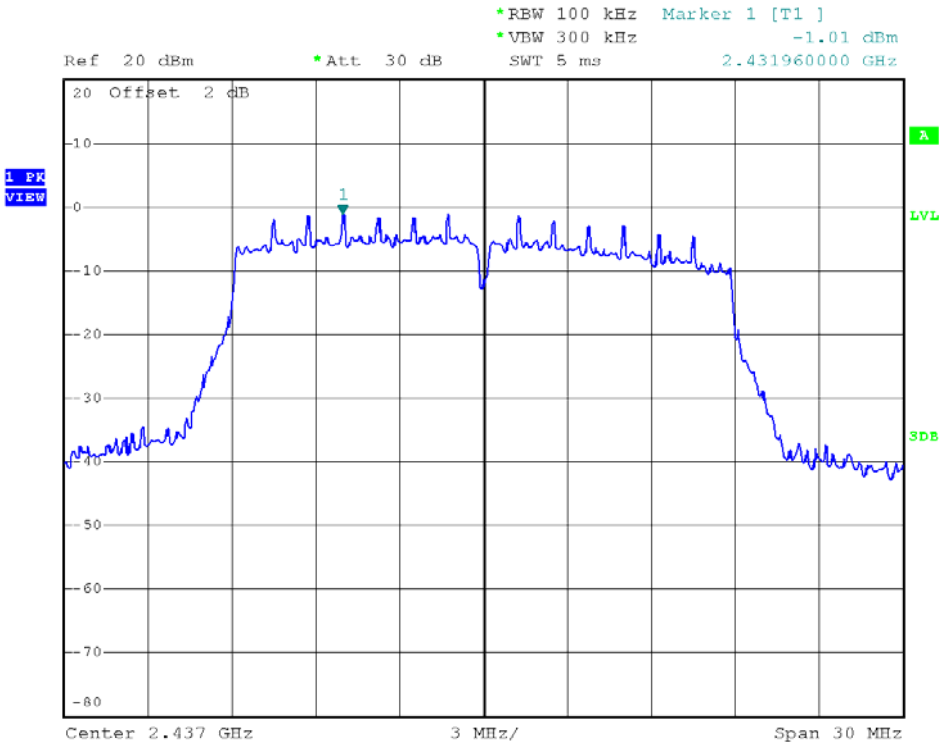
**A. Test Verdict:**

| Spectral power density | | | | | | |
|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Measured PSD (dBm/100kHz) | Measured PSD (dBm/3kHz) | Refer to Plot | Limit (dBm/3kHz) | Verdict |
| 1 | 2412 | -1.77 | -16.97 | Plot2.5 G | 8 | PASS |
| 6 | 2437 | -1.01 | -16.21 | Plot2.5 H | 8 | PASS |
| 11 | 2462 | -0.57 | -15.77 | Plot2.5 I | 8 | PASS |
| Measurement uncertainty: ±1.3dB | | | | | | |

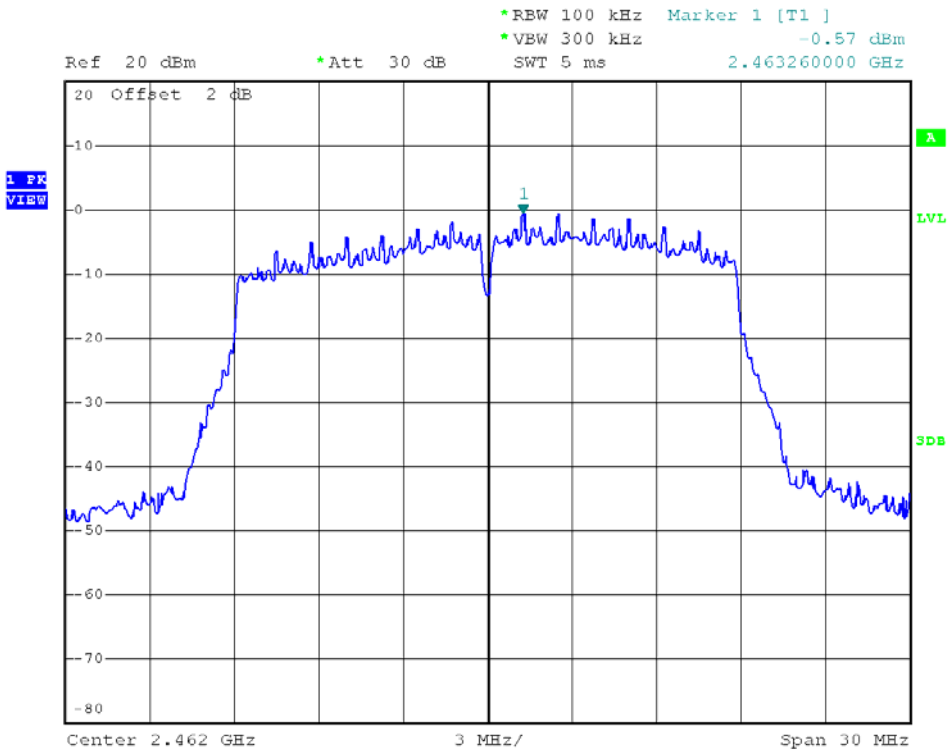
**B. Test Plots:**




(Plot 2.5 G: Channel = 1 @ 802.11n-20




(Plot 2.5 H: Channel = 6 @ 802.11n-20



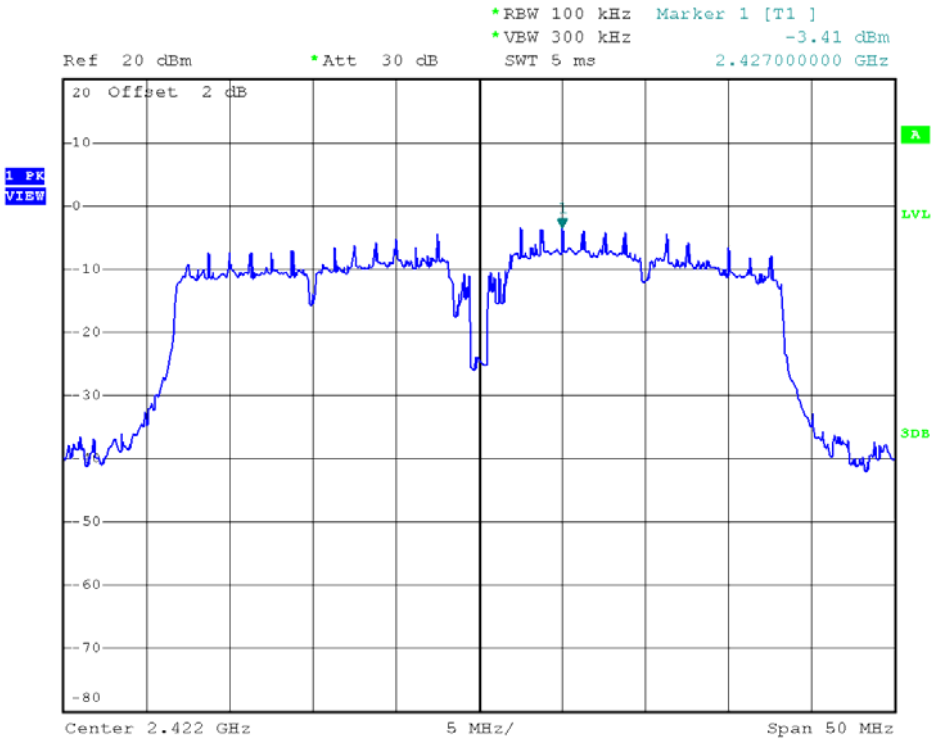

(Plot 2.5 I: Channel = 11 @ 802.11n-20

### 2.5.3.4 802.11n-40 Test mode

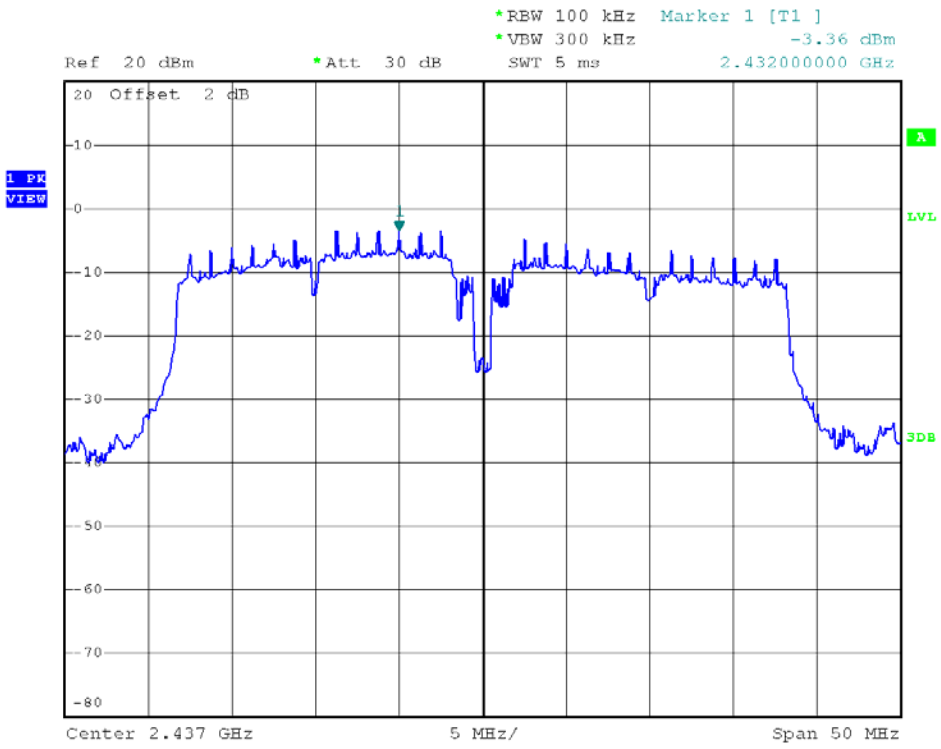
**A. Test Verdict:**

| Spectral power density | | | | | | |
|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Measured PSD (dBm/100kHz) | Measured PSD (dBm/3kHz) | Refer to Plot | Limit (dBm/3kHz) | Verdict |
| 3 | 2422 | -3.41 | -18.61 | Plot 2.5 J | 8 | PASS |
| 6 | 2437 | -3.36 | -18.56 | Plot 2.5 K | 8 | PASS |
| 9 | 2452 | -3.31 | -18.51 | Plot 2.5 L | 8 | PASS |
| Measurement uncertainty: ±1.3dB | | | | | | |

