# FCC Radio Test Report

## FCC ID: 2AB9W-PP120XP

| | | |
|---|---|---|
| **Report No.** | : | BTL-FCCP-1-1911T047 |
| **Equipment** | : | 3D Printer |
| **Model Name** | : | PartPro120 xP |
| **Brand Name** | : | XYZprinting |
| **Applicant** | : | XYZprinting, Inc. |
| **Address** | : | 10F., No.99, Sec. 5, Nanjing E. Rd.,Songshan Dist., Taipei City 10571, Taiwan (R.O.C.) |
| **Manufacturer** | : | Cal-Comp Electronics (Thailand) Public Company Limited |
| **Address** | : | 138, Moo 4, Phechkasem Road, Sapang, Koawyoi, Petchaburi 76140, Thailand. |
| **Factory** | : | Cal-Comp Electronics (Thailand) Public Company Limited |
| **Address** | : | 138, Moo 4, Phechkasem Road, Sapang, Koawyoi, Petchaburi 76140, Thailand. |
| **Radio Function** | : | WLAN 2.4 GHz |
| **FCC Rule Part(s)** | : | FCC Part15, Subpart C (15.247) |
| **Measurement Procedure(s)** | : | ANSI C63.10-2013 |
| **Date of Receipt** | : | 2019/11/27 |
| **Date of Test** | : | 2019/11/27 ~ 2019/12/30 |
| **Issued Date** | : | 2020/1/8 |

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

**Prepared by** : Peter Chen, Engineer

**Approved by** : Scott Hsu , Manager

**BTL Inc.**
No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan
Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com

**Declaration**

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL**'s reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

**BTL**'s laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

**Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

**CONTENTS**

## REPORT ISSUED HISTORY

| Report Version | Description | Issued Date |
|---|---|---|
| R00 | Original Issue. | 2020/1/8 |

# 1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

| FCC Part 15, Subpart C (15.247) | | | | |
|---|---|---|---|---|
| **Standard(s) Section** | **Description** | **Test Result** | **Judgement** | **Remark** |
| 15.207 | AC Power Line Conducted Emissions | APPENDIX A | Pass | ------ |
| 15.205<br>15.209<br>15.247(d) | Radiated Emissions | APPENDIX B<br>APPENDIX C<br>APPENDIX D | Pass | ------ |
| 15.247(a) | Bandwidth | APPENDIX E | Pass | ------ |
| 15.247(b) | Output Power | APPENDIX F | Pass | ------ |
| 15.247(e) | Power Spectral Density | APPENDIX G | Pass | ------ |
| 15.247(d) | Antenna conducted Spurious Emission | APPENDIX H | Pass | ------ |
| 15.203 | Antenna Requirement | ------ | Pass | ------ |

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report.
(2) The report format version is TP.1.1.1.

## 1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 355421 and DN: TW1099.

☒ C05 ☐ CB08 ☐ CB11 ☐ CB15 ☐ CB16
☒ SR06

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan
The test sites and facilities are covered under FCC RN: 325517 and DN: TW1115.

☐ C03 ☒ CB18 ☐ CB19

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 $U_{cispr}$ requirement.

A. AC power line conducted emissions test:

| Test Site | Method | Measurement Frequency Range | U (dB) |
|---|---|---|---|
| C05 | CISPR | 150 kHz ~ 30MHz | 3.44 |

B. Radiated emissions below 1 GHz test :

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U,(dB) |
|---|---|---|---|---|
| CB18 (3m) | CISPR | 30MHz ~ 200MHz | V | 4.20 |
| | | 30MHz ~ 200MHz | H | 3.64 |
| | | 200MHz ~ 1,000MHz | V | 4.56 |
| | | 200MHz ~ 1,000MHz | H | 3.90 |

C. Radiated emissions above 1 GHz test :

| Test Site | Method | Measurement Frequency Range | Ant. H / V | U,(dB) |
|---|---|---|---|---|
| CB18 (3m) | CISPR | 1GHz ~ 6GHz | V | 4.46 |
| | | 1GHz ~ 6GHz | H | 4.40 |
| | | 6GHz ~ 18GHz | V | 3.88 |
| | | 6GHz ~ 18GHz | H | 4.00 |

| Test Site | Method | Measurement Frequency Range | U,(dB) |
|---|---|---|---|
| CB18 (1m) | CISPR | 18 ~ 26.5 GHz | 4.62 |
| | | 26.5 ~ 40 GHz | 5.12 |

D. Conducted test :

| Test Item | U,(dB) |
|---|---|
| Bandwidth | 1.13 |
| Output power | 1.06 |
| Power Spectral Density | 1.20 |
| Conducted Spurious emissions | 1.14 |
| Conducted Band edges | 1.13 |

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

### 1.3 TEST ENVIRONMENT CONDITIONS

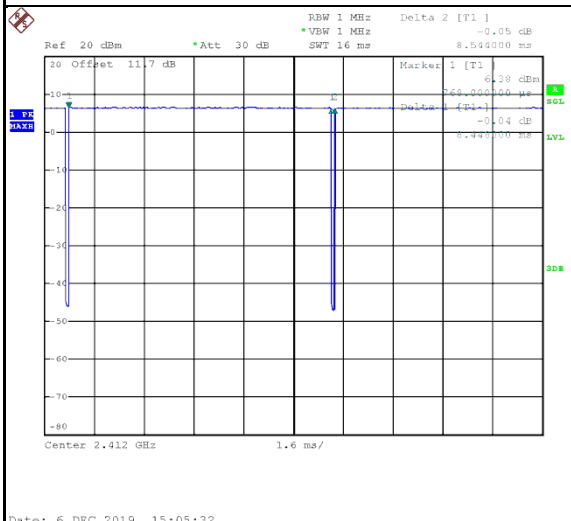
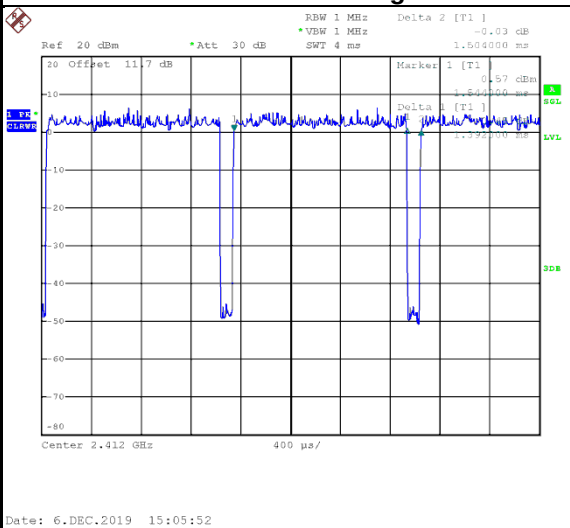
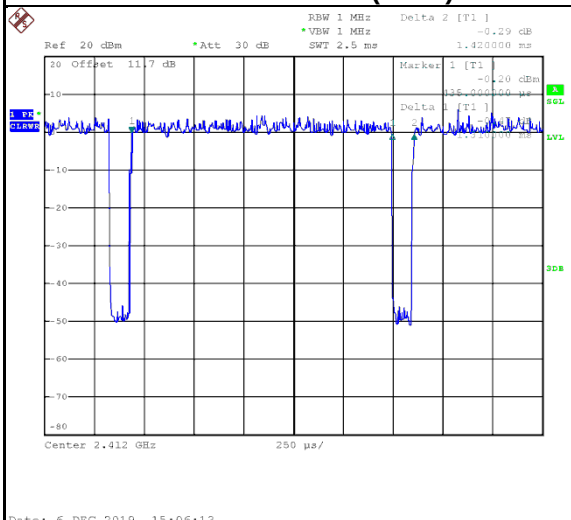
| Test Item | Environment Condition | Tested by |
|---|---|---|
| AC Power Line Conducted Emissions | 20 °C, 51 % | Jay Kao |
| Radiated emissions below 1 GHz | 23 °C, 59 % | Hunter Chiang |
| Radiated emissions above 1 GHz | 23 °C, 59 % | Hunter Chiang |
| Bandwidth | 23.5 °C, 58 % | William Wei |
| Output Power | 23.5 °C, 58 % | William Wei |
| Power Spectral Density | 23.5 °C, 58 % | William Wei |
| Antenna conducted Spurious Emission | 23.5 °C, 58 % | William Wei |

### 1.4 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

| Test Software | Tera Term V4.101 | | | |
|---|---|---|---|---|
| Mode | 2412 MHz | 2437 MHz | 2462 MHz | Data Rate |
| IEEE 802.11b | 17 | 16 | 16 | 1 Mbps |
| IEEE 802.11g | 14 | 14 | 14 | 6 Mbps |
| IEEE 802.11n (HT20) | 14 | 15 | 15 | MCS 0 |

## 1.5 DUTY CYCLE

If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.

| IEEE 802.11b | IEEE 802.11g |
|---|---|
|  |  |
| Duty cycle= 8.448 ms / 8.544 ms = 98.88 %<br>Duty Factor= 10 * log(1 / 0.9888) = 0.05 dB | Duty cycle= 1.392 ms / 1.504 ms = 92.55 %<br>Duty Factor= 10 * log(1 / 0.9255) = 0.34 dB |
| **IEEE 802.11n (HT20)** | |
|  | |
| Duty cycle= 1.310 ms / 1.420 ms = 92.25 %<br>Duty Factor= 10 * log(1 / 0.9225) = 0.35dB | |

# 2 GENERAL INFORMATION

## 2.1 DESCRIPTION OF EUT

| | |
|---|---|
| Equipment | 3D Printer |
| Model Name | PartPro120 xP |
| Brand Name | XYZprinting |
| Model Difference | N/A |
| Power Source | DC voltage supplied from AC/DC Adapter. |
| Power Rating | I/P: 100-240V~, 1.8A, 50-60Hz / O/P: 24.0V⎓5A |
| Products Covered | 1 * Power cable<br>1 * Adapter: FSP / FSP120-AAAN3 |
| Frequency Range | 2400 MHz ~ 2483.5 MHz |
| Operation Frequency | 2412 MHz ~ 2462 MHz |
| Modulation Technology | IEEE 802.11b: DSSS<br>IEEE 802.11g: OFDM<br>IEEE 802.11n: OFDM |
| Transfer Rate | IEEE 802.11b: 11/5.5/2/1 Mbps<br>IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps<br>IEEE 802.11n: up to 72.2 Mbps |
| Output Power Max. | IEEE 802.11b: 15.38 dBm (0.0345 W)<br>IEEE 802.11g: 20.02 dBm (0.1005 W)<br>IEEE 802.11n (HT20): 19.99 dBm (0.0998 W) |
| Test Model | PartPro120 xP |
| Sample Status | Engineering Sample |
| EUT Modification(s) | N/A |

NOTE:
(1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
(2) Channel List:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 01 | 2412 | 05 | 2432 | 09 | 2452 |
| 02 | 2417 | 06 | 2437 | 10 | 2457 |
| 03 | 2422 | 07 | 2442 | 11 | 2462 |
| 04 | 2427 | 08 | 2447 | | |

(3) Table for Filed Antenna:

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---|---|---|---|---|---|
| 1 | N/A | N/A | PCB | N/A | -8.65 |

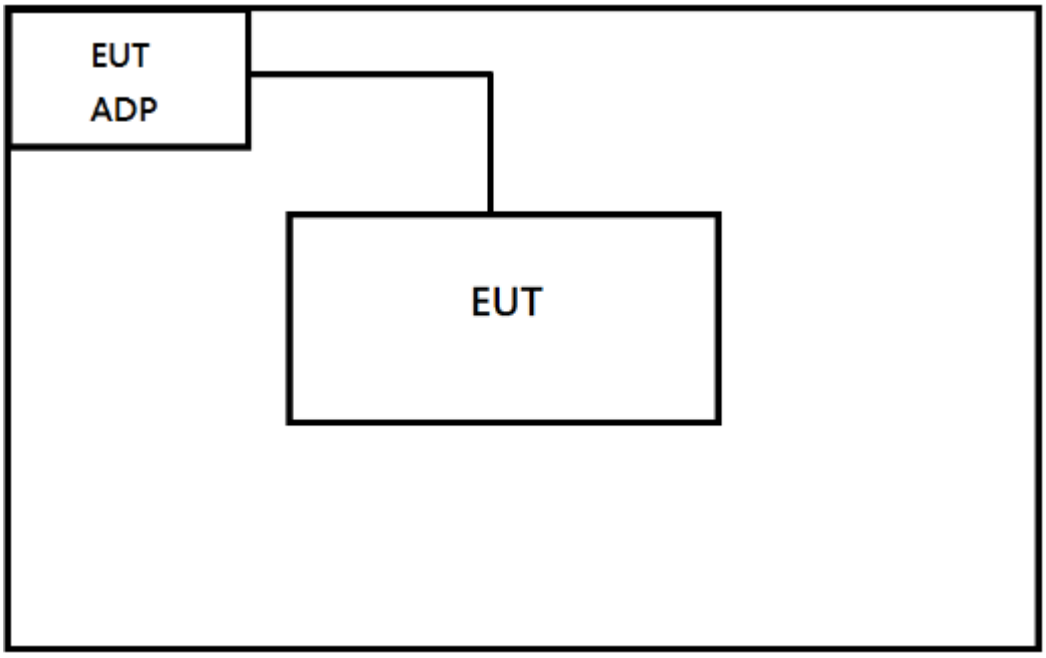
## 2.2 TEST MODES

| Test Items | Test mode | Channel | Note |
|---|---|---|---|
| AC power line conducted emissions | 2.4G_Normal | - | - |
| Transmitter Radiated Emissions (below 1GHz) | TX Mode_IEEE 802.11b | 01 | - |
| Transmitter Radiated Emissions (above 1GHz) | TX Mode_IEEE 802.11b | 01/06/11 | |
| | TX Mode_IEEE 802.11g | | |
| | TX Mode_IEEE 802.11n (HT20) | | |
| Bandwidth | TX Mode_IEEE 802.11b | 01/06/11 | - |
| | TX Mode_IEEE 802.11g | | |
| | TX Mode_IEEE 802.11n (HT20) | | |
| Output Power | TX Mode_IEEE 802.11b | 01/06/11 | - |
| | TX Mode_IEEE 802.11g | | |
| | TX Mode_IEEE 802.11n (HT20) | | |
| Power Spectral Density | TX Mode_IEEE 802.11b | 01/06/11 | - |
| | TX Mode_IEEE 802.11g | | |
| | TX Mode_IEEE 802.11n (HT20) | | |
| Antenna conducted Spurious Emission | TX Mode_IEEE 802.11b | 01/06/11 | - |
| | TX Mode_IEEE 802.11g | | |
| | TX Mode_IEEE 802.11n (HT20) | | |

NOTE:
(1) The Radiated emissions test was verified based on the worst conducted power and Bandwidth test results reported in the original report.
(2) All X, Y and Z axes are evaluated, but only the worst case (Z axis) is recorded.
(3) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.

## 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.




## 2.4 SUPPORT UNITS

| Item | Equipment | Brand | Model No. | Series No. | Remarks |
|---|---|---|---|---|---|
| - | - | - | - | - | - |

| Item | Shielded | Ferrite Core | Length | Cable Type | Remarks |
|---|---|---|---|---|---|
| - | - | - | - | - | - |

# 3 AC POWER LINE CONDUCTED EMISSIONS TEST

## 3.1 LIMIT

| Frequency (MHz) | Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 - 0.5 | 66 - 56 * | 56 - 46 * |
| 0.50 - 5.0 | 56 | 46 |
| 5.0 - 30.0 | 60 | 50 |

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

| Reading Level | | Correct Factor | | Measurement Value |
|---|---|---|---|---|
| 38.22 | + | 3.45 | = | 41.67 |

| Measurement Value | | Limit Value | | Margin Level |
|---|---|---|---|---|
| 41.67 | - | 60 | = | -18.33 |

The following table is the setting of the receiver.

| Receiver Parameter | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 KHz |

## 3.2 TEST PROCEDURE

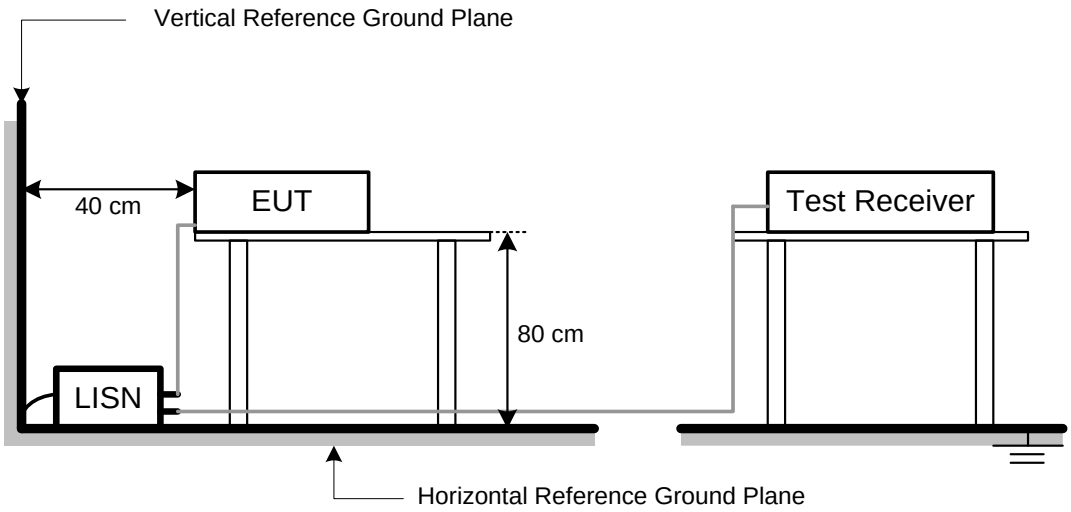
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

**NOTE:**
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

## 3.3 DEVIATION FROM TEST STANDARD

No deviation.

### 3.4 TEST SETUP




### 3.5 TEST RESULT

Please refer to the APPENDIX A.

