# Test Report

**Date : 2022-04-28** 
**No. : HMD22040014**

| | | |
|---|---|---|
| **Applicant** | : | Hip Shing Electronics Limited<br>Units 1.2&3,20/F., New Treasure Centre, 10., Ng Fong Street, San Po Kong, Kowloon, Hong Kong |
| **Supplier / Manufacturer** | : | Dongguan Zhi Cheng Electronic Products Co., Ltd.<br>No.32 Shangbao Road, 188 Industrial Zone, Pingshan, Tangxia, Dongguan, Guangdong, China |
| **Description of Sample(s)** | : | Submitted sample(s) said to be<br>Product: Internet, DAB/DAB+ and FM Digital Radio With Bluetooth and CD<br>Brand Name: REVO<br>Model No.: SUPERCD<br>FCC ID: BZAIDFB2215H5X |
| **Date Samples Received** | : | 2022-04-08 |
| **Date Tested** | : | 2022-04-08 to 2022-04-24 |
| **Investigation Requested** | : | Perform Electro Magnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.10:2013 for FCC Certification. |
| **Conclusions** | : | The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report. |
| **Remarks** | : | WIFI (802.11b/g/n20/n40) |

Dr.CHAN Kwok Hung, Brian
Authorized Signatory


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## 1.0 General Details

### 1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate, New Territories, Hong Kong
Telephone: 852 2666 1888
Fax: 852 2664 4353

### 1.2 Equipment Under Test [EUT]

**Description of Sample(s)**

| | |
|---|---|
| Product: | Internet, DAB/DAB+ and FM Digital Radio With Bluetooth and CD |
| Manufacturer: | Dongguan Zhi Cheng Electronic Products Co., Ltd.<br>No.32 Shangbao Road, 188 Industrial Zone, Pingshan, Tangxia, Dongguan, Guangdong, China |
| Brand Name: | REVO |
| Model Number: | SUPERCD |
| Rating: | 20.0Vd.c. by adapter |

The AC/DC adapter was provided by the applicant with following details:
Brand name: REVO, Model no.: BQ60A-2003000-D
Input: 100-240Va.c. 50/60Hz 1500mA, Output: 20.0Vd.c. 3.0A 60.0W

### 1.2.1 Description of EUT Operation

The Equipment Under Test (EUT) is an Internet, DAB/DAB+ and FM Digital Radio With Bluetooth and CD. The transmission signal is digital modulated with channel frequency range 2412-2462MHz.

### 1.3 Antenna Details

| | |
|---|---|
| Antenna Type: | PCB antenna |
| Antenna Gain: | 2.5dBi |

### 1.4 Date of Order

2022-04-08

### 1.5 Submitted Sample(s):

1 Sample

### 1.6 Test Duration

2022-04-08 to 2022-04-24

### 1.7 Country of Origin

China


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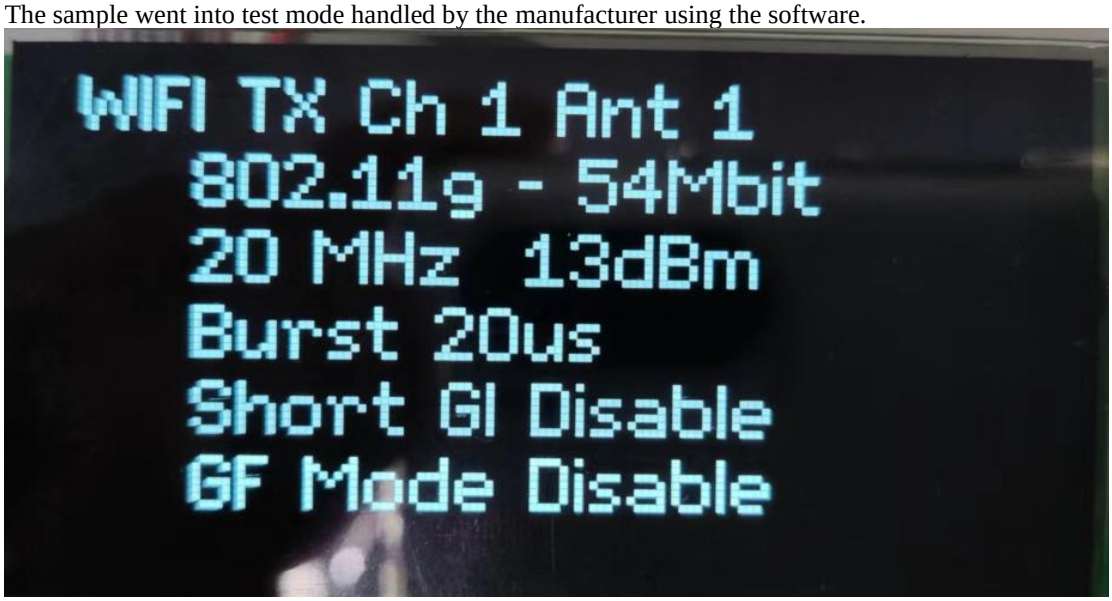
## 2.0 Technical Details

### 2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 Regulations and ANSI C63.10:2013 for FCC Certification.
According FCC KDB 558074 DTS Measurement Guidance, Duty cycle ≧98%.
The test mode sample is provided by manufacturer.

### 2.1.0 Operating conditions for the EUT

The sample went into test mode handled by the manufacturer using the software.





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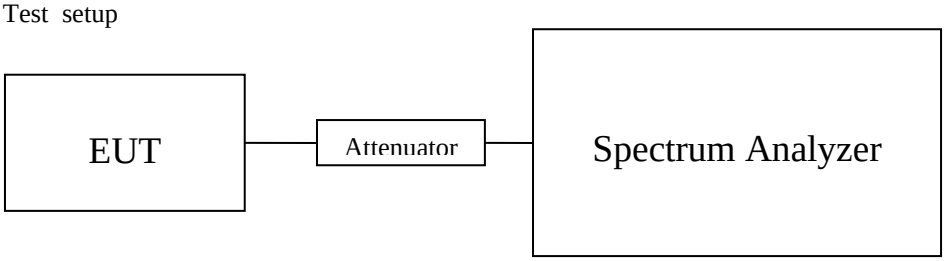
### 2.1.1 EUT Duty cycle

The EUT shall be configured or modified to transmit continuously. The intent is to test at 100% duty cycle; however, a small reduction in duty cycle (to no lower than 98%) is permitted if required by the EUT for amplitude control purposes.
The test mode sample is provided by manufacturer.

Test setup

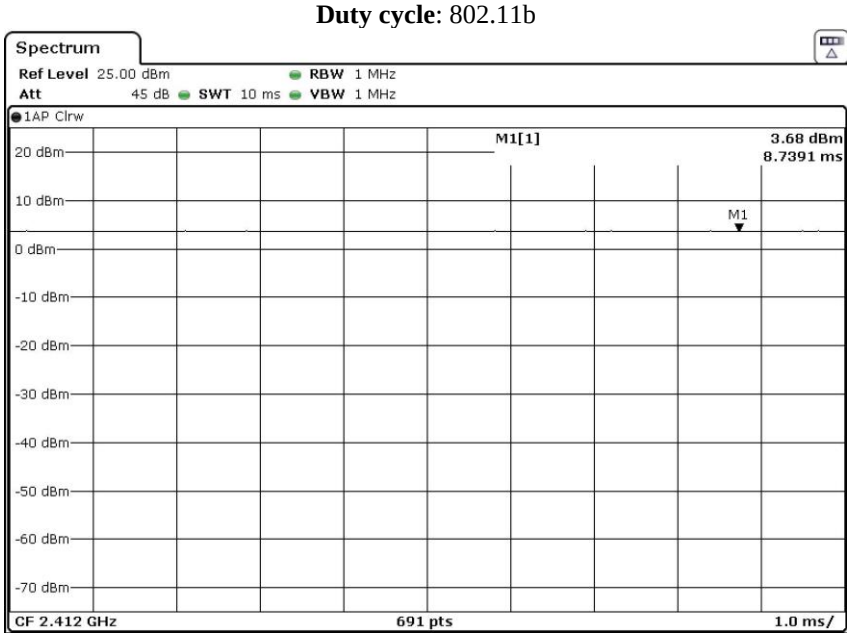



Results

| Mode | On Time (msec) | Period (msec) | Duty Cycle X (Linear) | Duty Cycle (%)* |
|---|---|---|---|---|
| 802.11b | 1 | 1 | 1 | 100 |
| 802.11g | 1 | 1 | 1 | 100 |
| 802.11n20 | 1 | 1 | 1 | 100 |
| 802.11n40 | 1 | 1 | 1 | 100 |

-*: If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

**Duty cycle**: 802.11b





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## 2.2 Test Standards and Results Summary Tables

| EMISSION<br>Results Summary | | | | | | |
|---|---|---|---|---|---|---|
| Test Condition | Test Requirement | Test Method | Class / Severity | Test Result | | |
| | | | | Pass | Failed | N/A |
| Output Power of Fundamental Emissions | FCC 47CFR 15.247(b)(3) | ANSI C63.10:2013 | N/A | ☒ | ☐ | ☐ |
| Radiated Emissions | FCC 47CFR 15.209 | ANSI C63.10:2013 | N/A | ☒ | ☐ | ☐ |
| Conducted Emissions | FCC 47CFR 15.207 | ANSI C63.10:2013 | N/A | ☒ | ☐ | ☐ |
| Power Spectral Density | FCC 47CFR 15.247(e) | N/A | N/A | ☒ | ☐ | ☐ |
| 6dB Bandwidth | FCC 47CFR 15.247(a)(2) | N/A | N/A | ☒ | ☐ | ☐ |
| Band Edge Emissions | FCC 47CFR 15.247(d) | N/A | N/A | ☒ | ☐ | ☐ |
| Antenna requirement | FCC 47CFR 15.203 | N/A | N/A | ☒ | ☐ | ☐ |

Note: N/A - Not Applicable


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## 3.0 Test Results

### 3.1 Emission

### 3.1.1 Maximum Peak Output Power

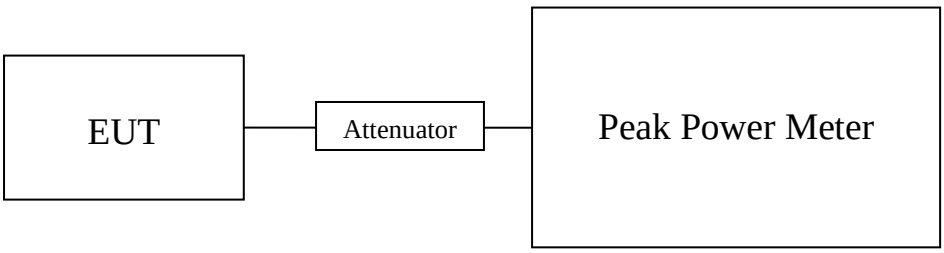
| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(b)(3) |
| Test Method: | ANSI C63.10: 2013 |
| Test Date: | 2022-04-18 |
| Mode of Operation: | WIFI Tx mode |

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Method:**

The RF output of the EUT was connected to the peak power meter. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in Watt.

**Test Setup:**




Note: a temporary antenna connector was soldered to the RF output.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**Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:**

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

**Results of WiFi mode 802.11 b, (2412MHz to 2462MHz) : Pass (TX Unit)**
**Maximum conducted output power**

| Channel | Frequency (MHz) | Output Power (Watt) |
|---|---|---|
| Low | 2412 | 0.056990 |
| Middle | 2437 | 0.050442 |
| High | 2462 | 0.049034 |

**Results of WiFi mode 802.11 g, (2412MHz to 2462MHz): Pass (TX Unit)**
**Maximum conducted output power**

| Channel | Frequency (MHz) | Output Power (Watt) |
|---|---|---|
| Low | 2412 | 0.076984 |
| Middle | 2437 | 0.069694 |
| High | 2462 | 0.067951 |

**Results of WiFi mode 802.11 n20, (2412MHz to 2462MHz): Pass (TX Unit)**
**Maximum conducted output power**

| Channel | Frequency (MHz) | Output Power (Watt) |
|---|---|---|
| Low | 2412 | 0.072995 |
| Middle | 2437 | 0.086964 |
| High | 2462 | 0.063576 |

**Results of WiFi mode 802.11 n40, (2422MHz to 2452MHz): Pass (TX Unit)**
**Maximum conducted output power**

| Channel | Frequency (MHz) | Output Power (Watt) |
|---|---|---|
| Low | 2422 | 0.047853 |
| Middle | 2437 | 0.042338 |
| High | 2452 | 0.039435 |

| | | | |
|---|---|---|---|
| Calculated measurement uncertainty | : | 30MHz to 1GHz | 1.7dB |
| | | 1GHz to 26GHz | 1.7dB |


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### 3.1.2 Radiated Emissions

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.209 |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2022-04-19 |
| Mode of Operation: | WIFI Tx mode |

Ambient Temperature: 24℃ Relative Humidity: 52% Atmospheric Pressure: 101 kPa

**Test Method:**

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-Anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.


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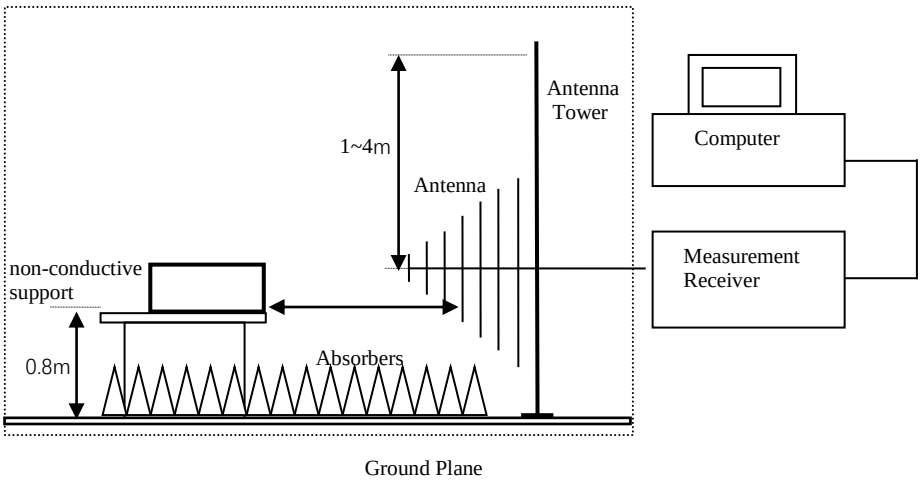
**Spectrum Analyzer Setting:**

| | | |
|---|---|---|
| 9KHz – 30MHz (Pk & Av) | RBW: | 10kHz |
| | VBW: | 30kHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |
| 30MHz – 1GHz (QP) | RBW: | 120kHz |
| | VBW: | 120kHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |
| Above 1GHz (Pk) | RBW: | 1MHz |
| | VBW: | 1MHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |
| Above 1GHz (Av) | RBW: | 1MHz |
| | VBW: | 10Hz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |

**Test Setup:**




- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used.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**Limits for Radiated Emissions FCC 47 CFR 15.247 ]:**

| Frequency Range | Quasi-Peak Limits |
|---|---|
| [MHz] | [µV/m] |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

**Result of Tx mode (2412.0 MHz) (802.11b) (9kHz – 30MHz): Pass**

| **Field Strength of Spurious Emissions Peak Value** | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2412.0 MHz) (802.11b) (1GHz-25GHz): Pass**

| **Field Strength of Spurious Emissions Peak Value** | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4824.0 | 57.2 | 0.82 | 58.0 | 74.0 | 16.0 | Vertical |
| 4824.0 | 57.9 | 0.52 | 58.4 | 74.0 | 15.6 | Horizontal |
| 7236.0 | 50.2 | 7.00 | 57.2 | 74.0 | 16.8 | Vertical |
| 7236.0 | 50.7 | 6.50 | 57.2 | 74.0 | 16.8 | Horizontal |
| 9648.0 | 47.3 | 8.50 | 55.8 | 74.0 | 18.2 | Vertical |
| 9648.0 | 47.1 | 8.30 | 55.4 | 74.0 | 18.6 | Horizontal |
| 12060.0 | 45.8 | 10.90 | 56.7 | 74.0 | 17.3 | Vertical |
| 12060.0 | 45.2 | 10.80 | 56.0 | 74.0 | 18.0 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4824.0 | 41.3 | 0.82 | 42.1 | 54.0 | 11.9 | Vertical |
| 4824.0 | 42.5 | 0.52 | 43.0 | 54.0 | 11.0 | Horizontal |
| 7236.0 | 35.4 | 7.00 | 42.4 | 54.0 | 11.6 | Vertical |
| 7236.0 | 35.3 | 6.50 | 41.8 | 54.0 | 12.2 | Horizontal |
| 9648.0 | 32.3 | 8.50 | 40.8 | 54.0 | 13.2 | Vertical |
| 9648.0 | 31.6 | 8.30 | 39.9 | 54.0 | 14.1 | Horizontal |
| 12060.0 | 29.8 | 10.90 | 40.7 | 54.0 | 13.3 | Vertical |
| 12060.0 | 29.4 | 10.80 | 40.2 | 54.0 | 13.8 | Horizontal |

**Result of Tx mode (2437.0 MHz) (802.11b) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2437.0 MHz) (802.11b) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4874.0 | 57.1 | 0.82 | 57.9 | 74.0 | 16.1 | Vertical |
| 4874.0 | 57.3 | 0.52 | 57.8 | 74.0 | 16.2 | Horizontal |
| 7311.0 | 50.4 | 7.00 | 57.4 | 74.0 | 16.6 | Vertical |
| 7311.0 | 51.2 | 6.50 | 57.7 | 74.0 | 16.3 | Horizontal |
| 9748.0 | 48.5 | 8.50 | 57.0 | 74.0 | 17.0 | Vertical |
| 9748.0 | 47.9 | 8.30 | 56.2 | 74.0 | 17.8 | Horizontal |
| 12185.0 | 45.4 | 10.90 | 56.3 | 74.0 | 17.7 | Vertical |
| 12185.0 | 45.2 | 10.80 | 56.0 | 74.0 | 18.0 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBuV | Correction Factor dB/m | Field Strength dBuV/m | Limit @3m dBuV/m | Margin dB | E-Field Polarity |
| 4874.0 | 42.3 | 0.82 | 43.1 | 54.0 | 10.9 | Vertical |
| 4874.0 | 41.7 | 0.52 | 42.3 | 54.0 | 11.8 | Horizontal |
| 7311.0 | 35.2 | 7.00 | 42.2 | 54.0 | 11.8 | Vertical |
| 7311.0 | 35.8 | 6.50 | 42.3 | 54.0 | 11.7 | Horizontal |
| 9748.0 | 32.8 | 8.50 | 41.3 | 54.0 | 12.7 | Vertical |
| 9748.0 | 32.8 | 8.30 | 41.1 | 54.0 | 12.9 | Horizontal |
| 12185.0 | 30.3 | 10.90 | 41.2 | 54.0 | 12.8 | Vertical |
| 12185.0 | 30.8 | 10.80 | 41.6 | 54.0 | 12.4 | Horizontal |

**Result of Tx mode (2462.0 MHz) (802.11b) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2462.0 MHz) (802.11b) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4924.0 | 57.1 | 0.82 | 57.9 | 74.0 | 16.1 | Vertical |
| 4924.0 | 57.4 | 0.52 | 57.9 | 74.0 | 16.1 | Horizontal |
| 7386.0 | 50.9 | 7.00 | 57.9 | 74.0 | 16.1 | Vertical |
| 7386.0 | 51.2 | 6.50 | 57.7 | 74.0 | 16.3 | Horizontal |
| 9848.0 | 47.6 | 8.50 | 56.1 | 74.0 | 17.9 | Vertical |
| 9848.0 | 47.3 | 8.30 | 55.6 | 74.0 | 18.4 | Horizontal |
| 12310.0 | 45.9 | 10.90 | 56.8 | 74.0 | 17.2 | Vertical |
| 12310.0 | 45.4 | 10.80 | 56.2 | 74.0 | 17.8 | Horizontal |