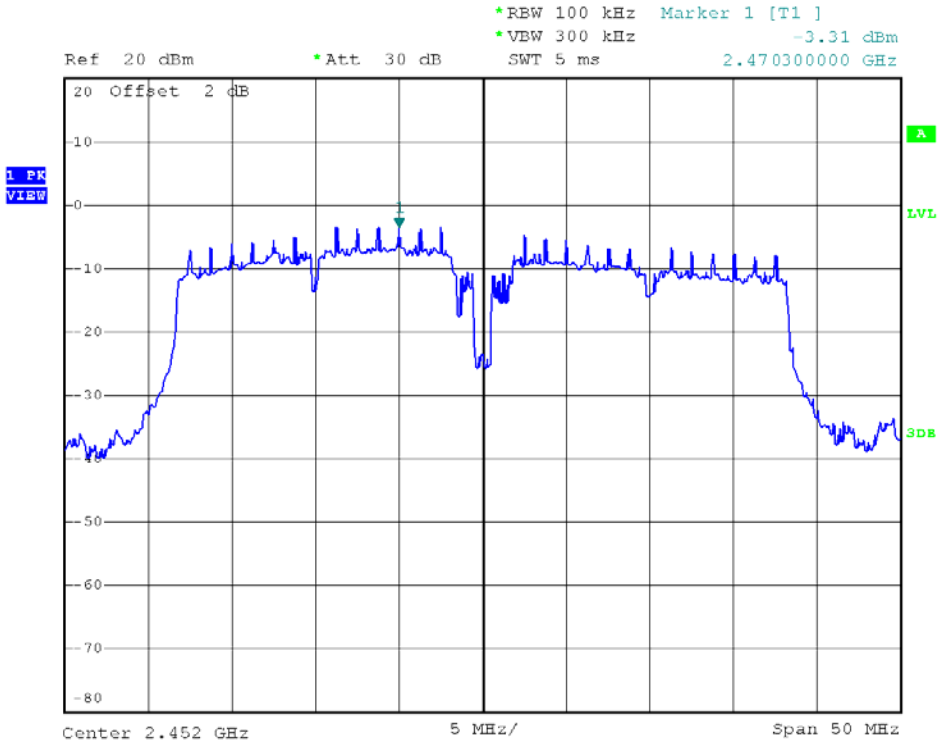
**B. Test Plots:**




(Plot 2.5 J: Channel = 3 @ 802.11n-40




(Plot 2.5 K: Channel = 6 @ 802.11n-40



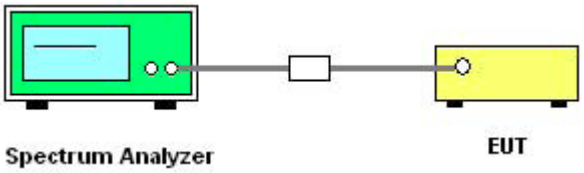

(Plot 2.5 L: Channel = 9 @ 802.11n-40

## 2.6 Conducted Band Edge

### 2.6.1 Requirement

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### 2.6.2 Test Description




**Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Spectrum Analyzer | R&S | FSP40 | 1164.4391.40 | 2014.07.07 | 2015.07.06 |

### 2.6.3 Test Procedure

The following procedures may be used to determine the peak or average field strength or power of an unwanted emission that is within 2 MHz of the authorized band edge. If a peak detector is utilized, use the procedure described in 13.2.1. Use the procedure described in 13.2.2 when using an average detector and the EUT can be configured to transmit continuously (i.e., duty cycle ≥ 98%). Use the procedure described in 13.2.3 when using an average detector and the EUT cannot be configured to transmit continuously but the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent). Use the procedure described in 13.2.4 when using an average detector for those cases where the EUT cannot be configured to transmit continuously and the duty cycle is not constant (duty cycle variations equal or exceed 2 percent).
When using a peak detector to measure unwanted emissions at or near the band edge (within 2 MHz of the authorized band), the following integration procedure can be used.

Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).

Set span to 2 MHz
RBW = 100 kHz.

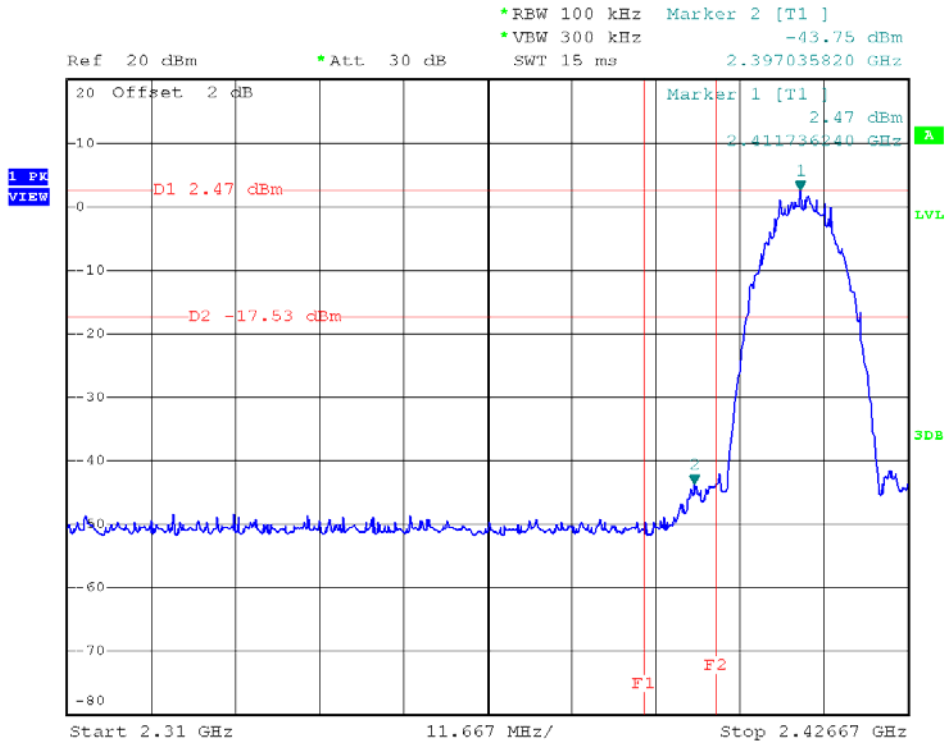
VBW ≥ 3 x RBW.
Detector = peak.
Sweep time = auto.
Trace mode = max hold.
Allow sweep to continue until the trace stabilizes (required measurement time may increase for low duty cycle applications)
Compute the power by integrating the spectrum over 1 MHz using the analyzer's band power measurement function with band limits set equal to the emission frequency (femission) ± 0.5 MHz. If the instrument does not have a band power function, then sum the amplitude levels (in power units) at 100 kHz intervals extending across the 1 MHz spectrum defined by femission ± 0.5 MHz.

### 2.6.4 Test Result

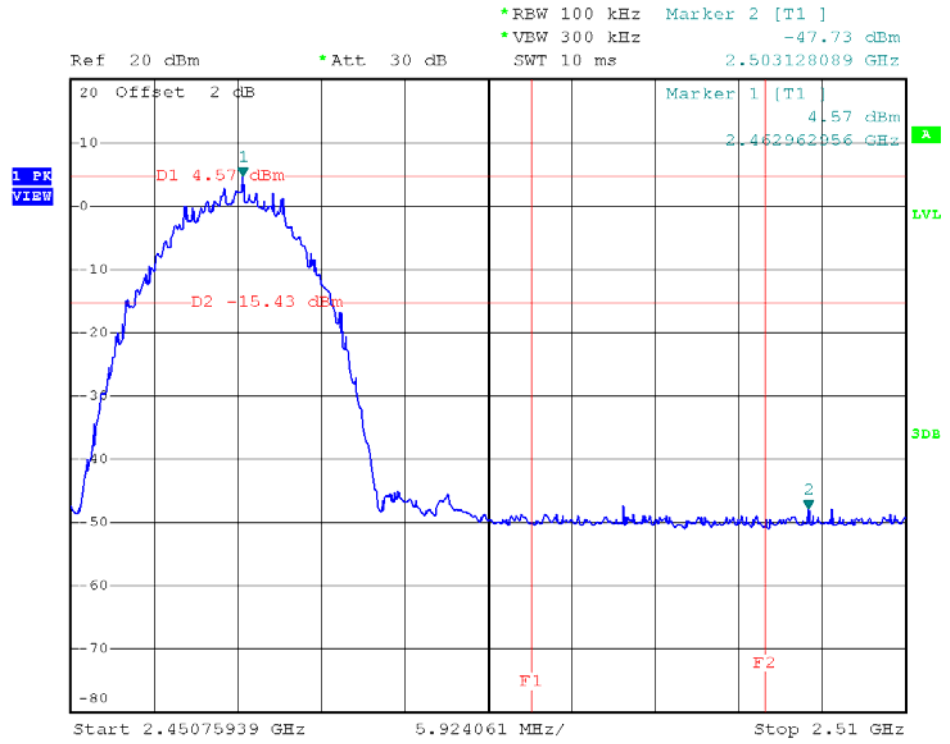
Band edge were measurement for 802.11b, 802.11g, 802.11n (HT20) and 802.11n (HT40) mode at difference date, recording worst case in test report.