# 4 RADIATED EMISSIONS TEST

## 4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 KHz to 1000 MHz)

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| 960~1000 | 500 | 3 |

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

| Frequency (MHz) | Radiated Emissions (dBuV/m) | | Measurement Distance (meters) |
|---|---|---|---|
| | Peak | Average | |
| Above 1000 | 74 | 54 | 3 |

NOTE:
(1) The limit for radiated test was performed according to FCC Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

| Reading Level | | Correct Factor | | Measurement Value |
|---|---|---|---|---|
| 19.11 | + | 2.11 | = | 21.22 |

| Measurement Value | | Limit Value | | Margin Level |
|---|---|---|---|---|
| 21.22 | - | 54 | = | -32.78 |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RBW / VBW (Emission in restricted band) | 1MHz / 3MHz for Peak, 1MHz / 1/T for Average |

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9KHz~90KHz for PK/AVG detector |
| Start ~ Stop Frequency | 90KHz~110KHz for QP detector |
| Start ~ Stop Frequency | 110KHz~490KHz for PK/AVG detector |
| Start ~ Stop Frequency | 490KHz~30MHz for QP detector |
| Start ~ Stop Frequency | 30MHz~1000MHz for QP detector |

## 4.2 TEST PROCEDURE

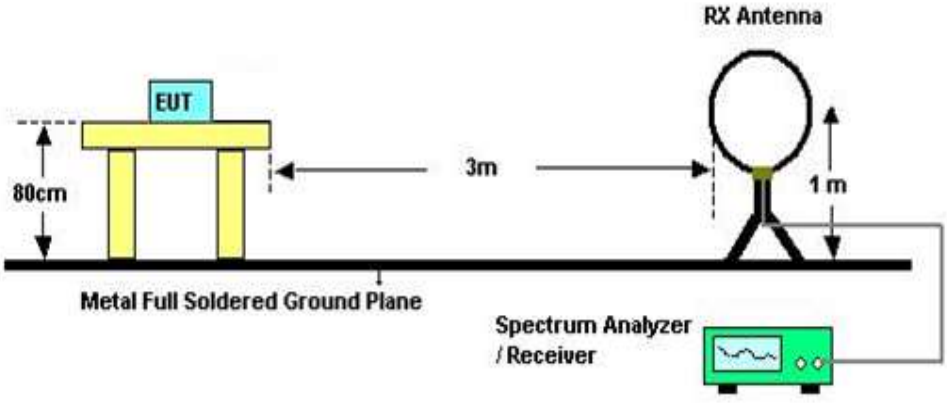
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

## 4.3 DEVIATION FROM TEST STANDARD

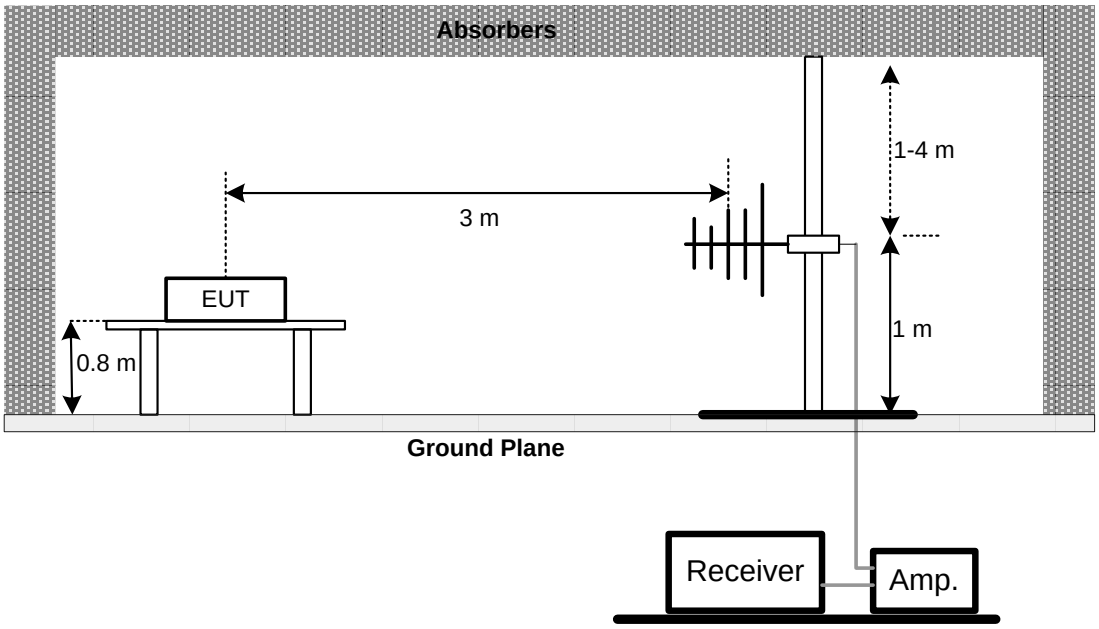
No deviation.

## 4.4 TEST SETUP

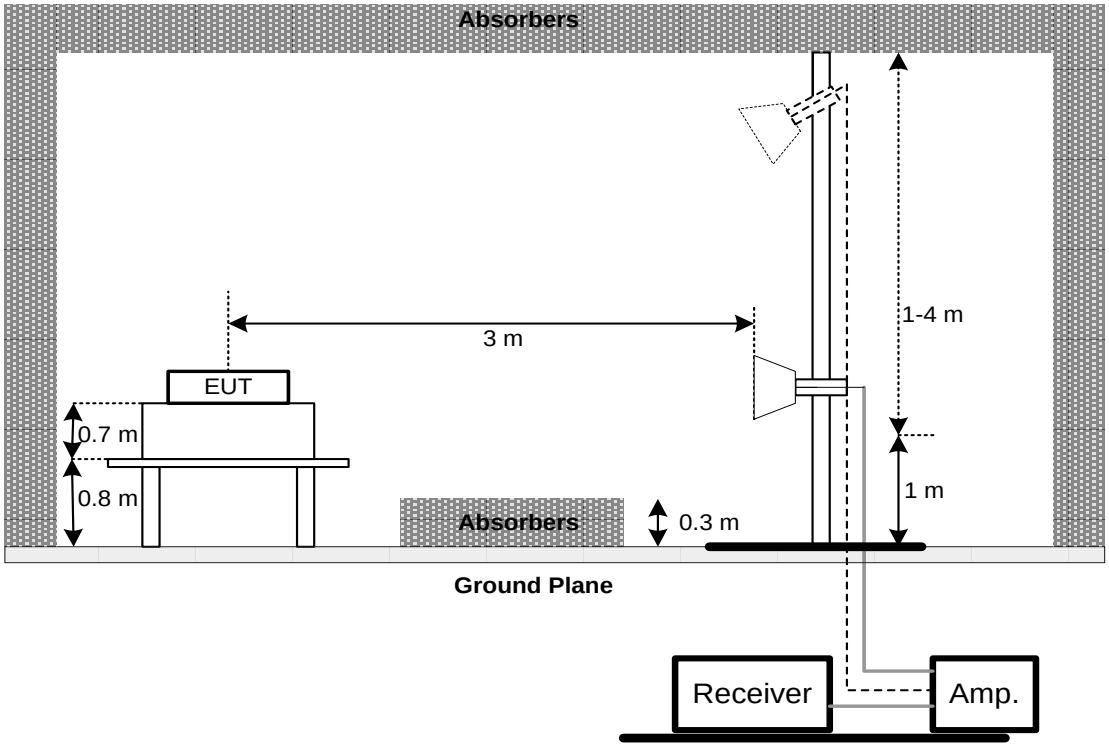
**9 KHz to 30 MHz**



**30 MHz to 1 GHz**




**Above 1 GHz**




## 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

### 4.6 TEST RESULT – 9 kHZ TO 30 MHZ

Please refer to the APPENDIX B

### 4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX C.

### 4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX D.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

# 5 BANDWIDTH TEST

## 5.1 LIMIT

| FCC Part15, Subpart C (15.247) | | |
|---|---|---|
| Section | Test Item | Limit |
| 15.247(a) | 6 dB Bandwidth | 500 kHz |

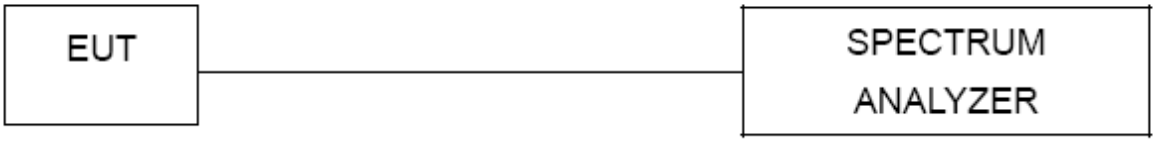
## 5.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

## 5.3 DEVIATION FROM TEST STANDARD

No deviation.

## 5.4 TEST SETUP




## 5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 5.6 TEST RESULT

Please refer to the APPENDIX E.

# 6 OUTPUT POWER TEST

## 6.1 LIMIT

| FCC Part15, Subpart C (15.247) | | |
|---|---|---|
| Section | Test Item | Limit |
| 15.247(b) | Maximum Output Power | 1 Watt or 30dBm |

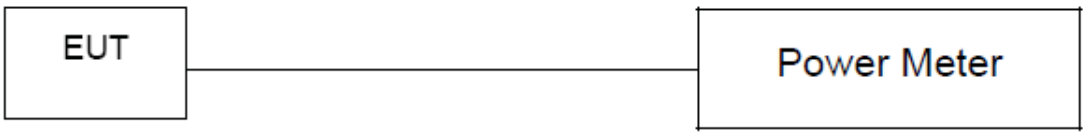
## 6.2 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
b. The maximum peak conducted output power was performed in accordance with method 9.1.2 of FCC KDB 558074 D01 DTS Meas Guidance.

## 6.3 DEVIATION FROM TEST STANDARD

No deviation.

## 6.4 TEST SETUP




## 6.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 6.6 TEST RESULT

Please refer to the APPENDIX F.

# 7 POWER SPECTRAL DENSITY

## 7.1 LIMIT

| FCC Part15, Subpart C (15.247) | | |
|---|---|---|
| Section | Test Item | Limit |
| 15.247(e) | Power Spectral Density | 8 dBm<br>(in any 3 kHz) |

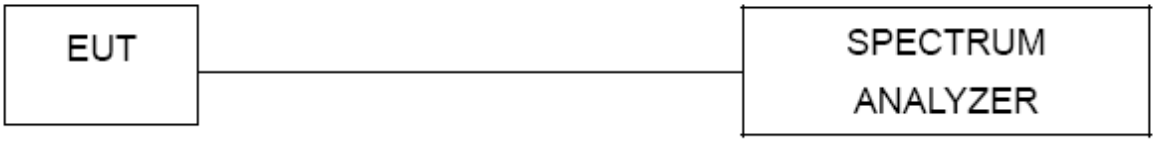
## 7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW = 3 kHz, VBW = 10 kHz, Sweep time = Auto.

## 7.3 DEVIATION FROM TEST STANDARD

No deviation.

## 7.4 TEST SETUP




## 7.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 7.6 TEST RESULT

Please refer to the APPENDIX G.

# 8 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST

## 8.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

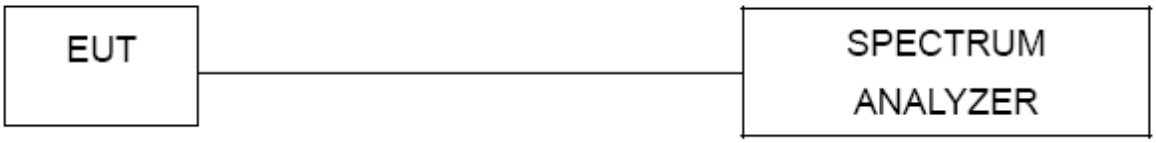
## 8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW = 100 kHz, VBW=300 kHz, Sweep time = Auto.
c. Offset = antenna gain + cable loss.

## 8.3 DEVIATION FROM TEST STANDARD

No deviation.

## 8.4 TEST SETUP




## 8.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 8.6 TEST RESULT

Please refer to the APPENDIX H.

# 9 LIST OF MEASURING EQUIPMENTS

| AC Power Line Conducted Emissions | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | TWO-LINE V-NETWORK | R&S | ENV216 | 101050 | 2019/3/18 | 2020/3/17 |
| 2 | Test Cable | EMCI | EMCCFD300-BM-BMR-6000 | 170715 | 2019/8/7 | 2020/8/6 |
| 3 | EMI Test Receiver | R&S | ESCI | 100080 | 2019/6/14 | 2020/6/13 |
| 4 | Measurement Software | EZ | EZ_EMC (Version NB-03A) | N/A | N/A | N/A |

| Radiated Emissions | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Preamplifier | EMCI | EMC001340 | 980555 | 2019/4/12 | 2020/4/11 |
| 2 | Preamplifier | EMCI | EMC02325B | 980217 | 2019/4/12 | 2020/4/11 |
| 3 | Preamplifier | EMCI | EMC012645B | 980267 | 2019/4/12 | 2020/4/11 |
| 4 | Test Cable | EMCI | EMC104-SM-SM-800 | 150207 | 2019/4/12 | 2020/4/11 |
| 5 | Test Cable | EMCI | EMC104-SM-SM-3000 | 151205 | 2019/4/12 | 2020/4/11 |
| 6 | Test Cable | EMCI | EMC-SM-SM-7000 | 180408 | 2019/4/12 | 2020/4/11 |
| 7 | MXE EMI Receiver | Agilent | N9038A | MY55420127 | 2019/3/26 | 2020/3/25 |
| 8 | Signal Analyzer | Agilent | N9010A | MY56480554 | 2019/6/6 | 2020/6/5 |
| 9 | Loop Ant | EMCO | EMCI-LPA600 | 274 | 2019/5/31 | 2020/5/30 |
| 10 | Horm Ant | SCHWARZBECK | BBHA 9120D | 9120D-1342 | 2019/6/10 | 2020/6/9 |
| 11 | Trilog-Broadband Antenna | Schwarzbeck | VULB 9168 | 000992 | 2019/5/29 | 2020/5/28 |
| 12 | 5dB Attenuator | EMCI | EMCI-N-6-05 | AT-N0508 | 2019/5/29 | 2020/5/28 |

| Bandwidth | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP40 | 100129 | 2019/5/23 | 2020/5/22 |

| Output Power | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP40 | 100129 | 2019/5/23 | 2020/5/22 |
| 2 | Power Meter | Anritsu | ML2487A | 6K00004714 | 2019/6/20 | 2020/6/18 |
| 3 | Power Sensor | Anritsu | MA2491A | 1725282 | 2019/6/20 | 2020/6/18 |

| Power Spectral Density | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP40 | 100129 | 2019/5/23 | 2020/5/22 |

| Antenna conducted Spurious Emission | | | | | | |
|---|---|---|---|---|---|---|
| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated Date | Calibrated Until |
| 1 | Spectrum Analyzer | R&S | FSP40 | 100129 | 2019/5/23 | 2020/5/22 |

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

## 10 EUT TEST PHOTO

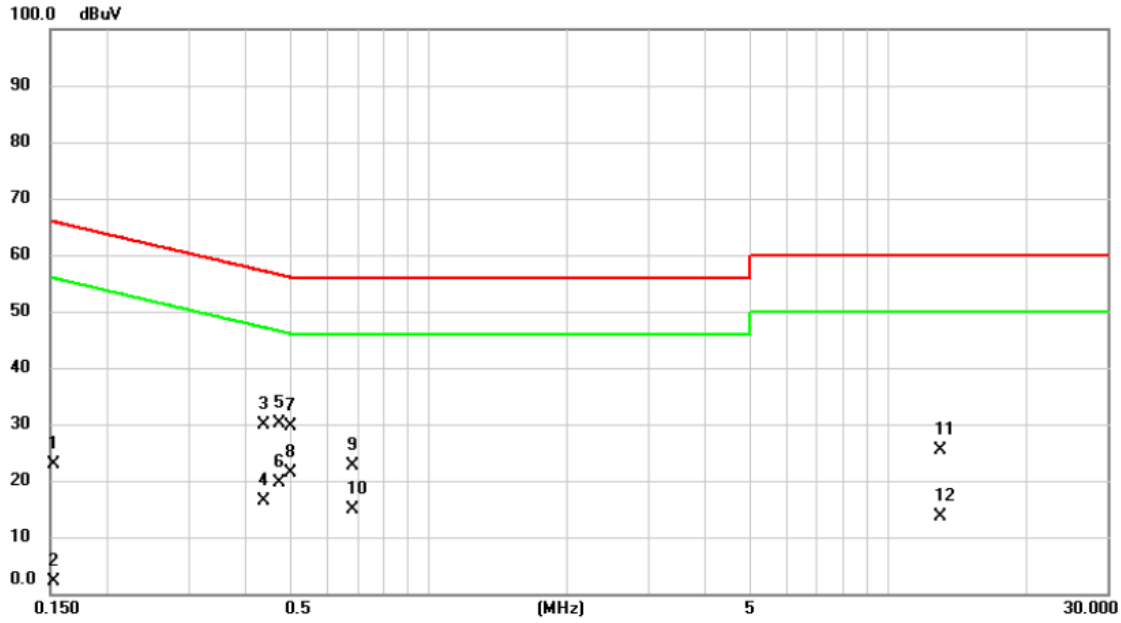
Please refer to document Appendix No.: TP-1911T047-FCCP-1 (APPENDIX-TEST PHOTOS).

## 11 EUT PHOTOS

Please refer to document Appendix No.: EP-1911T047-1 (APPENDIX-EUT PHOTOS).

# APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

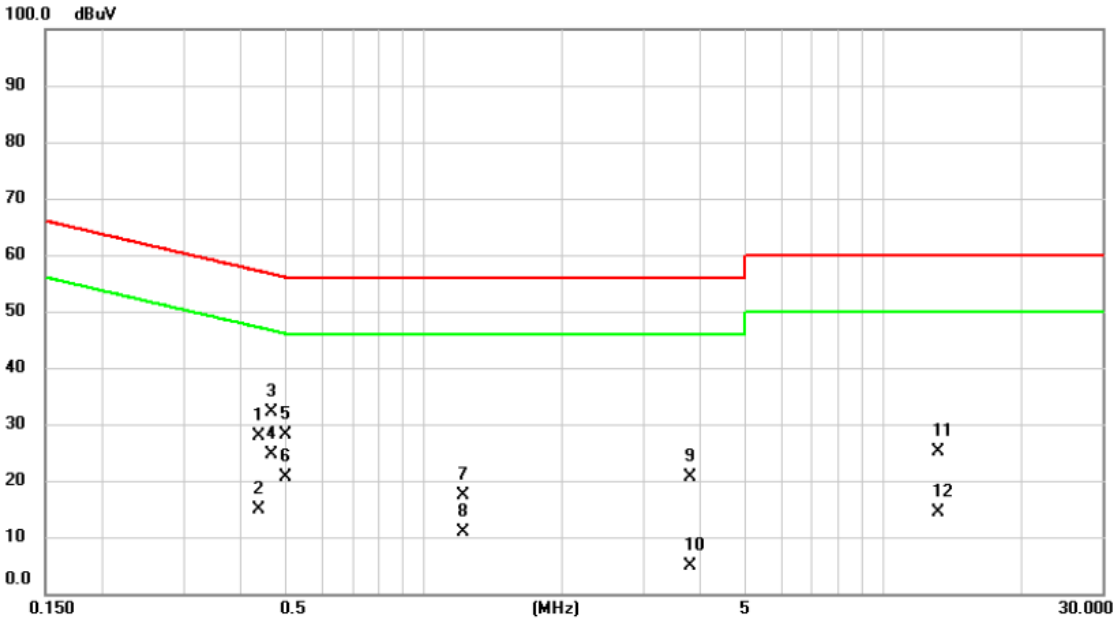
| Test Mode | 2.4G_Normal | Tested Date | 2019/12/4 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Phase | Line |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1522 | 22.81 | 0.00 | 22.81 | 65.88 | -43.07 | QP | |
| 2 | | 0.1522 | 2.08 | 0.00 | 2.08 | 55.88 | -53.80 | AVG | |
| 3 | | 0.4380 | 29.73 | 0.06 | 29.79 | 57.10 | -27.31 | QP | |
| 4 | | 0.4380 | 16.42 | 0.06 | 16.48 | 47.10 | -30.62 | AVG | |
| 5 | | 0.4717 | 30.11 | 0.06 | 30.17 | 56.48 | -26.31 | QP | |
| 6 | | 0.4717 | 19.66 | 0.06 | 19.72 | 46.48 | -26.76 | AVG | |
| 7 | | 0.5010 | 29.61 | 0.06 | 29.67 | 56.00 | -26.33 | QP | |
| 8 | * | 0.5010 | 21.23 | 0.06 | 21.29 | 46.00 | -24.71 | AVG | |
| 9 | | 0.6810 | 22.59 | 0.08 | 22.67 | 56.00 | -33.33 | QP | |
| 10 | | 0.6810 | 14.89 | 0.08 | 14.97 | 46.00 | -31.03 | AVG | |
| 11 | | 13.0268 | 25.21 | 0.24 | 25.45 | 60.00 | -34.55 | QP | |
| 12 | | 13.0268 | 13.28 | 0.24 | 13.52 | 50.00 | -36.48 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | 2.4G_Normal | Tested Date | 2019/12/4 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Phase | Neutral |

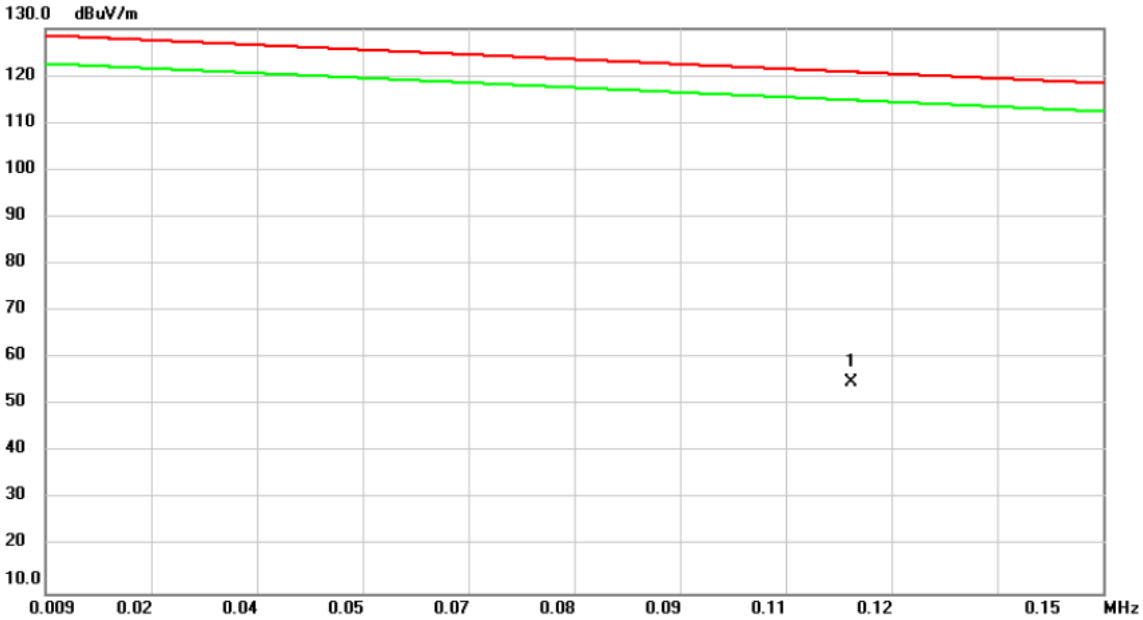



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.4380 | 27.85 | 0.06 | 27.91 | 57.10 | -29.19 | QP | |
| 2 | | 0.4380 | 14.74 | 0.06 | 14.80 | 47.10 | -32.30 | AVG | |
| 3 | | 0.4650 | 31.96 | 0.06 | 32.02 | 56.60 | -24.58 | QP | |
| 4 | * | 0.4650 | 24.62 | 0.06 | 24.68 | 46.60 | -21.92 | AVG | |
| 5 | | 0.5010 | 28.12 | 0.06 | 28.18 | 56.00 | -27.82 | QP | |
| 6 | | 0.5010 | 20.51 | 0.06 | 20.57 | 46.00 | -25.43 | AVG | |
| 7 | | 1.2164 | 17.27 | 0.07 | 17.34 | 56.00 | -38.66 | QP | |
| 8 | | 1.2164 | 10.71 | 0.07 | 10.78 | 46.00 | -35.22 | AVG | |
| 9 | | 3.7950 | 20.53 | 0.13 | 20.66 | 56.00 | -35.34 | QP | |
| 10 | | 3.7950 | 4.86 | 0.13 | 4.99 | 46.00 | -41.01 | AVG | |
| 11 | | 13.1392 | 24.88 | 0.24 | 25.12 | 60.00 | -34.88 | QP | |
| 12 | | 13.1392 | 14.02 | 0.24 | 14.26 | 50.00 | -35.74 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX B RADIATED EMISSIONS - 9 KHZ TO 30 MHZ

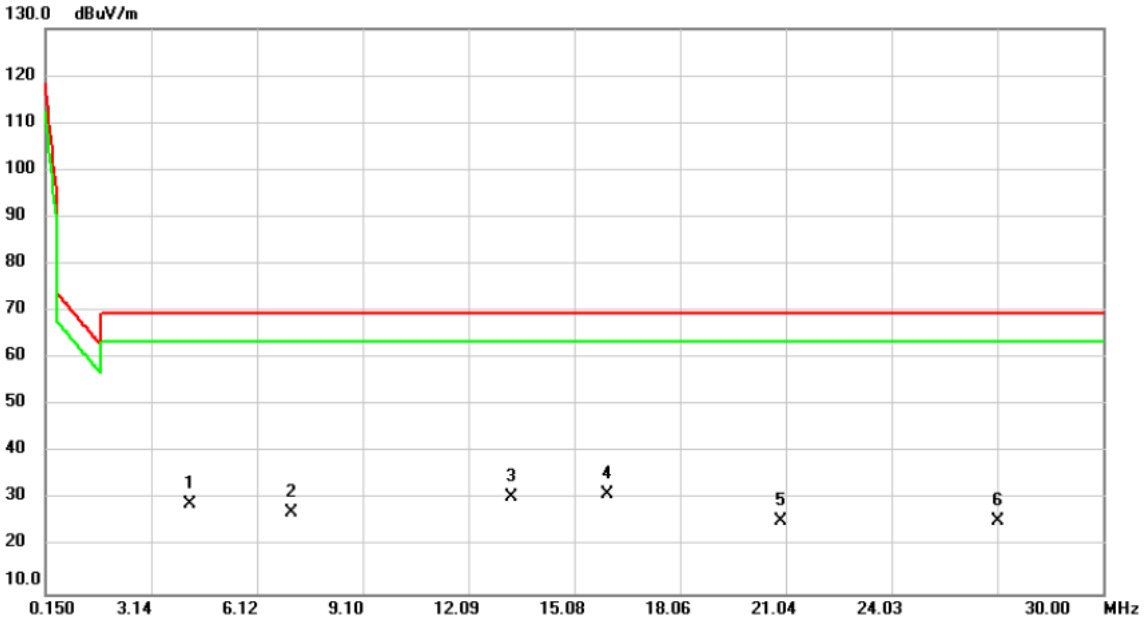
| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/23 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Azimuth Angle | 90° |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 0.1165 | 39.15 | 15.66 | 54.81 | 120.76 | -65.95 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

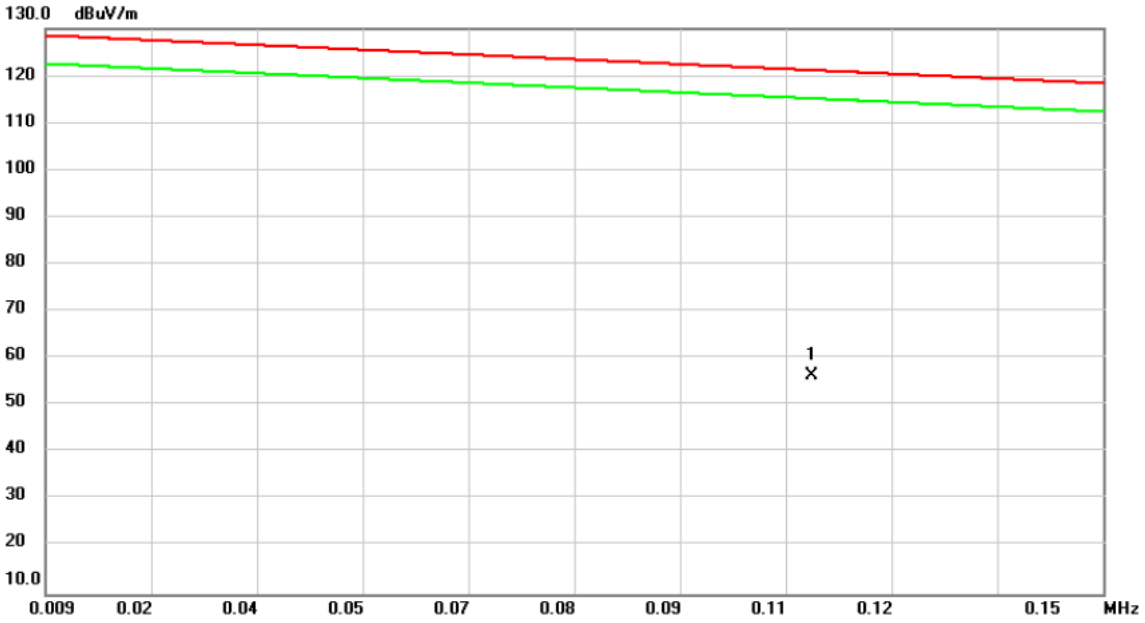
| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/23 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Azimuth Angle | 90° |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4.2394 | 32.30 | -3.38 | 28.92 | 69.54 | -40.62 | QP | |
| 2 | | 7.0752 | 30.79 | -3.65 | 27.14 | 69.54 | -42.40 | QP | |
| 3 | | 13.3140 | 34.59 | -3.96 | 30.63 | 69.54 | -38.91 | QP | |
| 4 | * | 16.0004 | 35.53 | -4.29 | 31.24 | 69.54 | -38.30 | QP | |
| 5 | | 20.8957 | 30.70 | -5.24 | 25.46 | 69.54 | -44.08 | QP | |
| 6 | | 27.0150 | 32.56 | -7.01 | 25.55 | 69.54 | -43.99 | QP | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

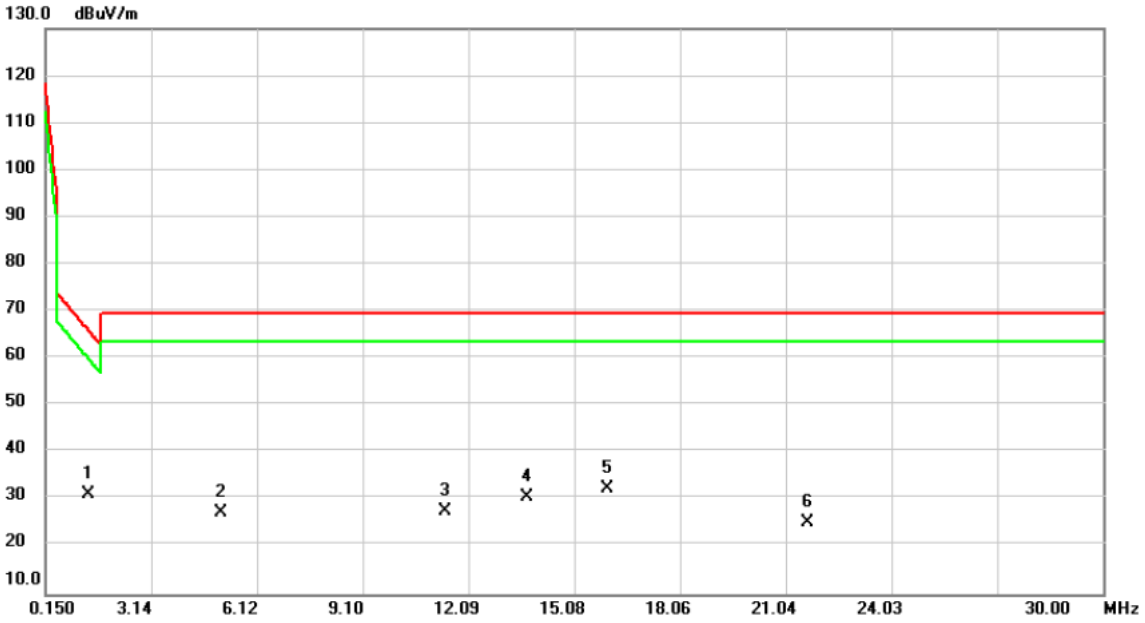
| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/23 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Azimuth Angle | 0° |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 0.1111 | 40.30 | 15.97 | 56.27 | 121.15 | -64.88 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/23 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Azimuth Angle | 0° |

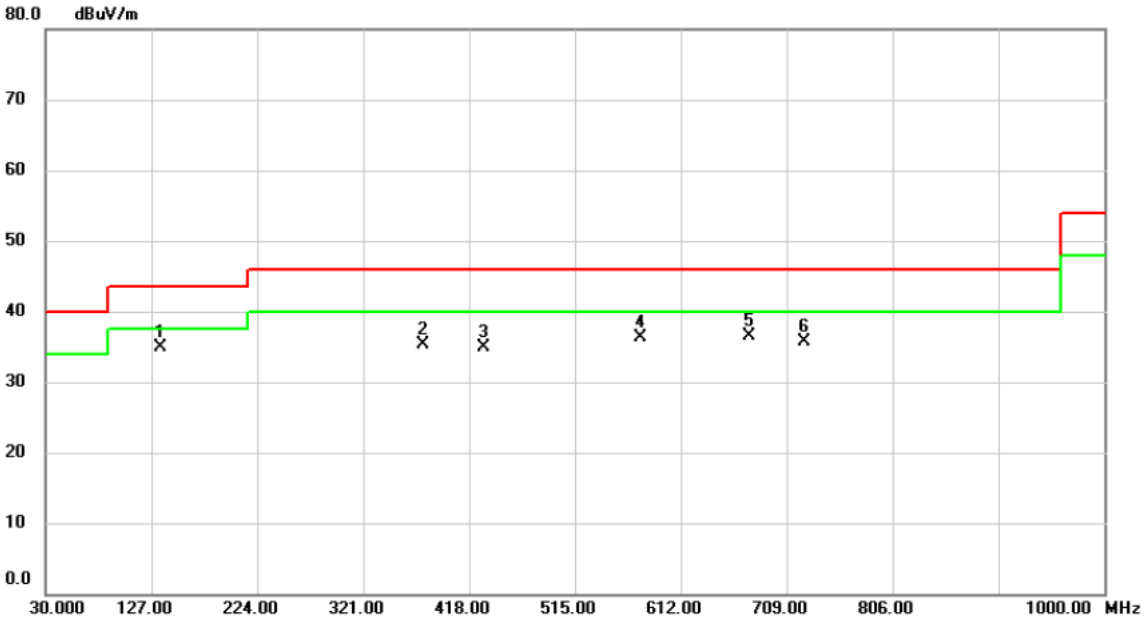



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 1.3740 | 31.89 | -0.74 | 31.15 | 65.92 | -34.77 | QP | |
| 2 | | 5.1051 | 30.80 | -3.55 | 27.25 | 69.54 | -42.29 | QP | |
| 3 | | 11.4333 | 31.53 | -4.07 | 27.46 | 69.54 | -42.08 | QP | |
| 4 | | 13.7317 | 34.45 | -3.93 | 30.52 | 69.54 | -39.02 | QP | |
| 5 | | 16.0004 | 36.52 | -4.29 | 32.23 | 69.54 | -37.31 | QP | |
| 6 | | 21.6420 | 30.57 | -5.31 | 25.26 | 69.54 | -44.28 | QP | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX C RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

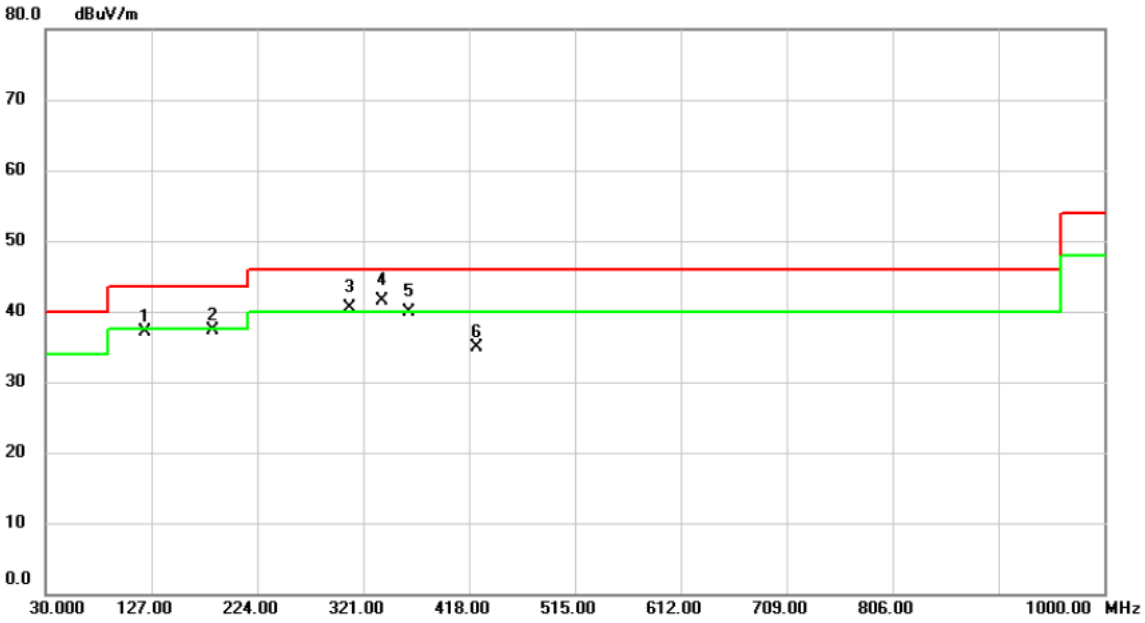
| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/20 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | * | 134.7600 | 47.60 | -12.72 | 34.88 | 43.50 | -8.62 | peak | |
| 2 | | 375.3200 | 43.90 | -8.68 | 35.22 | 46.00 | -10.78 | peak | |
| 3 | | 431.5800 | 41.97 | -7.08 | 34.89 | 46.00 | -11.11 | peak | |
| 4 | | 575.1400 | 40.82 | -4.52 | 36.30 | 46.00 | -9.70 | peak | |
| 5 | | 675.0500 | 39.35 | -2.84 | 36.51 | 46.00 | -9.49 | peak | |
| 6 | | 725.4900 | 37.58 | -1.83 | 35.75 | 46.00 | -10.25 | peak | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | TX Mode_IEEE 802.11b_2412MHz | Tested Date | 2019/12/20 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |

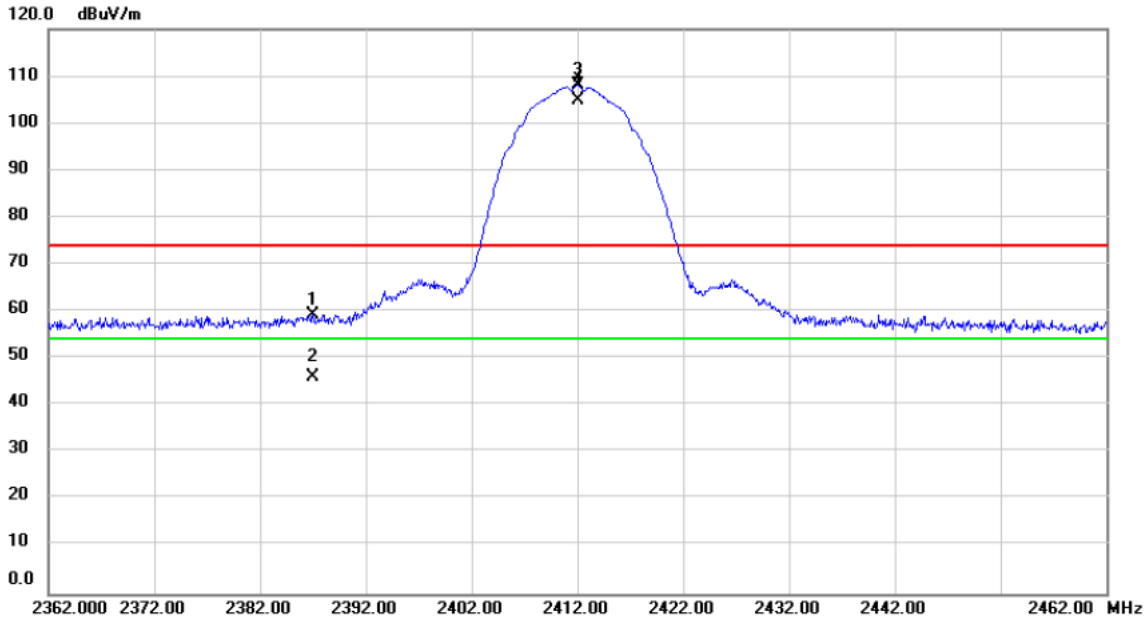



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 121.1800 | 50.69 | -13.52 | 37.17 | 43.50 | -6.33 | peak | |
| 2 | | 183.2600 | 50.40 | -13.13 | 37.27 | 43.50 | -6.23 | peak | |
| 3 | ! | 308.3100 | 51.09 | -10.49 | 40.60 | 46.00 | -5.40 | QP | |
| 4 | * | 338.5100 | 51.31 | -9.80 | 41.51 | 46.00 | -4.49 | QP | |
| 5 | | 363.6000 | 48.88 | -9.07 | 39.81 | 46.00 | -6.19 | QP | |
| 6 | | 424.7900 | 41.90 | -7.09 | 34.81 | 46.00 | -11.19 | peak | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX D RADIATED EMISSIONS - ABOVE 1 GHZ

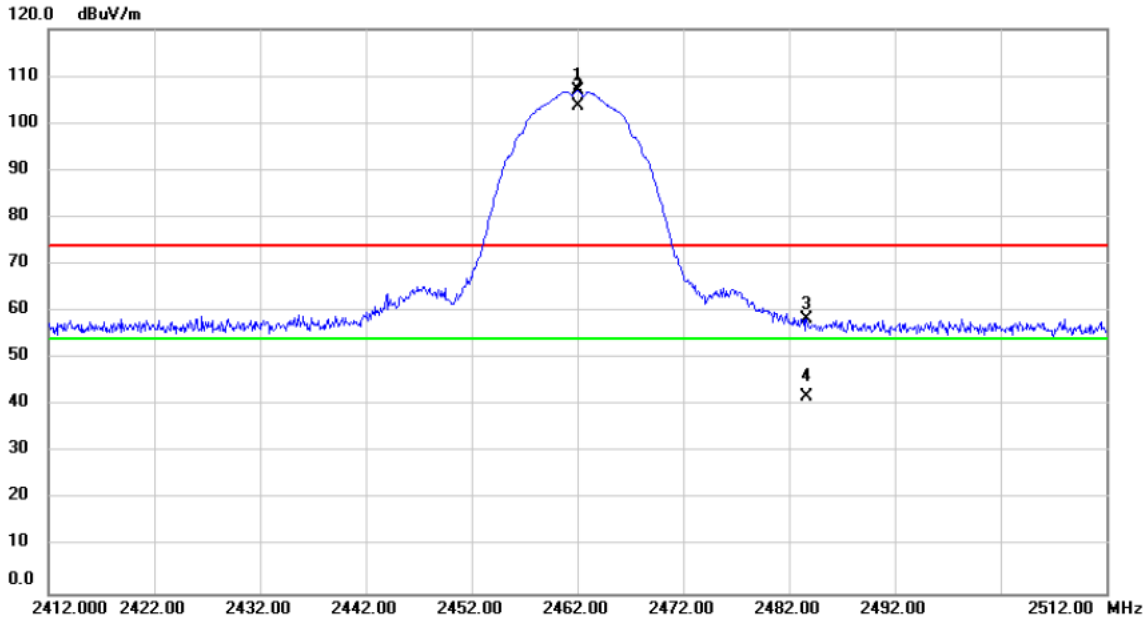
| Test Mode | TX Mode_IEEE 802.11b_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2387.000 | 28.17 | 31.23 | 59.40 | 74.00 | -14.60 | peak | |
| 2 | | 2387.000 | 14.68 | 31.23 | 45.91 | 54.00 | -8.09 | AVG | |
| 3 | X | 2412.000 | 76.72 | 31.34 | 108.06 | 74.00 | 34.06 | peak | No Limit |
| 4 | * | 2412.000 | 73.46 | 31.34 | 104.80 | 54.00 | 50.80 | AVG | No Limit |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

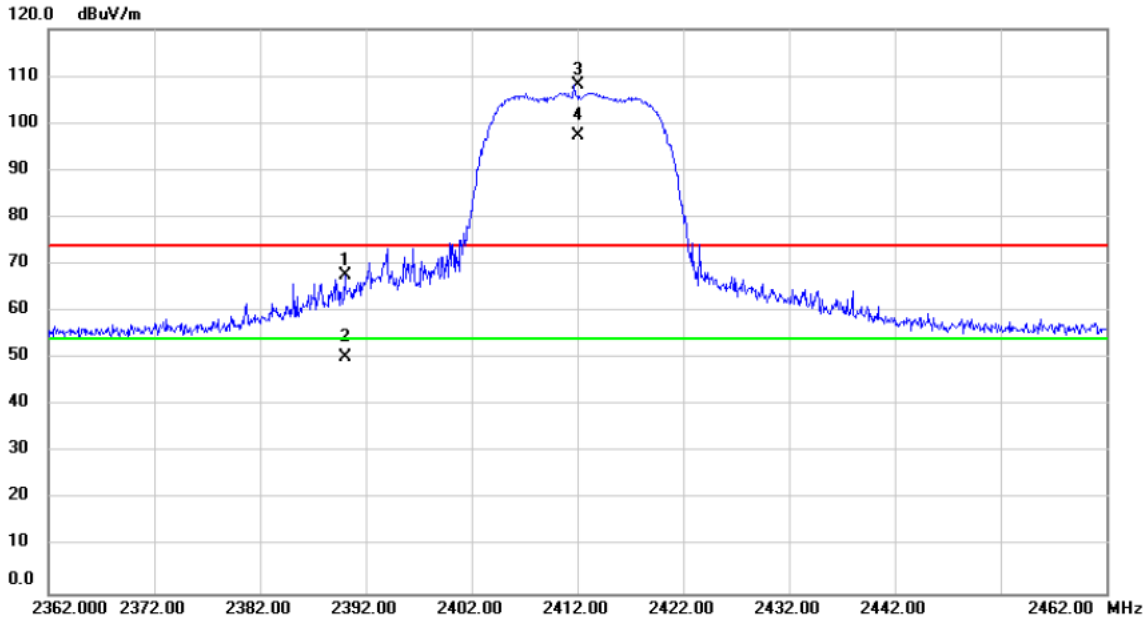
| Test Mode | TX Mode_IEEE 802.11b_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | X | 2462.000 | 75.36 | 31.56 | 106.92 | 74.00 | 32.92 | peak | No Limit |
| 2 | * | 2462.000 | 72.20 | 31.56 | 103.76 | 54.00 | 49.76 | AVG | No Limit |
| 3 | | 2483.700 | 26.80 | 31.66 | 58.46 | 74.00 | -15.54 | peak | |
| 4 | | 2483.700 | 10.29 | 31.66 | 41.95 | 54.00 | -12.05 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

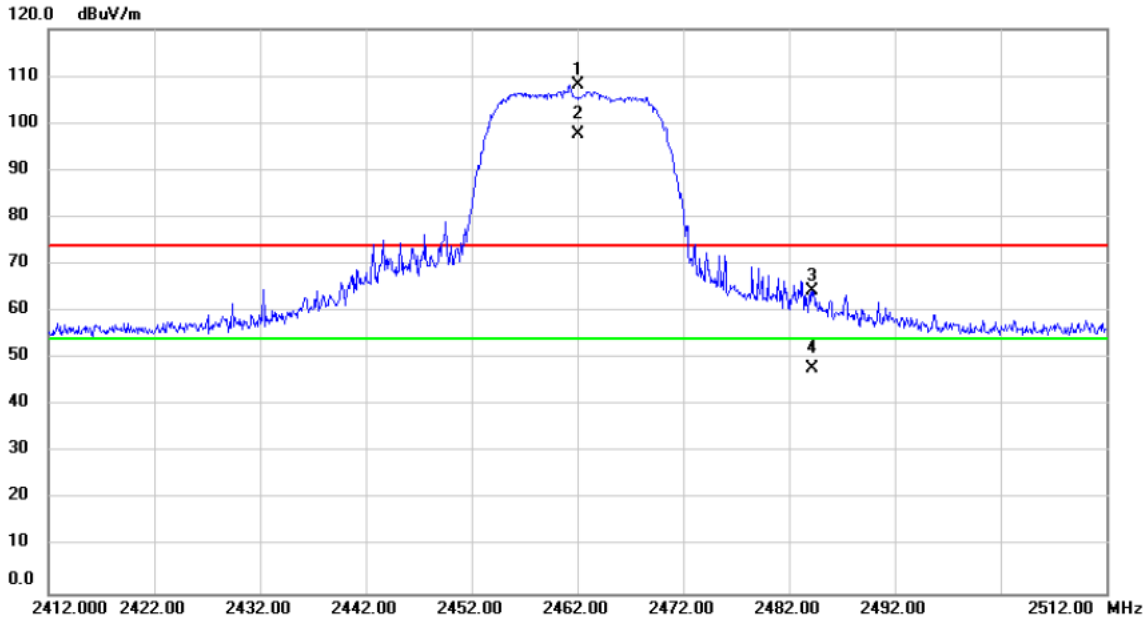
| Test Mode | TX Mode_IEEE 802.11g_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2390.000 | 36.28 | 31.25 | 67.53 | 74.00 | -6.47 | peak | |
| 2 | | 2390.000 | 19.03 | 31.25 | 50.28 | 54.00 | -3.72 | AVG | |
| 3 | X | 2412.000 | 76.70 | 31.34 | 108.04 | 74.00 | 34.04 | peak | No Limit |
| 4 | * | 2412.000 | 66.12 | 31.34 | 97.46 | 54.00 | 43.46 | AVG | No Limit |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

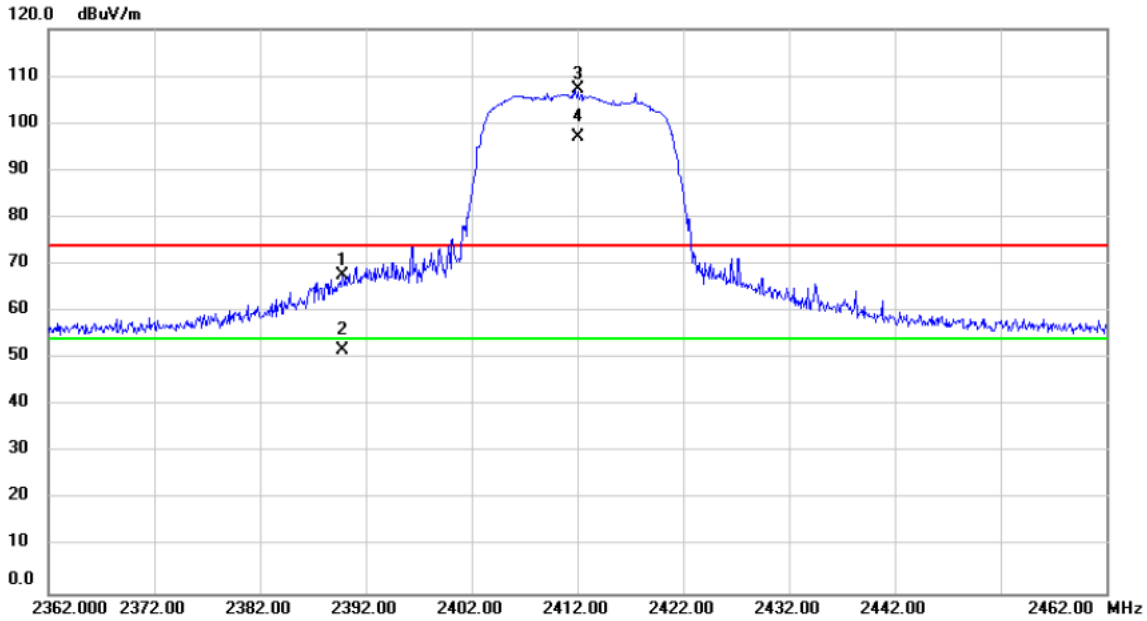
| Test Mode | TX Mode_IEEE 802.11g_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | X | 2462.000 | 76.46 | 31.56 | 108.02 | 74.00 | 34.02 | peak | No Limit |
| 2 | * | 2462.000 | 66.20 | 31.56 | 97.76 | 54.00 | 43.76 | AVG | No Limit |
| 3 | | 2484.200 | 32.79 | 31.66 | 64.45 | 74.00 | -9.55 | peak | |
| 4 | | 2484.200 | 16.23 | 31.66 | 47.89 | 54.00 | -6.11 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

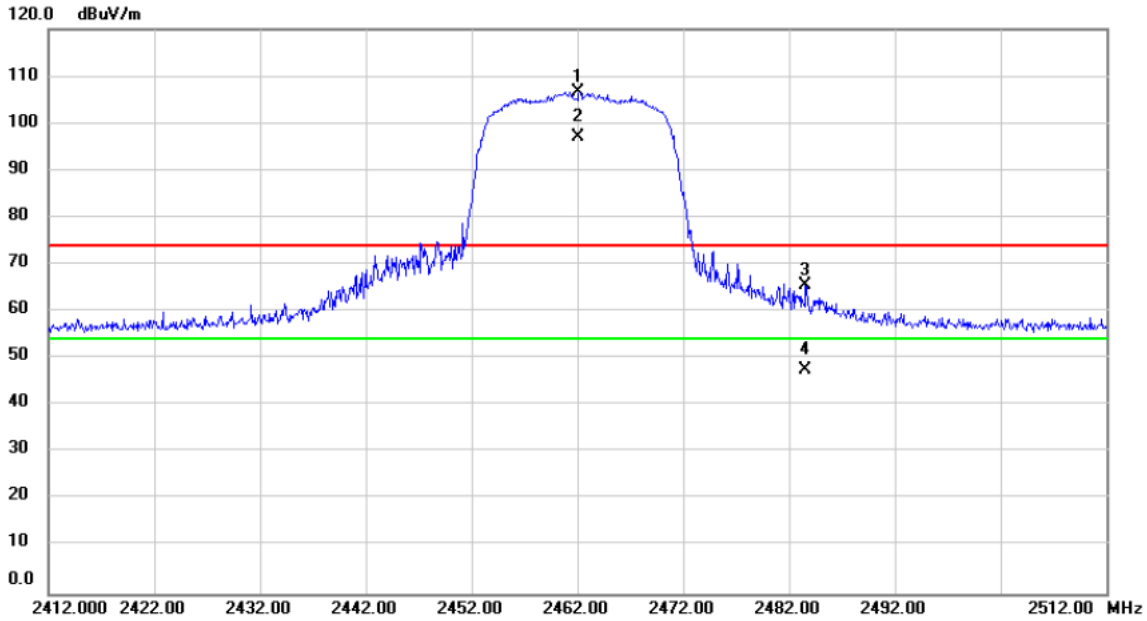
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 2389.800 | 36.27 | 31.25 | 67.52 | 74.00 | -6.48 | peak | |
| 2 | | 2389.800 | 20.55 | 31.25 | 51.80 | 54.00 | -2.20 | AVG | |
| 3 | X | 2412.000 | 75.77 | 31.34 | 107.11 | 74.00 | 33.11 | peak | No Limit |
| 4 | * | 2412.000 | 65.70 | 31.34 | 97.04 | 54.00 | 43.04 | AVG | No Limit |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

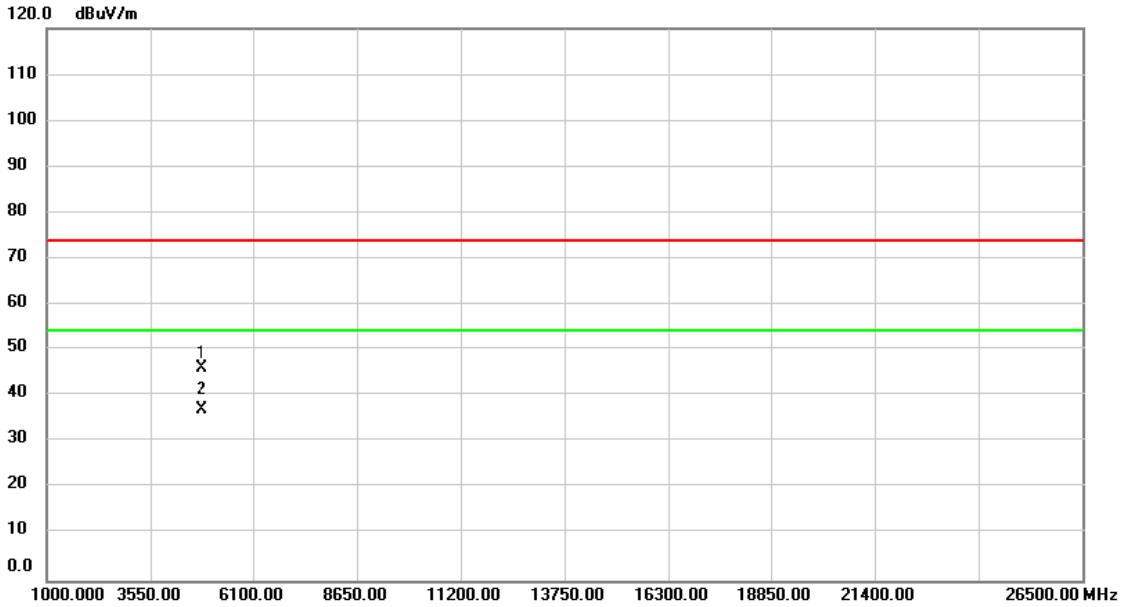
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | X | 2462.000 | 75.23 | 31.56 | 106.79 | 74.00 | 32.79 | peak | No Limit |
| 2 | * | 2462.000 | 65.40 | 31.56 | 96.96 | 54.00 | 42.96 | AVG | No Limit |
| 3 | | 2483.600 | 33.76 | 31.66 | 65.42 | 74.00 | -8.58 | peak | |
| 4 | | 2483.600 | 15.96 | 31.66 | 47.62 | 54.00 | -6.38 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