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| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4924.0 | 42.4 | 0.82 | 43.2 | 54.0 | 10.8 | Vertical |
| 4924.0 | 42.5 | 0.52 | 43.0 | 54.0 | 11.0 | Horizontal |
| 7386.0 | 35.1 | 7.00 | 42.1 | 54.0 | 11.9 | Vertical |
| 7386.0 | 35.6 | 6.50 | 42.1 | 54.0 | 11.9 | Horizontal |
| 9848.0 | 32.6 | 8.50 | 41.1 | 54.0 | 12.9 | Vertical |
| 9848.0 | 33.1 | 8.30 | 41.4 | 54.0 | 12.6 | Horizontal |
| 12310.0 | 29.4 | 10.90 | 40.3 | 54.0 | 13.7 | Vertical |
| 12310.0 | 30.5 | 10.80 | 41.3 | 54.0 | 12.7 | Horizontal |

**Result of Tx mode (2412.0 MHz) (802.11g) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Field Strength<br>µV/m | Limit<br>µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2412.0 MHz) (802.11g) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4824.0 | 56.5 | 0.82 | 57.3 | 74.0 | 16.7 | Vertical |
| 4824.0 | 56.4 | 0.52 | 56.9 | 74.0 | 17.1 | Horizontal |
| 7236.0 | 49.5 | 7.00 | 56.5 | 74.0 | 17.5 | Vertical |
| 7236.0 | 51.1 | 6.50 | 57.6 | 74.0 | 16.4 | Horizontal |
| 9648.0 | 47.4 | 8.50 | 55.9 | 74.0 | 18.1 | Vertical |
| 9648.0 | 47.5 | 8.30 | 55.8 | 74.0 | 18.2 | Horizontal |
| 12060.0 | 45.1 | 10.90 | 56.0 | 74.0 | 18.0 | Vertical |
| 12060.0 | 45.3 | 10.80 | 56.1 | 74.0 | 17.9 | Horizontal |


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| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4824.0 | 41.2 | 0.82 | 42.0 | 54.0 | 12.0 | Vertical |
| 4824.0 | 41.5 | 0.52 | 42.0 | 54.0 | 12.0 | Horizontal |
| 7236.0 | 35.3 | 7.00 | 42.3 | 54.0 | 11.7 | Vertical |
| 7236.0 | 35.4 | 6.50 | 41.9 | 54.0 | 12.1 | Horizontal |
| 9648.0 | 31.2 | 8.50 | 39.7 | 54.0 | 14.3 | Vertical |
| 9648.0 | 32.8 | 8.30 | 41.1 | 54.0 | 12.9 | Horizontal |
| 12060.0 | 30.5 | 10.90 | 41.4 | 54.0 | 12.6 | Vertical |
| 12060.0 | 29.8 | 10.80 | 40.6 | 54.0 | 13.4 | Horizontal |

**Result of Tx mode (2437.0 MHz) (802.11g) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Field Strength<br>µV/m | Limit<br>µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2437.0 MHz) (802.11g) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4874.0 | 56.5 | 0.82 | 57.3 | 74.0 | 16.7 | Vertical |
| 4874.0 | 57.1 | 0.52 | 57.6 | 74.0 | 16.4 | Horizontal |
| 7311.0 | 48.9 | 7.00 | 55.9 | 74.0 | 18.1 | Vertical |
| 7311.0 | 50.2 | 6.50 | 56.7 | 74.0 | 17.3 | Horizontal |
| 9748.0 | 47.1 | 8.50 | 55.6 | 74.0 | 18.4 | Vertical |
| 9748.0 | 47.2 | 8.30 | 55.5 | 74.0 | 18.5 | Horizontal |
| 12185.0 | 46.1 | 10.90 | 57.0 | 74.0 | 17.0 | Vertical |
| 12185.0 | 45.5 | 10.80 | 56.3 | 74.0 | 17.7 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4874.0 | 41.8 | 0.82 | 42.6 | 54.0 | 11.4 | Vertical |
| 4874.0 | 41.9 | 0.52 | 42.4 | 54.0 | 11.6 | Horizontal |
| 7311.0 | 34.0 | 7.00 | 41.0 | 54.0 | 13.0 | Vertical |
| 7311.0 | 35.2 | 6.50 | 41.7 | 54.0 | 12.3 | Horizontal |
| 9748.0 | 31.5 | 8.50 | 40.0 | 54.0 | 14.0 | Vertical |
| 9748.0 | 32.6 | 8.30 | 40.9 | 54.0 | 13.1 | Horizontal |
| 12185.0 | 32.0 | 10.90 | 42.9 | 54.0 | 11.1 | Vertical |
| 12185.0 | 30.4 | 10.80 | 41.2 | 54.0 | 12.8 | Horizontal |

**Result of Tx mode (2462.0 MHz) (802.11g) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2462.0 MHz) (802.11g) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4924.0 | 57.3 | 0.82 | 58.1 | 74.0 | 15.9 | Vertical |
| 4924.0 | 57.2 | 0.52 | 57.7 | 74.0 | 16.3 | Horizontal |
| 7386.0 | 50.1 | 7.00 | 57.1 | 74.0 | 16.9 | Vertical |
| 7386.0 | 51.4 | 6.50 | 57.9 | 74.0 | 16.1 | Horizontal |
| 9848.0 | 47.6 | 8.50 | 56.1 | 74.0 | 17.9 | Vertical |
| 9848.0 | 47.1 | 8.30 | 55.4 | 74.0 | 18.6 | Horizontal |
| 12310.0 | 45.3 | 10.90 | 56.2 | 74.0 | 17.8 | Vertical |
| 12310.0 | 45.4 | 10.80 | 56.2 | 74.0 | 17.8 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4924.0 | 41.6 | 0.82 | 42.4 | 54.0 | 11.6 | Vertical |
| 4924.0 | 41.8 | 0.52 | 42.3 | 54.0 | 11.7 | Horizontal |
| 7386.0 | 35.4 | 7.00 | 42.4 | 54.0 | 11.6 | Vertical |
| 7386.0 | 36.2 | 6.50 | 42.7 | 54.0 | 11.3 | Horizontal |
| 9848.0 | 33.6 | 8.50 | 42.1 | 54.0 | 11.9 | Vertical |
| 9848.0 | 32.7 | 8.30 | 41.0 | 54.0 | 13.0 | Horizontal |
| 12310.0 | 29.4 | 10.90 | 40.3 | 54.0 | 13.7 | Vertical |
| 12310.0 | 31.3 | 10.80 | 42.1 | 54.0 | 12.0 | Horizontal |

**Result of Tx mode (2412.0 MHz) (802.11n20) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2412.0 MHz) (802.11n20) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4824.0 | 56.6 | 0.82 | 57.4 | 74.0 | 16.6 | Vertical |
| 4824.0 | 57.2 | 0.52 | 57.7 | 74.0 | 16.3 | Horizontal |
| 7236.0 | 50.3 | 7.00 | 57.3 | 74.0 | 16.7 | Vertical |
| 7236.0 | 50.4 | 6.50 | 56.9 | 74.0 | 17.1 | Horizontal |
| 9648.0 | 47.9 | 8.50 | 56.4 | 74.0 | 17.6 | Vertical |
| 9648.0 | 46.9 | 8.30 | 55.2 | 74.0 | 18.8 | Horizontal |
| 12060.0 | 46.1 | 10.90 | 57.0 | 74.0 | 17.0 | Vertical |
| 12060.0 | 45.5 | 10.80 | 56.3 | 74.0 | 17.7 | Horizontal |


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| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4824.0 | 41.6 | 0.82 | 42.4 | 54.0 | 11.6 | Vertical |
| 4824.0 | 42.0 | 0.52 | 42.5 | 54.0 | 11.5 | Horizontal |
| 7236.0 | 35.4 | 7.00 | 42.4 | 54.0 | 11.6 | Vertical |
| 7236.0 | 35.6 | 6.50 | 42.1 | 54.0 | 11.9 | Horizontal |
| 9648.0 | 31.2 | 8.50 | 39.7 | 54.0 | 14.3 | Vertical |
| 9648.0 | 33.2 | 8.30 | 41.5 | 54.0 | 12.6 | Horizontal |
| 12060.0 | 30.3 | 10.90 | 41.2 | 54.0 | 12.9 | Vertical |
| 12060.0 | 30.7 | 10.80 | 41.5 | 54.0 | 12.5 | Horizontal |

**Result of Tx mode (2437.0 MHz) (802.11n20) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Field Strength<br>µV/m | Limit<br>µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2437.0 MHz) (802.11n20) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4874.0 | 57.4 | 0.82 | 58.2 | 74.0 | 15.8 | Vertical |
| 4874.0 | 57.1 | 0.52 | 57.6 | 74.0 | 16.4 | Horizontal |
| 7311.0 | 49.5 | 7.00 | 56.5 | 74.0 | 17.5 | Vertical |
| 7311.0 | 51.2 | 6.50 | 57.7 | 74.0 | 16.3 | Horizontal |
| 9748.0 | 47.6 | 8.50 | 56.1 | 74.0 | 17.9 | Vertical |
| 9748.0 | 47.0 | 8.30 | 55.3 | 74.0 | 18.7 | Horizontal |
| 12185.0 | 45.1 | 10.90 | 56.0 | 74.0 | 18.0 | Vertical |
| 12185.0 | 45.5 | 10.80 | 56.3 | 74.0 | 17.8 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4874.0 | 41.6 | 0.82 | 42.4 | 54.0 | 11.6 | Vertical |
| 4874.0 | 41.3 | 0.52 | 41.8 | 54.0 | 12.2 | Horizontal |
| 7311.0 | 35.6 | 7.00 | 42.6 | 54.0 | 11.4 | Vertical |
| 7311.0 | 35.8 | 6.50 | 42.3 | 54.0 | 11.7 | Horizontal |
| 9748.0 | 32.4 | 8.50 | 40.9 | 54.0 | 13.1 | Vertical |
| 9748.0 | 31.6 | 8.30 | 39.9 | 54.0 | 14.1 | Horizontal |
| 12185.0 | 30.9 | 10.90 | 41.8 | 54.0 | 12.2 | Vertical |
| 12185.0 | 30.7 | 10.80 | 41.5 | 54.0 | 12.5 | Horizontal |

**Result of Tx mode (2462.0 MHz) (802.11n20) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2462.0 MHz) (802.11n20) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4924.0 | 57.3 | 0.82 | 58.1 | 74.0 | 15.9 | Vertical |
| 4924.0 | 56.3 | 0.52 | 56.8 | 74.0 | 17.2 | Horizontal |
| 7386.0 | 50.4 | 7.00 | 57.4 | 74.0 | 16.6 | Vertical |
| 7386.0 | 51.3 | 6.50 | 57.8 | 74.0 | 16.2 | Horizontal |
| 9848.0 | 47.8 | 8.50 | 56.3 | 74.0 | 17.7 | Vertical |
| 9848.0 | 47.3 | 8.30 | 55.6 | 74.0 | 18.4 | Horizontal |
| 12310.0 | 45.2 | 10.90 | 56.1 | 74.0 | 17.9 | Vertical |
| 12310.0 | 45.4 | 10.80 | 56.2 | 74.0 | 17.8 | Horizontal |


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| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4924.0 | 41.5 | 0.82 | 42.3 | 54.0 | 11.7 | Vertical |
| 4924.0 | 42.1 | 0.52 | 42.6 | 54.0 | 11.4 | Horizontal |
| 7386.0 | 35.9 | 7.00 | 42.9 | 54.0 | 11.1 | Vertical |
| 7386.0 | 34.4 | 6.50 | 40.9 | 54.0 | 13.1 | Horizontal |
| 9848.0 | 32.3 | 8.50 | 40.8 | 54.0 | 13.2 | Vertical |
| 9848.0 | 31.6 | 8.30 | 39.9 | 54.0 | 14.1 | Horizontal |
| 12310.0 | 31.9 | 10.90 | 42.8 | 54.0 | 11.2 | Vertical |
| 12310.0 | 30.5 | 10.80 | 41.3 | 54.0 | 12.7 | Horizontal |

**Result of Tx mode (2422.0 MHz) (802.11n40) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Field Strength<br>µV/m | Limit<br>µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2422.0 MHz) (802.11n40) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions<br>Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4844.0 | 57.2 | 0.82 | 58.0 | 74.0 | 16.0 | Vertical |
| 4844.0 | 56.6 | 0.52 | 57.1 | 74.0 | 16.9 | Horizontal |
| 7266.0 | 49.5 | 7.00 | 56.5 | 74.0 | 17.5 | Vertical |
| 7266.0 | 49.3 | 6.50 | 55.8 | 74.0 | 18.2 | Horizontal |
| 9688.0 | 47.2 | 8.50 | 55.7 | 74.0 | 18.3 | Vertical |
| 9688.0 | 47.7 | 8.30 | 56.0 | 74.0 | 18.0 | Horizontal |
| 12110.0 | 45.4 | 10.90 | 56.3 | 74.0 | 17.7 | Vertical |
| 12110.0 | 45.3 | 10.80 | 56.1 | 74.0 | 17.9 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4844.0 | 41.2 | 0.82 | 42.0 | 54.0 | 12.0 | Vertical |
| 4844.0 | 41.5 | 0.52 | 42.0 | 54.0 | 12.0 | Horizontal |
| 7266.0 | 34.9 | 7.00 | 41.9 | 54.0 | 12.1 | Vertical |
| 7266.0 | 35.1 | 6.50 | 41.6 | 54.0 | 12.4 | Horizontal |
| 9688.0 | 31.6 | 8.50 | 40.1 | 54.0 | 13.9 | Vertical |
| 9688.0 | 33.2 | 8.30 | 41.5 | 54.0 | 12.5 | Horizontal |
| 12110.0 | 31.0 | 10.90 | 41.9 | 54.0 | 12.1 | Vertical |
| 12110.0 | 30.6 | 10.80 | 41.4 | 54.0 | 12.6 | Horizontal |

**Result of Tx mode (2437.0 MHz) (802.11n40) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2437.0 MHz) (802.11n40) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4874.0 | 56.6 | 0.82 | 57.4 | 74.0 | 16.6 | Vertical |
| 4874.0 | 56.2 | 0.52 | 56.7 | 74.0 | 17.3 | Horizontal |
| 7311.0 | 50.4 | 7.00 | 57.4 | 74.0 | 16.6 | Vertical |
| 7311.0 | 50.2 | 6.50 | 56.7 | 74.0 | 17.3 | Horizontal |
| 9748.0 | 47.8 | 8.50 | 56.3 | 74.0 | 17.7 | Vertical |
| 9748.0 | 47.1 | 8.30 | 55.4 | 74.0 | 18.6 | Horizontal |
| 12185.0 | 48.6 | 10.90 | 59.5 | 74.0 | 14.5 | Vertical |
| 12185.0 | 46.5 | 10.80 | 57.3 | 74.0 | 16.7 | Horizontal |


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| Field Strength of Spurious Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4874.0 | 42.2 | 0.82 | 43.0 | 54.0 | 11.0 | Vertical |
| 4874.0 | 41.9 | 0.52 | 42.4 | 54.0 | 11.6 | Horizontal |
| 7311.0 | 35.6 | 7.00 | 42.6 | 54.0 | 11.4 | Vertical |
| 7311.0 | 36.1 | 6.50 | 42.6 | 54.0 | 11.4 | Horizontal |
| 9748.0 | 32.4 | 8.50 | 40.9 | 54.0 | 13.1 | Vertical |
| 9748.0 | 32.5 | 8.30 | 40.8 | 54.0 | 13.2 | Horizontal |
| 12185.0 | 30.9 | 10.90 | 41.8 | 54.0 | 12.2 | Vertical |
| 12185.0 | 30.5 | 10.80 | 41.3 | 54.0 | 12.7 | Horizontal |

**Result of Tx mode (2452.0 MHz) (802.11n40) (9kHz – 30MHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level dBµV | Correction Factor dB/m | Field Strength dBµV/m | Field Strength µV/m | Limit µV/m | E-Field Polarity |
| **Emissions detected are more than 20 dB below the FCC Limits** | | | | | | |

**Result of Tx mode (2452.0 MHz) (802.11n40) (1GHz-25GHz): Pass**

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 4904.0 | 55.2 | 0.82 | 56.0 | 74.0 | 18.0 | Vertical |
| 4904.0 | 56.1 | 0.52 | 56.6 | 74.0 | 17.4 | Horizontal |
| 7356.0 | 48.9 | 7.00 | 55.9 | 74.0 | 18.1 | Vertical |
| 7356.0 | 49.2 | 6.50 | 55.7 | 74.0 | 18.3 | Horizontal |
| 9808.0 | 47.2 | 8.50 | 55.7 | 74.0 | 18.3 | Vertical |
| 9808.0 | 47.1 | 8.30 | 55.4 | 74.0 | 18.6 | Horizontal |
| 12260.0 | 45.4 | 10.90 | 56.3 | 74.0 | 17.7 | Vertical |
| 12260.0 | 45.6 | 10.80 | 56.4 | 74.0 | 17.6 | Horizontal |


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| Field Strength of Spurious Emissions<br>Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV | Correction Factor<br>dB/m | Field Strength<br>dBµV/m | Limit @3m<br>dBµV/m | Margin<br>dB | E-Field Polarity |
| 4904.0 | 40.6 | 0.82 | 41.4 | 54.0 | 12.6 | Vertical |
| 4904.0 | 41.5 | 0.52 | 42.0 | 54.0 | 12.0 | Horizontal |
| 7356.0 | 34.6 | 7.00 | 41.6 | 54.0 | 12.4 | Vertical |
| 7356.0 | 35.2 | 6.50 | 41.7 | 54.0 | 12.3 | Horizontal |
| 9808.0 | 31.9 | 8.50 | 40.4 | 54.0 | 13.6 | Vertical |
| 9808.0 | 31.4 | 8.30 | 39.7 | 54.0 | 14.3 | Horizontal |
| 12260.0 | 31.5 | 10.90 | 42.4 | 54.0 | 11.6 | Vertical |
| 12260.0 | 30.6 | 10.80 | 41.4 | 54.0 | 12.6 | Horizontal |

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (9kHz-30MHz): 2.0dB
(30MHz -1GHz): 4.9dB
(1GHz -26GHz): 4.02dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.