The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

**802.11b Band edge**

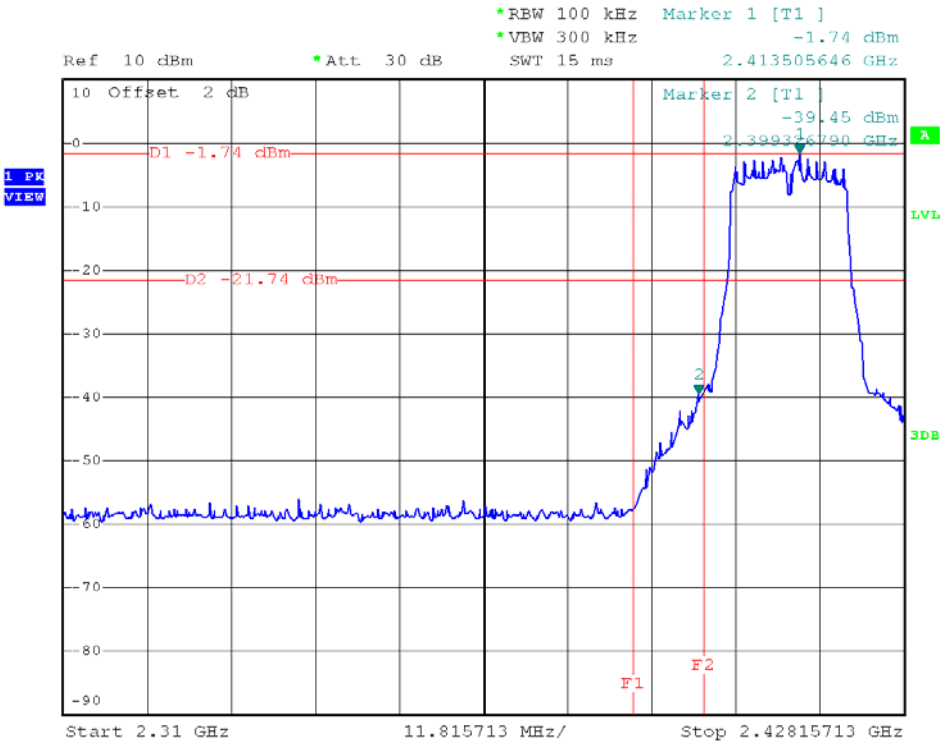



Channel = 1 @ 802.11b

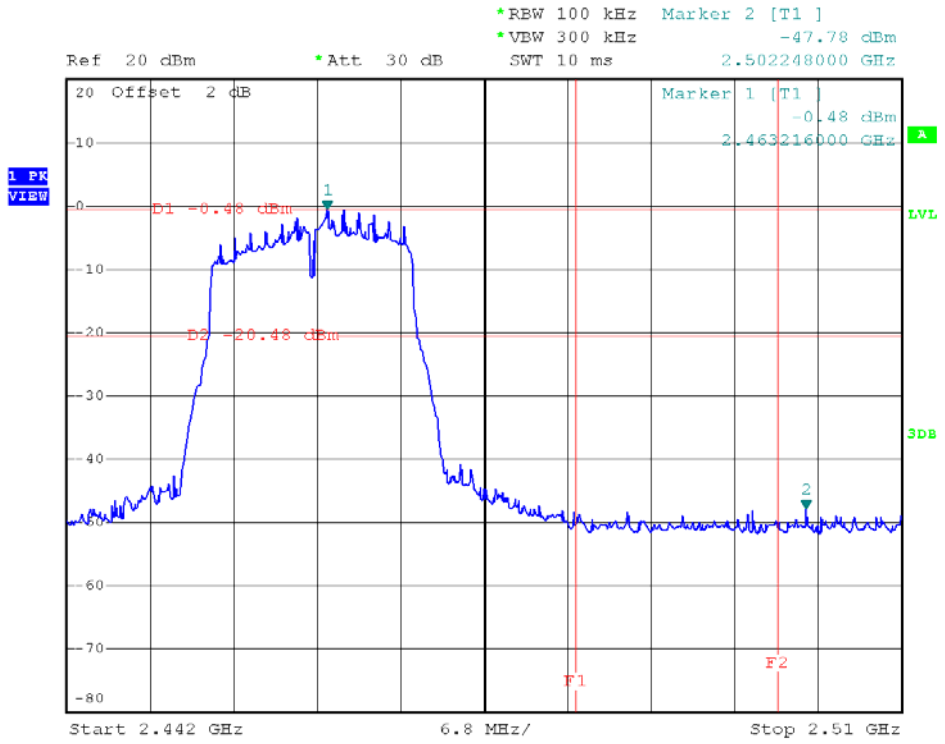



Channel = 11 @ 802.11b

**802.11g Band edge**

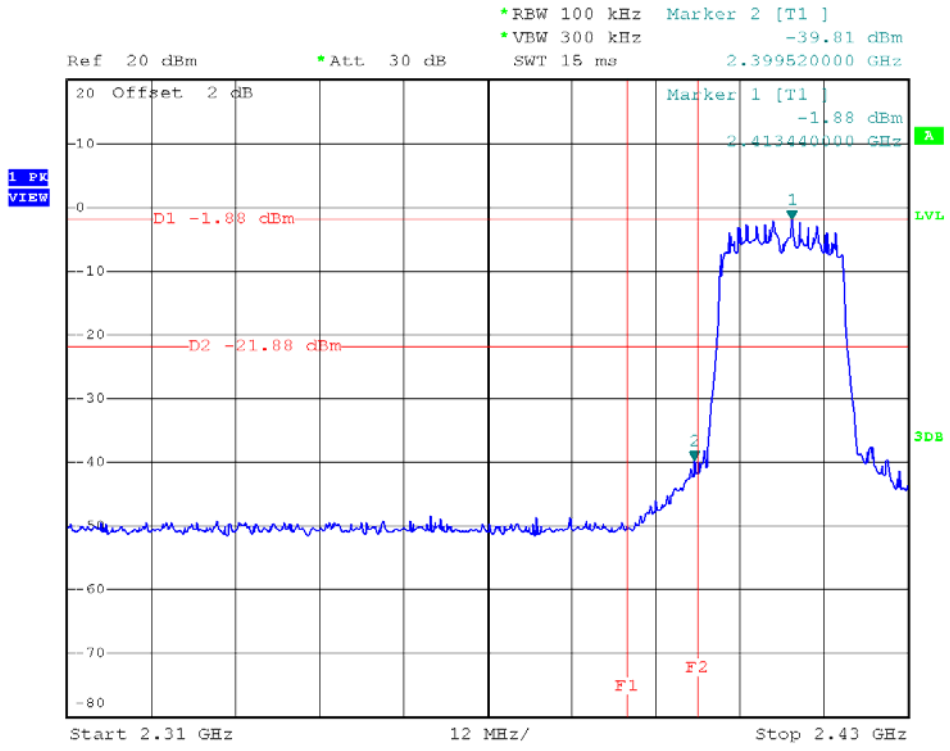



Channel = 1 @ 802.11g)

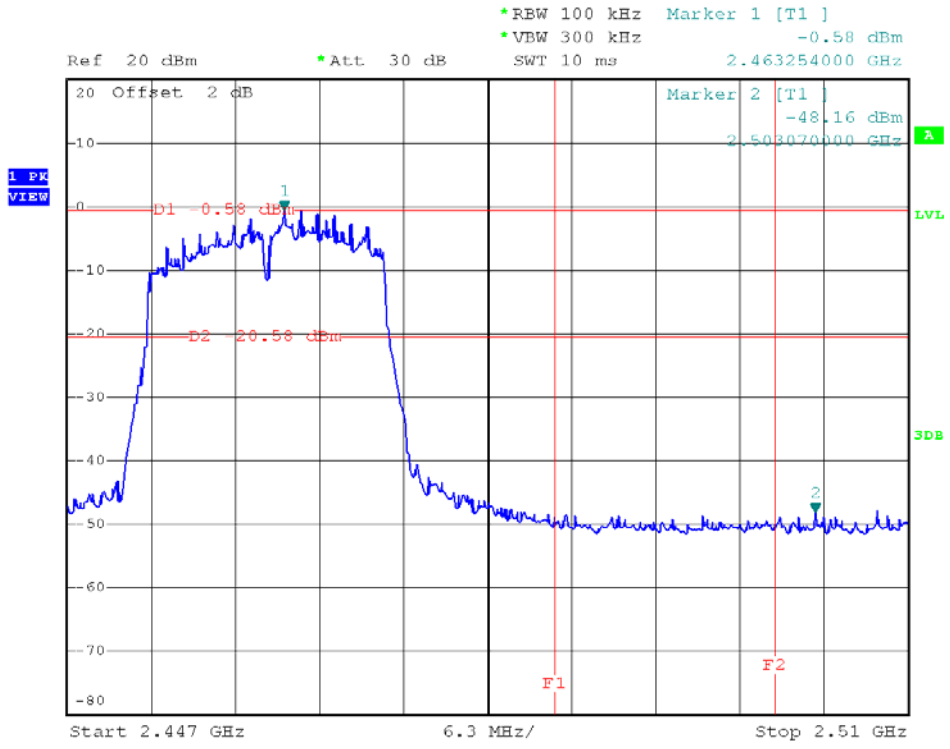



Channel = 11 @ 802.11g)

