# TEST REPORT

| | |
|---|---|
| **Application No.:** | DNT240738R1242-3091 |
| **Applicant:** | Shenzhen Baiyi Information Technology Co., Ltd |
| **Address of Applicant:** | NO.289, Ainan Road, Nanlian Commuity, Longgang Street, Longgang District, Shenzhen Guangdong Province,China |
| **EUT Description:** | Wireless Connectivity Keyboard and Mouse Kit |
| **Model No.:** | GT900,E75,E76,E77,E78,E79,E80,E81,GT800,GT801,GT802,GT803,GT804,GT805 S201,S202,S203,S204,S205,S206 |
| **FCC ID:** | 2BGHM-GT900 |
| **Power Supply** | DC 3.7V From Battery; DC 5V From Adapter Input AC 100-240V,50/60Hz |
| **Trade Mark:** | Great Wall |
| **Standards:** | 47 CFR FCC Part 2, Subpart J<br>47 CFR Part 15, Subpart C<br>ANSI C63.10: 2013 |
| **Date of Receipt:** | 2024/5/11 |
| **Date of Test:** | 2024/5/12 to 2024/5/23 |
| **Date of Issue:** | 2024/5/23 |
| **Test Result:** | **PASS** |

**Prepared By:** Wayne.Lin (Testing Engineer)

**Reviewed By:** Pencils.Chen (Project Engineer)

**Approved By:** Yoyo Chen (Manager)

Note: If there is any objection to the results in this report, please submit a written inquiry to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp, and is issued by the company in accordance with the requirements of the "Conditions of Issuance of Test Reports" printed in the attached page. Unless otherwise stated, the results presented in this report only apply to the samples tested this time. Partial reproduction of this report is not allowed unless approved by the company in writing.

**Report Revise Record**

| Report Version | Revise Time | Issued Date | Valid Version | Notes |
|---|---|---|---|---|
| V2.0 | / | May.23, 2024 | Valid | Original Report |

# 1 Test Summary

| Test Item | Standard Section | Test Result |
|---|---|---|
| Antenna Requirement | 15.203 | PASS |
| 20dB Occupied Bandwidth | 15.215 | PASS |
| Field Strength | 15.249(a) | PASS |
| Radiated Spurious Emissions And Band Edge | 15.205, 15.209, 15.249(a)(c)(d)(e), 15.35(b) | PASS |
| AC Power Line Conducted Emissions | 15.207 | PASS |

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# 2 General Information

## 2.1 Test Location

| | |
|---|---|
| Company: | Dongguan DN Testing Co., Ltd |
| Address: | No. 1, West Fourth Street, South Xinfa Road, Wusha Liwu, Chang ' an Town, Dongguan City, Guangdong P.R.China |
| Test engineer: | Wayne Lin |

## 2.2 General Description of EUT

| | |
|---|---|
| Manufacturer: | Shenzhen Baiyi Information Technology Co., Ltd |
| Address of Manufacturer: | NO.289, Ainan Road, Nanlian Commuity, Longgang Street, Longgang District, Shenzhen Guangdong Province,China |
| EUT Description: | Wireless Connectivity Keyboard and Mouse Kit |
| Test Model No.: | GT900 |
| Additional Model(s): | E75,E76,E77,E78,E79,E80,E81,GT800,GT801,GT802,GT803,GT804,GT805 S201,S202,S203,S204,S205,S206 |
| Power Supply | DC 3.7V From Battery; DC 5V From Adapter Input AC 100-240V,50/60Hz |
| Chip Type: | HFD550FSHS |
| Serial number: | PR240738R1242 |
| Trade Mark: | Great Wall |
| Hardware Version: | V1.0 |
| Software Version: | V1.0 |
| Operation Frequency: | 2402MHz-2480MHz |
| Type of Modulation: | GFSK |
| Sample Type: | Prototype production |
| Antenna Type: | ☐ External, ☒ Integrated |
| Antenna Ports | ☒ Ant 1, ☐ Ant 2, ☐ Ant 3 |
| Antenna Gain*: | ☒ Provided by applicant |
| | 3.85dBi |
| RF Cable*: | ☒ Provided by applicant |
| | 0.5dB(0.6~1GHz); 0.8dB(1.4~2GHz); 1.0dB(2.1~2.7GHz); 1.5dB(3~4GHz); 1.8dB(4.4~6GHz); |

Remark:

*All models are just color differences, motherboard, PCB circuit board, chip, electronic components, appearance is all the same.