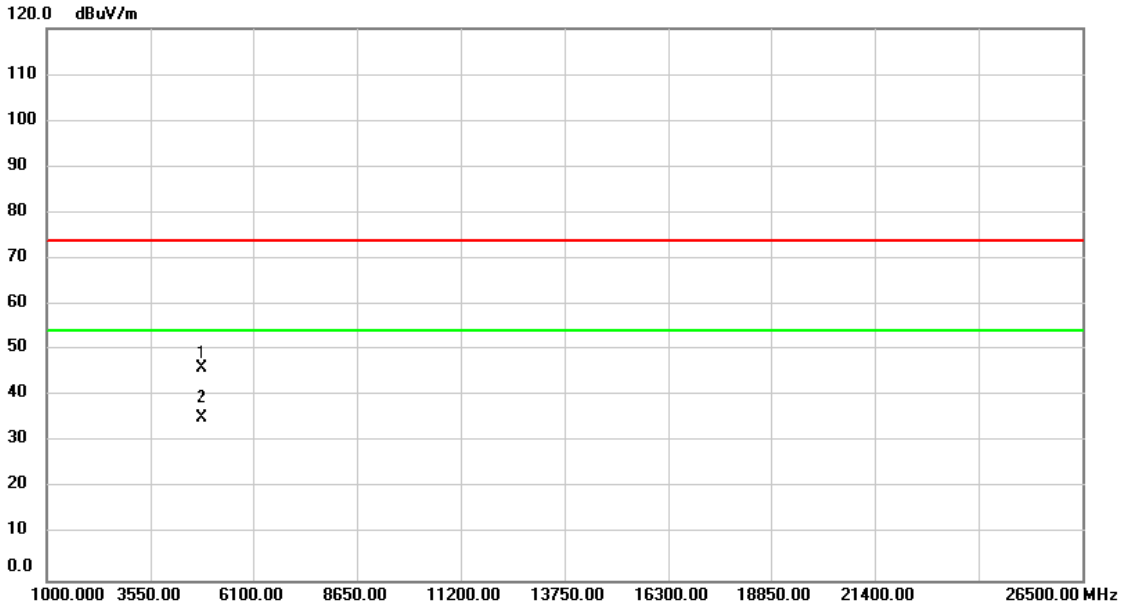
| Test Mode | TX Mode_IEEE 802.11b_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 56.67 | -10.52 | 46.15 | 74.00 | -27.85 | peak | |
| 2 | * | 4824.000 | 47.59 | -10.52 | 37.07 | 54.00 | -16.93 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

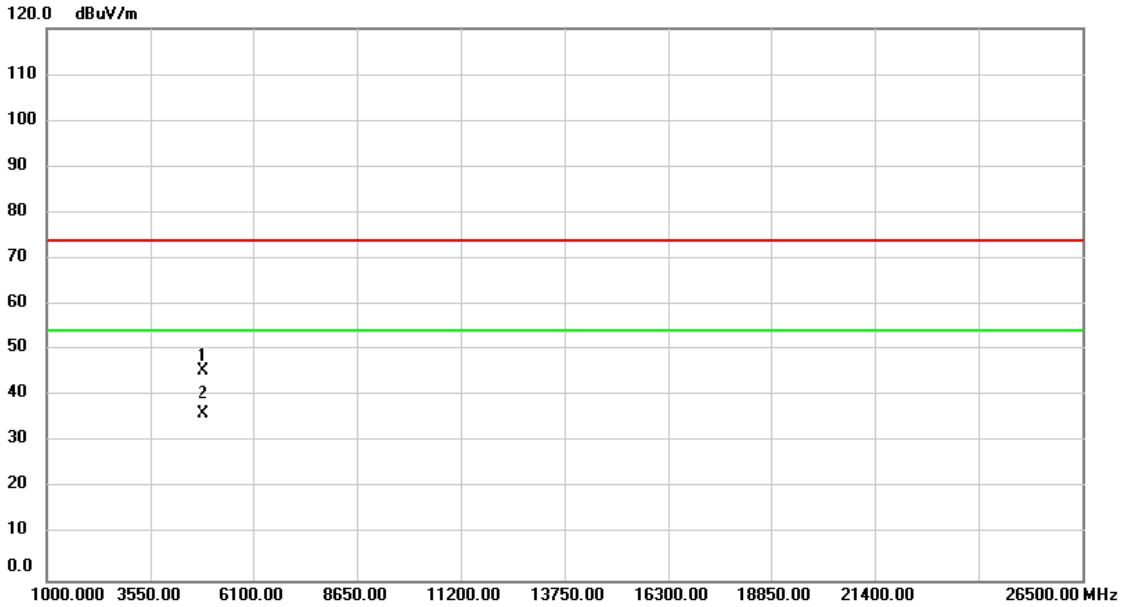
| Test Mode | TX Mode_IEEE 802.11b_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 56.43 | -10.52 | 45.91 | 74.00 | -28.09 | peak | |
| 2 | * | 4824.000 | 45.65 | -10.52 | 35.13 | 54.00 | -18.87 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

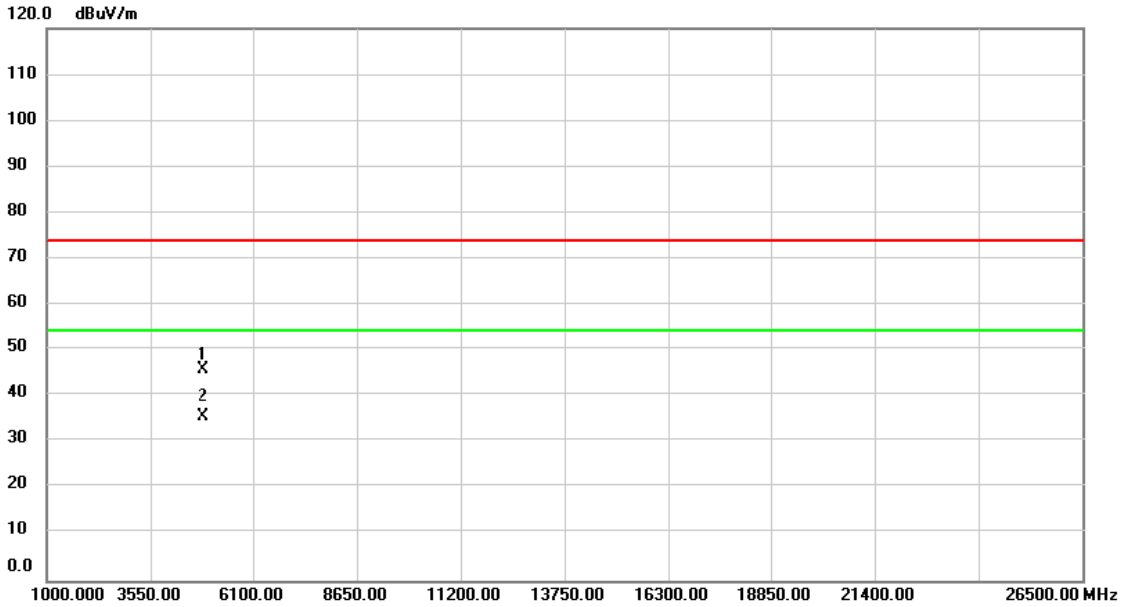
| Test Mode | TX Mode_IEEE 802.11b_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 55.91 | -10.40 | 45.51 | 74.00 | -28.49 | peak | |
| 2 | * | 4874.000 | 46.42 | -10.40 | 36.02 | 54.00 | -17.98 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

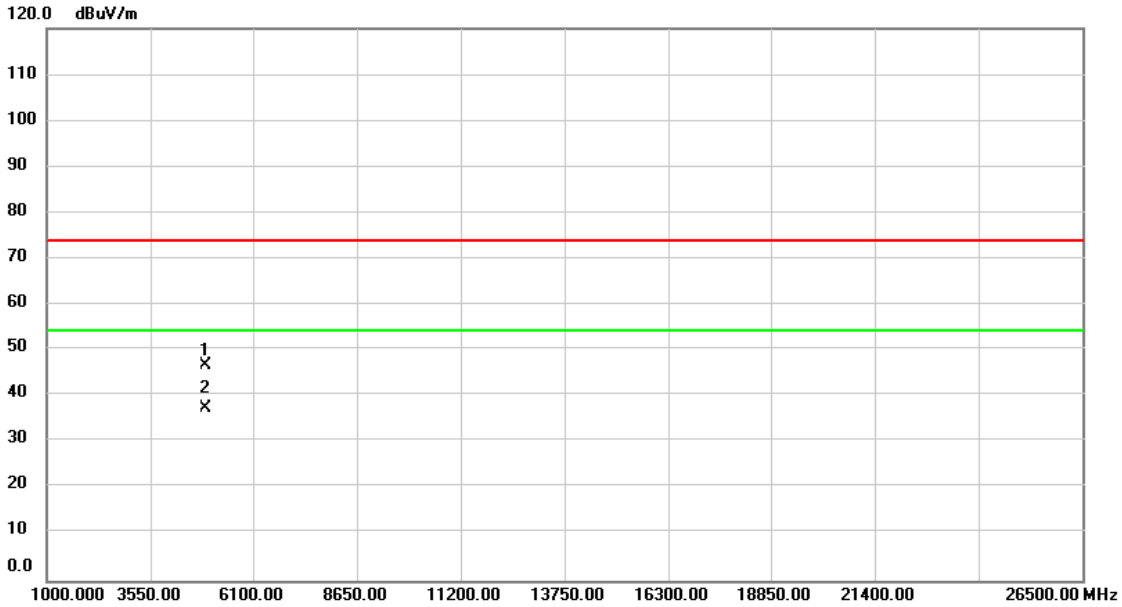
| Test Mode | TX Mode_IEEE 802.11b_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 56.17 | -10.40 | 45.77 | 74.00 | -28.23 | peak | |
| 2 | * | 4874.000 | 46.09 | -10.40 | 35.69 | 54.00 | -18.31 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

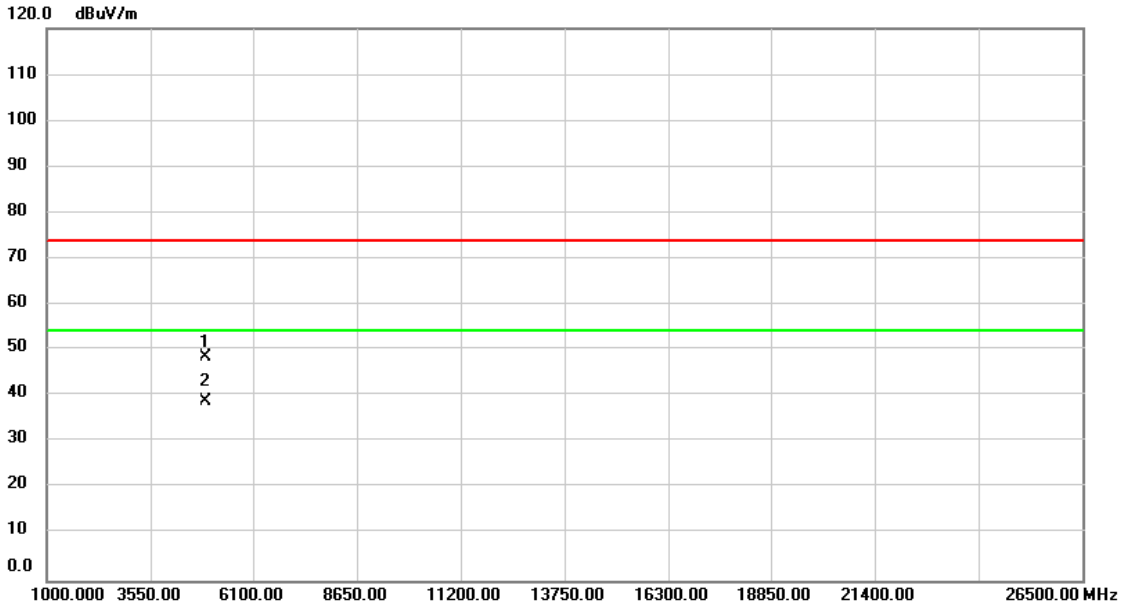
| Test Mode | TX Mode_IEEE 802.11b_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 56.93 | -10.28 | 46.65 | 74.00 | -27.35 | peak | |
| 2 | * | 4924.000 | 47.52 | -10.28 | 37.24 | 54.00 | -16.76 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

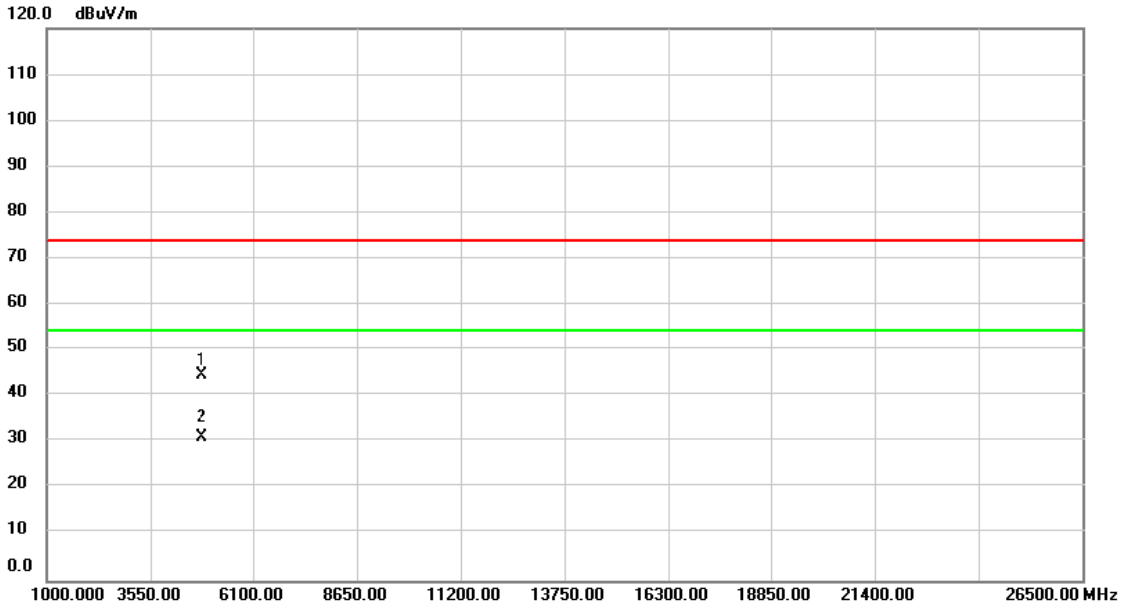
| Test Mode | TX Mode_IEEE 802.11b_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 58.59 | -10.28 | 48.31 | 74.00 | -25.69 | peak | |
| 2 | * | 4924.000 | 49.13 | -10.28 | 38.85 | 54.00 | -15.15 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

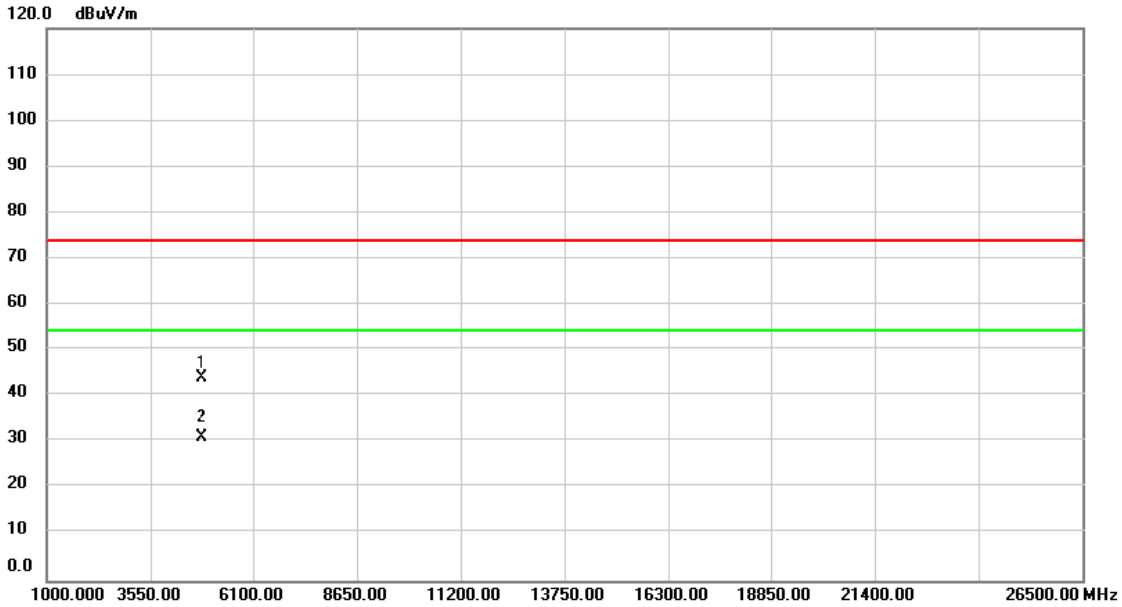
| Test Mode | TX Mode_IEEE 802.11g_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 55.01 | -10.52 | 44.49 | 74.00 | -29.51 | peak | |
| 2 | * | 4824.000 | 41.67 | -10.52 | 31.15 | 54.00 | -22.85 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