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**Radiated Emissions Measurement:**

**Limit：**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section 5.205(c)).

**Result： RF Radiated Emissions (Lowest)-802.11b**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 55.9 | -4.8 | 51.1 | 74.0 | 22.9 | Vertical |
| 2390.0 | 56.3 | -4.7 | 51.6 | 74.0 | 22.4 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 42.4 | -4.8 | 37.6 | 54.0 | 16.4 | Vertical |
| 2390.0 | 41.8 | -4.7 | 37.1 | 54.0 | 16.9 | Horizontal |

**Result： RF Radiated Emissions (Highest) -802.11b**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 55.7 | -4.8 | 50.9 | 74.0 | 23.1 | Vertical |
| 2483.5 | 55.3 | -4.7 | 50.6 | 74.0 | 23.4 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 42.6 | -4.8 | 37.8 | 54.0 | 16.2 | Vertical |
| 2483.5 | 42.5 | -4.7 | 37.8 | 54.0 | 16.2 | Horizontal |


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**Result: RF Radiated Emissions (Lowest)-802.11g**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 66.3 | -4.8 | 61.5 | 74.0 | 12.5 | Vertical |
| 2390.0 | 66.1 | -4.7 | 61.4 | 74.0 | 12.6 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 48.6 | -4.8 | 43.8 | 54.0 | 10.2 | Vertical |
| 2390.0 | 47.3 | -4.7 | 42.6 | 54.0 | 11.4 | Horizontal |

**Result: RF Radiated Emissions (Highest) -802.11g**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 66.1 | -4.8 | 61.3 | 74.0 | 12.7 | Vertical |
| 2483.5 | 65.8 | -4.7 | 61.1 | 74.0 | 12.9 | Horizontal |

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 48.9 | -4.8 | 44.1 | 54.0 | 9.9 | Vertical |
| 2483.5 | 49.0 | -4.7 | 44.3 | 54.0 | 9.7 | Horizontal |


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**Result: RF Radiated Emissions (Lowest)-802.11n20**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 65.6 | -4.8 | 60.8 | 74.0 | 13.2 | Horizontal |
| 2390.0 | 64.5 | -4.7 | 59.8 | 74.0 | 14.2 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 49.1 | -4.8 | 44.3 | 54.0 | 9.7 | Vertical |
| 2390.0 | 48.6 | -4.7 | 43.9 | 54.0 | 10.1 | Horizontal |

**Result: RF Radiated Emissions (Highest) -802.11n20**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 62.3 | -4.8 | 57.5 | 74.0 | 16.5 | Vertical |
| 2483.5 | 64.5 | -4.7 | 59.8 | 74.0 | 14.2 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 50.1 | -4.8 | 45.3 | 54.0 | 8.7 | Horizontal |
| 2483.5 | 51.4 | -4.7 | 46.7 | 54.0 | 7.3 | Horizontal |


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**Result: RF Radiated Emissions (Lowest)-802.11n40**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 72.5 | -4.8 | 67.7 | 74.0 | 6.3 | Vertical |
| 2390.0 | 73.1 | -4.7 | 68.4 | 74.0 | 5.6 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2390.0 | 50.3 | -4.8 | 45.5 | 54.0 | 8.5 | Vertical |
| 2390.0 | 50.4 | -4.7 | 45.7 | 54.0 | 8.3 | Horizontal |

**Result: RF Radiated Emissions (Highest) -802.11n40**

| Field Strength of Band-edge Compliance Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 67.7 | -4.8 | 62.9 | 74.0 | 11.1 | Vertical |
| 2483.5 | 68.2 | -4.7 | 63.5 | 74.0 | 10.5 | Horizontal |

| Field Strength of Band-edge Compliance Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV | Correction Factor dB/m | Field Strength dBµV/m | Limit @3m dBµV/m | Margin dB | E-Field Polarity |
| 2483.5 | 48.4 | -4.8 | 43.6 | 54.0 | 10.4 | Horizontal |
| 2483.5 | 47.8 | -4.7 | 43.1 | 54.0 | 10.9 | Horizontal |


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**Limits for Radiated Emissions FCC 47 CFR 15.247]:**

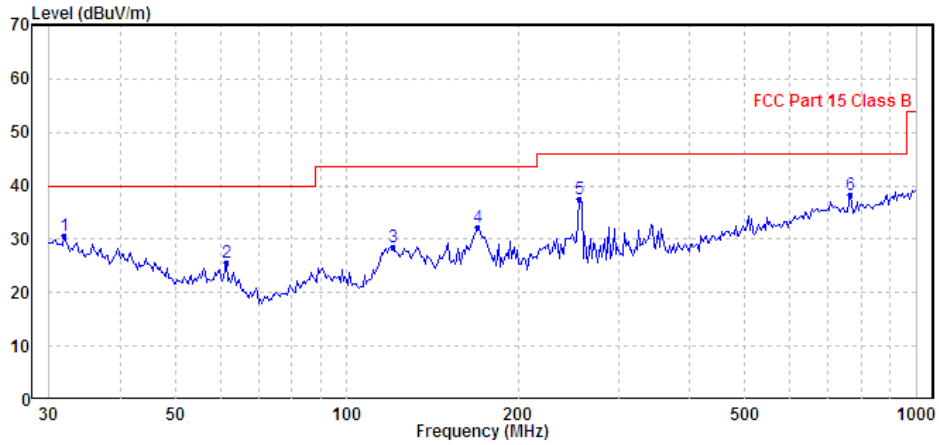
| Frequency Range | Quasi-Peak Limits |
|---|---|
| [MHz] | [μV/m] |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

**Results of WIFI TX mode: Pass**

Please refer to the following table for result details (The data is the worst cases)

Horizontal




Ambient Temperature: 27.0C
Relative Humidity : 45.0%

| | Freq | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | | |
| 1 | 31.955 | 30.56 | 40.00 | -9.44 | QP | Horizontal |
| 2 | 61.346 | 25.54 | 40.00 | -14.46 | QP | Horizontal |
| 3 | 120.277 | 28.57 | 43.50 | -14.93 | QP | Horizontal |
| 4 | 169.599 | 32.34 | 43.50 | -11.16 | QP | Horizontal |
| 5 | 256.521 | 37.59 | 46.00 | -8.41 | QP | Horizontal |
| 6 | 766.057 | 38.26 | 46.00 | -7.74 | QP | Horizontal |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**Limits for Radiated Emissions FCC 47 CFR 15.247 Class B]:**

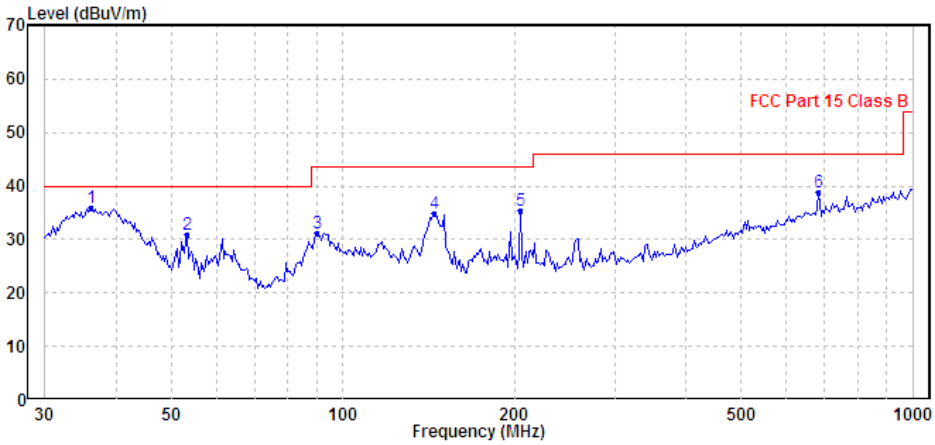
| Frequency Range | Quasi-Peak Limits |
|---|---|
| [MHz] | [μV/m] |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

**Results of WIFI TX mode: Pass**

Please refer to the following table for result details (The data is the worst cases)

Vertical




Ambient Temperature: 27.0C
Relative Humidity : 45.0%

| | Freq | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | | |
| 1 | 36.254 | 36.04 | 40.00 | -3.96 | QP | Vertical |
| 2 | 53.318 | 30.98 | 40.00 | -9.02 | QP | Vertical |
| 3 | 90.220 | 31.27 | 43.50 | -12.23 | QP | Vertical |
| 4 | 144.335 | 34.83 | 43.50 | -8.67 | QP | Vertical |
| 5 | 204.955 | 35.35 | 43.50 | -8.15 | QP | Vertical |
| 6 | 684.745 | 38.94 | 46.00 | -7.06 | QP | Vertical |

Remarks: Calculated measurement uncertainty (30MHz – 1GHz): 4.9dB
Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.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### 3.1.3 AC Mains Conducted Emissions (0.15MHz to 30MHz)

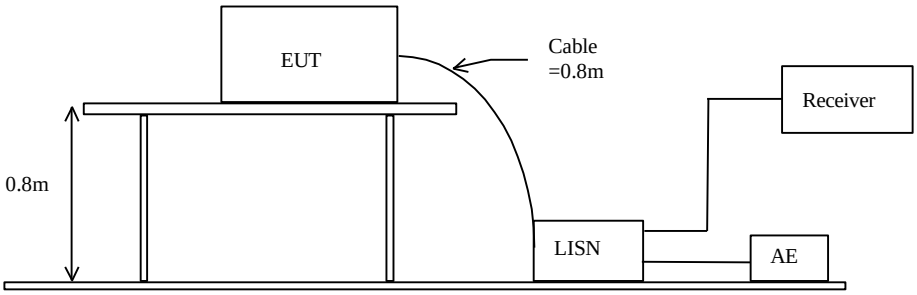
| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.207 |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2022-04-11 |
| Mode of Operation: | WIFI TX mode |
| Test Voltage: | 120Va.c. 60Hz |

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Method:**
The test was performed in accordance with ANSI ANSI C63.10:2013, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

**Receiver Setting:**
Bandw. = 9 kHz, Meas. Time= 10.0 ms, Step Width = 5.0kHz
Detector = MaxPeak and CISPR AV

**Test Setup:**




**Limits for Conducted Emissions (FCC 47 CFR 15.207):**

| Frequency Range [MHz] | Quasi-Peak Limits [dBμV] | Average [dBμV] |
|---|---|---|
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

* Decreases with the logarithm of the frequency.
Remarks:
Calculated measurement uncertainty (0.15MHz – 30MHz): 3.25dB
-*- Emission(s) that is far below the corresponding limit line.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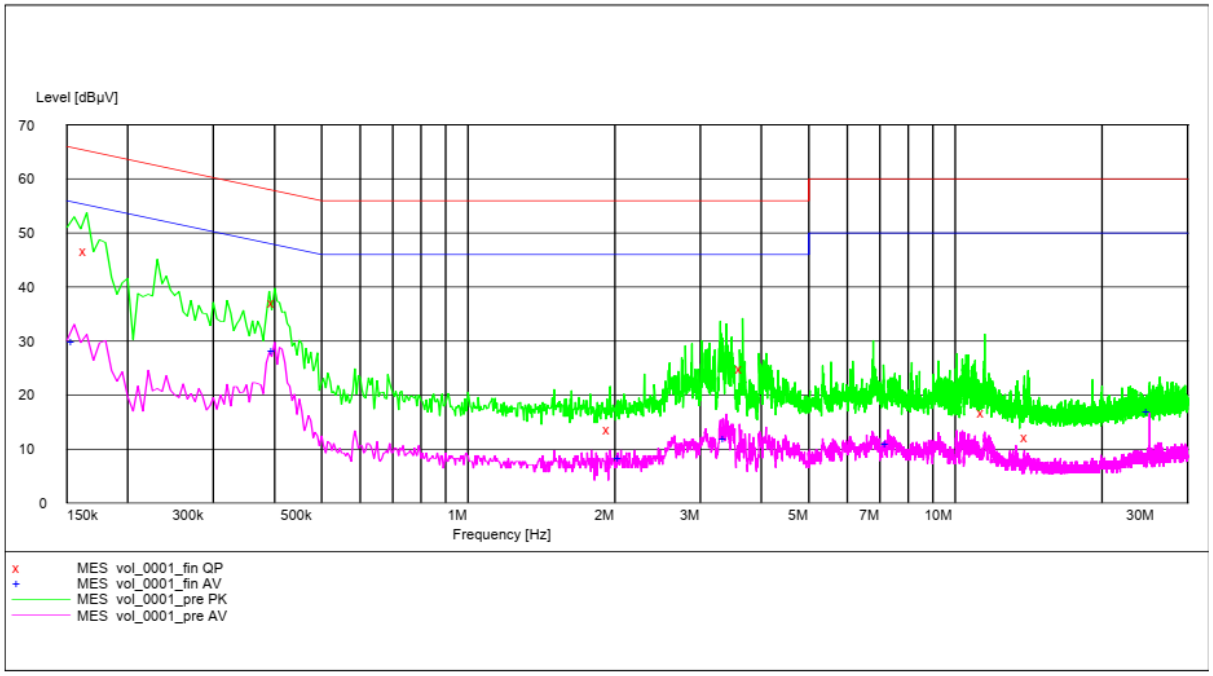
**Results of WIFI TX mode (L): PASS**

Please refer to the following diagram for individual results.




***MEASUREMENT RESULT: "vol_0001_fin QP"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.165000 | 46.6 | 9.7 | 65.2 | 18.6 | L1 | GND |
| 0.400000 | 37.2 | 9.7 | 57.9 | 20.7 | L1 | GND |
| 1.955000 | 13.7 | 9.8 | 56.0 | 42.3 | L1 | GND |
| 3.660000 | 24.8 | 9.8 | 56.0 | 31.2 | L1 | GND |
| 11.490000 | 16.8 | 10.1 | 60.0 | 43.2 | L1 | GND |
| 14.090000 | 12.2 | 10.2 | 60.0 | 47.8 | L1 | GND |

***MEASUREMENT RESULT: "vol_0001_fin AV"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.155000 | 30.0 | 9.7 | 55.7 | 25.7 | L1 | GND |
| 0.400000 | 28.1 | 9.7 | 47.9 | 19.8 | L1 | GND |
| 2.060000 | 8.3 | 9.8 | 46.0 | 37.7 | L1 | GND |
| 3.390000 | 12.0 | 9.8 | 46.0 | 34.0 | L1 | GND |
| 7.280000 | 11.0 | 9.9 | 50.0 | 39.0 | L1 | GND |
| 25.060000 | 17.1 | 10.7 | 50.0 | 32.9 | L1 | GND |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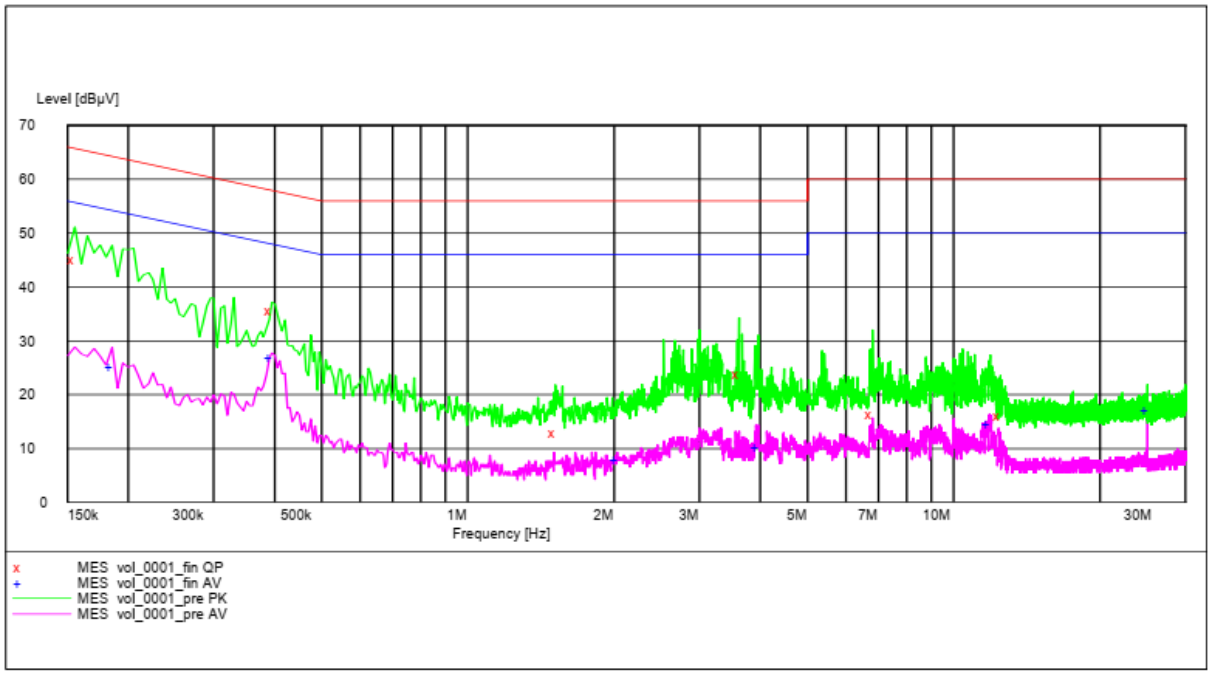
**Results of WIFI TX mode (N): PASS**

Please refer to the following diagram for individual results.




***MEASUREMENT RESULT: "vol_0001_fin QP"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.155000 | 45.2 | 9.7 | 65.7 | 20.5 | N | GND |
| 0.395000 | 35.5 | 9.7 | 58.0 | 22.5 | N | GND |
| 1.515000 | 12.8 | 9.8 | 56.0 | 43.2 | N | GND |
| 3.615000 | 23.8 | 9.8 | 56.0 | 32.2 | N | GND |
| 6.815000 | 16.4 | 9.9 | 60.0 | 43.6 | N | GND |
| 12.480000 | 16.1 | 10.1 | 60.0 | 43.9 | N | GND |

***MEASUREMENT RESULT: "vol_0001_fin AV"***

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line | PE |
|---|---|---|---|---|---|---|
| 0.185000 | 25.4 | 9.7 | 54.3 | 28.9 | N | GND |
| 0.395000 | 26.9 | 9.7 | 48.0 | 21.1 | N | GND |
| 2.030000 | 7.9 | 9.8 | 46.0 | 38.1 | N | GND |
| 3.960000 | 10.2 | 9.8 | 46.0 | 35.8 | N | GND |
| 11.860000 | 14.6 | 10.1 | 50.0 | 35.4 | N | GND |
| 25.060000 | 17.3 | 10.7 | 50.0 | 32.7 | N | GND |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### 3.1.4 Power Spectral Density

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(e) |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2022-04-18 |
| Mode of Operation: | WIFI TX mode |

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Method:**

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=100kHz , VBW= 300KHz , Set the span to 1.5 times the DTS channel bandwidth. Detector = peak, Sweep time = auto couple , Trace mode = max hold. Measure the Power Spectral Density (PSD) and record the results in dBm.

**Test Setup:**

As Test Setup of clause 3.1.1 in this test report.