*Since the above data and/or information is provided by the applicant relevant results or conclusions of this report are only made for these data and/or information , DNT is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

## 2.3 Power Setting of Test Software

| Software Name | 662x_FCC_Rev1.6d | | |
|---|---|---|---|
| Frequency(MHz) | 2402 | 2440 | 2480 |
| Setting | Default | Default | Default |

## 2.4 Test Environment and Mode

| **Operating Environment:** | |
|---|---|
| Temperature: | 20~25.0 ˚C |
| Humidity: | 45~56 % RH |
| Atmospheric Pressure: | 101.0~101.30 KPa |
| **Test mode:** | |
| Transmitting mode: | Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate. |

## 2.5 Channel List

| **Operation Frequency of each channel** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Channel** | **Frequency** | **Channel** | **Frequency** | **Channel** | **Frequency** | **Channel** | **Frequency** |
| 0 | 2402MHz | 10 | 2422MHz | 20 | 2442MHz | 30 | 2462MHz |
| 1 | 2404MHz | 11 | 2424MHz | 21 | 2444MHz | 31 | 2464MHz |
| 2 | 2406MHz | 12 | 2426MHz | 22 | 2446MHz | 32 | 2466MHz |
| 3 | 2408MHz | 13 | 2428MHz | 23 | 2448MHz | 33 | 2468MHz |
| 4 | 2410MHz | 14 | 2430MHz | 24 | 2450MHz | 34 | 2470MHz |
| 5 | 2412MHz | 15 | 2432MHz | 25 | 2452MHz | 35 | 2472MHz |
| 6 | 2414MHz | 16 | 2434MHz | 26 | 2454MHz | 36 | 2474MHz |
| 7 | 2416MHz | 17 | 2436MHz | 27 | 2456MHz | 37 | 2476MHz |
| 8 | 2418MHz | 18 | 2438MHz | 28 | 2458MHz | 38 | 2478MHz |
| 9 | 2420MHz | 19 | 2440MHz | 29 | 2460MHz | 39 | 2480MHz |

## 2.6 Description of Support Units

The EUT has been tested independent unit.

## 2.7 Test Facility

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

**Lab A:**

**• FCC, USA**

Designation Number: CN1348

**• A2LA (Certificate No. 7050.01)**

DONGGUAN DN TESTING CO., LTD.

**• Innovation, Science and Economic Development Canada**

DONGGUAN DN TESTING CO., LTD. EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

IC#: 31026.

## 2.8 Measurement Uncertainty (95% confidence levels, k=2)

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Total RF power, conducted | ±0.41dB |
| 2 | RF power density, conducted | ±1.96dB |

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Conduction Emission | ± 3.0dB (150kHz to 30MHz) |
| 2 | Radiated Emission | ± 4.8dB (Below 1GHz) |
| | | ± 4.8dB (1GHz to 6GHz) |
| | | ± 4.5dB (6GHz to 18GHz) |
| | | ± 5.02dB (Above 18GHz) |

## 2.9 Equipment List

| For Connect EUT Antenna Terminal Test | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | Cal date | Due date |
| Signal Generator | Keysight | N5181A-6G | MY48180415 | 2023-10-25 | 2024-10-24 |
| Signal Generator | Keysight | N5182B | MY57300617 | 2023-10-25 | 2024-10-24 |
| Power supply | Keysight | E3640A | ZB2022656 | 2023-10-25 | 2024-10-24 |
| Spectrum Analyzer | Aglient | N9010A | MY52221458 | 2023-10-25 | 2024-10-24 |
| BT/WIFI Test Software | Tonscend | JS1120 V3.1.83 | NA | NA | NA |
| RF Control Unit | Tonscend | JS0806-2 | 22F8060581 | NA | NA |
| temperature and humidity box | SCOTEK | SCD-C40-80PRO | 6866682020008 | 2023-10-25 | 2024-10-24 |