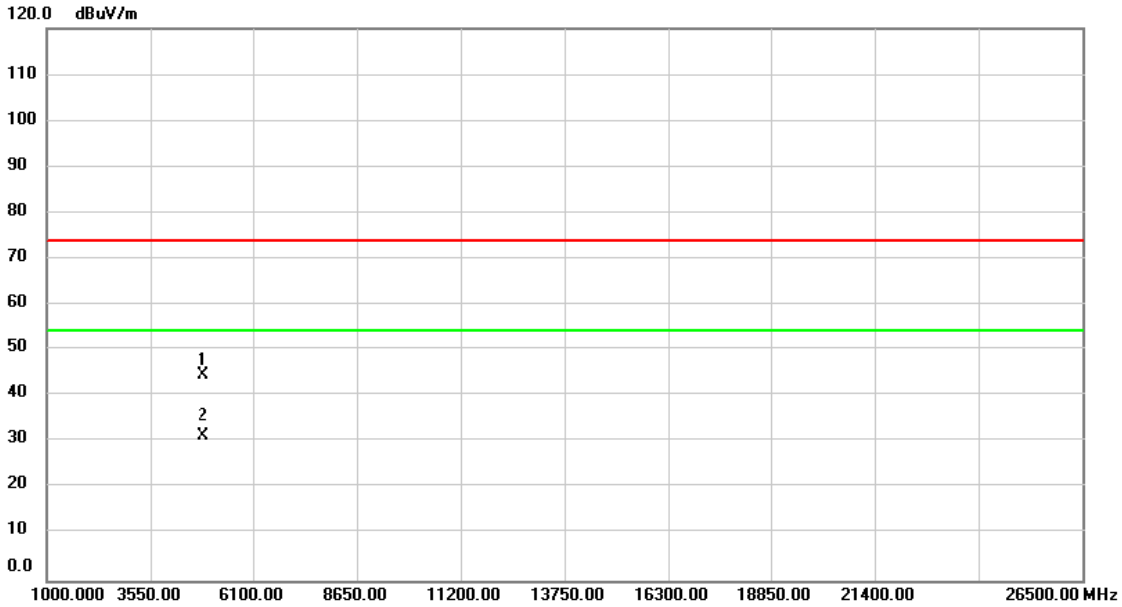
| Test Mode | TX Mode_IEEE 802.11g_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 54.62 | -10.52 | 44.10 | 74.00 | -29.90 | peak | |
| 2 | * | 4824.000 | 41.71 | -10.52 | 31.19 | 54.00 | -22.81 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

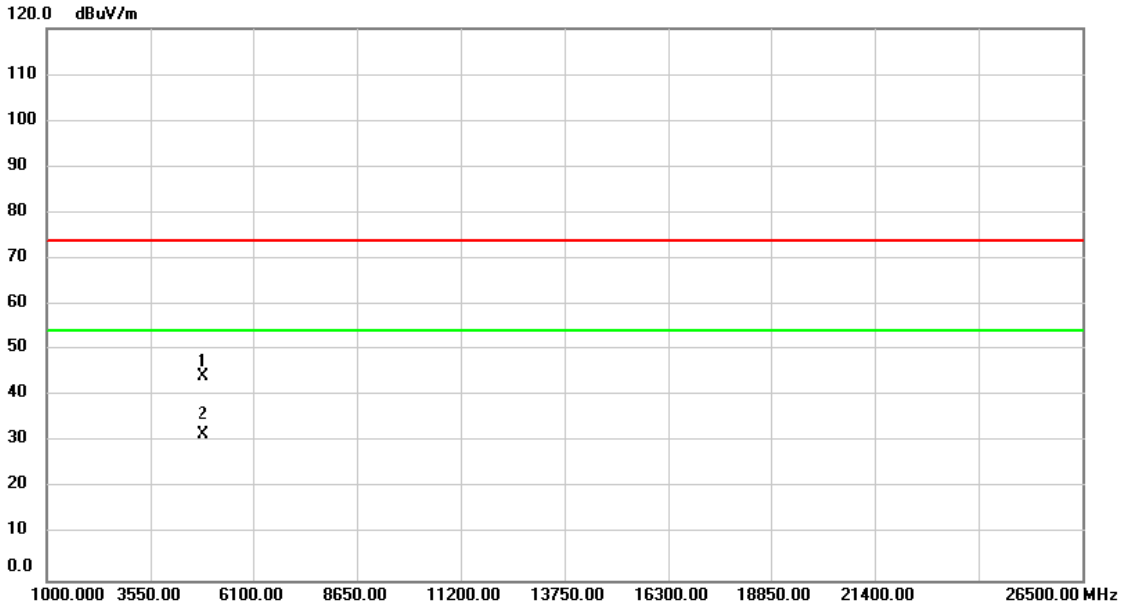
| Test Mode | TX Mode_IEEE 802.11g_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 55.06 | -10.40 | 44.66 | 74.00 | -29.34 | peak | |
| 2 | * | 4874.000 | 41.70 | -10.40 | 31.30 | 54.00 | -22.70 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

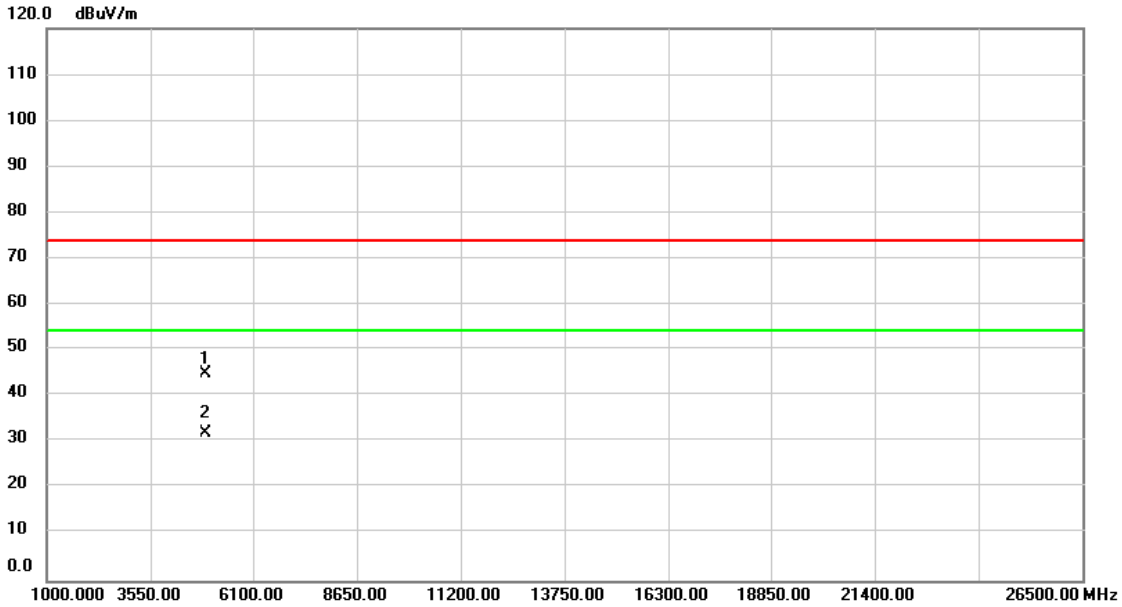
| Test Mode | TX Mode_IEEE 802.11g_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 54.56 | -10.40 | 44.16 | 74.00 | -29.84 | peak | |
| 2 | * | 4874.000 | 42.15 | -10.40 | 31.75 | 54.00 | -22.25 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

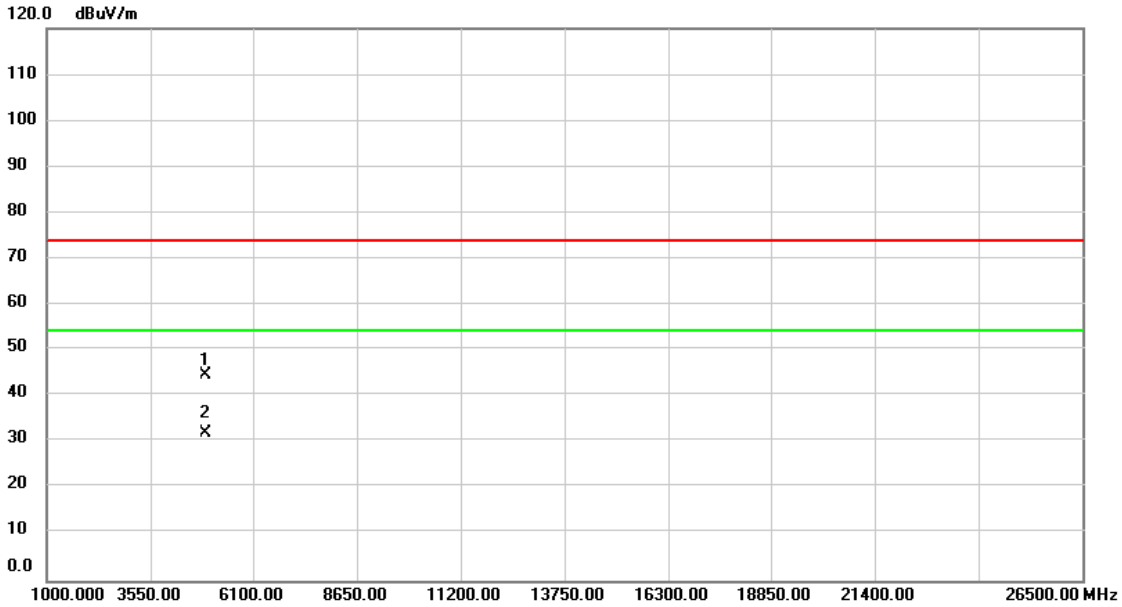
| Test Mode | TX Mode_IEEE 802.11g_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 55.28 | -10.28 | 45.00 | 74.00 | -29.00 | peak | |
| 2 | * | 4924.000 | 42.11 | -10.28 | 31.83 | 54.00 | -22.17 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

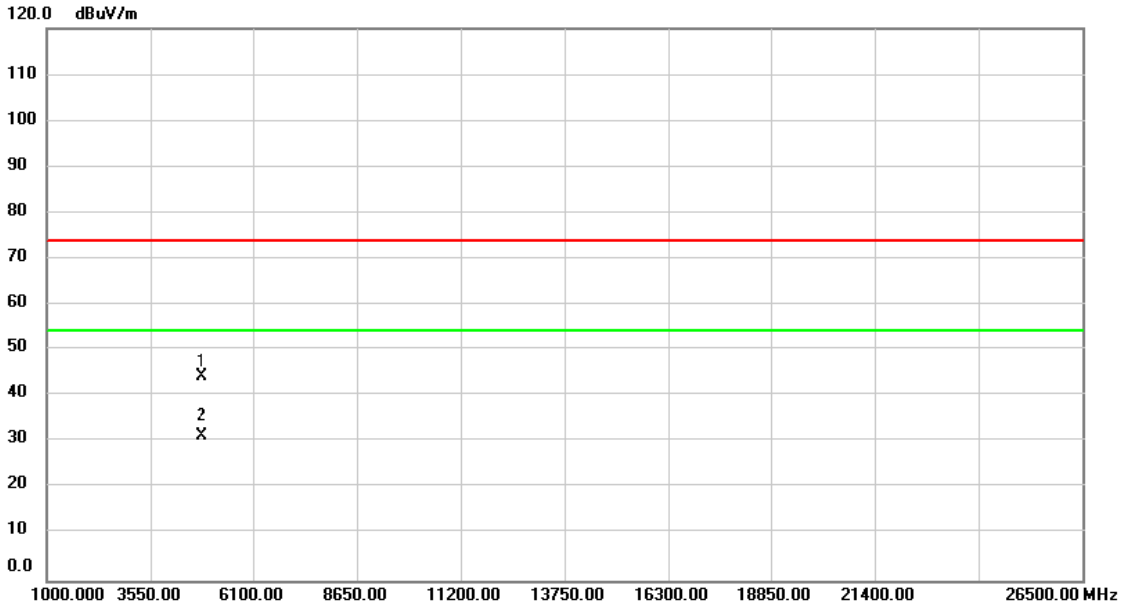
| Test Mode | TX Mode_IEEE 802.11g_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 54.85 | -10.28 | 44.57 | 74.00 | -29.43 | peak | |
| 2 | * | 4924.000 | 42.09 | -10.28 | 31.81 | 54.00 | -22.19 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

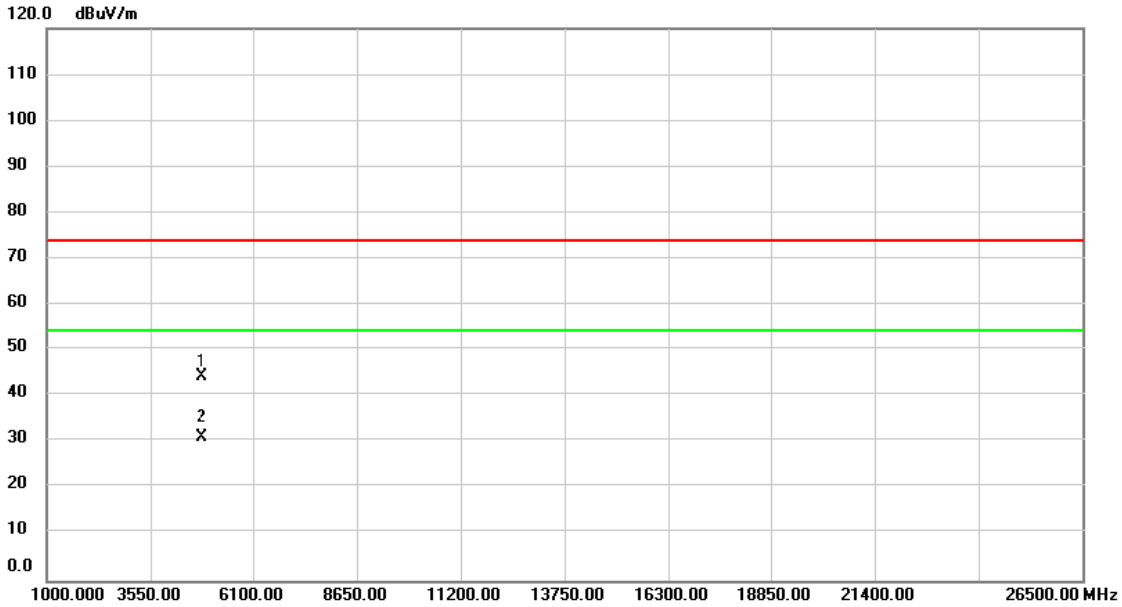
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 54.90 | -10.52 | 44.38 | 74.00 | -29.62 | peak | |
| 2 | * | 4824.000 | 41.80 | -10.52 | 31.28 | 54.00 | -22.72 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

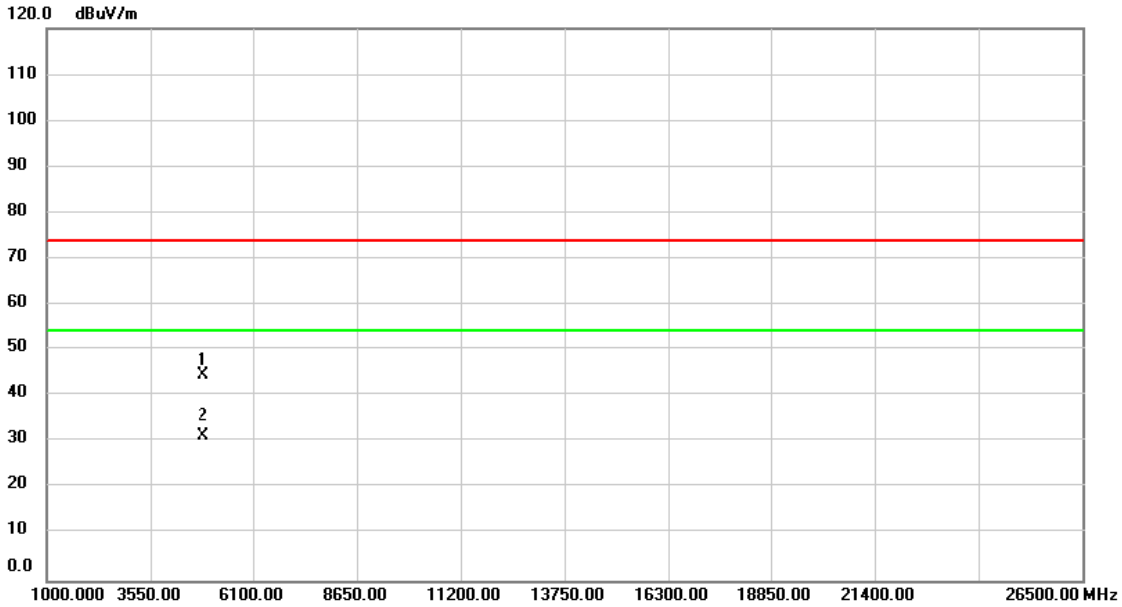
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2412 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4824.000 | 54.81 | -10.52 | 44.29 | 74.00 | -29.71 | peak | |
| 2 | * | 4824.000 | 41.68 | -10.52 | 31.16 | 54.00 | -22.84 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

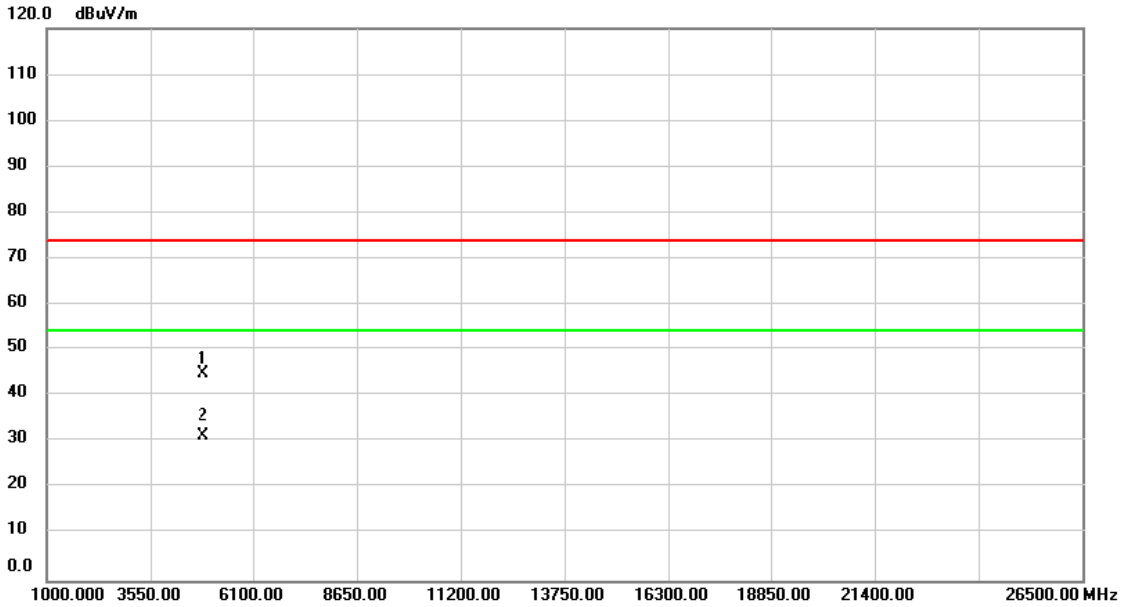
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 55.09 | -10.40 | 44.69 | 74.00 | -29.31 | peak | |
| 2 | * | 4874.000 | 41.66 | -10.40 | 31.26 | 54.00 | -22.74 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