**Test Limit:**
The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF=10log (3 kHz/100 kHz=-15.2dB)


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**Results of WIFI TX Mode 802.11 b (Tx:2412MHz to 2462MHz): Pass (TX Unit)**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| 2412.0 | -13.333 | 8dBm |
| 2437.0 | -12.765 | 8dBm |
| 2462.0 | -12.188 | 8dBm |

**Results of WIFI TX Mode 802.11 g (Tx:2412MHz to 2462MHz): Pass (TX Unit)**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| 2412.0 | -14.991 | 8dBm |
| 2437.0 | -13.891 | 8dBm |
| 2462.0 | -13.455 | 8dBm |

**Results of WIFI TX Mode 802.11 n20 (Tx:2412MHz to 2462MHz): Pass (TX Unit)**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| 2412.0 | -15.455 | 8dBm |
| 2437.0 | -15.195 | 8dBm |
| 2462.0 | -14.635 | 8dBm |

**Results of WIFI TX Mode 802.11 n40 (Tx:2422MHz to 2422MHz): Pass (TX Unit)**
**Maximum power spectral density**

| Transmitter Frequency (MHz) | Maximum Power spectral density level / 3kHz band (dBm) | Maximum Power spectral density / 3kHz band limit |
|---|---|---|
| 2422.0 | -15.445 | 8dBm |
| 2437.0 | -15.725 | 8dBm |
| 2452.0 | -15.685 | 8dBm |


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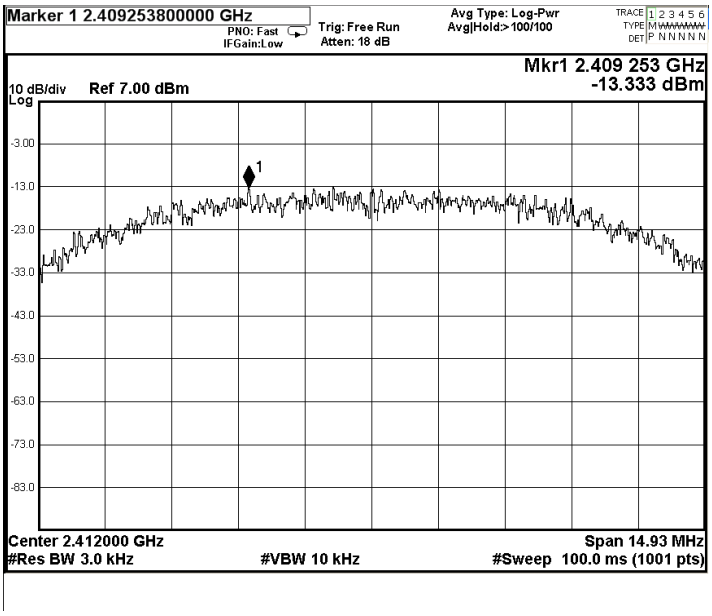
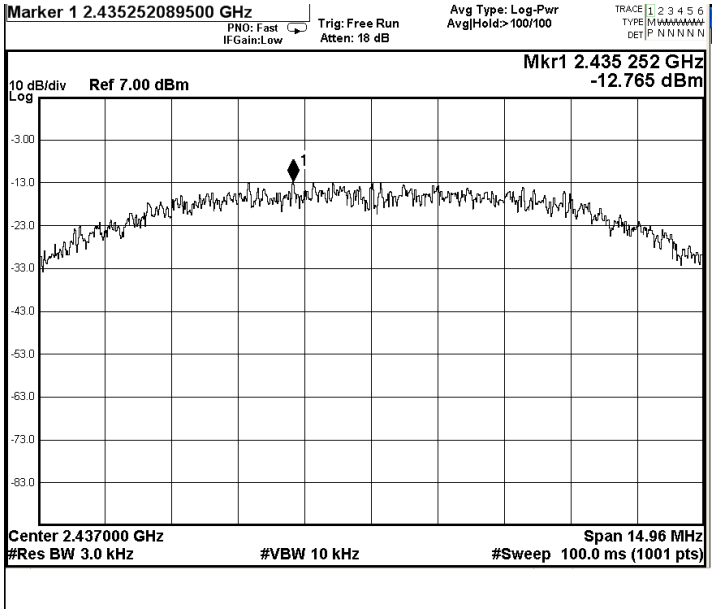
**WiFi mode 802.11 b**
**CH 1 (2412.0 MHz)**




**CH 6 (2437.0 MHz)**





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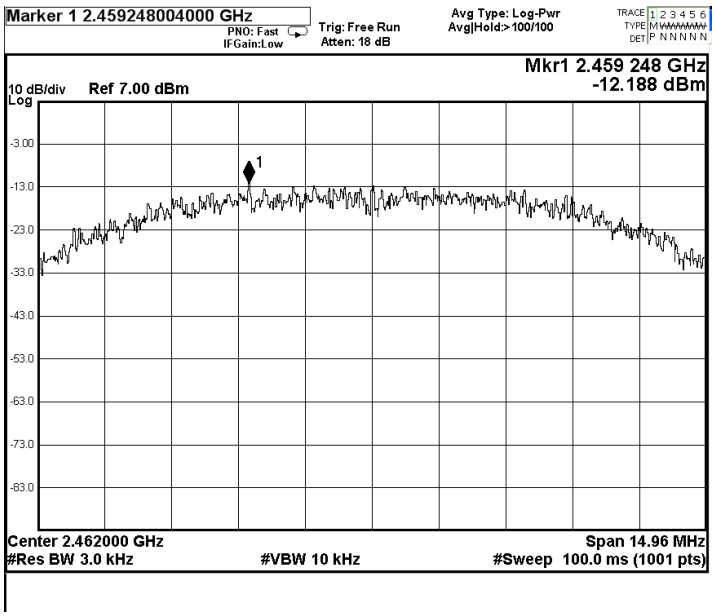
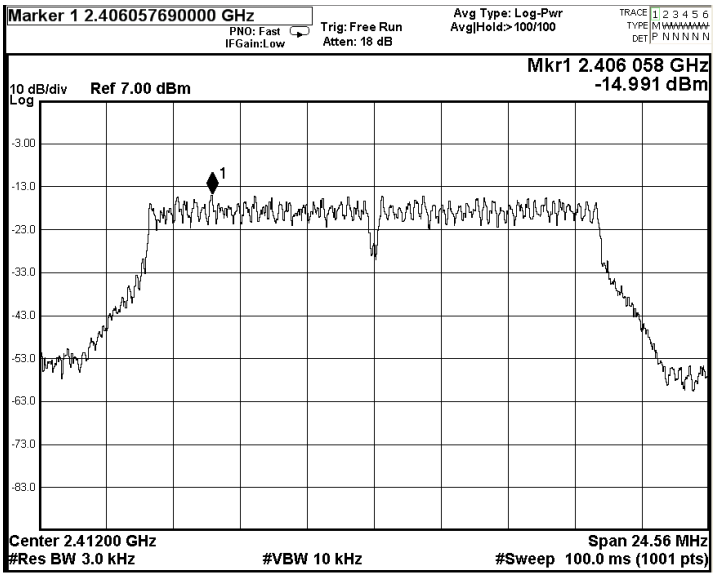
**CH 11 (2462.0 MHz)**




**WiFi mode 802.11 g**
**CH 1 (2412.0 MHz)**





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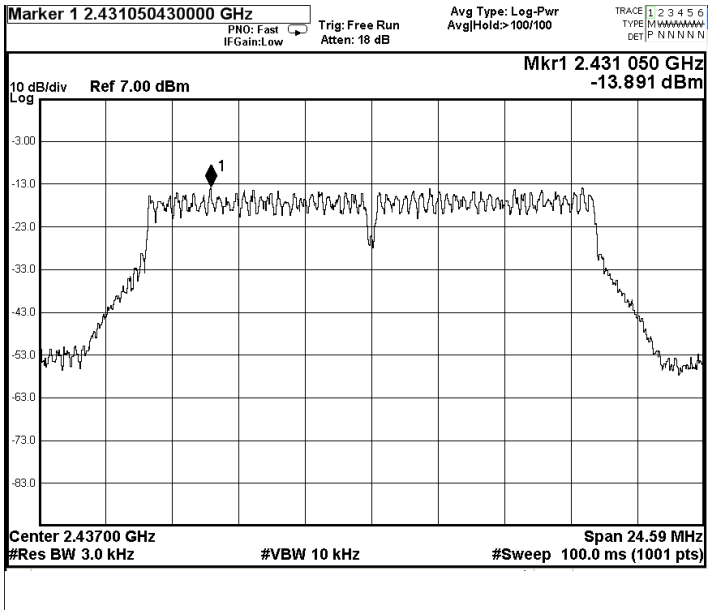
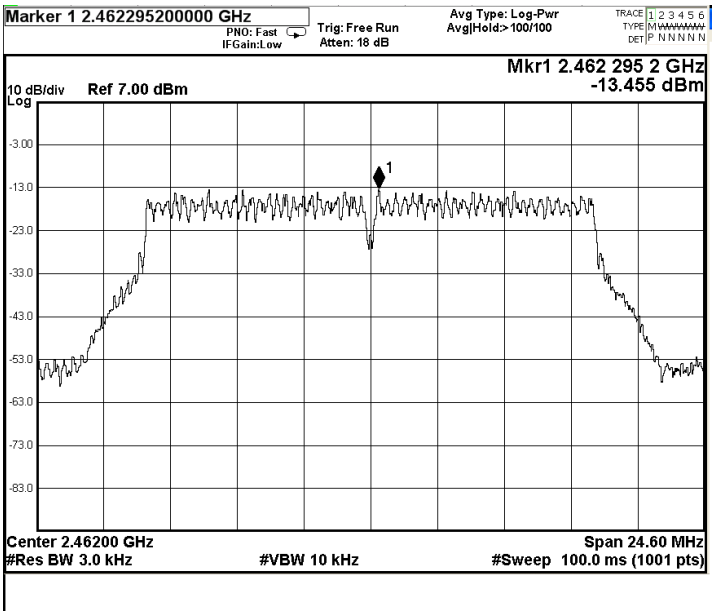
**CH 6 (2437.0 MHz)**




**CH 11 (2462.0 MHz)**





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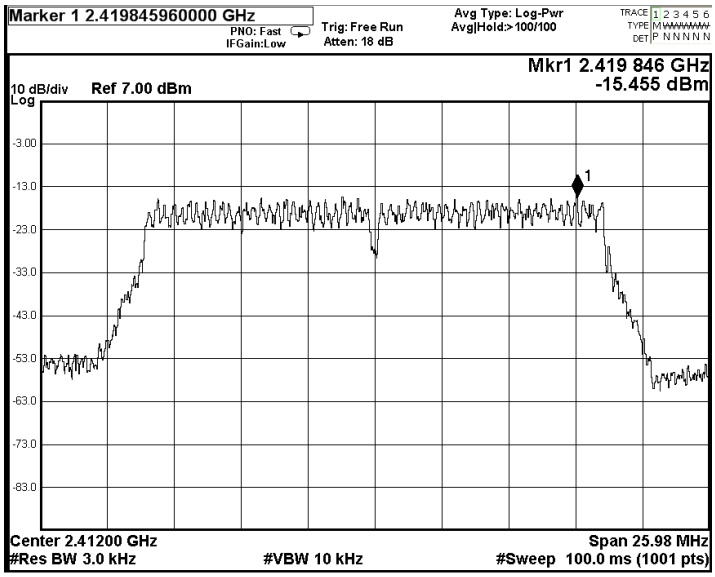
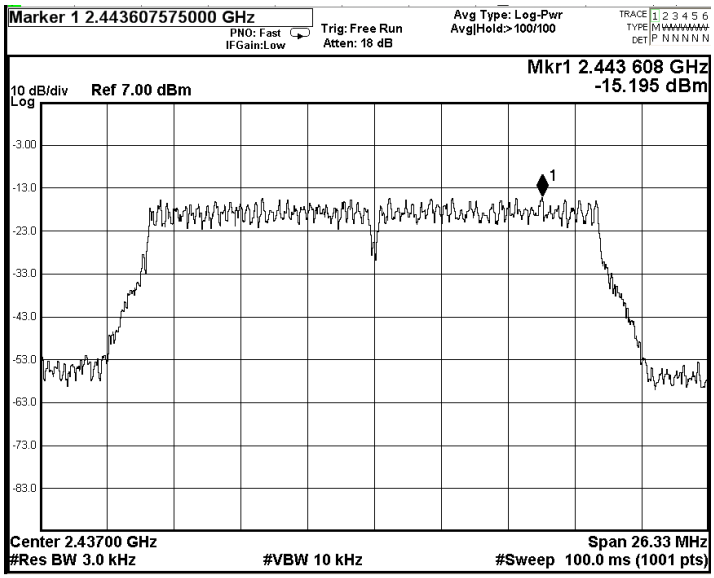
**WiFi mode 802.11 n20**

**CH 1 (2412.0 MHz)**




**CH 6 (2437.0 MHz)**





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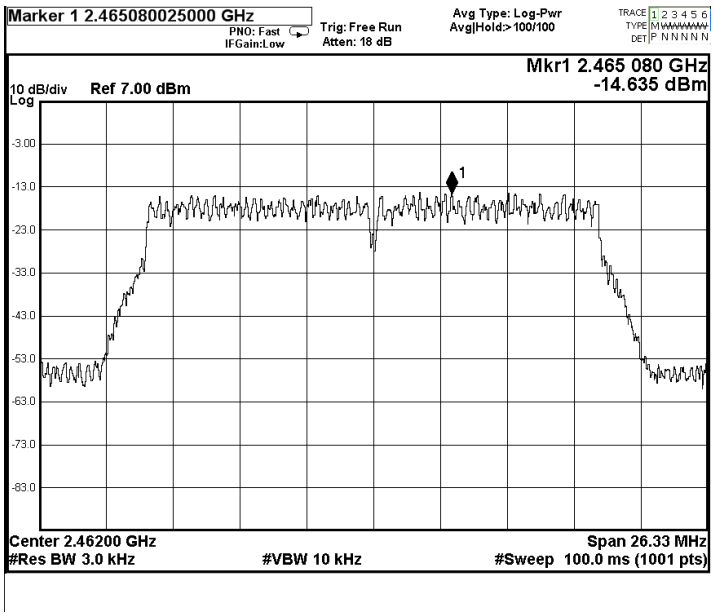
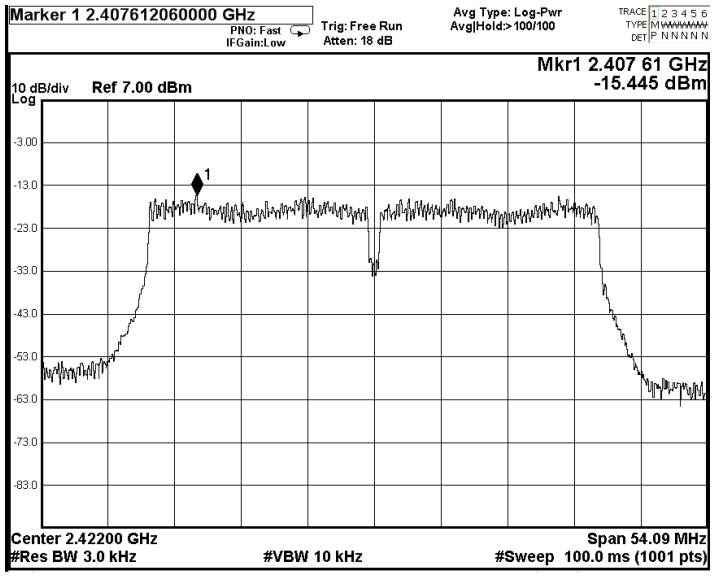
**CH 11 (2462.0 MHz)**




**WiFi mode 802.11 n40**
**CH 3 (2422.0 MHz)**





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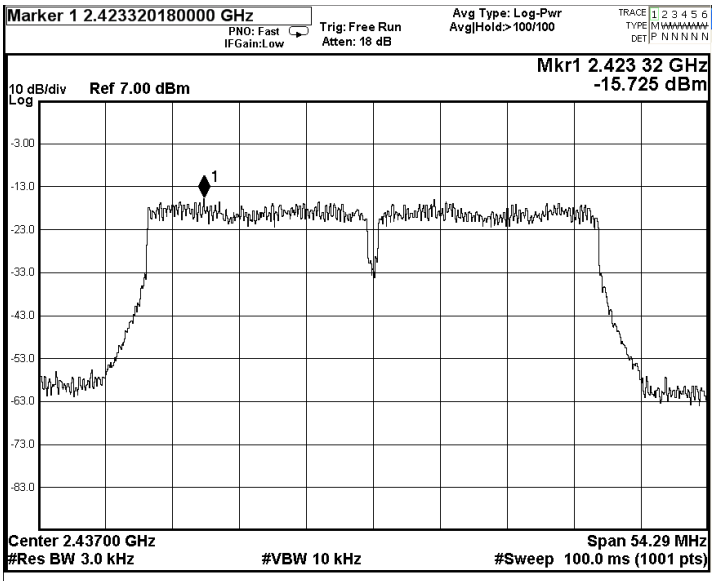
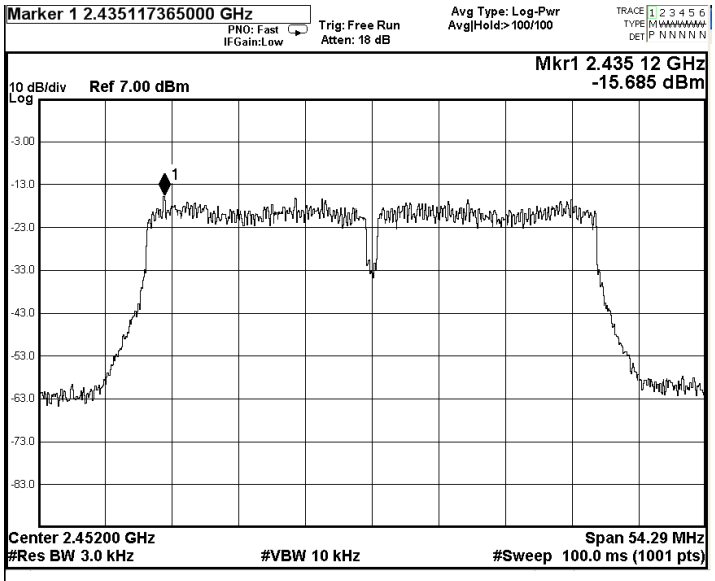
**CH 6 (2437.0 MHz)**




**CH 9 (2452.0 MHz)**



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### 3.1.5 6dB Spectrum Bandwidth Measurement

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247(a)(2) |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2022-04-21 |
| Mode of Operation: | WIFI TX mode |

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Method:**

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

**Spectrum Analyzer Setting:**

RBW = 100kHz, VBW ≥ 3*RBW, Sweep = Auto couple
Detector = Peak, Trace = Max. hold

**Test Setup:**

As Test Setup of clause 3.1.1 in this test report.


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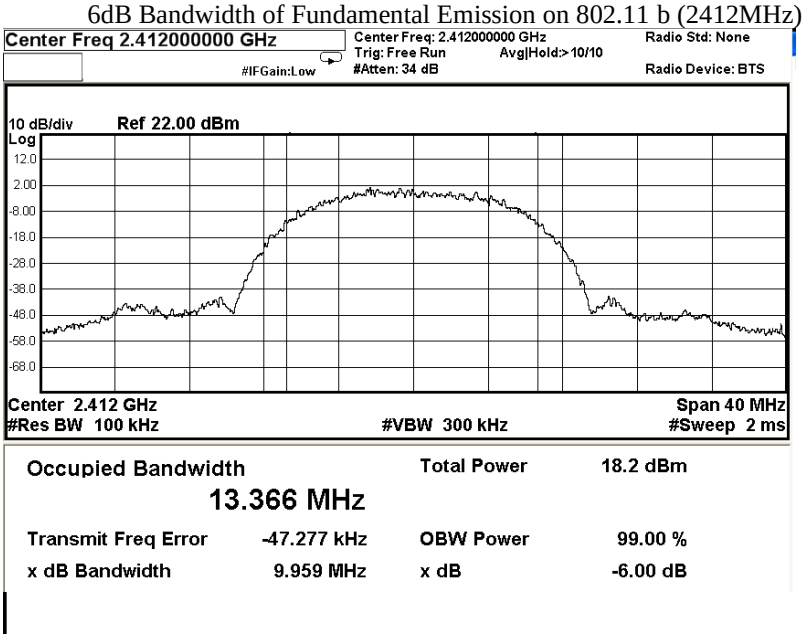
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 9.959 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 b (2412MHz)



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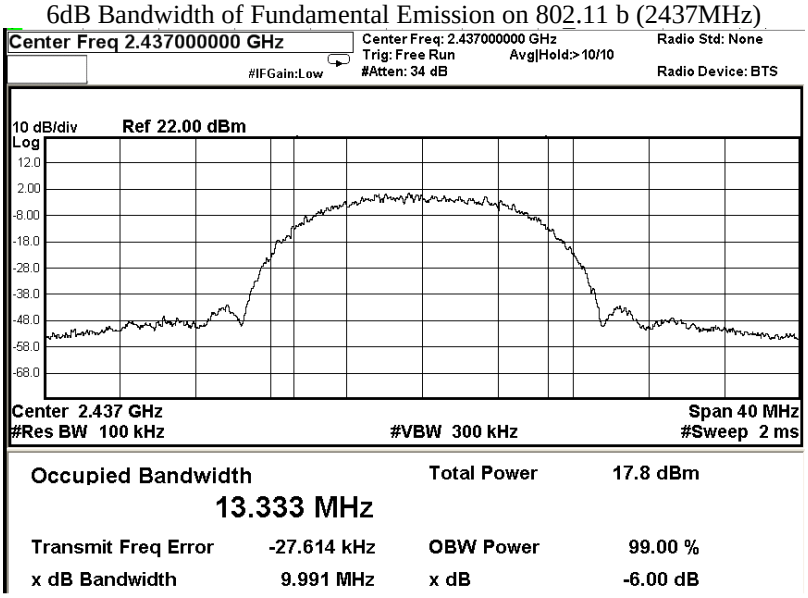
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2437.0 | 9.991 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 b (2437MHz)