| Test Equipment for Conducted Emission | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | Cal Date | Due Date |
| Receiver | R&S | ESCI3 | 101152 | 2023-10-24 | 2024-10-23 |
| LISN | R&S | ENV216 | 102874 | 2023-10-24 | 2024-10-23 |
| ISN | R&S | ENY81-CA6 | 1309.8590.03 | 2023-10-24 | 2024-10-23 |

| Test Equipment for Radiated Emission(below 1000MHz) | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | Cal Date | Due Date |
| Receiver | R&S | ESR7 | 102497 | 2023-10-24 | 2024-10-23 |
| Test Software | ETS-LINDGREN | TiLE-FULL | NA | NA | NA |
| RF Cable | ETS-LINDGREN | RFC-NMS-100-NMS-350-IN | NA | 2023-10-24 | 2024-10-23 |
| Log periodic antenna | ETS-LINDGREN | VULB 9168 | 01475 | 2023-10-24 | 2024-10-23 |
| Pre-amplifier | Schwarzbeck | BBV9743B | 00423 | 2023-10-24 | 2024-10-23 |
| Single ring magnetic field ring antenna | ETS-LINDGREN | 6502 | 6502 | 2023-10-24 | 2024-10-23 |

| Test Equipment for Radiated Emission(Above 1000MHz) | | | | | |
|---|---|---|---|---|---|
| Description | Manufacturer | Model | Serial Number | Cal Date | Due Date |
| Frequency analyser | Keysight | N9010A | MY52221458 | 2023-10-24 | 2024-10-23 |
| RF Cable | ETS-LINDGREN | RFC-NMS-100-NMS-350-IN | NA | 2023-10-24 | 2024-10-23 |
| Horn Antenna | ETS-LINDGREN | 3117 | 00252567 | 2023-10-24 | 2024-10-23 |
| Double ridged waveguide antenna | ETS-LINDGREN | 3116C | 00251780 | 2023-10-24 | 2024-10-23 |
| Test Software | ETS-LINDGREN | TiLE-FULL | NA | NA | NA |
| Pre-amplifier | ETS-LINDGREN | 3117-PA | 252567 | 2023-10-24 | 2024-10-23 |
| Pre-amplifier | ETS-LINDGREN | 3116C-PA | 251780 | 2023-10-24 | 2024-10-23 |

## 2.10 Assistant equipment used for test

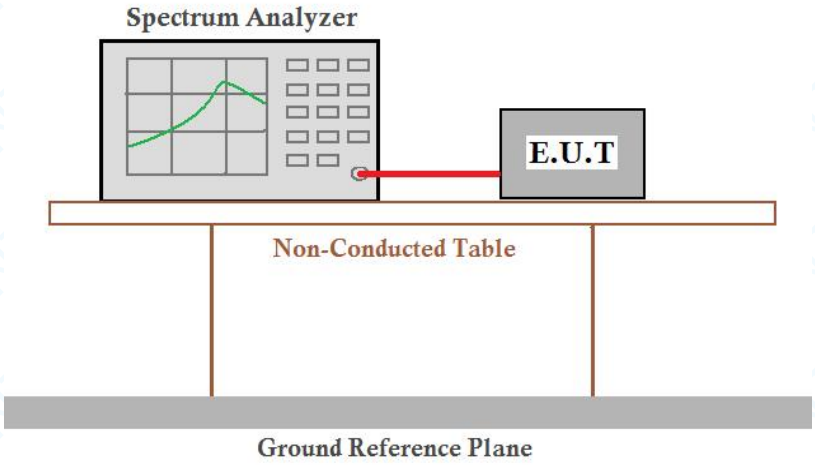
| Code | Equipment | Manufacturer | Model No. | Equipment No. |
|---|---|---|---|---|
| 1 | 1 | Adapter | Chenyang | ICSO1 |

# 3 Test results and Measurement Data

## 3.1 Antenna requirements

| **Standard requirement:** | 47 CFR Part 15C Section 15.203 /247(c) |
|---|---|
| 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. | |
| The antenna is welded on the main PCB and no consideration of replacement. The best case gain of the antenna is 3.85dBi. | |