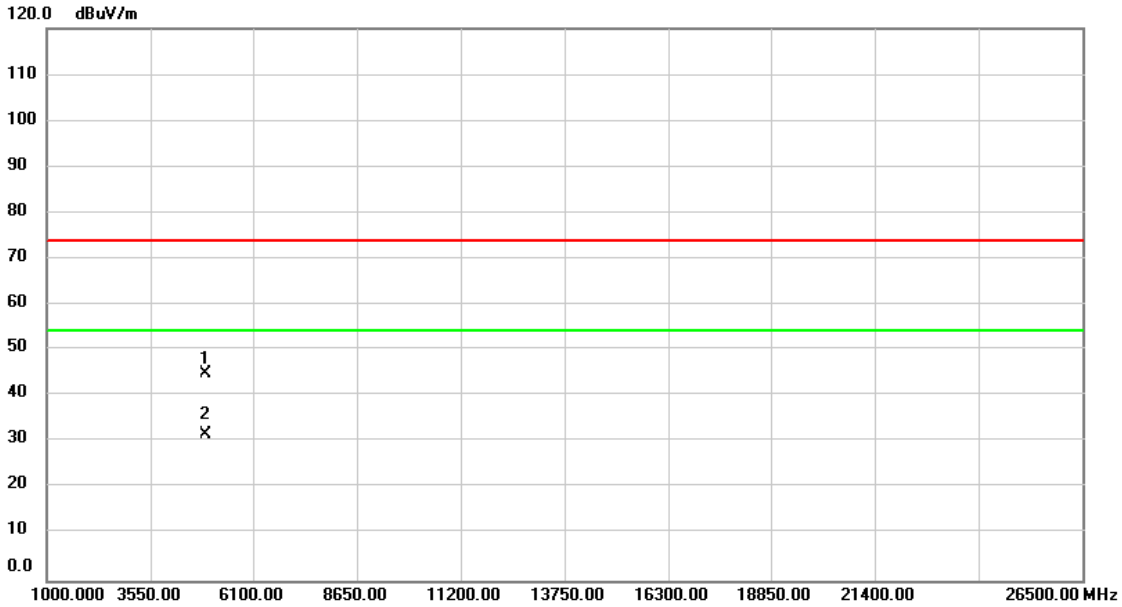
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2437 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4874.000 | 55.30 | -10.40 | 44.90 | 74.00 | -29.10 | peak | |
| 2 | * | 4874.000 | 41.70 | -10.40 | 31.30 | 54.00 | -22.70 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

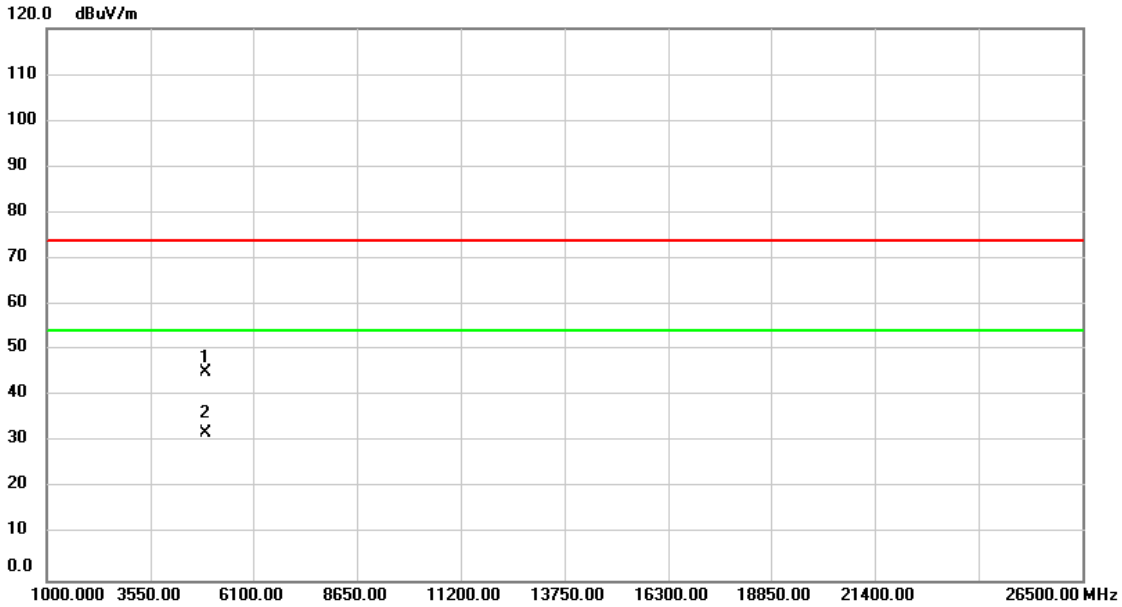
| Test Mode | TX Mode_IEEE 802.11n (HT20)_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Vertical |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 55.25 | -10.28 | 44.97 | 74.00 | -29.03 | peak | |
| 2 | * | 4924.000 | 42.04 | -10.28 | 31.76 | 54.00 | -22.24 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

| Test Mode | TX Mode_IEEE 802.11n (HT20)_2462 MHz | Tested Date | 2019/12/13 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | Polarization | Horizontal |



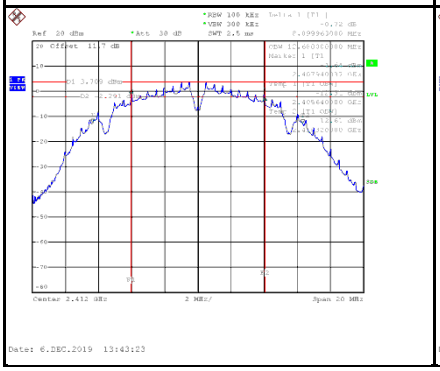
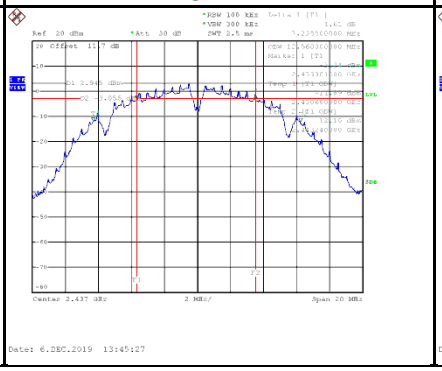
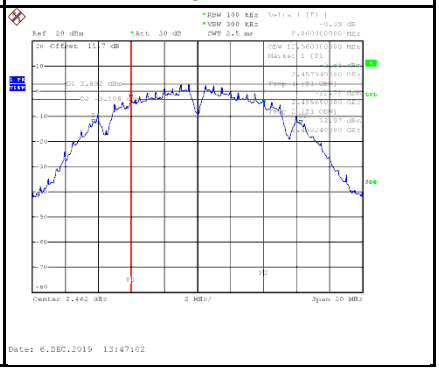

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Margin | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | Comment |
| 1 | | 4924.000 | 55.39 | -10.28 | 45.11 | 74.00 | -28.89 | peak | |
| 2 | * | 4924.000 | 42.15 | -10.28 | 31.87 | 54.00 | -22.13 | AVG | |

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

# APPENDIX E BANDWIDTH

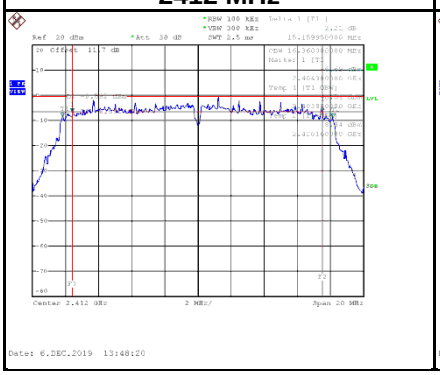
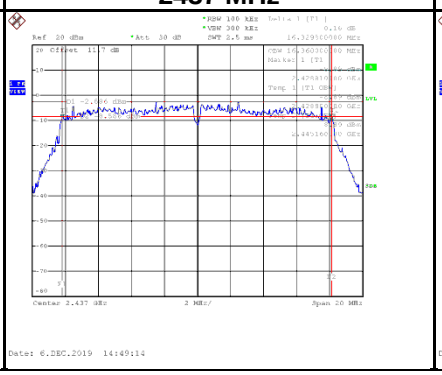
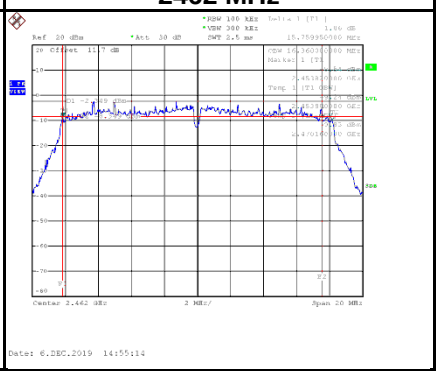
| Test Mode | IEEE 802.11b |
|---|---|
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99 % Occupied Bandwidth (MHz) | 6 dB Bandwidth Limit (kHz) | Result |
|---|---|---|---|---|
| 2412 | 8.10 | 12.68 | 500 | Complies |
| 2437 | 7.24 | 12.56 | 500 | Complies |
| 2462 | 8.06 | 12.56 | 500 | Complies |

| 2412 MHz | 2437 MHz | 2462 MHz |
|---|---|---|
|  |  |  |

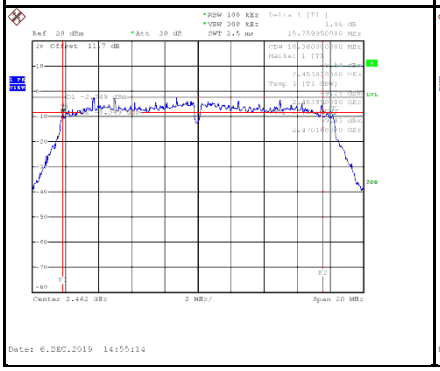
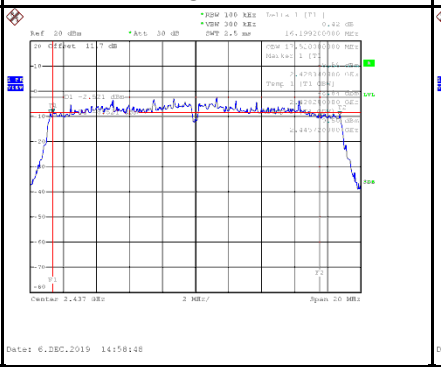
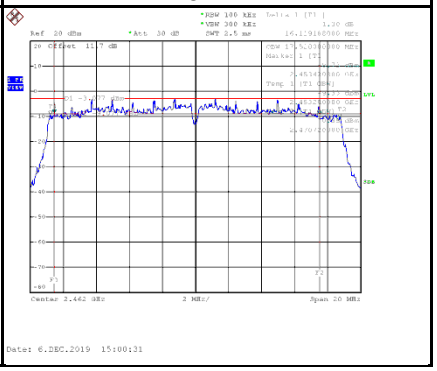
| Test Mode | IEEE 802.11g |
|---|---|
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99 % Occupied Bandwidth (MHz) | 6 dB Bandwidth Limit (kHz) | Result |
|---|---|---|---|---|
| 2412 | 15.16 | 16.36 | 500 | Complies |
| 2437 | 16.33 | 16.36 | 500 | Complies |
| 2462 | 15.75 | 16.36 | 500 | Complies |

| 2412 MHz | 2437 MHz | 2462 MHz |
|---|---|---|
|  |  |  |

| | |
|---|---|
| Test Mode | IEEE 802.11n (HT20) |
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99 % Occupied Bandwidth (MHz) | 6 dB Bandwidth Limit (kHz) | Result |
|---|---|---|---|---|
| 2412 | 16.14 | 17.56 | 500 | Complies |
| 2437 | 16.20 | 17.52 | 500 | Complies |
| 2462 | 16.12 | 17.52 | 500 | Complies |

| 2412 MHz | 2437 MHz | 2462 MHz |
|---|---|---|
|  |  |  |

# APPENDIX F OUTPUT POWER

| Test Mode | IEEE 802.11b | Tested Date | 2019/12/4 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | | |

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Limit (dBm) | Limit (W) | Result |
|---|---|---|---|---|---|
| 2412 | 15.38 | 0.0345 | 30.00 | 1.0000 | Complies |
| 2437 | 15.02 | 0.0318 | 30.00 | 1.0000 | Complies |
| 2462 | 14.77 | 0.0300 | 30.00 | 1.0000 | Complies |

| Test Mode | IEEE 802.11g | Tested Date | 2019/12/4 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | | |

| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Limit (dBm) | Limit (W) | Result |
|---|---|---|---|---|---|
| 2412 | 20.02 | 0.1005 | 30.00 | 1.0000 | Complies |
| 2437 | 19.75 | 0.0944 | 30.00 | 1.0000 | Complies |
| 2462 | 19.63 | 0.0918 | 30.00 | 1.0000 | Complies |

| Test Mode | IEEE 802.11n (HT20) | Tested Date | 2019/12/4 |
|---|---|---|---|
| Test Voltage | AC 120V/60Hz | | |

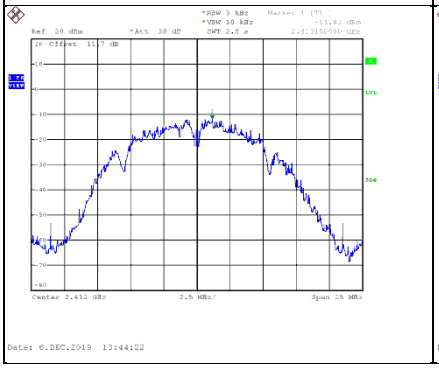
| Frequency (MHz) | Conducted Power (dBm) | Conducted Power (W) | Limit (dBm) | Limit (W) | Result |
|---|---|---|---|---|---|
| 2412 | 19.99 | 0.0998 | 30.00 | 1.0000 | Complies |
| 2437 | 19.78 | 0.0951 | 30.00 | 1.0000 | Complies |
| 2462 | 19.72 | 0.0938 | 30.00 | 1.0000 | Complies |

# APPENDIX G POWER SPECTRAL DENSITY

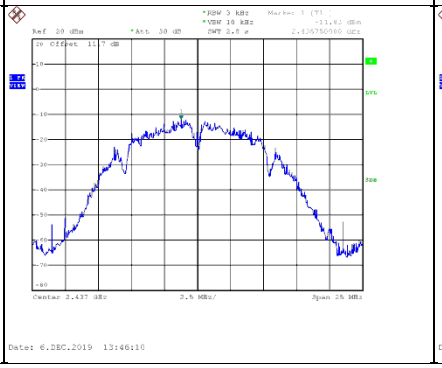
| | |
|---|---|
| Test Mode | IEEE 802.11b |
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | Power Density (dBm/3kHz) | Limit (dBm) | Result |
|---|---|---|---|
| 2412 | -11.83 | 8.00 | Complies |
| 2437 | -11.83 | 8.00 | Complies |
| 2462 | -11.80 | 8.00 | Complies |

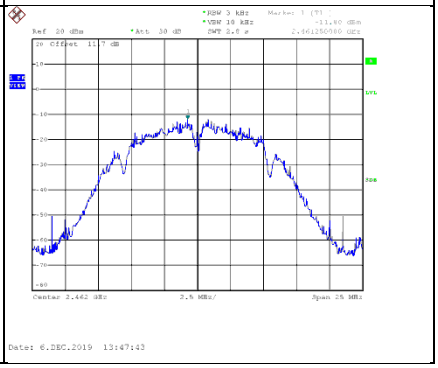
**2412 MHz**



**2437 MHz**



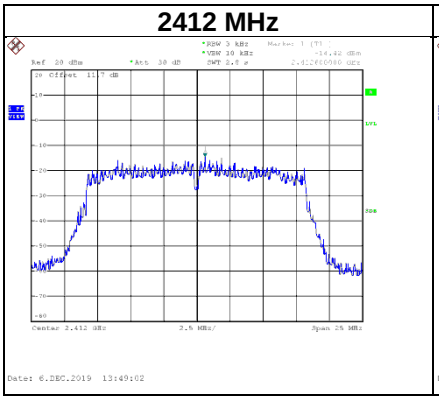
**2462 MHz**



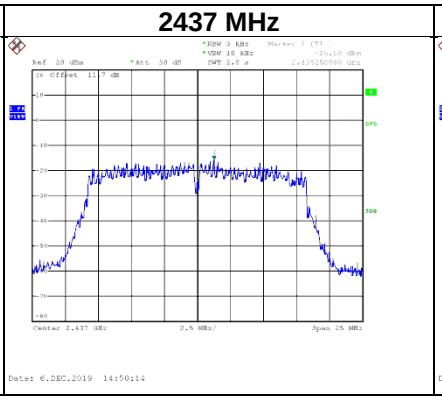
| | |
|---|---|
| Test Mode | IEEE 802.11g |
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | Power Density (dBm/3kHz) | Limit (dBm) | Result |
|---|---|---|---|
| 2412 | -14.42 | 8.00 | Complies |
| 2437 | -15.50 | 8.00 | Complies |
| 2462 | -14.28 | 8.00 | Complies |

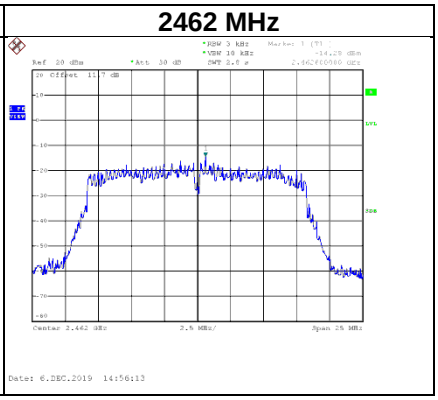
**2412 MHz**



**2437 MHz**



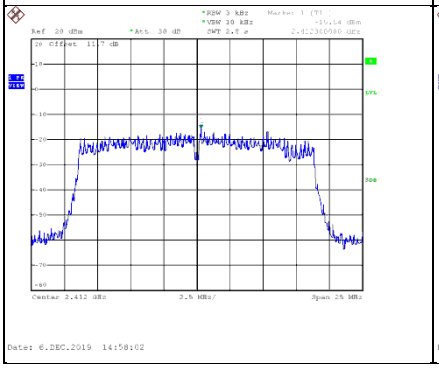
**2462 MHz**



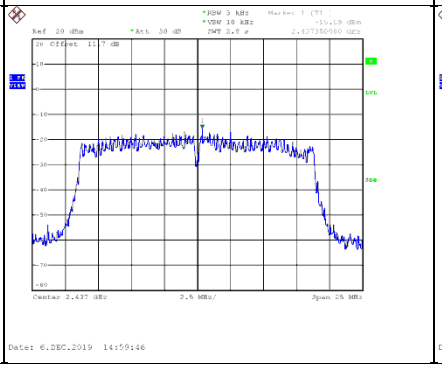
| Test Mode | IEEE 802.11n (HT20) |
|---|---|
| Test Voltage | AC 120V/60Hz |

| Frequency (MHz) | Power Density (dBm/3kHz) | Limit (dBm) | Result |
|---|---|---|---|
| 2412 | -15.54 | 8.00 | Complies |
| 2437 | -15.59 | 8.00 | Complies |
| 2462 | -16.97 | 8.00 | Complies |