**802.11n-20 Band edge**

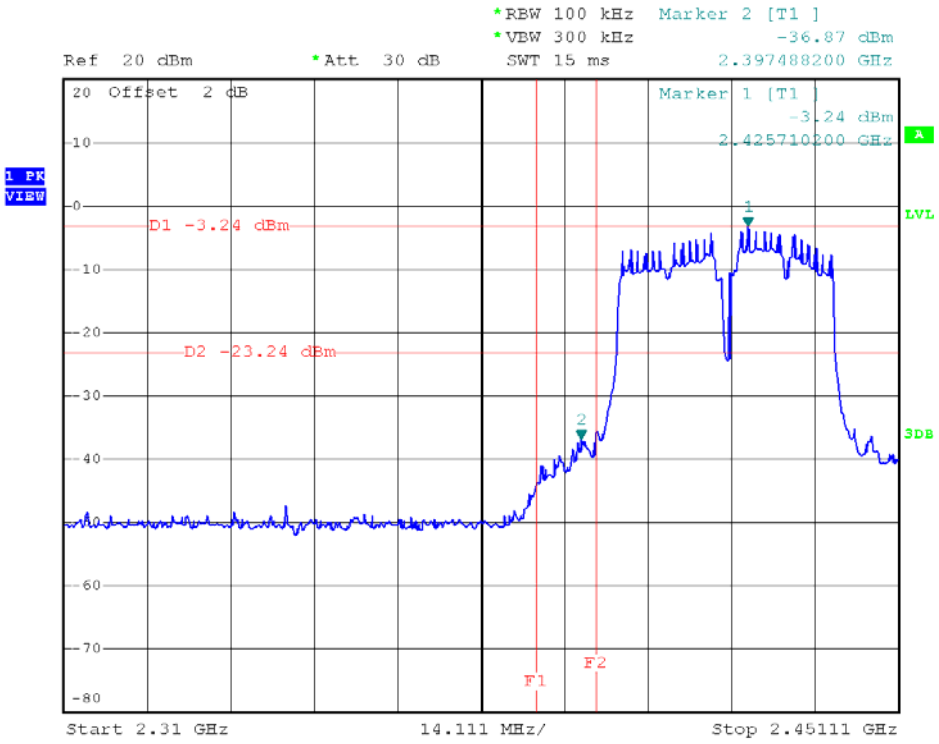



Channel = 1 @ 802.11n-20

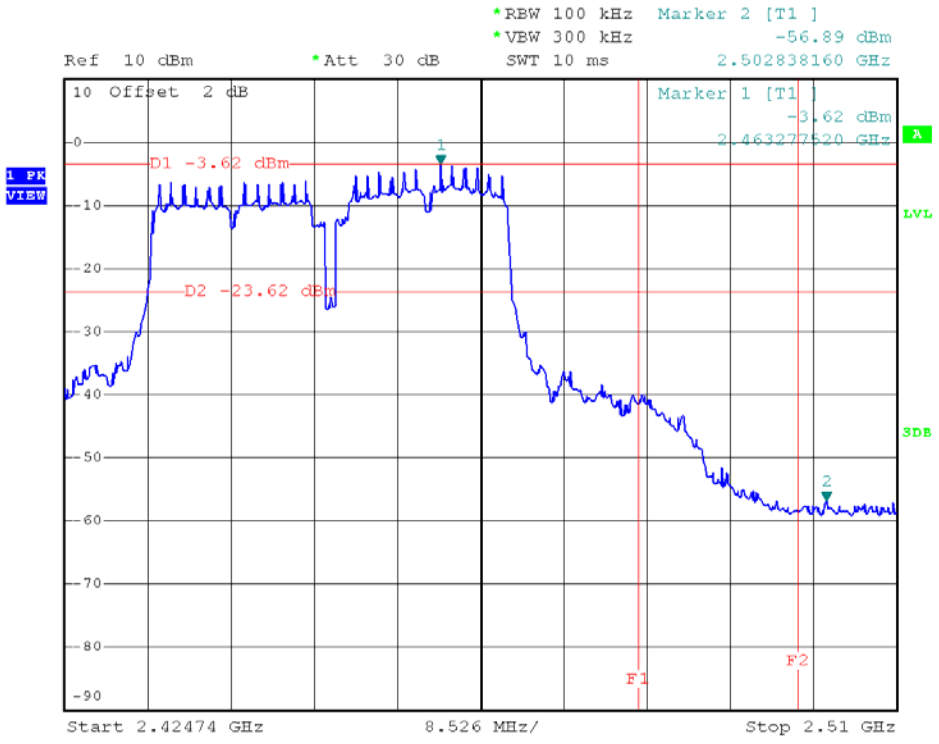



Channel = 11 @ 802.11n-20

**802.11n-40 Band edge**




Channel = 3 @ 802.11n-40




Channel = 9 @ 802.11n-40

## 2.7 Conducted Emission

### 2.7.1 Requirement

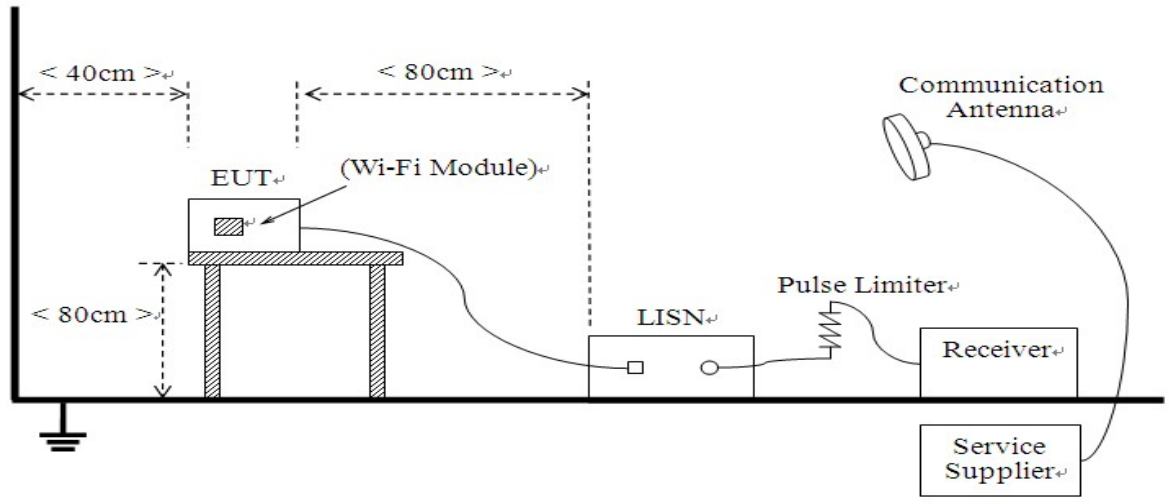
According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

| Frequency range (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quai-peak | Average |
| 0.15 - 0.50 | 66 to 56 | 56 to 46 |
| 0.50 - 5 | 56 | 46 |
| 5 - 30 | 60 | 50 |

NOTE:
(a) The lower limit shall apply at the band edges.
(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

### 2.7.2 Test Description

**A. Test Setup:**




The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4:2009

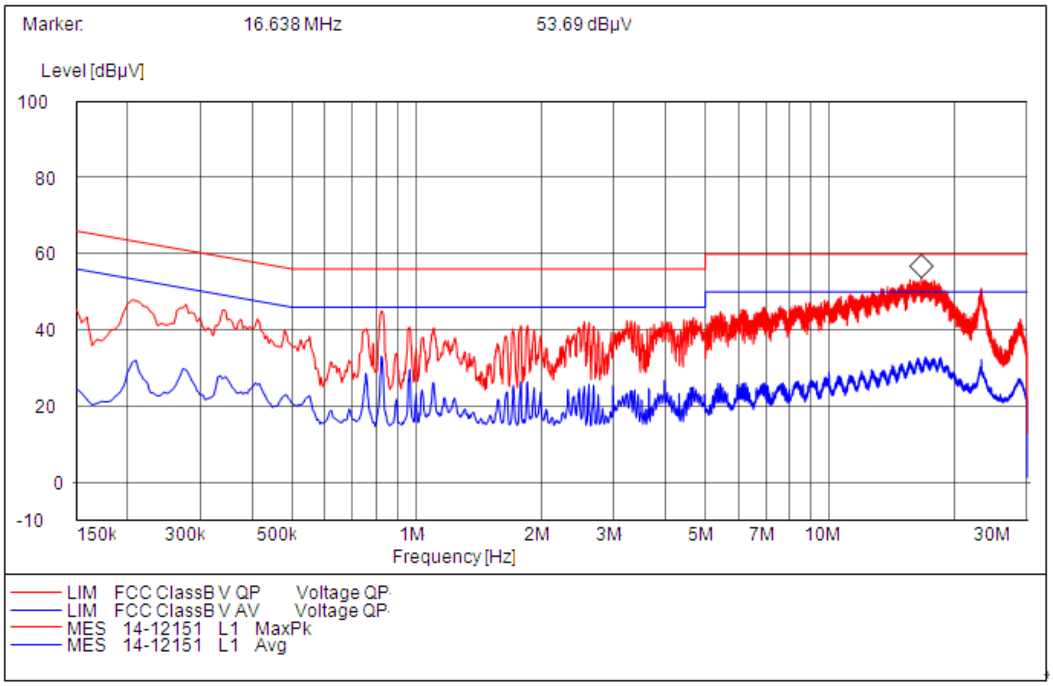
The EUT is powered by a PC. The factors of the site are calibrated to correct the reading. During the measurement, the EUT is activated and controlled by the Wi-Fi Service Supplier (SS) via a Common Antenna.