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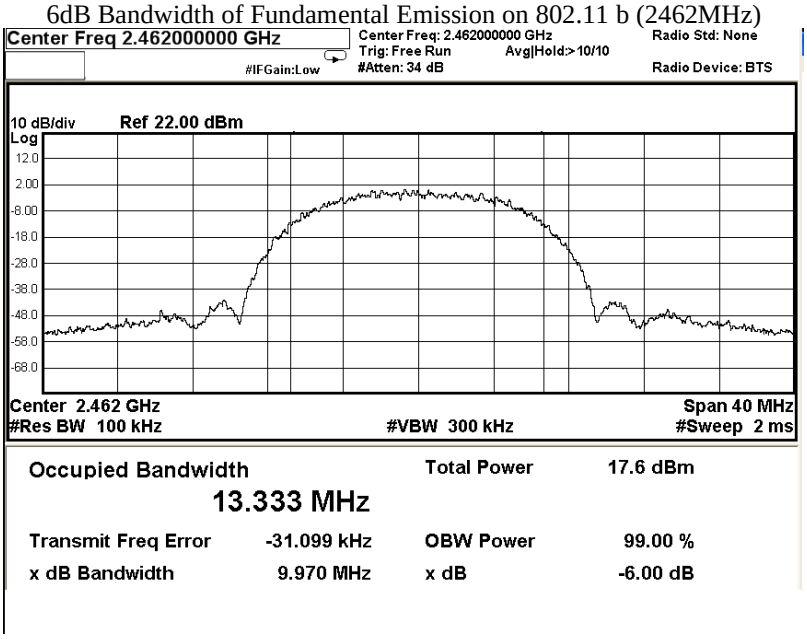
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2462.0 | 9.970 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 b (2462MHz)



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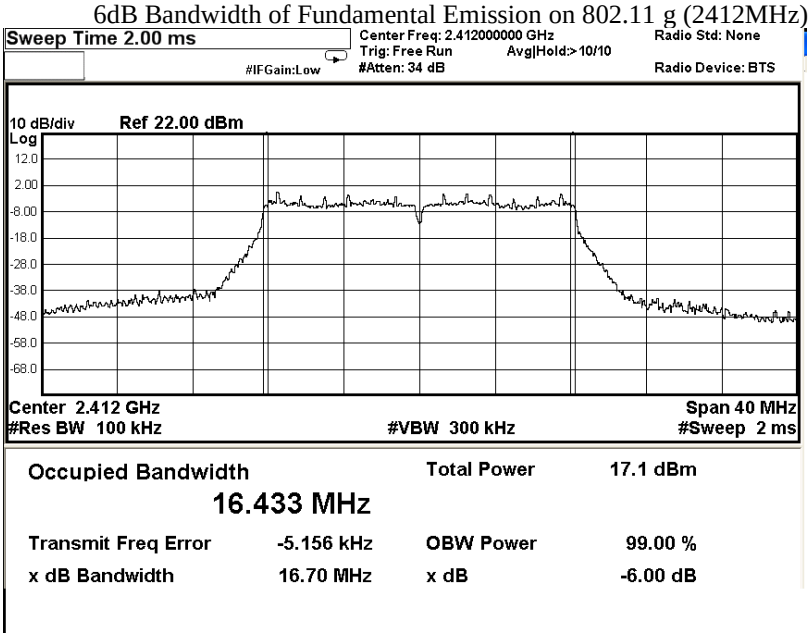
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 16.70 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 g (2412MHz)



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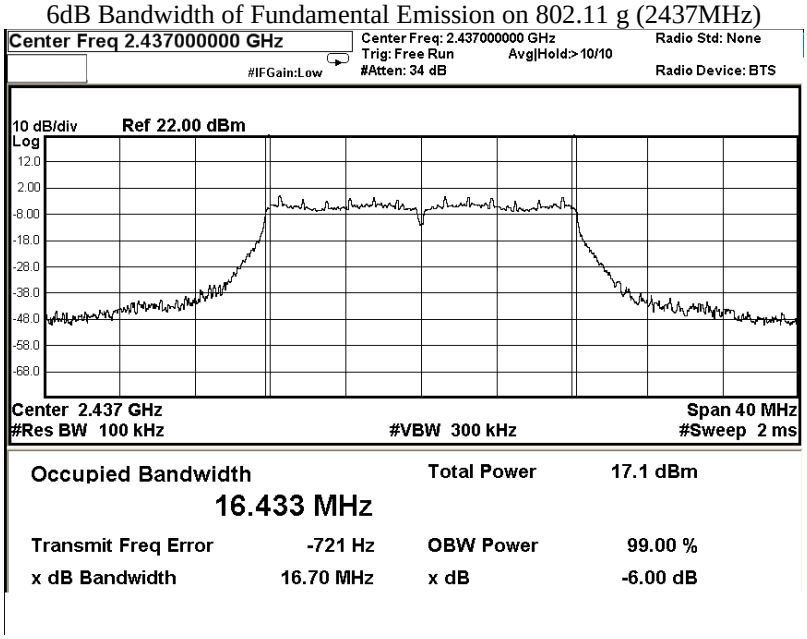
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2437.0 | 16.70 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 g (2437MHz)



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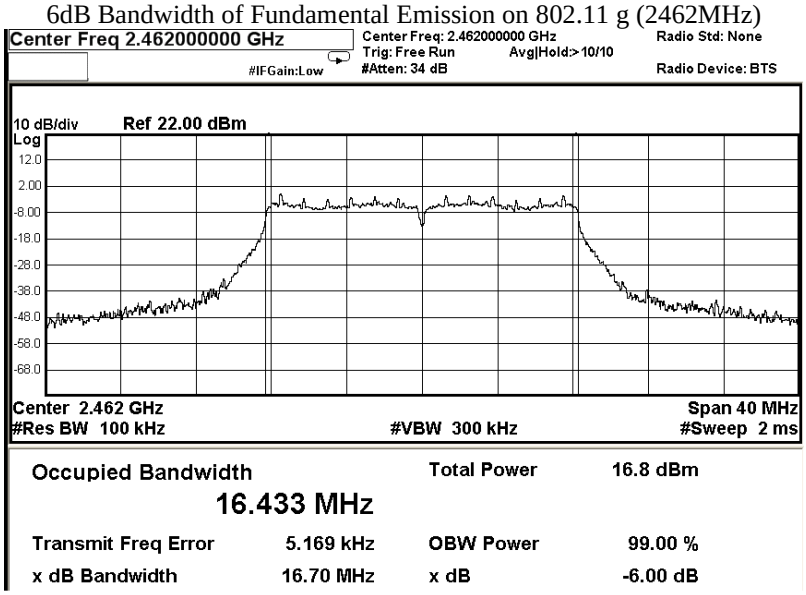
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2462.0 | 16.70 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 g (2462MHz)





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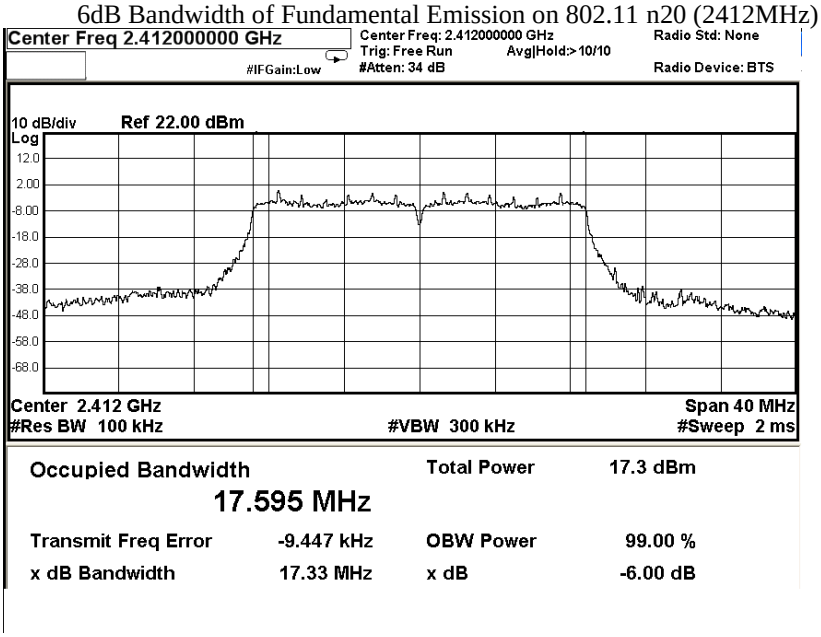
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2412.0 | 17.33 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n20 (2412MHz)



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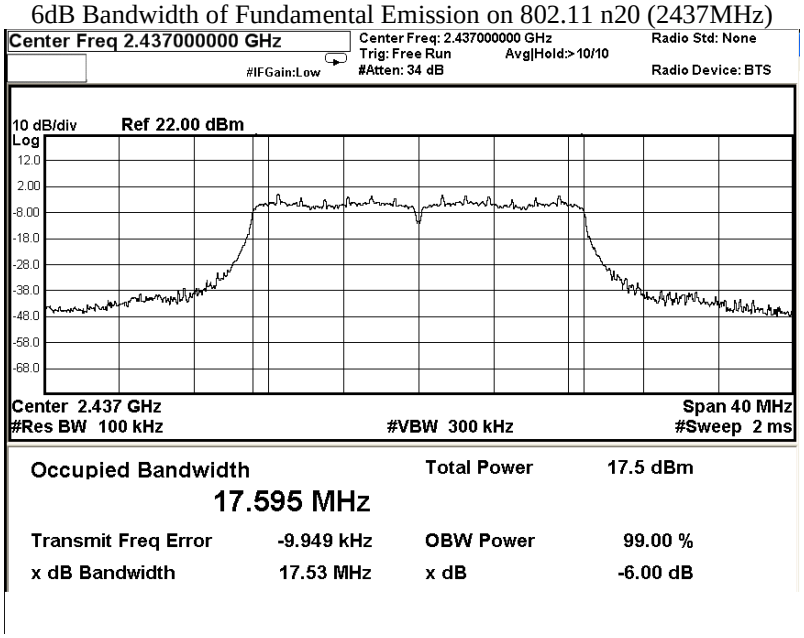
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2437.0 | 17.53 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n20 (2437MHz)





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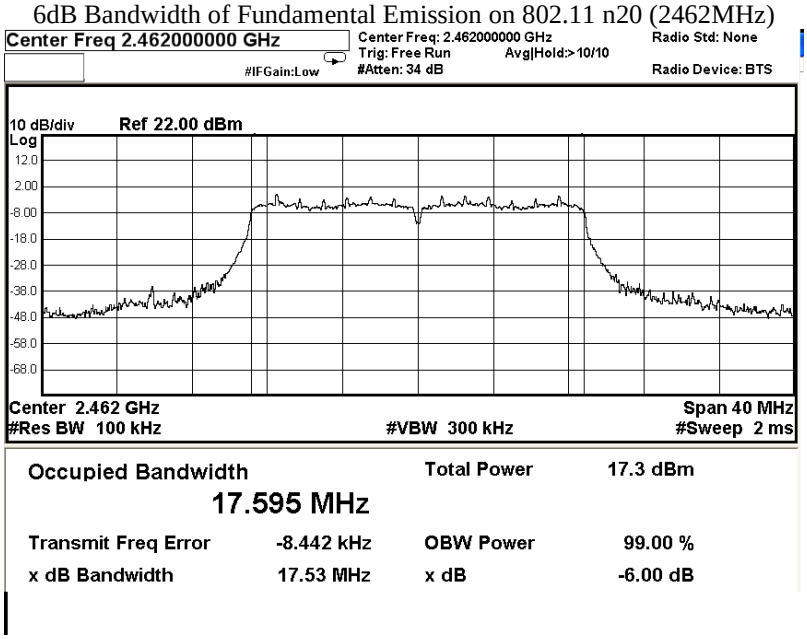
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2462.0 | 17.53 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n20 (2462MHz)



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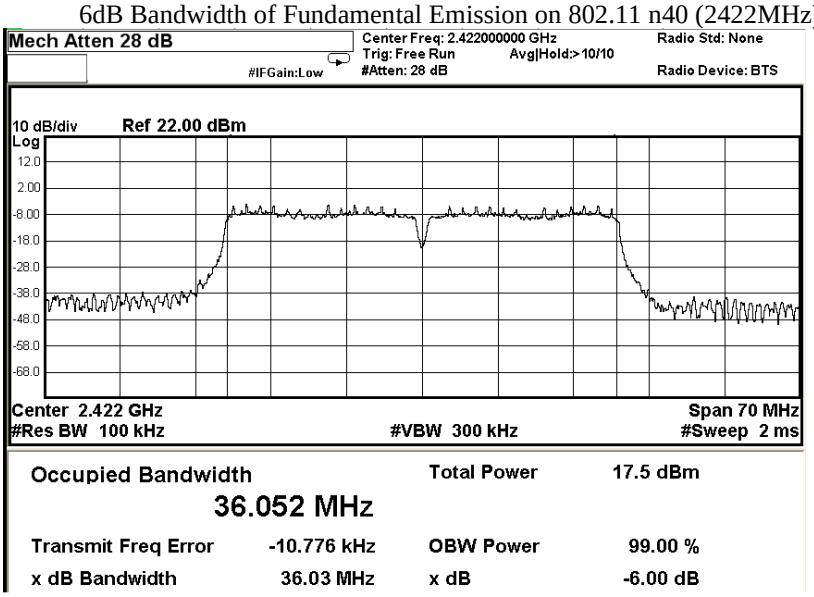
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Center Frequency [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2422.0 | 36.03 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n40 (2422MHz)





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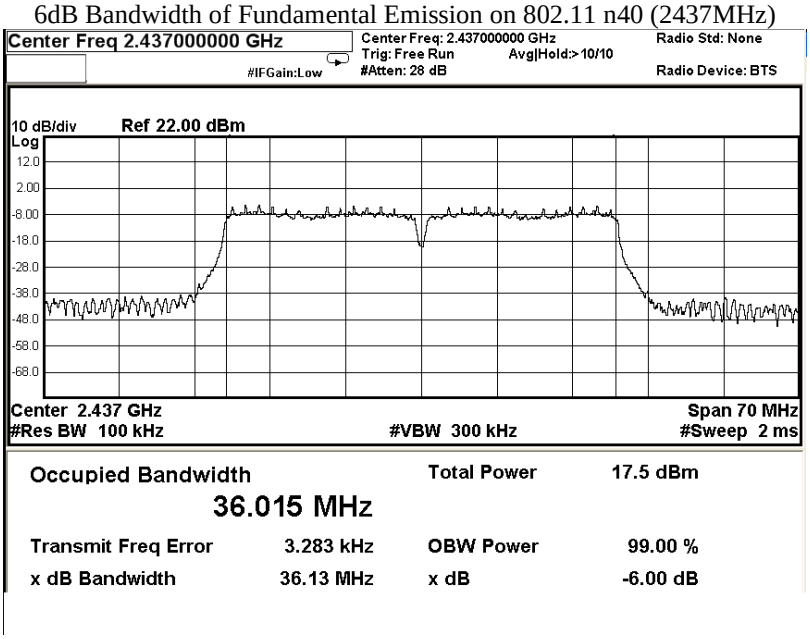
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2437.0 | 36.13 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n40 (2437MHz)





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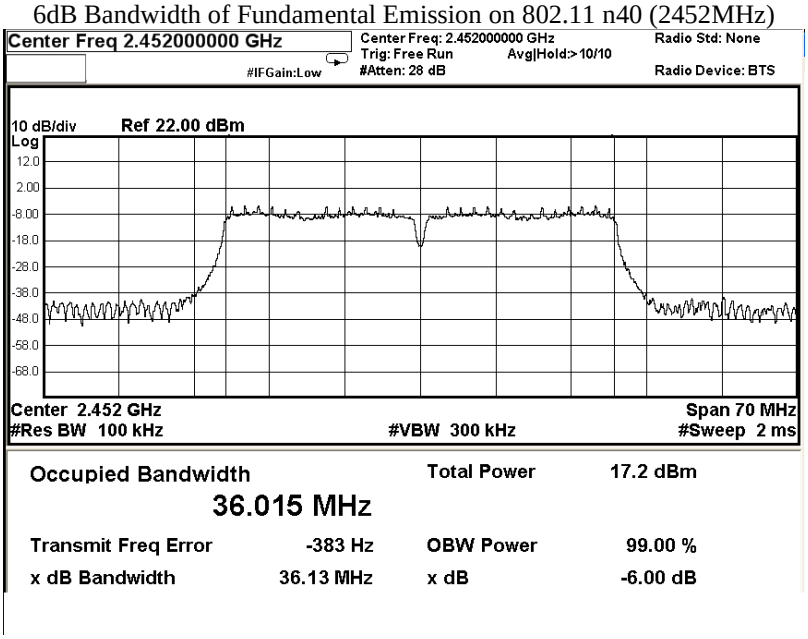
**Limits for 6dB Spectrum Bandwidth Measurement:**

| Frequency Range [MHz] | 6dB Bandwidth [MHz] | FCC Limits [kHz] |
|---|---|---|
| 2452.0 | 36.13 | > 500 |

6dB Bandwidth of Fundamental Emission on 802.11 n40 (2452MHz)





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### 3.1.6 Band Edges Measurement

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.247 |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2022-04-22 |
| Mode of Operation: | WIFI TX mode |

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Method:**

The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW are set to 100kHz and VBW are set to 300kHz for this measurement.

**Test Setup:**

As Test Setup of clause 3.1.2 in this test report.