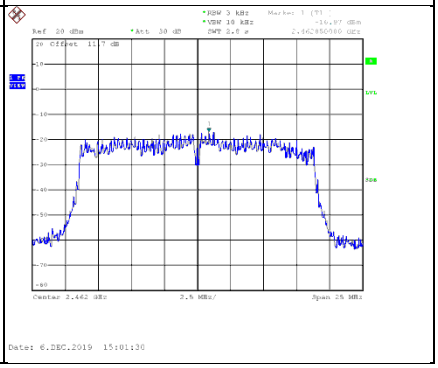
**2412 MHz**



**2437 MHz**

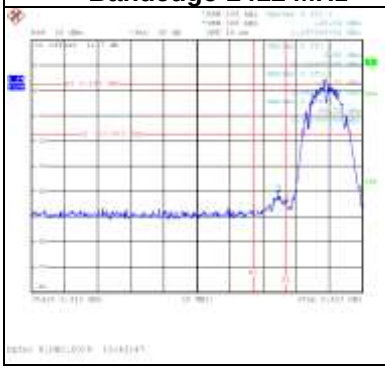
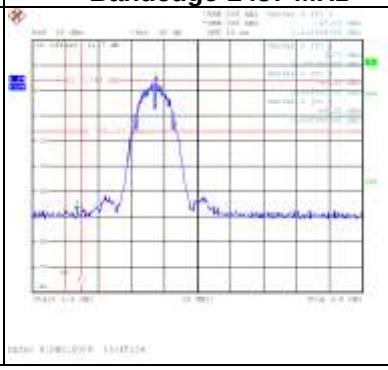
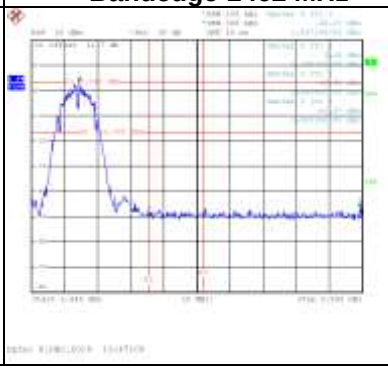


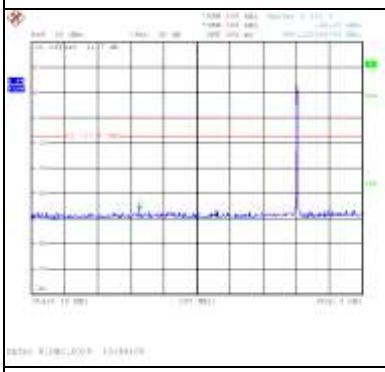
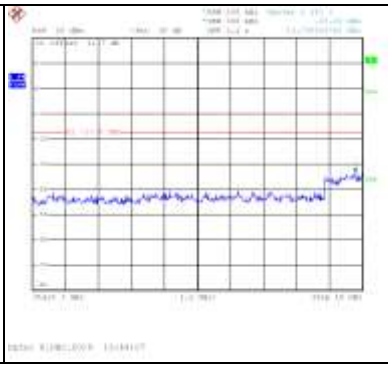
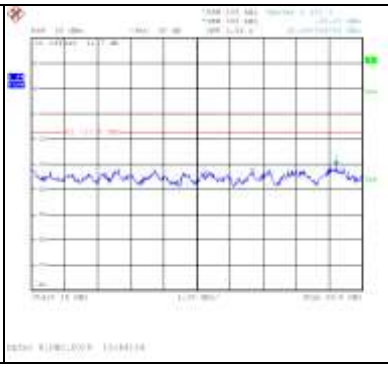
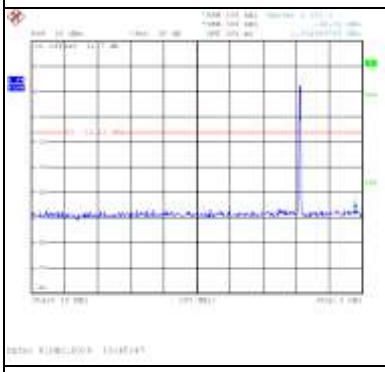
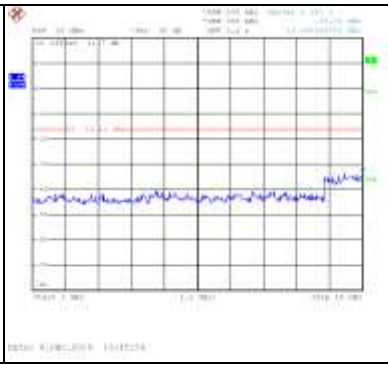
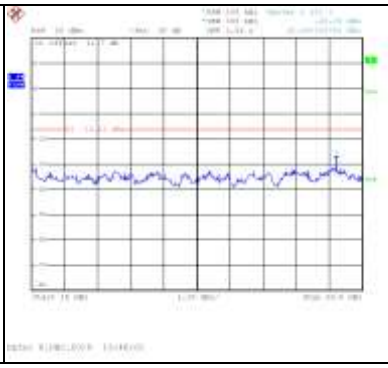
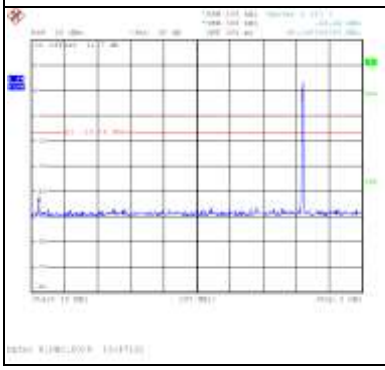
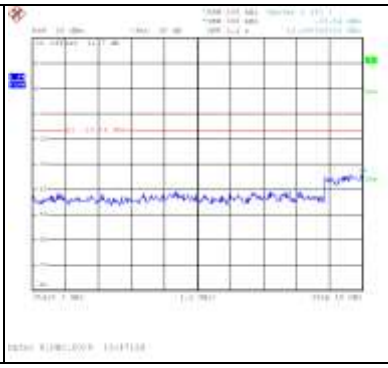
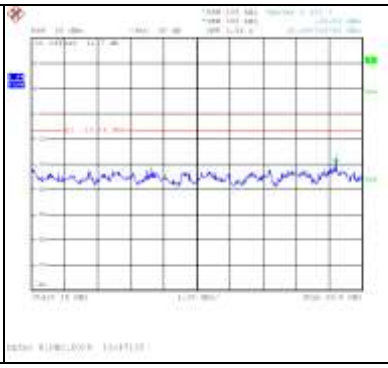
**2462 MHz**



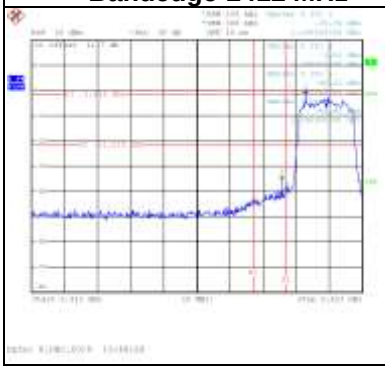
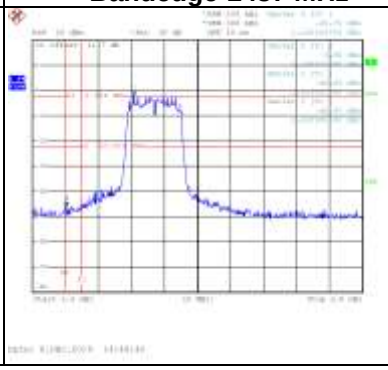
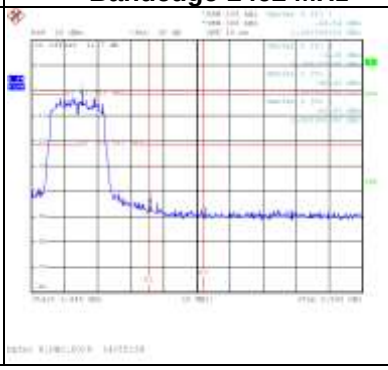
# APPENDIX H ANTENNA CONDUCTED SPURIOUS EMISSIONS

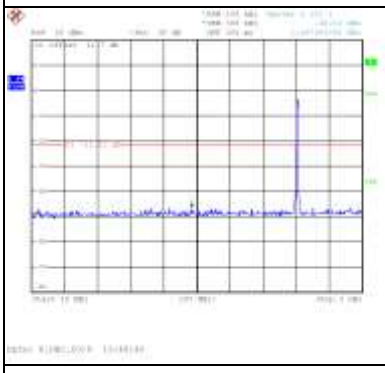
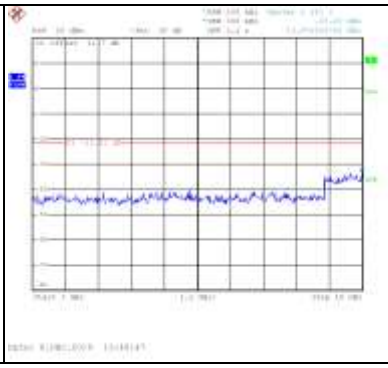
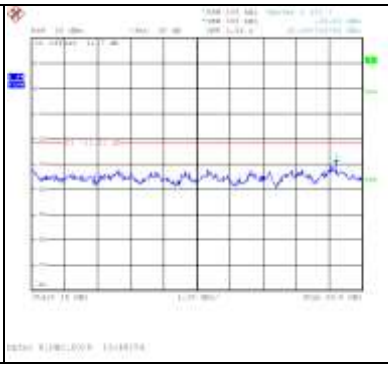
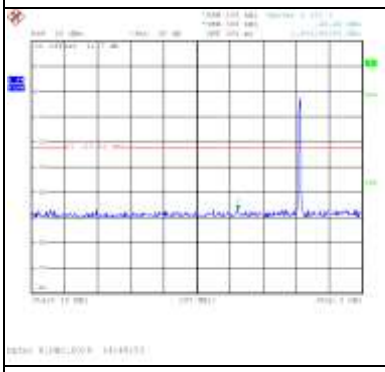
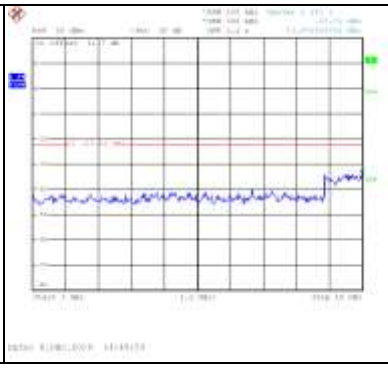
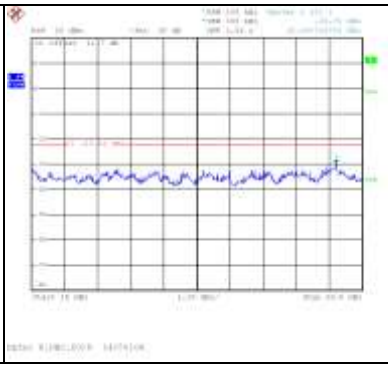
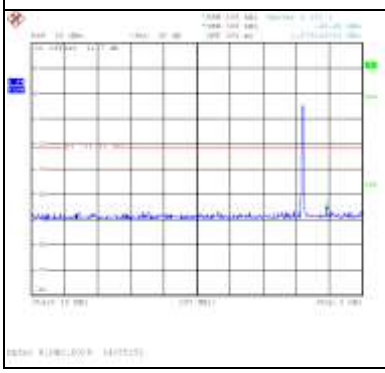
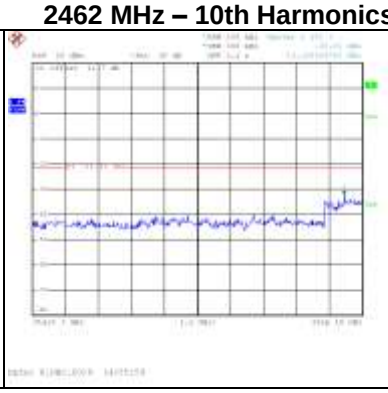
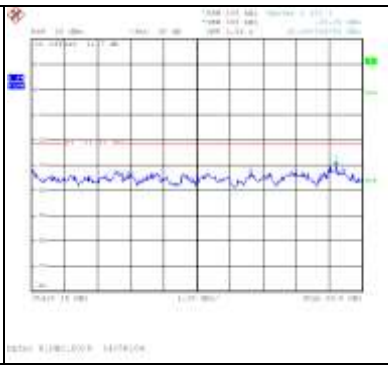
| | |
|---|---|
| Test Mode | IEEE 802.11b |
| Test Voltage | AC 120V/60Hz |

| Bandedge-2412 MHz | Bandedge-2437 MHz | Bandedge-2462 MHz |
|---|---|---|
|  |  |  |

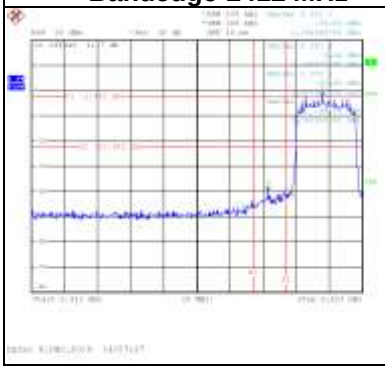
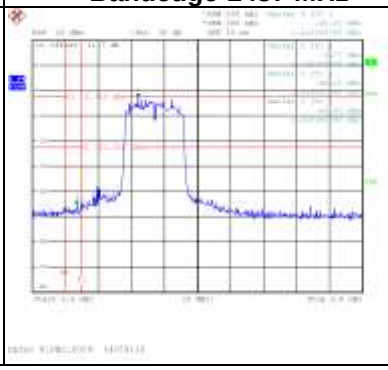
| 2412 MHz – 10th Harmonics | | |
|---|---|---|
|  |  |  |
| **2437 MHz – 10th Harmonics** | | |
|  |  |  |
| **2462 MHz – 10th Harmonics** | | |
|  |  |  |

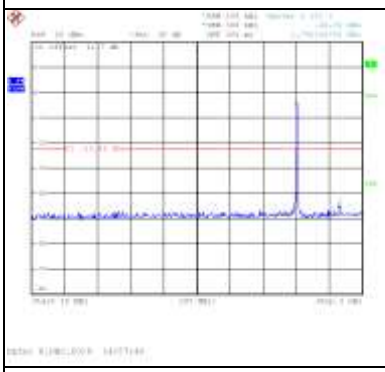
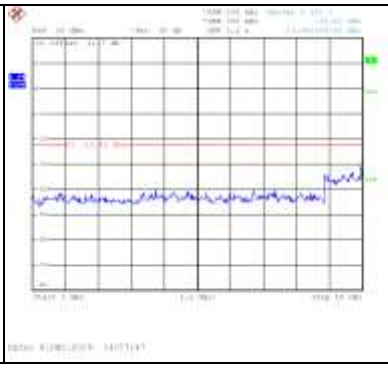
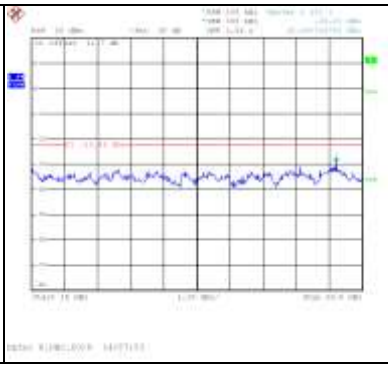
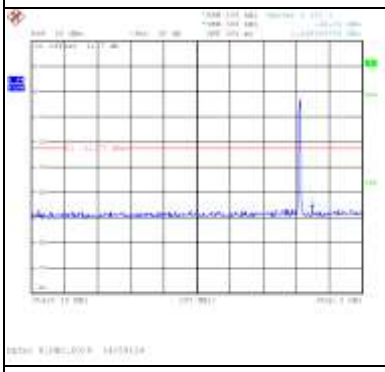
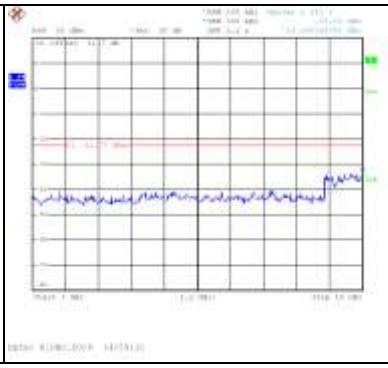
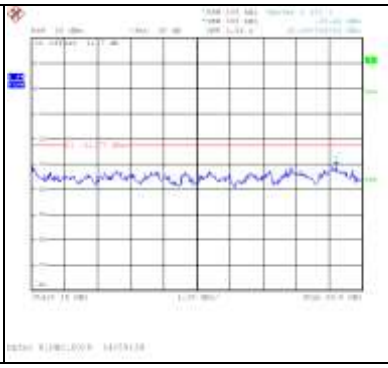
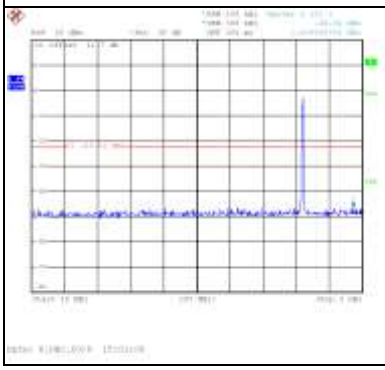
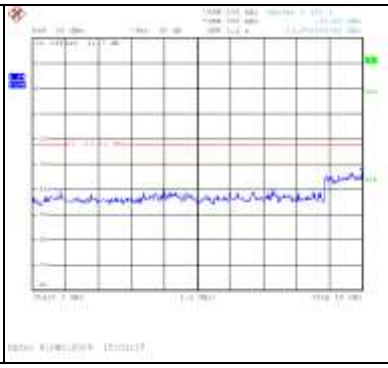
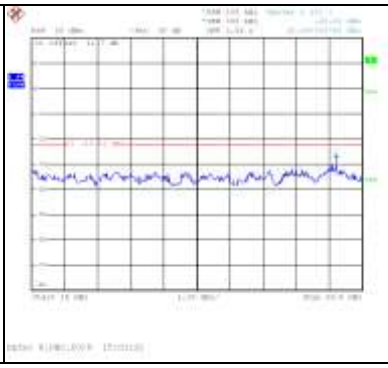
| | |
|---|---|
| Test Mode | IEEE 802.11g |
| Test Voltage | AC 120V/60Hz |

| Bandedge-2412 MHz | Bandedge-2437 MHz | Bandedge-2462 MHz |
|---|---|---|
|  |  |  |

| 2412 MHz – 10th Harmonics | | |
|---|---|---|
|  |  |  |
| **2437 MHz – 10th Harmonics** | | |
|  |  |  |
| **2462 MHz – 10th Harmonics** | | |
|  |  |  |

| Test Mode | IEEE 802.11n (HT20) |
|---|---|
| Test Voltage | AC 120V/60Hz |

| Bandedge-2412 MHz | Bandedge-2437 MHz | Bandedge-2462 MHz |
|---|---|---|
|  |  |  |

| 2412 MHz – 10th Harmonics | | |
|---|---|---|
|  |  |  |
| **2437 MHz – 10th Harmonics** | | |
|  |  |  |
| **2462 MHz – 10th Harmonics** | | |
|  |  |  |

**End of Test Report**