**B. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Test Receiver | R&S | ESCS30 | A0304260 | 2015.06.02 | 2016.06.02 |
| LISN | R&S | ESH2-Z5 | A0304221 | 2015.06.02 | 2016.06.02 |
| Cable | MATCHING PAD | W7 | / | 2015.06.02 | 2016.06.02 |

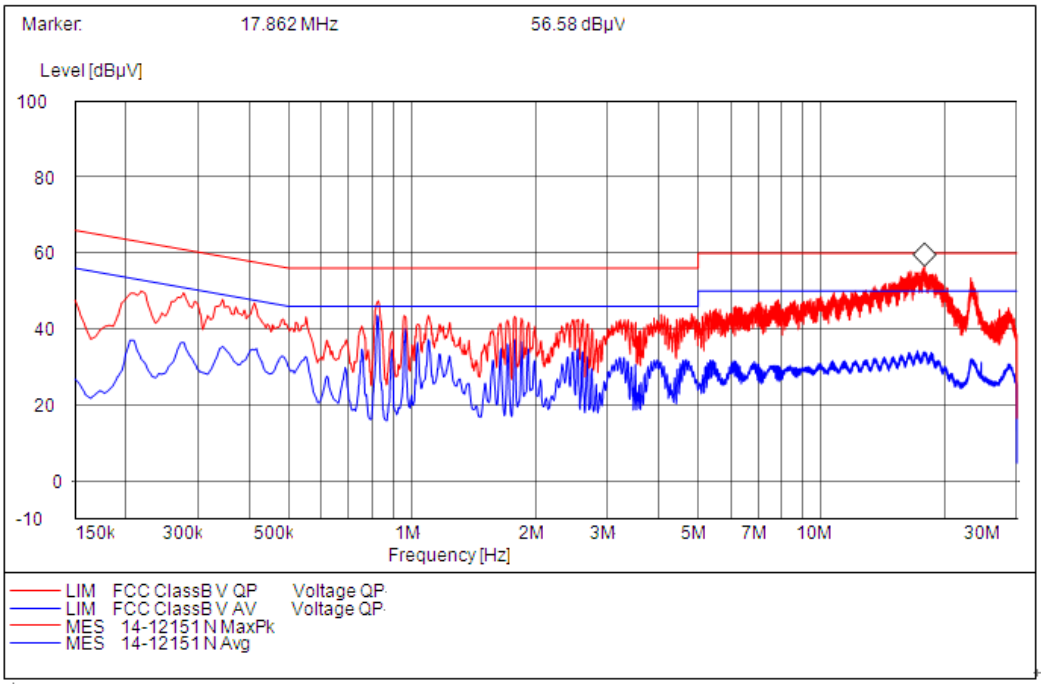
### 2.7.3 Test Result

The EUT configuration of the emission tests is EUT + PC.




(Plot A: L Phase)

| Conducted Disturbance at Mains Terminals | | | | | | | |
|---|---|---|---|---|---|---|---|
| QP | | | | AV | | | |
| Frequency (MHz) | Limits (dBµV) | Measurement Value (dBµV) | Margin (dB) | Frequency (MHz) | Limits (dBµV) | Measurement Value (dBµV) | Margin (dB) |
| 0.2760 | 60.90 | 44.75 | 16.15 | 0.2760 | 50.90 | 29.58 | 21.32 |
| 0.8205 | 56.00 | 42.94 | 13.06 | 0.8205 | 46.00 | 33.12 | 12.88 |
| 16.6380 | 60.00 | 49.98 | 10.02 | 16.6380 | 50.00 | 30.04 | 19.96 |




(Plot B: N Phase)

| Conducted Disturbance at Mains Terminals | | | | | | | |
|---|---|---|---|---|---|---|---|
| QP | | | | AV | | | |
| Frequency (MHz) | Limits (dBµV) | Measurement Value (dBµV) | Margin (dB) | Frequency (MHz) | Limits (dBµV) | Measurement Value (dBµV) | Margin (dB) |
| 0.4110 | 57.60 | 44.90 | 12.70 | 0.4110 | 47.60 | 34.48 | 13.12 |
| 0.8250 | 56.00 | 45.63 | 10.37 | 0.8250 | 46.00 | 42.55 | 3.45 |
| 17.8620 | 60.00 | 54.09 | 5.91 | 17.8620 | 50.00 | 33.86 | 16.14 |

## 2.8 Radiated Band Edge and Spurious Emission

### 2.8.1 Requirement

According to FCC section 15.247(c), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Measurement Distance (m) |
|---|---|---|---|
| 0.009 - 0.490 | 2400/F(kHz) | 20log(2400/F(KHz))+80 | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 20log(24000/F(KHz))+40 | 30 |
| 1.705 - 30.0 | 30 | 20log(30)+40 | 30 |
| 30 - 88 | 100 | 40.0 | 3 |
| 88 - 216 | 150 | 43.5 | 3 |
| 216 - 960 | 200 | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

Note:

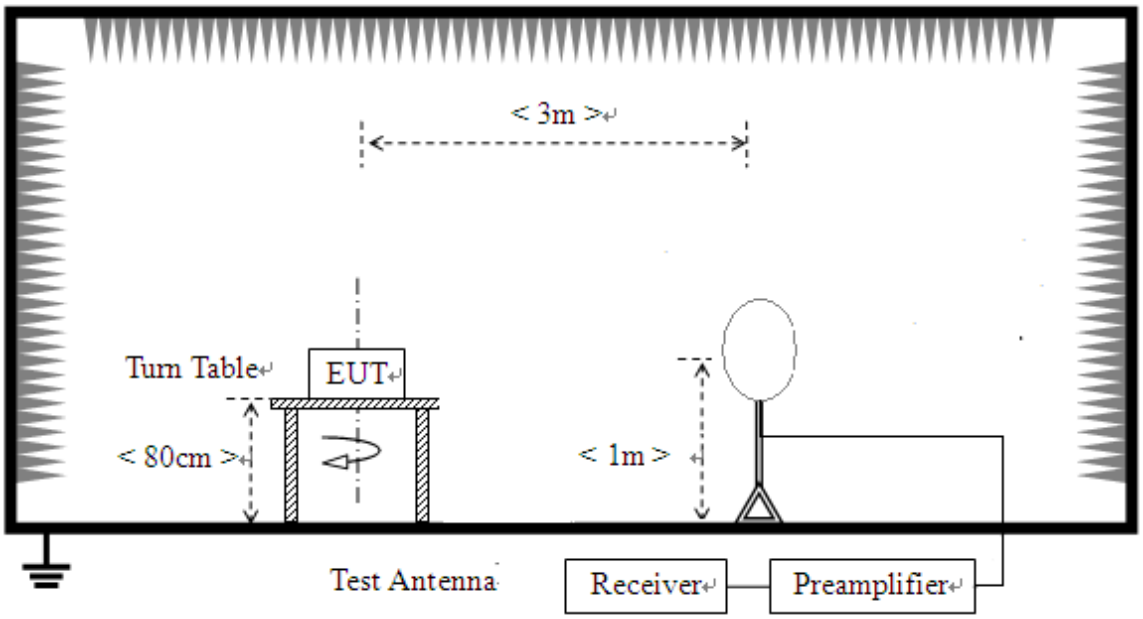
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