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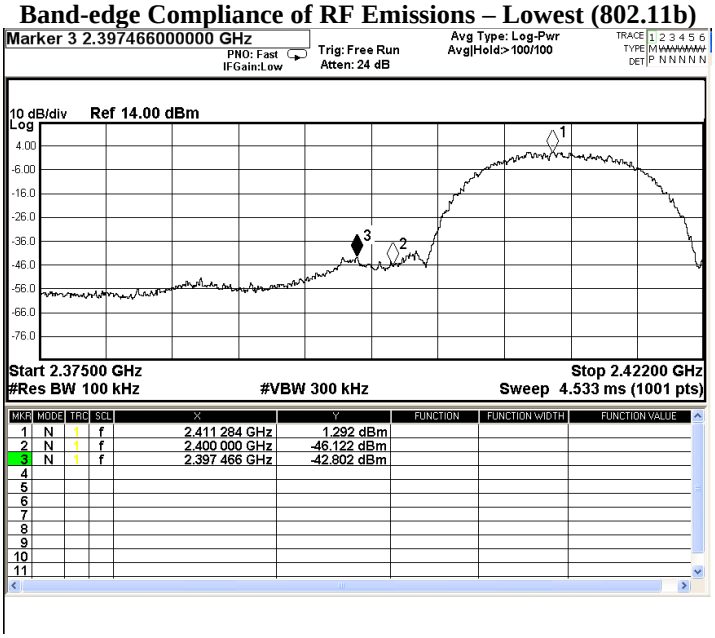
**Band-edge Compliance of RF Conducted Emissions Measurement:**

**Limit：**
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

Remark: The worst-case measurement results were recorded in the test report
The following plots include cable losses :0.3dB (There is no Attenuator )

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2400 – Lowest Fundamental (2412) | 1.292 | -18.708 | -42.802 | Pass |

**Band-edge Compliance of RF Emissions – Lowest (802.11b)**





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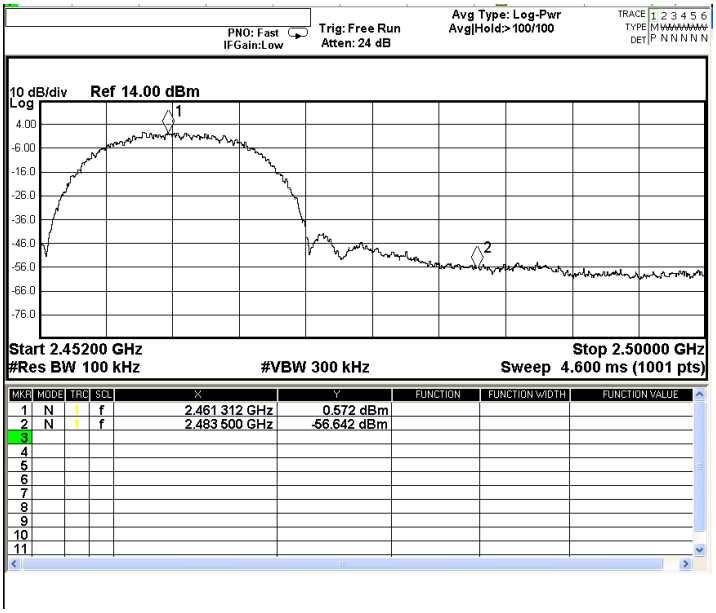
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2483.5 – Highest Fundamental (2462) | 0.572 | -19.428 | -56.642 | Pass |

**Band-edge Compliance of RF Emissions – Highest (802.11b)**





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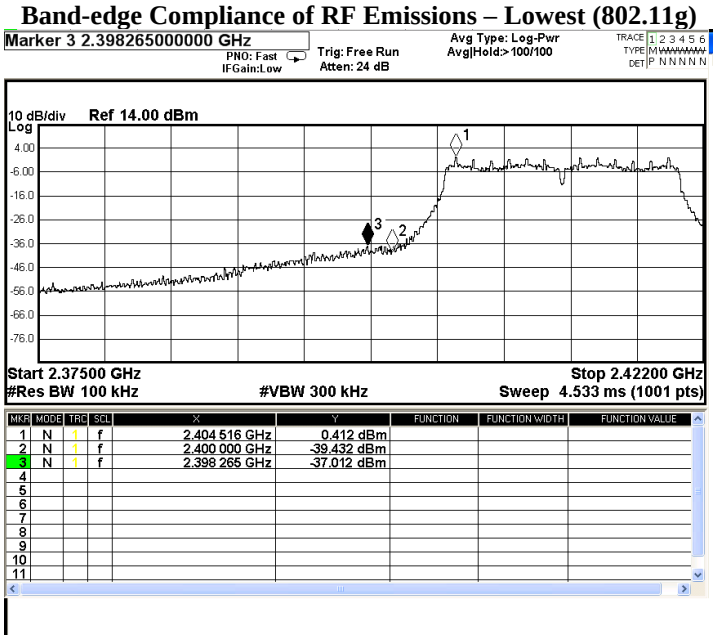
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2400 – Lowest Fundamental (2412) | 0.412 | -19.588 | -37.012 | Pass |

**Band-edge Compliance of RF Emissions – Lowest (802.11g)**



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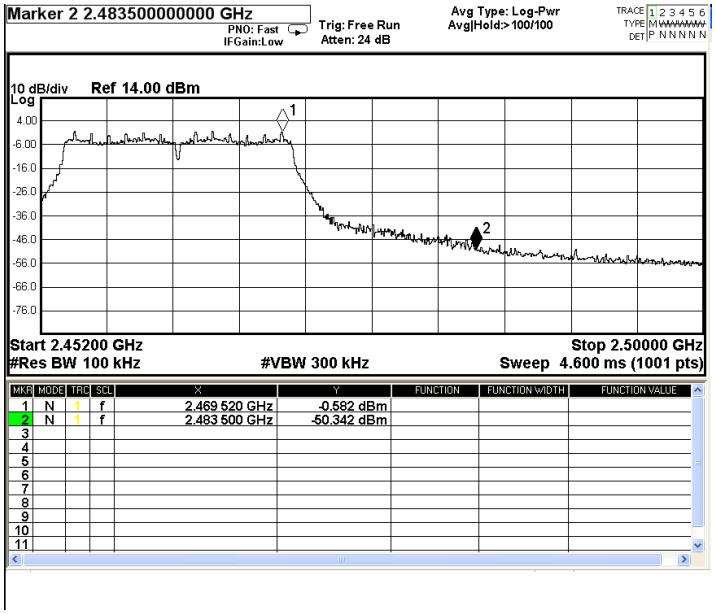
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2483.5 – Highest Fundamental (2462) | -0.582 | -20.582 | -50.342 | Pass |

**Band-edge Compliance of RF Emissions – Highest (802.11g)**



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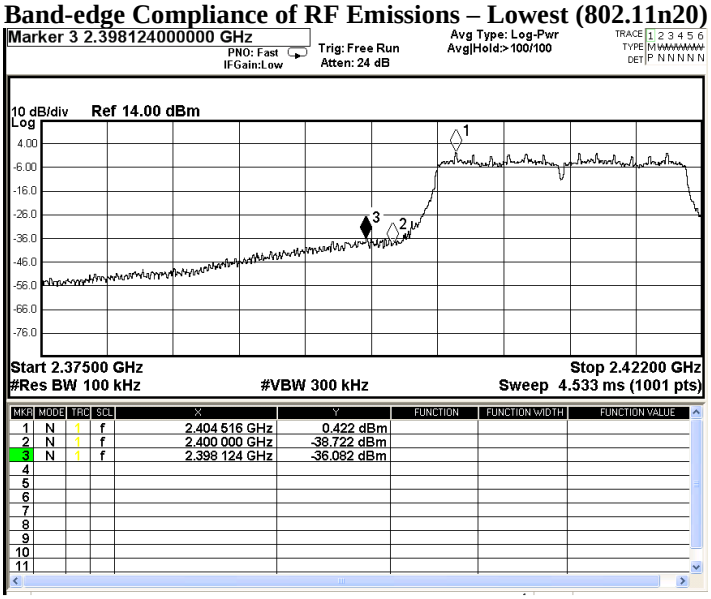
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2400 – Lowest Fundamental (2412) | 0.422 | -19.578 | -36.082 | Pass |

**Band-edge Compliance of RF Emissions – Lowest (802.11n20)**



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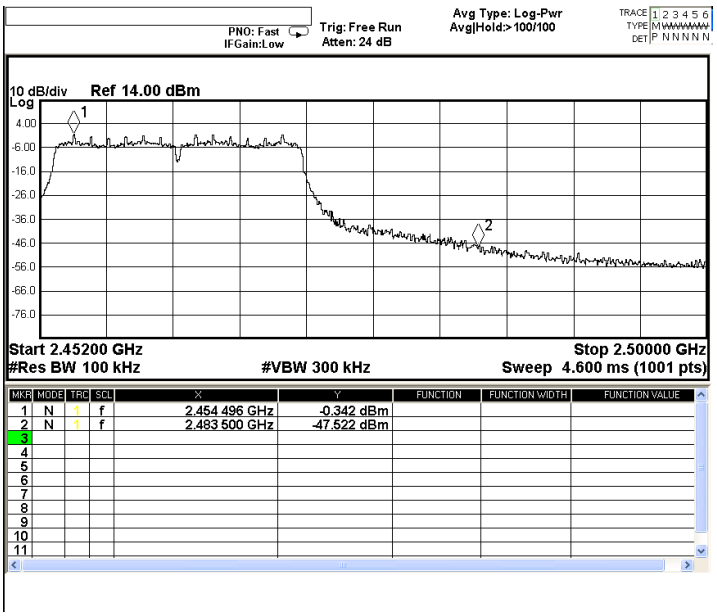
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2483.5 – Highest Fundamental (2462) | -0.342 | -20.342 | -47.522 | Pass |

**Band-edge Compliance of RF Emissions – Highest (802.11n20)**





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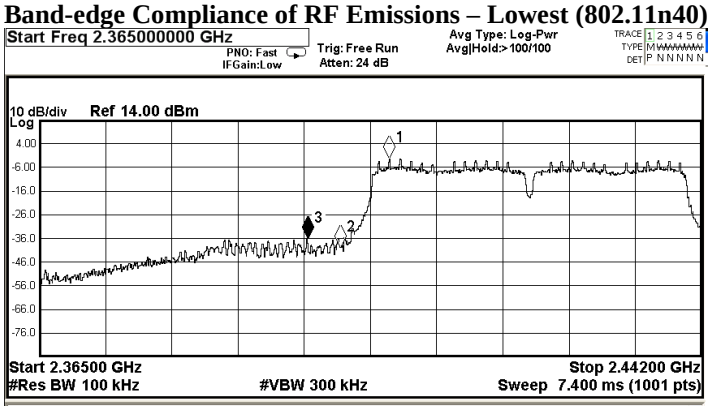
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2400 – Lowest Fundamental (2422) | -2.362 | -22.362 | -36.112 | Pass |

**Band-edge Compliance of RF Emissions – Lowest (802.11n40)**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.405 712 GHz | -2.362 dBm | | | |
| 2 | N | 1 | f | 2.400 000 GHz | -39.822 dBm | | | |
| 3 | N | 1 | f | 2.396 208 GHz | -36.112 dBm | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |



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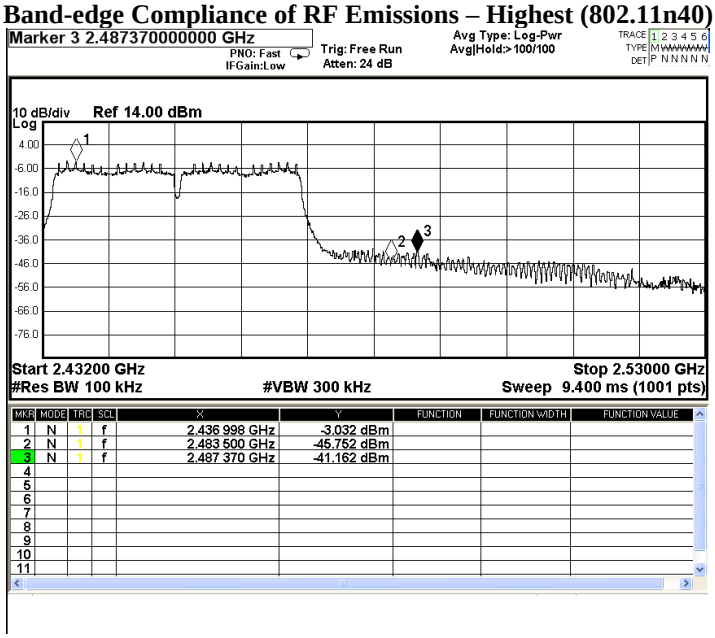
**Band-edge Compliance of RF Conducted Emissions Measurement:**

| Frequency Range | Reference level | Limit | The highest conducted band edge emission | Result |
|---|---|---|---|---|
| [MHz] | [dBm] | [dBm] | [dBm] | |
| 2483.5 – Highest Fundamental (2452) | -3.032 | -23.032 | -41.162 | Pass |

**Band-edge Compliance of RF Emissions – Highest (802.11n40)**



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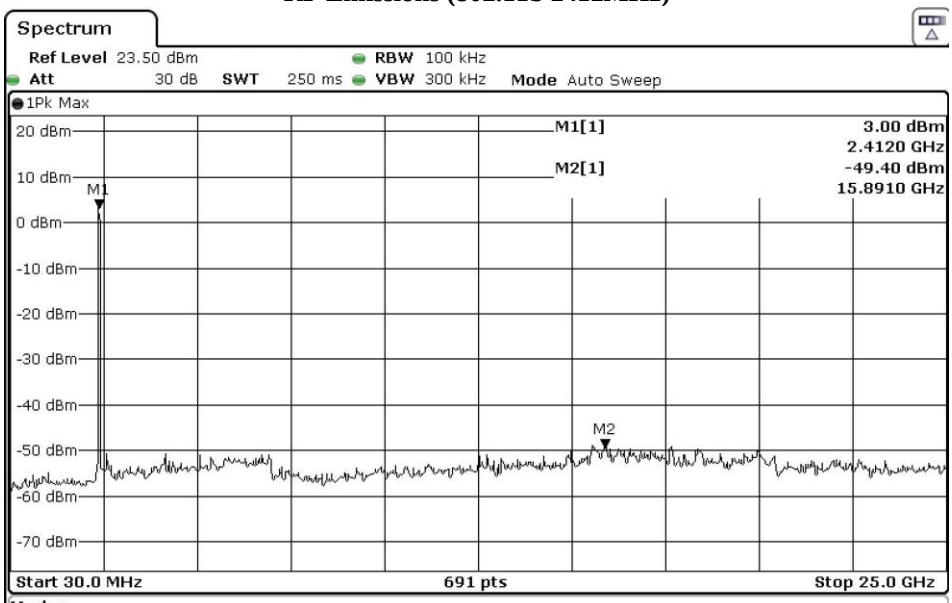
**RF Conducted Emissions Measurement:**

**Limit：**
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

Remark: The worst-case measurement results were recorded in the test report
The following plots include cable losses :0.3dB (There is no Attenuator )

**RF Emissions (802.11b 2412MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.412 GHz | 3.00 dBm | | |
| M2 | | 1 | 15.891 GHz | -49.40 dBm | | |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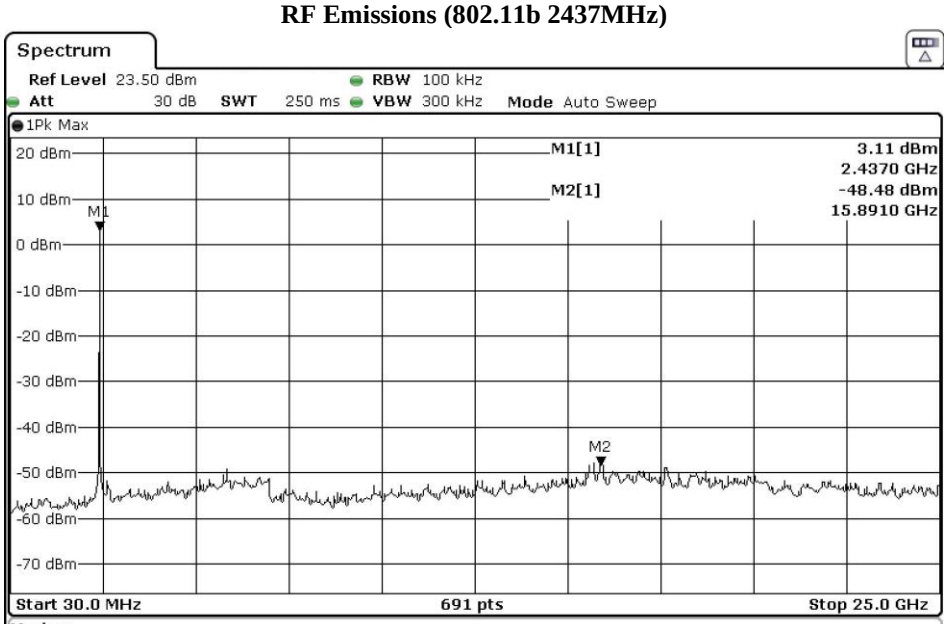
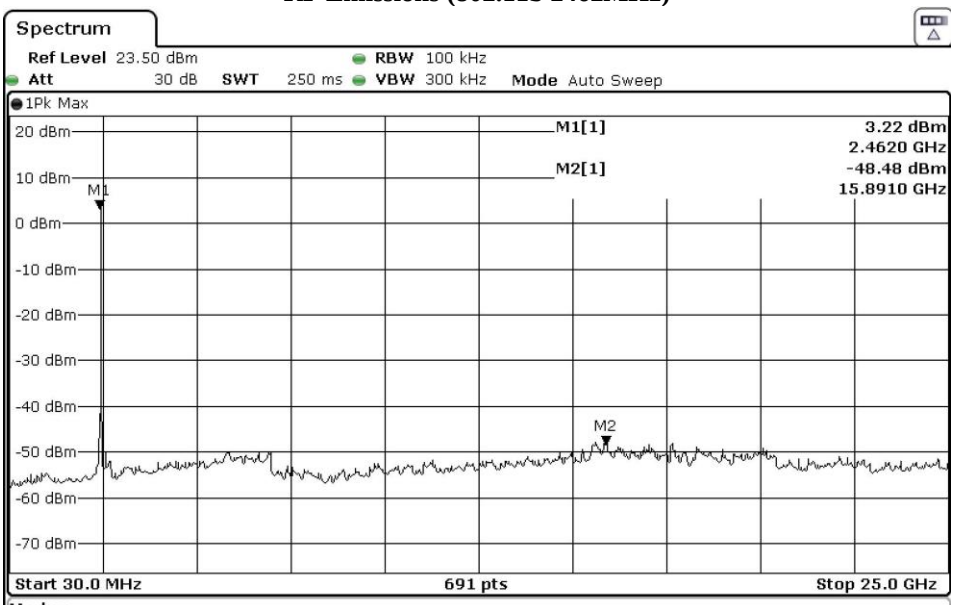
**RF Emissions (802.11b 2437MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.437 GHz | 3.11 dBm | | |
| M2 | | 1 | 15.891 GHz | -48.48 dBm | | |

**RF Emissions (802.11b 2462MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.462 GHz | 3.22 dBm | | |
| M2 | | 1 | 15.891 GHz | -48.48 dBm | | |



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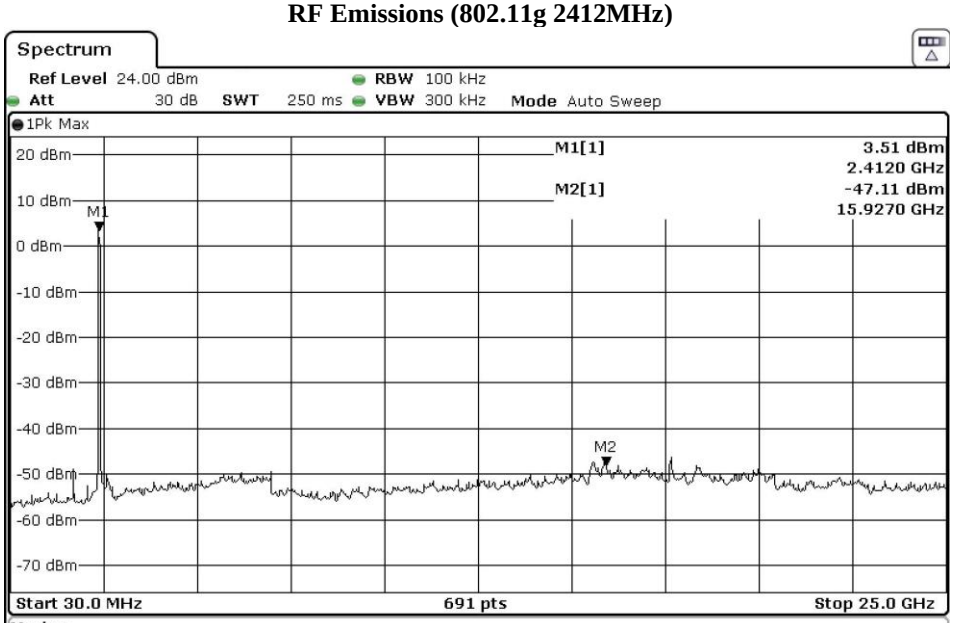
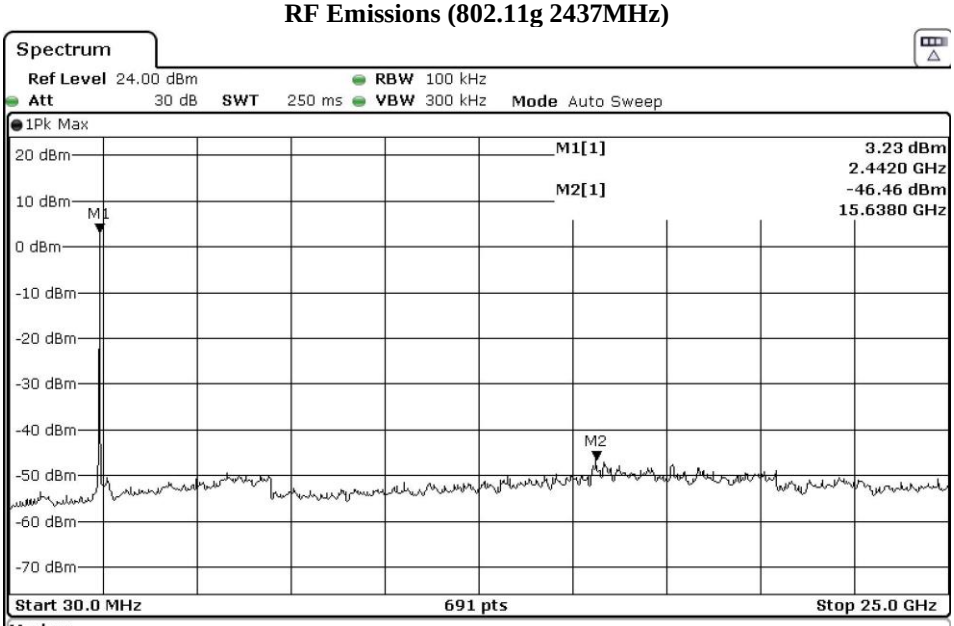
**RF Emissions (802.11g 2412MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.412 GHz | 3.51 dBm | | |
| M2 | | 1 | 15.927 GHz | -47.11 dBm | | |