## 3.2 20dB Occupied Bandwidth

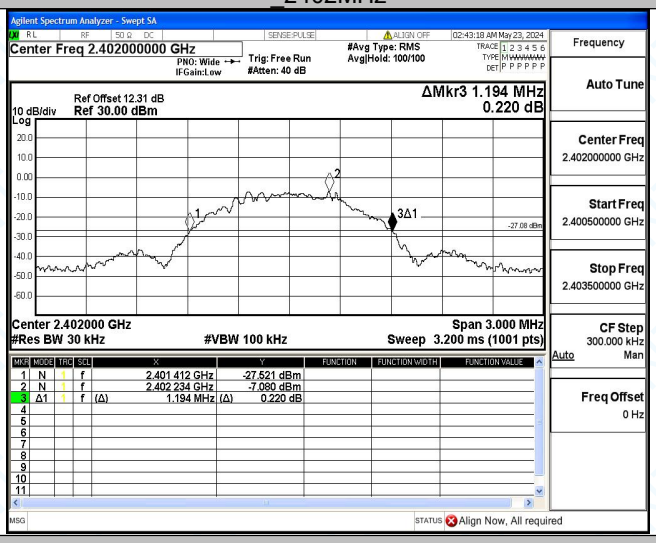
| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.215 |
| Test Method: | ANSI C63.10:2013 Section 7.8.7 |
| Test Setup: |  |
| Instruments Used: | Refer to section 2.9 for details |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find the worst case |
| Limit: | no wider than 0.25% of the center frequency |
| Test Results: | Pass |

**Test Data:**

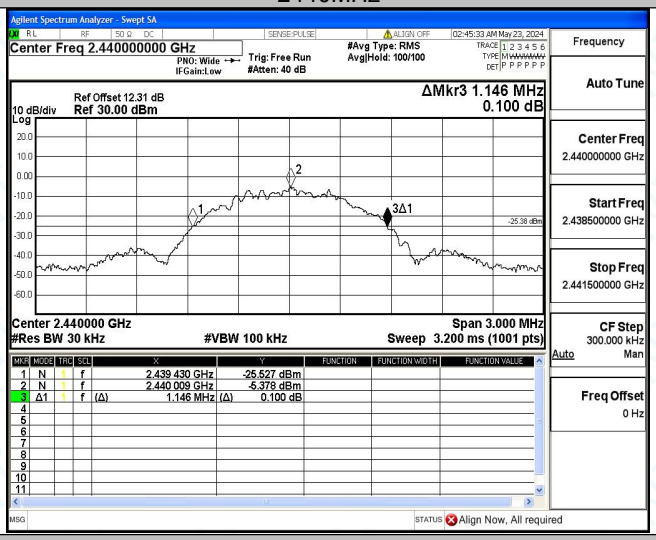
| Test Frequency (MHz) | 20dB Bandwidth (MHz) | Result |
|---|---|---|
| 2402 | 1.194 | Pass |
| 2440 | 1.146 | Pass |
| 2480 | 1.179 | Pass |