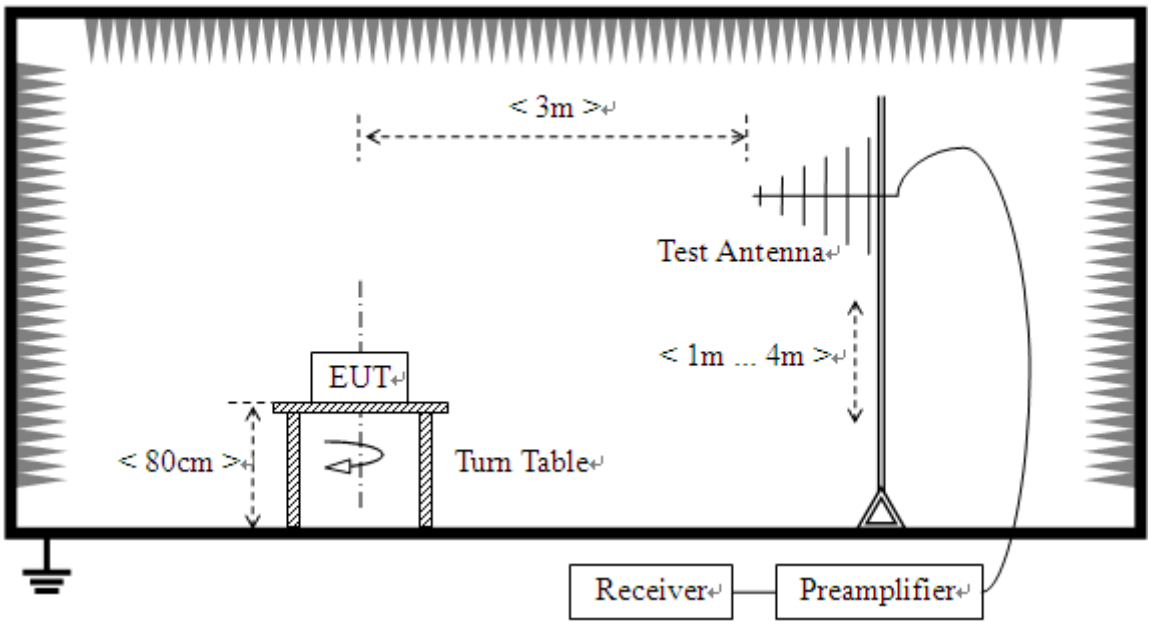
### 2.8.2 Test Description

**A. Test Setup:**

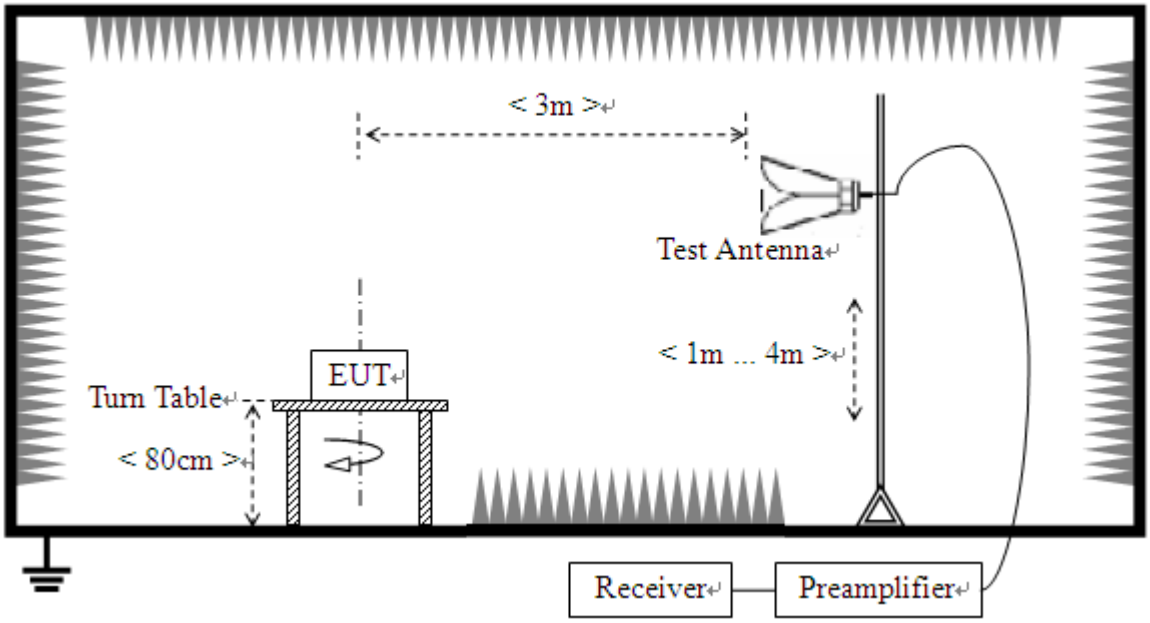
(1) For radiated emissions from 9kHz to 30MHz




(2) For radiated emissions from 30MHz to1GHz



(3) For radiated emissions above 1GHz




The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 2009. The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The EUT was powered by the PC. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, the EUT is activated and controlled by the PC, set to operate under WIFI test mode.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

**B. Equipments List:**

| Description | Manufacturer | Model | Serial No. | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|
| Receiver | R&S | ESIB26 | A0304218 | 2015.06.02 | 2016.06.02 |
| Full-Anechoic Chamber | Albatross | 12.8m*6.8m*6.4m | A0412372 | 2015.01.05 | 2016.01.04 |
| Test Antenna - Bi-Log | Schwarz beck | VULB 9163 | 9163-274 | 2015.06.02 | 2016.06.02 |
| Test Antenna - Horn | R&S | BBHA 9120D | 9120C-963 | 2015.06.02 | 2016.06.02 |
| Test Antenna - Horn | R&S | HF960 | 100150 | 2015.06.02 | 2016.06.02 |
| Test Antenna – Horn (18-25GHz) | ETS | UG-596A/U | A0902607 | 2015.06.02 | 2016.06.02 |
| Test Antenna -Loop | Schwarz beck | HFH2-Z2 | 100047 | 2015.06.02 | 2016.06.02 |
| Amplifier 1G~18GHz | R&S | MITEQ AFS42-00101800 | 25-S-42 | 2015.06.02 | 2016.06.02 |
| Amplifier 18G~40GHz | R&S | JS42-18002600-28-5A | 12111.0980.00 | 2015.06.02 | 2016.06.02 |
| amplifier 20M~3GHz | R&S | PAP-0203H | 22018 | 2015.06.02 | 2016.06.02 |
| Cable | SUNHNER | SUCOFLEX 100 | / | 2015.06.02 | 2016.06.02 |
| Cable | SUNHNER | SUCOFLEX 104 | / | 2015.06.02 | 2016.06.02 |

### 2.8.3 Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.
The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

$A_T$: Total correction Factor except Antenna

$U_R$: Receiver Reading

$G_{preamp}$: Preamplifier Gain

$A_{Factor}$: Antenna Factor at 3m

$L_{Cable\ loss}$: Cable loss

During the test, the total correction Factor AT and $A_{Factor}$ were built in test software.

Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

The minimum clock frequency was 24MHz,the radiated frequency range from 9KHz to 25GHz.

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.

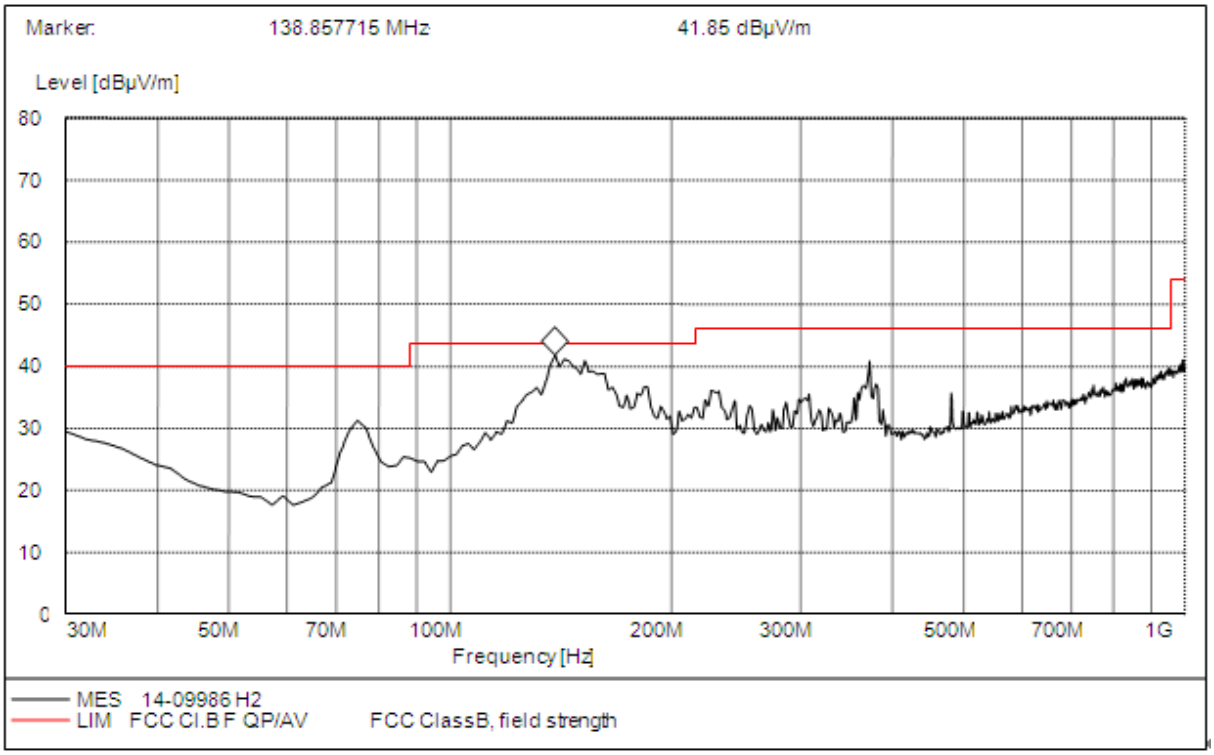
3. HORN ANTENNA for the radiation emission test above 1G.

Test plots for the whole measurement frequency range：

**For 9KHz to 30MHz**

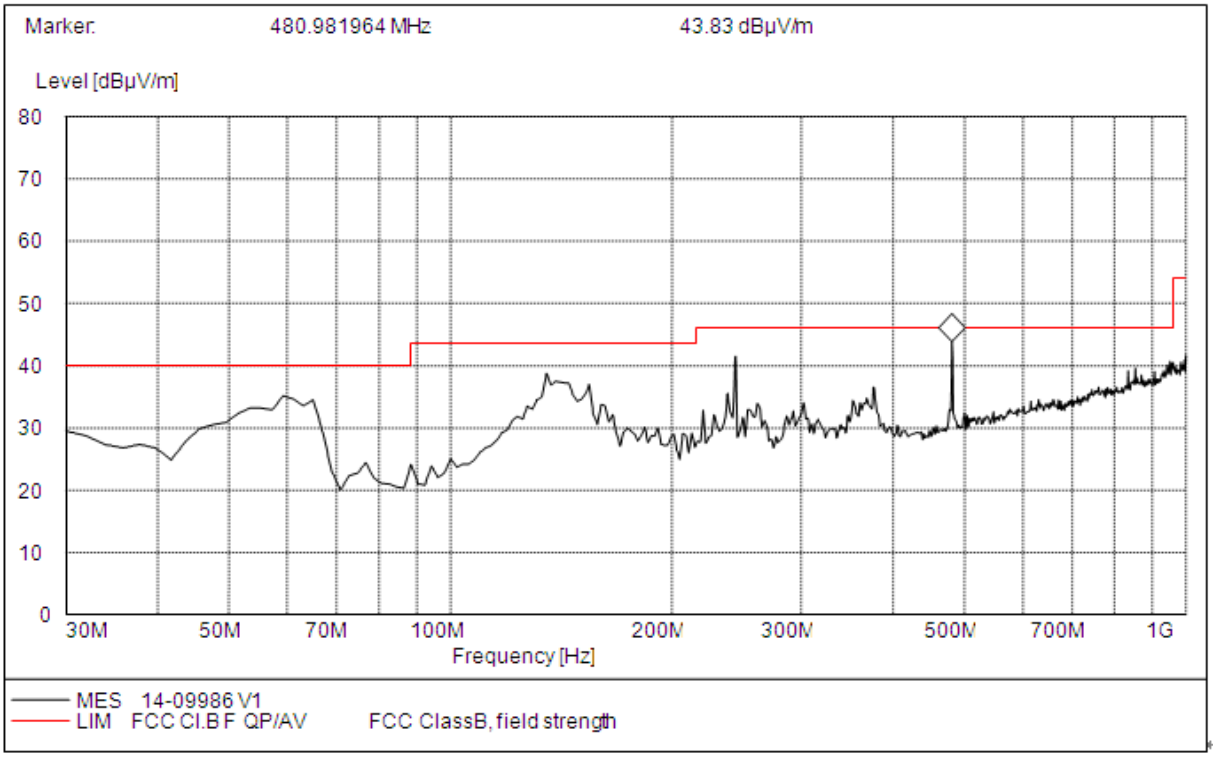
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