**RF Emissions (802.11g 2437MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.442 GHz | 3.23 dBm | | |
| M2 | | 1 | 15.638 GHz | -46.46 dBm | | |



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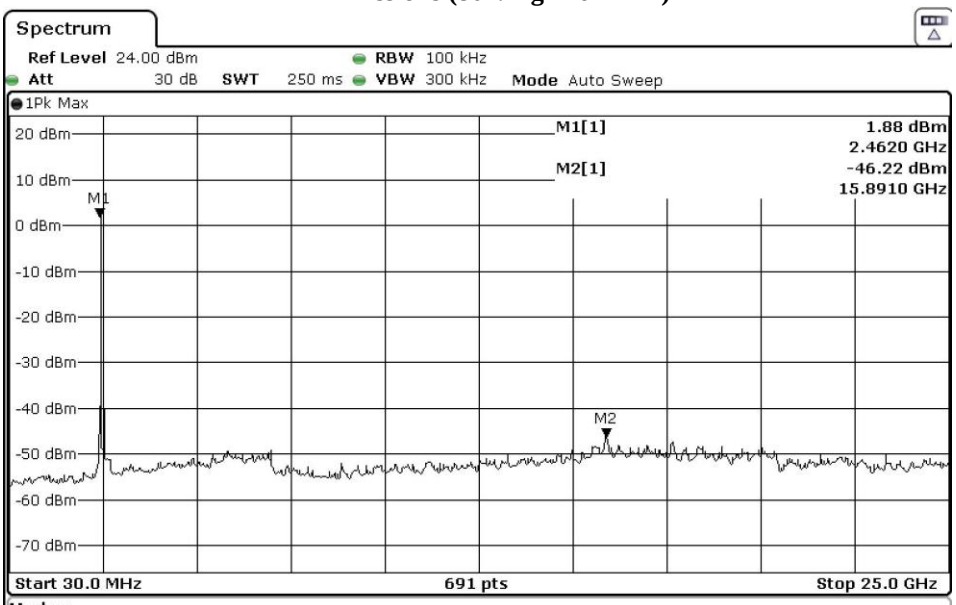
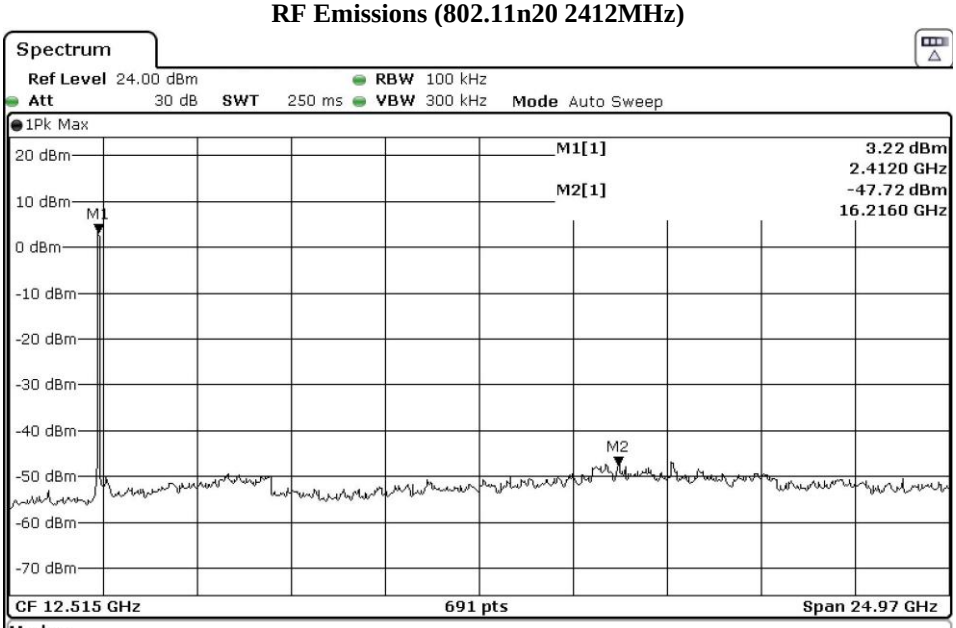
**RF Emissions (802.11g 2462MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.462 GHz | 1.88 dBm | | |
| M2 | | 1 | 15.891 GHz | -46.22 dBm | | |

**RF Emissions (802.11n20 2412MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.412 GHz | 3.22 dBm | | |
| M2 | | 1 | 16.216 GHz | -47.72 dBm | | |



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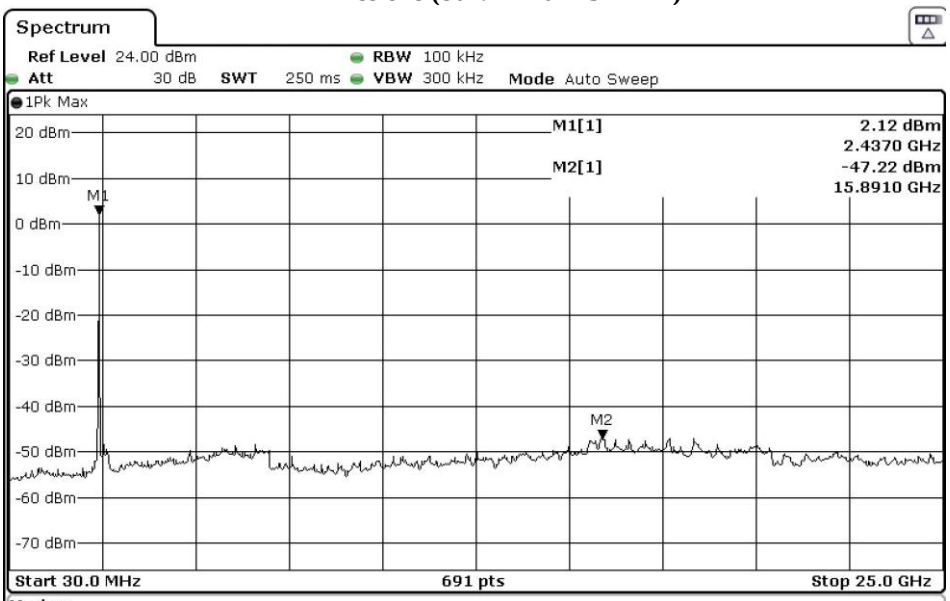
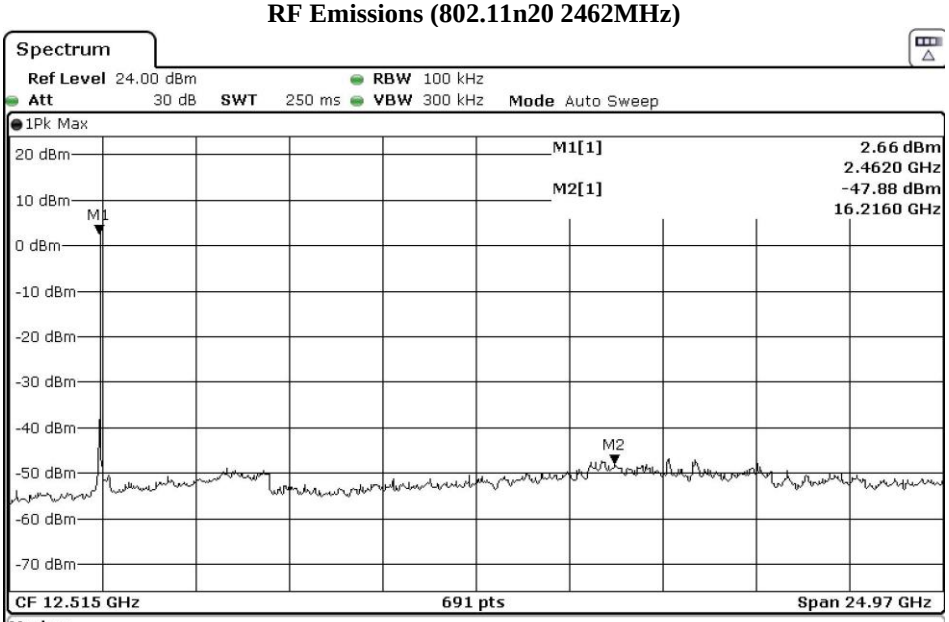
**RF Emissions (802.11n20 2437MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.437 GHz | 2.12 dBm | | |
| M2 | | 1 | 15.891 GHz | -47.22 dBm | | |

**RF Emissions (802.11n20 2462MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.462 GHz | 2.66 dBm | | |
| M2 | | 1 | 16.216 GHz | -47.88 dBm | | |



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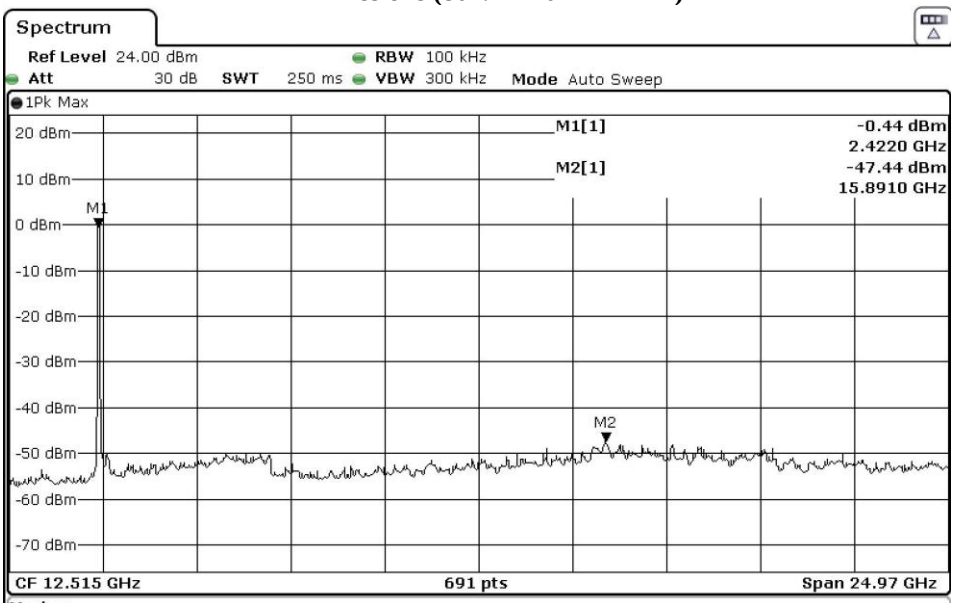
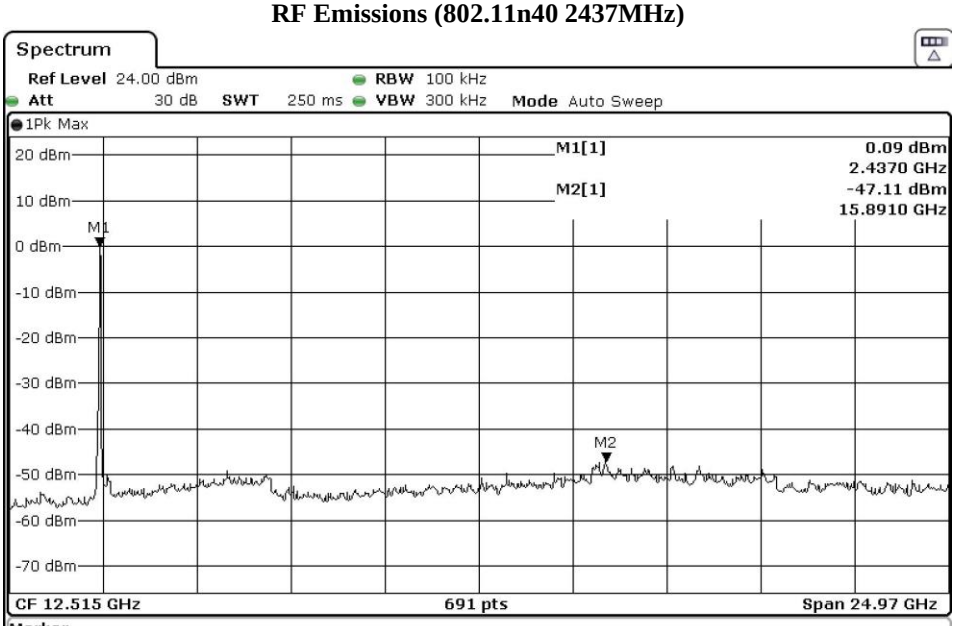
**RF Emissions (802.11n40 2422MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.422 GHz | -0.44 dBm | | |
| M2 | | 1 | 15.891 GHz | -47.44 dBm | | |

**RF Emissions (802.11n40 2437MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.437 GHz | 0.09 dBm | | |
| M2 | | 1 | 15.891 GHz | -47.11 dBm | | |



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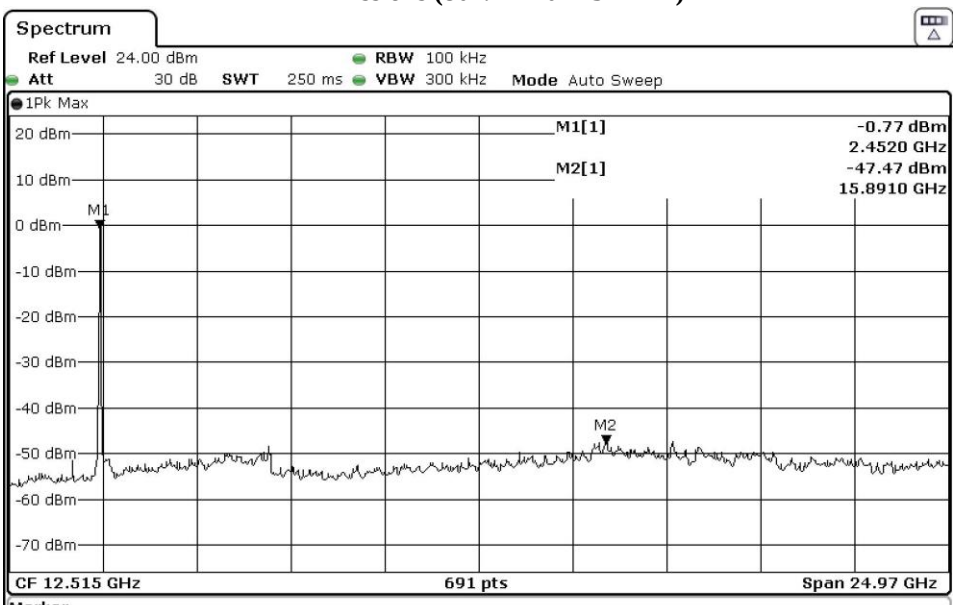
**RF Emissions (802.11n40 2452MHz)**




Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 2.452 GHz | -0.77 dBm | | |
| M2 | | 1 | 15.891 GHz | -47.47 dBm | | |



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**3.1.7 Antenna Requirement**

Ambient Temperature: 25℃ Relative Humidity: 51% Atmospheric Pressure: 101 kPa

**Test Requirements: § 15.203**

**Test Specification:**

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

**Test Results:**
This is monopole antenna. There is no external antenna, the antenna gain = 2.5dBi. User is unable to remove or changed the Antenna.


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**Appendix A**

**List of Measurement Equipment**

## Radiated Emission

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---|---|---|---|---|---|---|
| EM215 | MULTIDEVICE CONTROLLER | EMCO | 2090 | 00024676 | N/A | N/A |
| EM217 | ELECTRIC POWERED TURNTABLE | EMCO | 2088 | 00029144 | N/A | N/A |
| EM218 | ANECHOIC CHAMBER | ETS-LINDGREN | FACT-3 | -- | 2019/04/16 | 2024/04/16 |
| EM356 | ANTENNA POSITIONING TOWER | ETS-LINDGREN | 2171B | 00150346 | N/A | N/A |
| EM336 | PRECISION CONICAL DIPOLE | SEIBERSDORF LABORATORIES | PCD 3100 | 6236/M | 2020/05/30 | 2022/05/30 |
| EM229 | EMI TEST RECEIVER | R&S | ESIB40 | 100248 | 2020/05/13 | 2022/05/13 |
| EM299 | BROADBAND HORN ANTENNA | ETS-LINDGREN | 3115 | 00114120 | 2020/11/24 | 2022/11/24 |
| EM300 | PYRAMIDAL STANDARD GAIN HORN ANTENNA | ETS-LINDGREN | 3160-09 | 00130130 | 2020/11/25 | 2022/11/25 |
| EM301 | PYRAMIDAL STANDARD GAIN HORN ANTENNA | ETS-LINDGREN | 3160-10 | 00130988 | 2020/11/25 | 2022/11/25 |
| EM353 | LOOP ANTENNA | ETS_LINDGREN | 6502 | 00206533 | 2020/06/10 | 2022/06/10 |
| EM355 | Biconilog Antenna | ETS-Lindgren | 3143B | 00094856 | 2020/06/17 | 2022/06/17 |
| EM200 | DUAL CHANNEL POWER METER | R & S | NRVD | 100592 | 2019/10/11 | 2022/10/11 |
| EM012 | PRE-AMPLIFIER | HP | HP8448B | 3008A00262 | 2019/11/08 | 2022/11/08 |

## Line Conducted

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---|---|---|---|---|---|---|
| EM119 | LISN | R & S | ESH3-Z5 | 0831.5518.52 | 2020/06/30 | 2022/06/30 |
| EM145 | EMI TEST RECEIVER | R & S | ESIB7 | 100072 | 2020/05/13 | 2022/05/13 |
| EM233 | PULSE LIMITER | ROHDE & SCHWARZ | ESH3-Z2 | 100314 | 2021/01/18 | 2023/01/18 |
| EM154 | SHIELDING ROOM | SIEMENS MATSUSHITA COMPONENTS | N/A | 803-740-057-99A | 2022/02/02 | 2027/02/02 |
| N/A | MEASUREMENT AND EVALUATION SOFTWARE | ROHDE & SCHWARZ | BSIB-K1 | V1.20 | N/A | N/A |

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined


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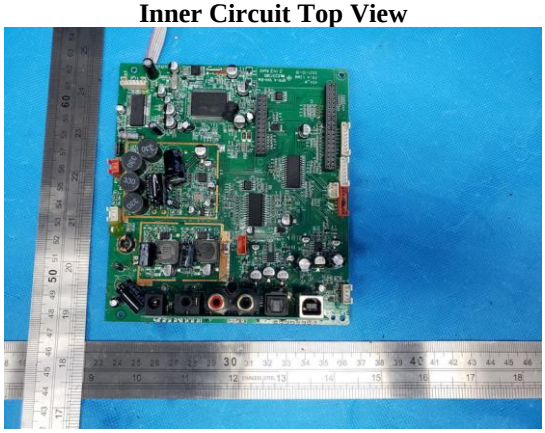
**Appendix B**