**Test Graphs**

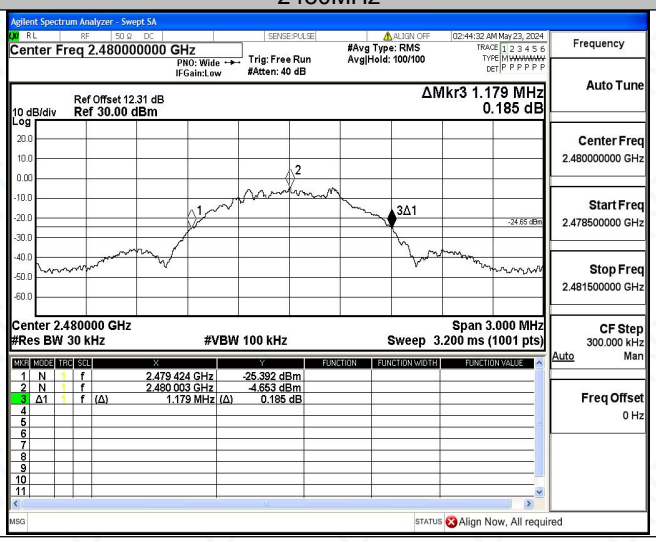
_2402MHz



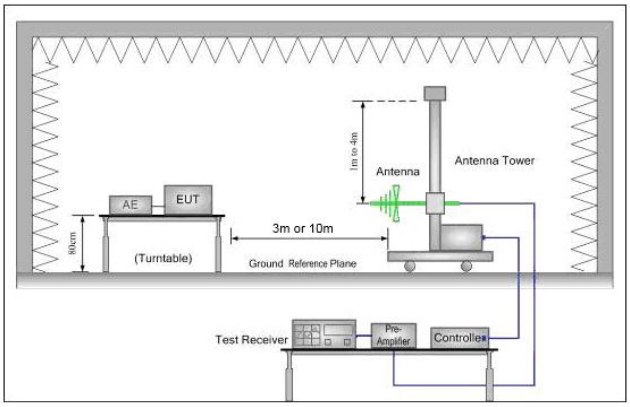

2440MHz




2480MHz



## 3.3 Field Strength of Fundamental

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.249(a) |
| Test Method: | ANSI C63.10 :2020 Section 11.12 |
| Test Setup: |  |
| Test Instruments: | Refer to section 2.9 for details |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Through Pre-scan, find the worst case |

**Limit:**

| Fundamental frequency | Field strength of fundamental@3m (microvolts/meter) |
|---|---|
| 902-928MHz | 50 |
| 2400-2483.5MHz | 50 |
| 5725-5875MHz | 50 |
| 24.0-24.25 | 250 |

The EUT fundamental frequency is in 2400-2483.5MHz,So the Average Limit& Peak Limit is show in below table:

| Fundamental frequency | Field strength of fundamental@3m (dBμV/m) | |
|---|---|---|
| | Average Limit | Peak Limit |
| 2400-2483.5MHz | 94 | 114 |

Note:

1. Average Limit (dBμV/m)=20×log[1000×Field Strength (mV/m)].
2. Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB

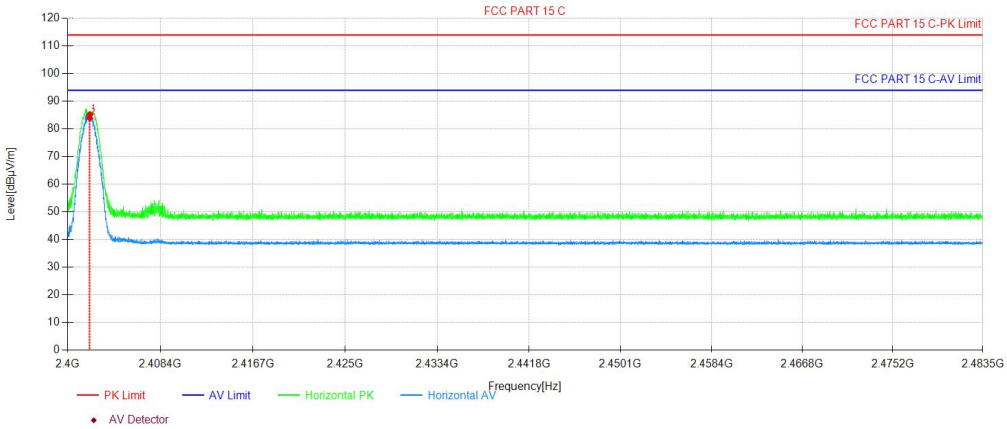
| | |
|---|---|
| Test Configuration: | RBW: ⩾OBW<br>VBW: 3XRBW<br>Start frequency: 2400MHz<br>Stop frequency: 2483.5MHz<br>Sweep Time: Auto<br>Detector: PEAK/AVG<br>Trace Mode: Max Hold |
| Test Procedure: | a. the EUT was placed on the top of a rotating table 1 meters above the ground at |

| | |
|---|---|
| | a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation<br>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>g. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.<br>r. Repeat above procedures until all frequencies measured was complete. |
| Test Results: | Pass |