**For 30MHz to 1000 MHz**



| Frequency (MHz) | QuasiPeak (dBμV/m) | Bandwidth (kHz) | Antenna height (cm) | Limit (dBμV/m) | Margin (dB) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|
| 74.710000 | 31.27 | 120.000 | 100.0 | 40.00 | 8.73 | Horizontal | Pass |
| 138.850000 | 40.15 | 120.000 | 100.0 | 43.50 | 3.35 | Horizontal | Pass |
| 152.460000 | 40.02 | 120.000 | 100.0 | 43.50 | 5.98 | Horizontal | Pass |
| 372.124000 | 40.56 | 120.000 | 100.0 | 46.00 | 5.54 | Horizontal | Pass |
| 580.120000 | 33.45 | 120.000 | 100.0 | 46.00 | 13.58 | Horizontal | Pass |

(Plot A: 30MHz to 1GHz, Antenna Vertical)




| Frequency (MHz) | QuasiPeak (dB μ V/m) | Bandwidth (kHz) | Antenna height (cm) | Limit (dB μ V/m) | Margin (dB) | Antenna | Verdict |
|---|---|---|---|---|---|---|---|
| 59.150000 | 32.68 | 120.000 | 100.0 | 40.00 | 7.32 | Vertical | Pass |
| 138.260000 | 38.56 | 120.000 | 100.0 | 43.50 | 4.94 | Vertical | Pass |
| 239.450000 | 40.35 | 120.000 | 100.0 | 46.00 | 5.65 | Vertical | Pass |
| 480.240000 | 43.26 | 120.000 | 100.0 | 46.00 | 2.74 | Vertical | Pass |

(Plot B: 30MHz to 1GHz, Antenna Horizontal)

**For 1GHz to 25GHz**

| 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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 56.40 | PK | 74.00 | -17.60 | 1.01 H | 228 | 24.20 | 32.20 |
| 2 | 2390.00 | 43.60 | AV | 54.00 | -10.40 | 1.01 H | 228 | 11.40 | 32.20 |
| 3 | *2412.00 | 101.70 | PK | / | / | 1.03 H | 112 | 69.50 | 32.20 |
| 4 | *2412.00 | 97.70 | AV | / | / | 1.03 H | 112 | 65.50 | 32.20 |
| 5 | 4824.00 | 51.40 | PK | 74.00 | -22.60 | 1.00 H | 254 | 46.10 | 5.30 |
| 6 | 4824.00 | 46.50 | AV | 54.00 | -7.50 | 1.00 H | 254 | 41.20 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 55.4 | PK | 74.00 | -18.6 | 1.11 V | 228 | 23.20 | 32.20 |
| 2 | 2390.00 | 44.3 | AV | 54.00 | -9.7 | 1.11 V | 228 | 12.10 | 32.20 |
| 3 | *2412.00 | 114.7 | PK | / | / | 1.09 V | 112 | 82.50 | 32.20 |
| 4 | *2412.00 | 112.9 | AV | / | / | 1.03 V | 112 | 80.70 | 32.20 |
| 5 | 4824.00 | 54.4 | PK | 74.00 | -19.6 | 1.21 V | 254 | 49.10 | 5.30 |
| 6 | 4824.00 | 43.5 | AV | 54.00 | -10.5 | 1.21 V | 254 | 38.20 | 5.30 |

| 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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 107.7 | PK | / | / | 1.01 H | 210 | 75.50 | 32.20 |
| 2 | *2437.00 | 106.4 | AV | / | / | 1.01 H | 210 | 74.20 | 32.20 |
| 3 | 4874.00 | 54.2 | PK | 74.00 | -19.8 | 1.03 H | 272 | 48.90 | 5.30 |
| 4 | 4874.00 | 44.0 | AV | 54.00 | -10.0 | 1.03 H | 272 | 38.70 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 109.00 | PK | / | / | 1.09 V | 112 | 76.80 | 32.20 |
| 2 | *2437.00 | 105.30 | AV | / | / | 1.09 V | 112 | 73.10 | 32.20 |
| 3 | 4874.00 | 56.80 | PK | 74.00 | -17.20 | 1.21 V | 254 | 51.50 | 5.30 |
| 4 | 4874.00 | 46.50 | AV | 54.00 | -7.50 | 1.21 V | 254 | 41.20 | 5.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11b_2462MHz） | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 107.7 | PK | / | / | 1.05 V | 215 | 75.40 | 32.30 |
| 2 | *2462.00 | 105.5 | AV | / | / | 1.05 V | 215 | 73.20 | 32.30 |
| 3 | 2483.50 | 56.8 | PK | 74.00 | -17.2 | 1.05 V | 211 | 24.40 | 32.40 |
| 4 | 2483.50 | 44.5 | AV | 54.00 | -9.5 | 1.05 V | 211 | 12.10 | 32.40 |
| 5 | 4924.00 | 52.1 | PK | 74.00 | -21.9 | 1.45 V | 320 | 46.60 | 5.50 |
| 6 | 4924.00 | 46.3 | AV | 54.00 | -7.7 | 1.45 V | 320 | 40.80 | 5.50 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11b_2462MHz）** | | | | | | | | | |
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 114.5 | PK | / | / | 1.05 V | 174 | 82.20 | 32.30 |
| 2 | *2462.00 | 113.8 | AV | / | / | 1.05 V | 174 | 81.50 | 32.30 |
| 3 | 2483.50 | 57.5 | PK | 74.00 | -16.5 | 1.05 V | 177 | 25.10 | 32.40 |
| 4 | 2483.50 | 44.7 | AV | 54.00 | -9.3 | 1.05 V | 177 | 12.30 | 32.40 |
| 5 | 4924.00 | 54.9 | PK | 74.00 | -19.1 | 1.45 V | 201 | 49.40 | 5.50 |
| 6 | 4924.00 | 45.6 | AV | 54.00 | -8.4 | 1.45 V | 201 | 40.10 | 5.50 |

| 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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 56.3 | PK | 74.0 | -17.7 | 1.01 H | 228 | 24.10 | 32.20 |
| 2 | 2390.00 | 43.4 | AV | 54.0 | -10.6 | 1.01 H | 228 | 11.20 | 32.20 |
| 3 | *2412.00 | 102.1 | PK | / | / | 1.03 H | 112 | 69.90 | 32.20 |
| 4 | *2412.00 | 97.6 | AV | / | / | 1.03 H | 112 | 65.40 | 32.20 |
| 5 | 4824.00 | 51.7 | PK | 74.00 | -22.3 | 1.00 H | 254 | 46.40 | 5.30 |
| 6 | 4824.00 | 48.5 | AV | 54.00 | -5.5 | 1.00 H | 254 | 43.20 | 5.30 |
| 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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 56.1 | PK | 74.0 | -17.9 | 1.11 V | 228 | 23.90 | 32.20 |
| 2 | 2390.00 | 43.4 | AV | 54.0 | -10.6 | 1.11 V | 228 | 11.20 | 32.20 |
| 3 | *2412.00 | 116.9 | PK | / | / | 1.09 V | 112 | 84.70 | 32.20 |
| 4 | *2412.00 | 113.6 | AV | / | / | 1.03 V | 112 | 81.40 | 32.20 |
| 5 | 4824.00 | 54.4 | PK | 74.00 | -19.6 | 1.21 V | 254 | 49.10 | 5.30 |
| 6 | 4824.00 | 44.7 | AV | 54.00 | -9.3 | 1.21 V | 254 | 39.40 | 5.30 |

| 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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 108.0 | PK | / | / | 1.01 H | 210 | 75.80 | 32.20 |
| 2 | *2437.00 | 105.6 | AV | / | / | 1.01 H | 210 | 73.40 | 32.20 |
| 3 | 4874.00 | 53.4 | PK | 74.00 | -20.6 | 1.03 H | 272 | 48.10 | 5.30 |
| 4 | 4874.00 | 44.0 | AV | 54.00 | -10.0 | 1.03 H | 272 | 38.70 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 108.3 | PK | / | / | 1.09 V | 112 | 76.10 | 32.20 |
| 2 | *2437.00 | 107.7 | AV | / | / | 1.09 V | 112 | 75.50 | 32.20 |
| 3 | 4874.00 | 56.8 | PK | 74.00 | -17.2 | 1.21 V | 254 | 51.50 | 5.30 |
| 4 | 4874.00 | 44.5 | AV | 54.00 | -9.5 | 1.21 V | 254 | 39.20 | 5.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11g_2462MHz） | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 109.7 | PK | / | / | 1.05 V | 215 | 77.40 | 32.30 |
| 2 | *2462.00 | 107.9 | AV | / | / | 1.05 V | 215 | 75.60 | 32.30 |
| 3 | 2483.50 | 57.3 | PK | 74.0 | -16.7 | 1.05 V | 211 | 24.90 | 32.40 |
| 4 | 2483.50 | 44.2 | AV | 54.0 | -9.8 | 1.05 V | 211 | 11.80 | 32.40 |
| 5 | 4924.00 | 52.4 | PK | 74.0 | -21.6 | 1.45 V | 320 | 46.90 | 5.50 |
| 6 | 4924.00 | 44.2 | AV | 54.0 | -9.8 | 1.45 V | 320 | 38.70 | 5.50 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11g_2462MHz）** | | | | | | | | | |
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 120.6 | PK | / | / | 1.05 V | 174 | 88.30 | 32.30 |
| 2 | *2462.00 | 116.8 | AV | / | / | 1.05 V | 174 | 84.50 | 32.30 |
| 3 | 2483.50 | 55.5 | PK | 74.0 | -18.5 | 1.05 V | 177 | 23.10 | 32.40 |
| 4 | 2483.50 | 44.7 | AV | 54.0 | -9.3 | 1.05 V | 177 | 12.30 | 32.40 |
| 5 | 4924.00 | 53.9 | PK | 74.0 | -20.1 | 1.45 V | 201 | 48.40 | 5.50 |
| 6 | 4924.00 | 45.9 | AV | 54.0 | -8.1 | 1.45 V | 201 | 40.40 | 5.50 |