**Photographs of EUT**

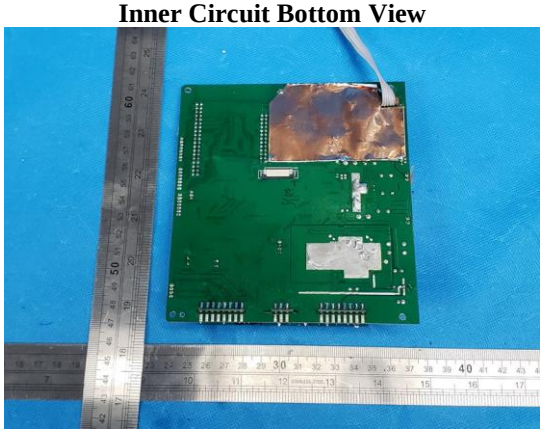
**View of the product**

**View of the product**

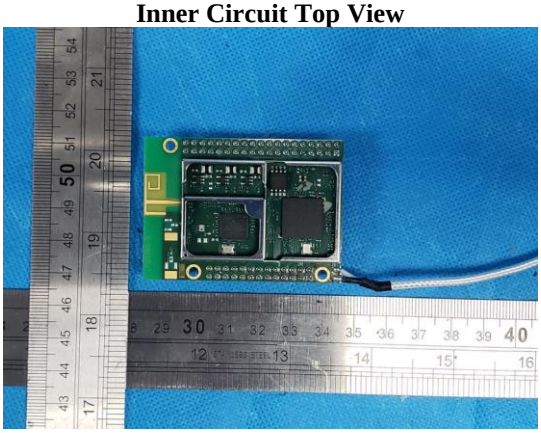
**Inner Circuit Top View**



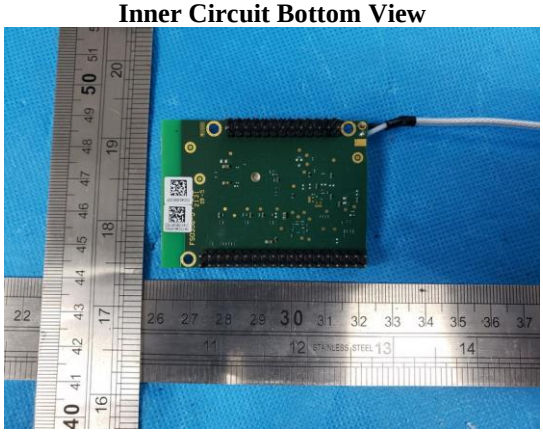
**Inner Circuit Bottom View**



**Inner Circuit Top View**



**Inner Circuit Bottom View**

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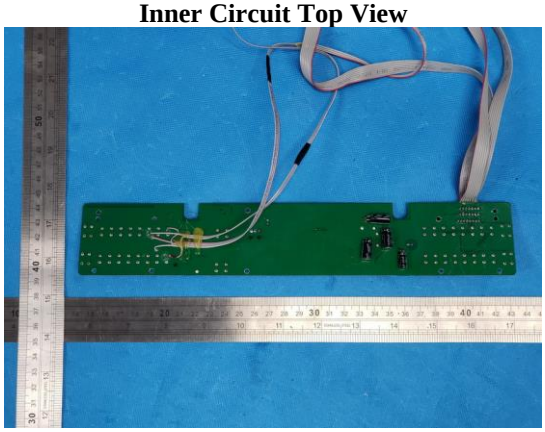
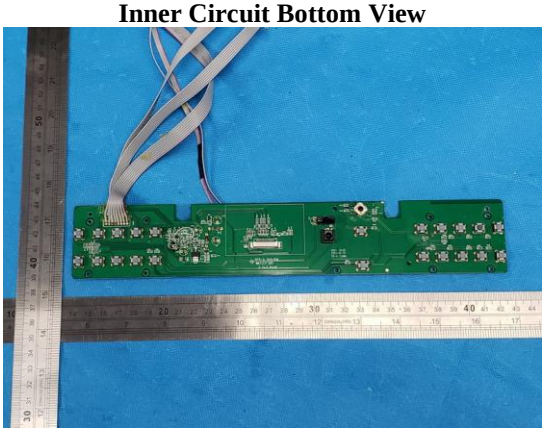
**Photographs of EUT**

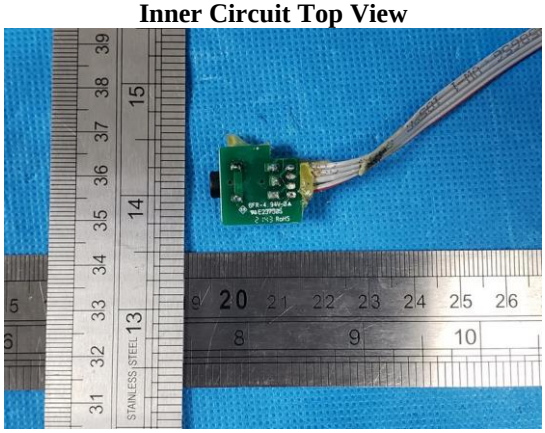
**Inner Circuit Top View**



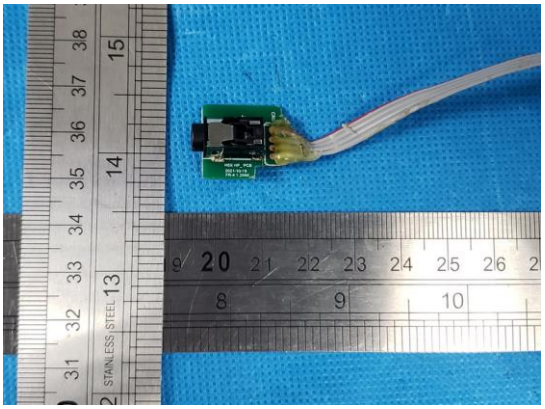
**Inner Circuit Bottom View**



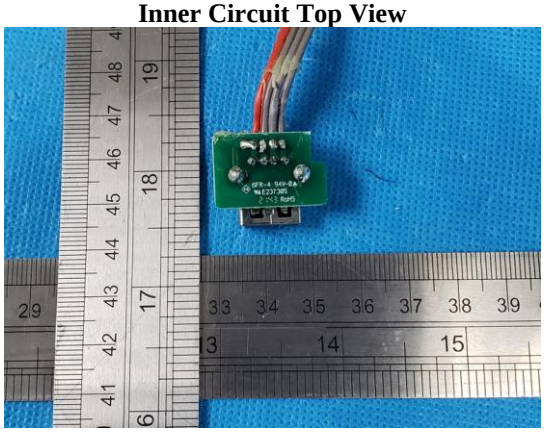
**Inner Circuit Top View**



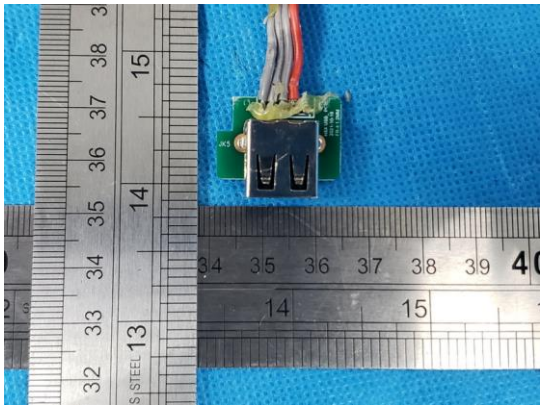
**Inner Circuit Bottom View**



**Inner Circuit Top View**



**Inner Circuit Bottom View**





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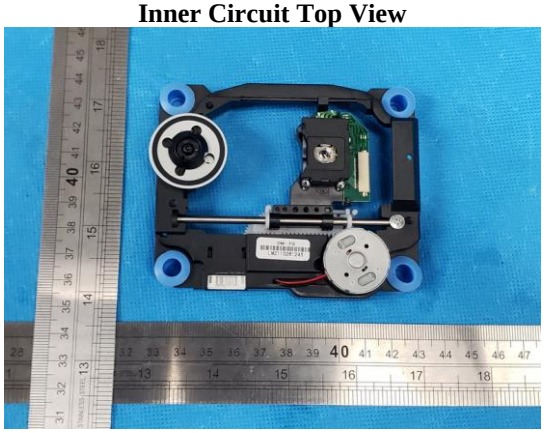
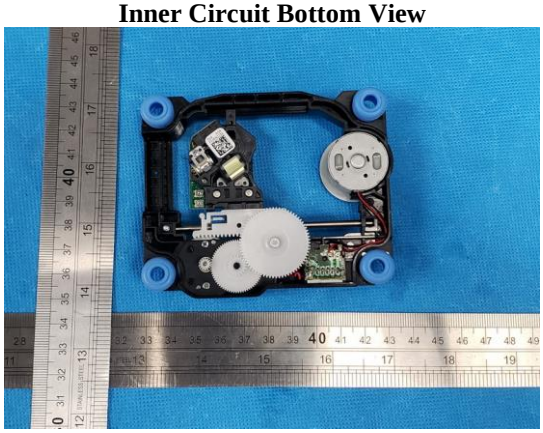
**Photographs of EUT**

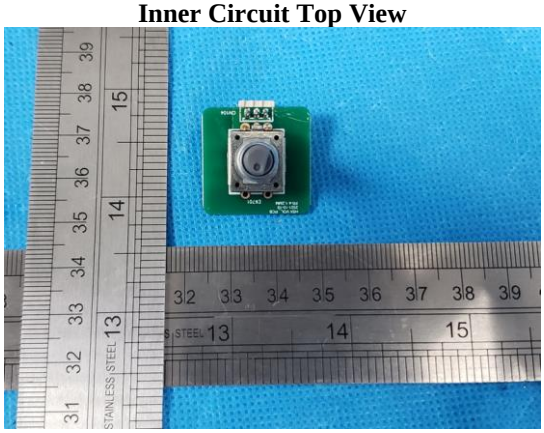
**Inner Circuit Top View**



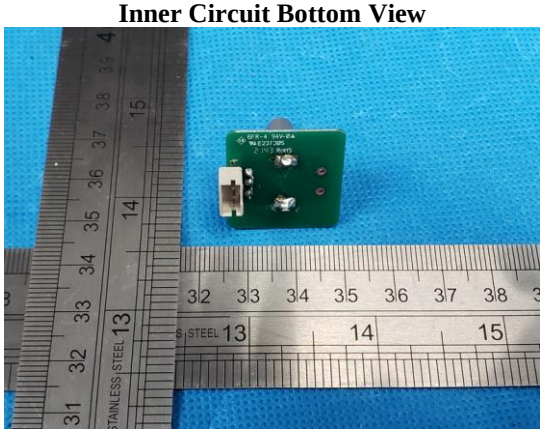
**Inner Circuit Bottom View**



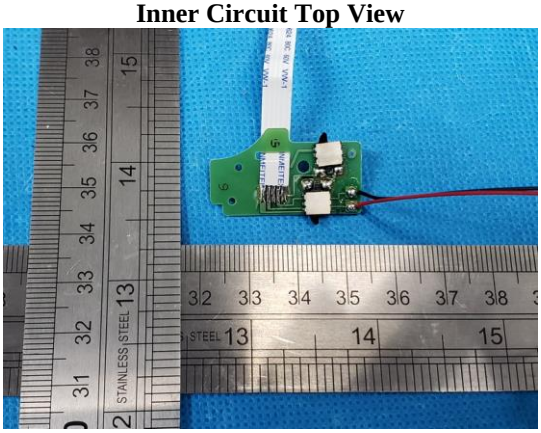
**Inner Circuit Top View**



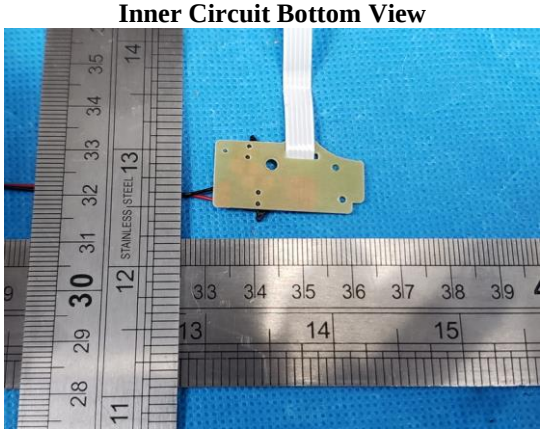
**Inner Circuit Bottom View**



**Inner Circuit Top View**



**Inner Circuit Bottom View**





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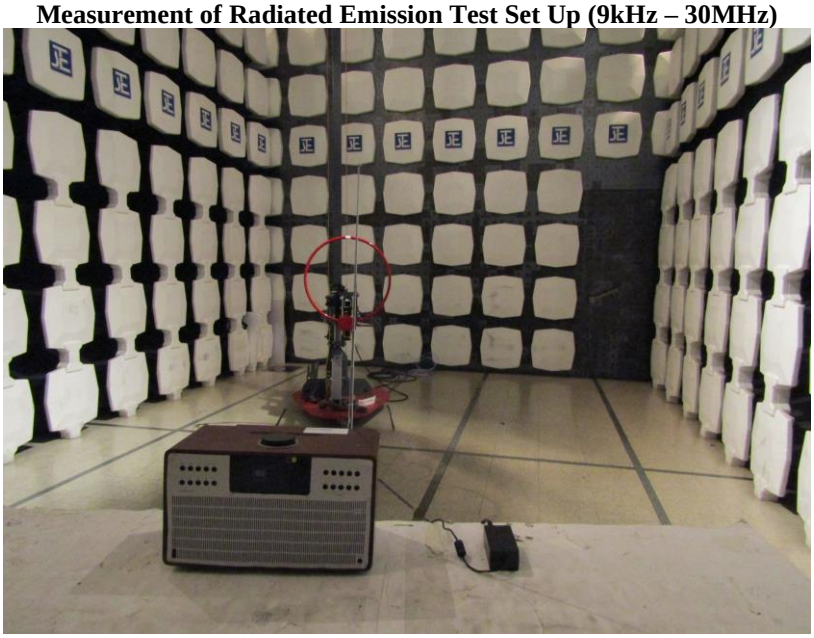
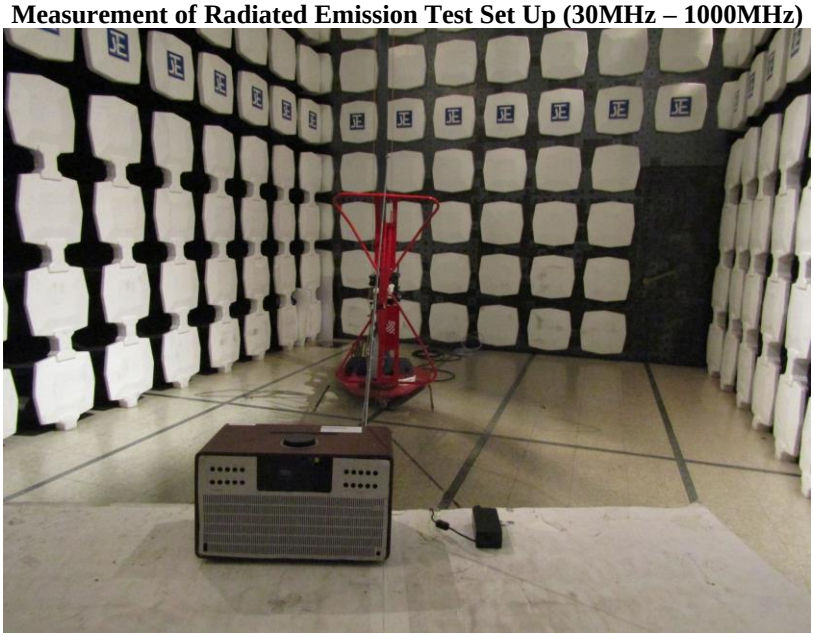
**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (9kHz – 30MHz)**



**Measurement of Radiated Emission Test Set Up (30MHz – 1000MHz)**

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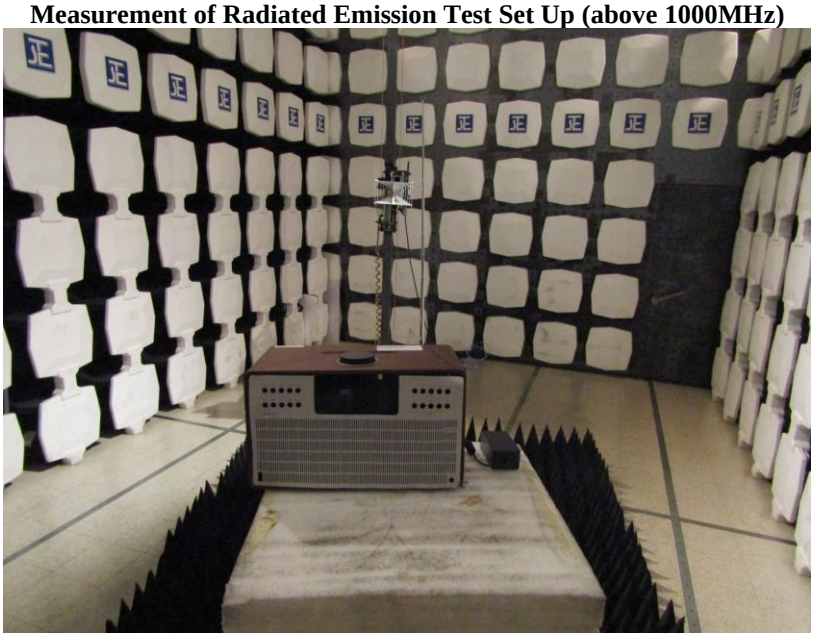
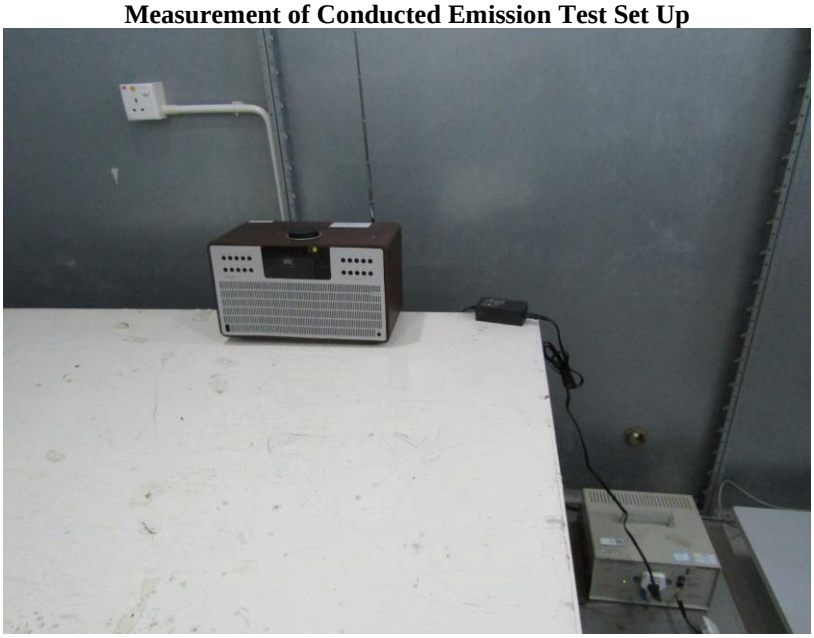
**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (above 1000MHz)**



**Measurement of Conducted Emission Test Set Up**



******* End of Test Report *******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5. The results in Report apply only to the sample as received and do not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

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10. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

11. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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