**Test Data**

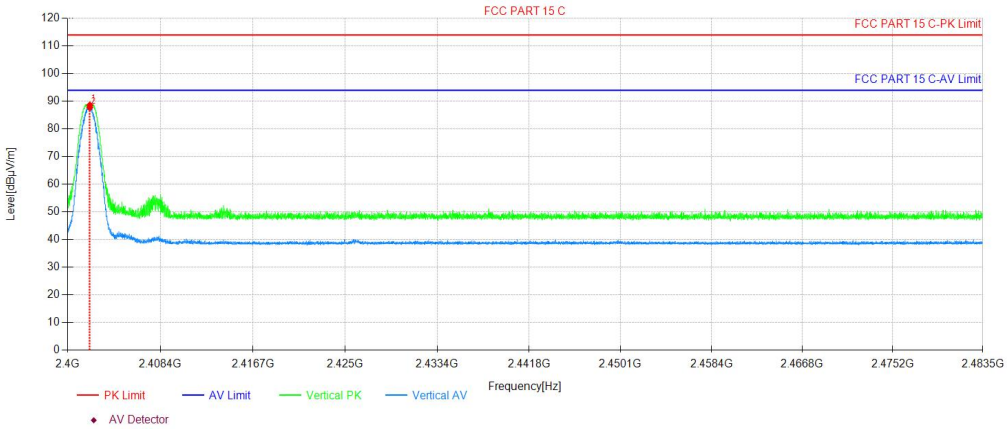
**2402MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2402.00 | 85.93 | -0.72 | 85.21 | 114.00 | 28.79 | 150 | 303 | PK |
| 2 | 2402.00 | 84.62 | -0.72 | 83.90 | 94.00 | 10.10 | 150 | 258 | AV |

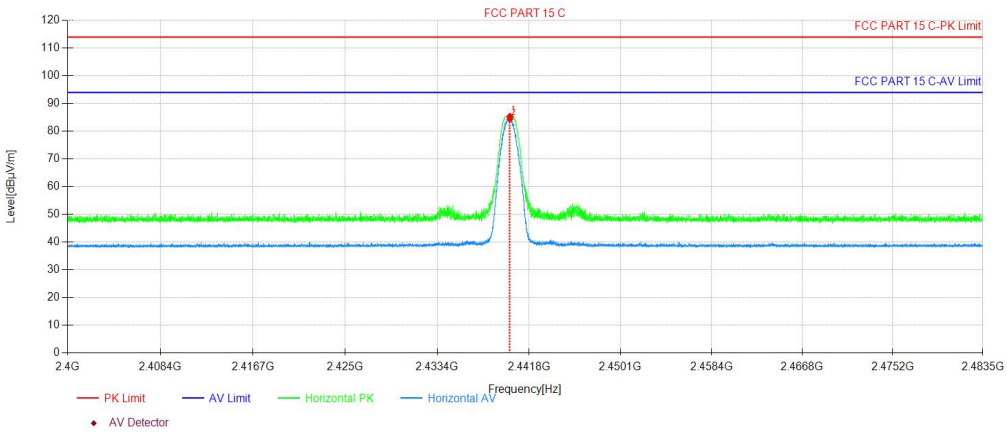
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2402.00 | 89.36 | -0.72 | 88.64 | 114.00 | 25.36 | 150 | 272 | PK |
| 2 | 2402.00 | 88.46 | -0.72 | 87.74 | 94.00 | 6.26 | 150 | 283 | AV |

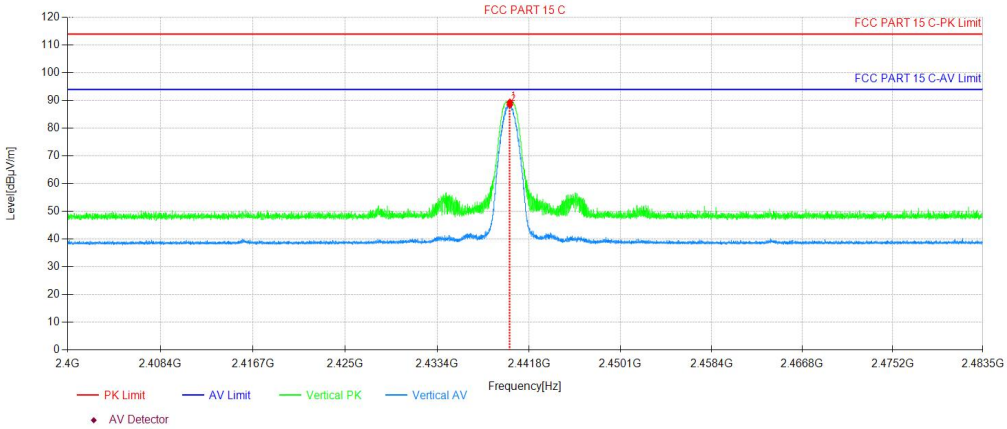
**2440MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2440.00 | 85.84 | -0.47 | 85.37 | 114.00 | 28.63 | 150 | 327 | PK |
| 2 | 2440.00 | 84.92 | -0.47 | 84.45 | 94.00 | 9.55 | 150 | 327 | AV |