| 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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 59.3 | PK | 74.0 | -14.7 | 1.01 H | 228 | 27.10 | 32.20 |
| 2 | 2390.00 | 42.7 | AV | 54.0 | -11.3 | 1.01 H | 228 | 10.50 | 32.20 |
| 3 | *2412.00 | 104.4 | PK | / | / | 1.03 H | 112 | 72.20 | 32.20 |
| 4 | *2412.00 | 102.0 | AV | / | / | 1.03 H | 112 | 69.80 | 32.20 |
| 5 | 4824.00 | 54.8 | PK | 74.00 | -19.2 | 1.00 H | 254 | 49.50 | 5.30 |
| 6 | 4824.00 | 46.6 | AV | 54.00 | -7.4 | 1.00 H | 254 | 41.30 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 57.7 | PK | 74.0 | -16.3 | 1.11 V | 228 | 25.50 | 32.20 |
| 2 | 2390.00 | 43.7 | AV | 54.0 | -10.3 | 1.11 V | 228 | 11.50 | 32.20 |
| 3 | *2412.00 | 117.1 | PK | / | / | 1.09 V | 112 | 84.90 | 32.20 |
| 4 | *2412.00 | 115 | AV | / | / | 1.03 V | 112 | 82.80 | 32.20 |
| 5 | 4824.00 | 54.4 | PK | 74.00 | -19.6 | 1.21 V | 254 | 49.10 | 5.30 |
| 6 | 4824.00 | 44.9 | AV | 54.00 | -9.1 | 1.21 V | 254 | 39.60 | 5.30 |

| 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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 114.3 | PK | / | / | 1.01 H | 210 | 82.10 | 32.20 |
| 2 | *2437.00 | 114.1 | AV | / | / | 1.01 H | 210 | 81.90 | 32.20 |
| 3 | 4874.00 | 57.8 | PK | 74.00 | -16.2 | 1.03 H | 272 | 52.50 | 5.30 |
| 4 | 4874.00 | 45.2 | AV | 54.00 | -8.8 | 1.03 H | 272 | 39.90 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 114.0 | PK | / | / | 1.09 V | 112 | 81.80 | 32.20 |
| 2 | *2437.00 | 115.3 | AV | / | / | 1.09 V | 112 | 83.10 | 32.20 |
| 3 | 4874.00 | 56.8 | PK | 74.00 | -17.2 | 1.21 V | 254 | 51.50 | 5.30 |
| 4 | 4874.00 | 45.5 | AV | 54.00 | -8.5 | 1.21 V | 254 | 40.20 | 5.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n20_2462MHz） | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 111.2 | PK | / | / | 1.05 V | 215 | 78.90 | 32.30 |
| 2 | *2462.00 | 109.9 | AV | / | / | 1.05 V | 215 | 77.60 | 32.30 |
| 3 | 2483.50 | 56.3 | PK | 74.0 | -17.7 | 1.05 V | 211 | 23.90 | 32.40 |
| 4 | 2483.50 | 44.1 | AV | 54.0 | -9.9 | 1.05 V | 211 | 11.70 | 32.40 |
| 5 | 4924.00 | 53.4 | PK | 74.0 | -20.6 | 1.45 V | 320 | 47.90 | 5.50 |
| 6 | 4924.00 | 46.3 | AV | 54.0 | -7.7 | 1.45 V | 320 | 40.80 | 5.50 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n20_2462MHz）** | | | | | | | | | |
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2462.00 | 110.5 | PK | / | / | 1.05 V | 174 | 78.20 | 32.30 |
| 2 | *2462.00 | 107.8 | AV | / | / | 1.05 V | 174 | 75.50 | 32.30 |
| 3 | 2483.50 | 55.5 | PK | 74.0 | -18.5 | 1.05 V | 177 | 23.10 | 32.40 |
| 4 | 2483.50 | 44.7 | AV | 54.0 | -9.3 | 1.05 V | 177 | 12.30 | 32.40 |
| 5 | 4924.00 | 55.9 | PK | 74.0 | -18.1 | 1.45 V | 201 | 50.40 | 5.50 |
| 6 | 4924.00 | 46.4 | AV | 54.0 | -7.6 | 1.45 V | 201 | 40.90 | 5.50 |

| 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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 56.9 | PK | 74.0 | -17.1 | 1.01 H | 228 | 24.70 | 32.20 |
| 2 | 2390.00 | 43.6 | AV | 54.0 | -10.4 | 1.01 H | 228 | 11.40 | 32.20 |
| 3 | *2422.00 | 101.8 | PK | / | / | 1.03 H | 112 | 69.60 | 32.20 |
| 4 | *2422.00 | 97.3 | AV | / | / | 1.03 H | 112 | 65.10 | 32.20 |
| 5 | 4844.00 | 51.7 | PK | 74.00 | -22.3 | 1.00 H | 254 | 46.40 | 5.30 |
| 6 | 4844.00 | 46.6 | AV | 54.00 | -7.4 | 1.00 H | 254 | 41.30 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | 2390.00 | 57.0 | PK | 74.0 | -17.0 | 1.11 V | 228 | 24.80 | 32.20 |
| 2 | 2390.00 | 44.4 | AV | 54.0 | -9.6 | 1.11 V | 228 | 12.20 | 32.20 |
| 3 | *2422.00 | 116.6 | PK | / | / | 1.09 V | 112 | 84.40 | 32.20 |
| 4 | *2422.00 | 113.6 | AV | / | / | 1.03 V | 112 | 81.40 | 32.20 |
| 5 | 4844.00 | 54.4 | PK | 74.00 | -19.6 | 1.21 V | 254 | 49.10 | 5.30 |
| 6 | 4844.00 | 44.6 | AV | 54.00 | -9.4 | 1.21 V | 254 | 39.30 | 5.30 |

| 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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 109.3 | PK | / | / | 1.01 H | 210 | 77.10 | 32.20 |
| 2 | *2437.00 | 109.1 | AV | / | / | 1.01 H | 210 | 76.90 | 32.20 |
| 3 | 4874.00 | 53.8 | PK | 74.00 | -20.2 | 1.03 H | 272 | 48.50 | 5.30 |
| 4 | 4874.00 | 44.2 | AV | 54.00 | -9.8 | 1.03 H | 272 | 38.90 | 5.30 |
| **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) | Correction Factor (dB/m) |
| 1 | *2437.00 | 109.0 | PK | / | / | 1.09 V | 112 | 76.80 | 32.20 |
| 2 | *2437.00 | 106.3 | AV | / | / | 1.09 V | 112 | 74.10 | 32.20 |
| 3 | 4874.00 | 56.4 | PK | 74.00 | -17.6 | 1.21 V | 254 | 51.10 | 5.30 |
| 4 | 4874.00 | 44.5 | AV | 54.00 | -9.5 | 1.21 V | 254 | 39.20 | 5.30 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M（802.11n40_2452MHz） | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2452.00 | 112.2 | PK | / | / | 1.05 V | 215 | 79.90 | 32.30 |
| 2 | *2452.00 | 111.1 | AV | / | / | 1.05 V | 215 | 78.80 | 32.30 |
| 3 | 2483.50 | 57.3 | PK | 74.0 | -16.7 | 1.05 V | 211 | 24.90 | 32.40 |
| 4 | 2483.50 | 45.0 | AV | 54.0 | -9.0 | 1.05 V | 211 | 12.60 | 32.40 |
| 5 | 4904.00 | 52.7 | PK | 74.0 | -21.3 | 1.45 V | 320 | 47.20 | 5.50 |
| 6 | 4904.00 | 43.0 | AV | 54.0 | -11.0 | 1.45 V | 320 | 37.50 | 5.50 |
| **ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M（802.11n40_2452MHz）** | | | | | | | | | |
| No. | Frequency (MHz) | Emssion Level (dBuV/m) | | Limit (dBuV/m) | Margin (dB) | Antenna Height (m) | Table Angle (Degree) | Raw Value (dBuV) | Correction Factor (dB/m) |
| 1 | *2452.00 | 110.4 | PK | / | / | 1.05 V | 174 | 78.10 | 32.30 |
| 2 | *2452.00 | 106.8 | AV | / | / | 1.05 V | 174 | 74.50 | 32.30 |
| 3 | 2483.50 | 55.5 | PK | 74.0 | -18.5 | 1.05 V | 177 | 23.10 | 32.40 |
| 4 | 2483.50 | 45.7 | AV | 54.0 | -8.3 | 1.05 V | 177 | 13.30 | 32.40 |
| 5 | 4904.00 | 55.9 | PK | 74.0 | -18.1 | 1.45 V | 201 | 50.40 | 5.50 |
| 6 | 4904.00 | 46.7 | AV | 54.0 | -7.3 | 1.45 V | 201 | 41.20 | 5.50 |

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

** END OF REPORT **