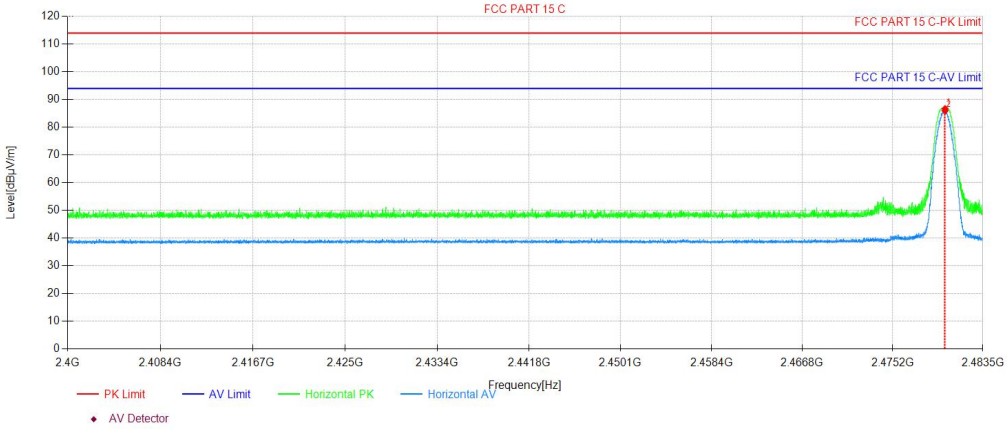
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2440.00 | 89.89 | -0.47 | 89.42 | 114.00 | 24.58 | 150 | 273 | PK |
| 2 | 2440.00 | 88.93 | -0.47 | 88.46 | 94.00 | 5.54 | 150 | 273 | AV |

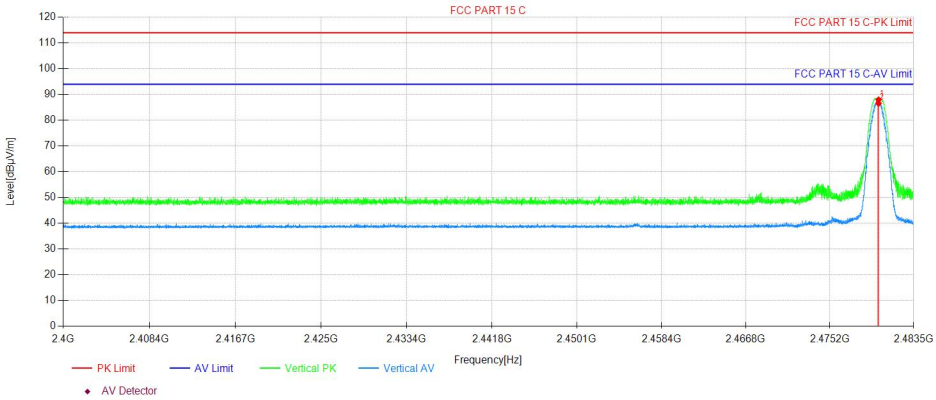
**2480MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2480.00 | 86.99 | -0.31 | 86.68 | 114.00 | 27.32 | 150 | 336 | PK |
| 2 | 2480.00 | 86.25 | -0.31 | 85.94 | 94.00 | 8.06 | 150 | 336 | AV |

Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dB μ V/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2480.00 | 88.28 | -0.31 | 87.97 | 114.00 | 26.03 | 150 | 262 | PK |
| 2 | 2480.00 | 86.84 | -0.31 | 86.53 | 94.00 | 7.47 | 150 | 296 | AV |

Note

1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including LISN Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including Ant.Factor ,Cable Factor etc. )

2. Average Level=Peak Level + 20log(Duty cycle)

## 3.4 Radiated Spurious Emissions

| | | | | | |
|---|---|---|---|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.249(a)<br>47 CFR Part 15C Section 15.209<br>47 CFR Part 15C Section 15.205 | | | | |
| Test Method: | ANSI C63.10 :2020 Section 11.12 | | | | |
| Test Site: | Measurement Distance: 3m or 10m (Semi-Anechoic Chamber) | | | | |
| Receiver Setup: | Frequency | Detector | RBW | VBW | Remark |
| | 0.009MHz-0.090MHz | Peak | 10kHz | 30kHz | Peak |
| | 0.009MHz-0.090MHz | Average | 10kHz | 30kHz | Average |
| | 0.090MHz-0.110MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| | 0.110MHz-0.490MHz | Peak | 10kHz | 30kHz | Peak |
| | 0.110MHz-0.490MHz | Average | 10kHz | 30kHz | Average |
| | 0.490MHz -30MHz | Quasi-peak | 10kHz | 30kHz | Quasi-peak |
| | 30MHz-1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| Limit: | 15.209 **Radiated emission limits** | | | | |
| | Frequency | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark | Measurement distance (m) |
| | 0.009MHz-0.490MHz | 2400/F(kHz) | - | - | 300 |
| | 0.490MHz-1.705MHz | 24000/F(kHz) | - | - | 30 |
| | 1.705MHz-30MHz | 30 | - | - | 30 |
| | 30MHz-88MHz | 100 | 40.0 | Quasi-peak | 3 |
| | 88MHz-216MHz | 150 | 43.5 | Quasi-peak | 3 |
| | 216MHz-960MHz | 200 | 46.0 | Quasi-peak | 3 |
| | 960MHz-1GHz | 500 | 54.0 | Quasi-peak | 3 |
| | Above 1GHz | 500 | 54.0 | Average | 3 |
| | Remark:Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.<br>The limits on the field strength of the spurious emissions in the below table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength. | | | | |

| Fundamental frequency | Field strength of harmonics@3m (microvolts/meter) |
|---|---|
| 902-928MHz | 500 |
| 2400-2483.5MHz | 500 |
| 5725-5875MHz | 500 |
| 24.0-24.25 | 2500 |

The EUT fundamental frequency is 2400-2483.5MHz,So the Average Limit& Peak Limit is show in below table:

| Fundamental frequency (MHz) | Field strength of spurious emission@3m (dBμV/m) | |
|---|---|---|
| | Average Limit | Peak Limit |
| 2400-2483.5 | 54 | 74 |

Note:

1.Average Limit (dBμV/m)=20×log[1000×Field Strength (mV/m)].

2.Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB

**15.205 Restricted frequency band**

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |

Test Setup:

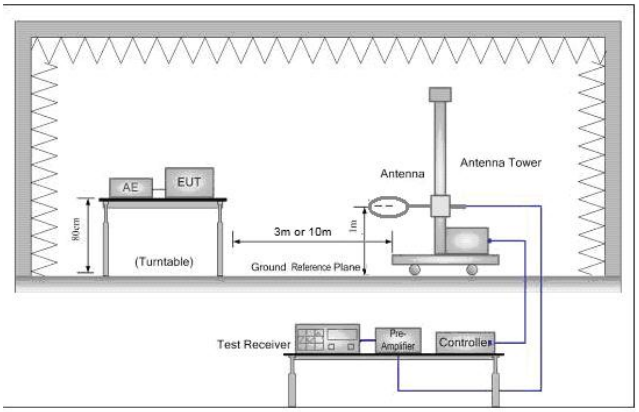



Figure 1. Below 30MHz

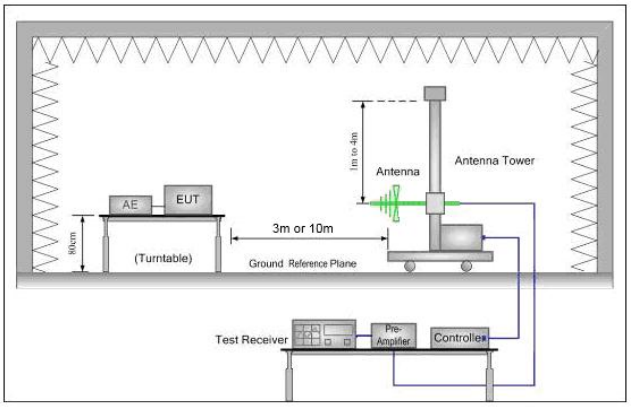



Figure 2. 30MHz to 1GHz

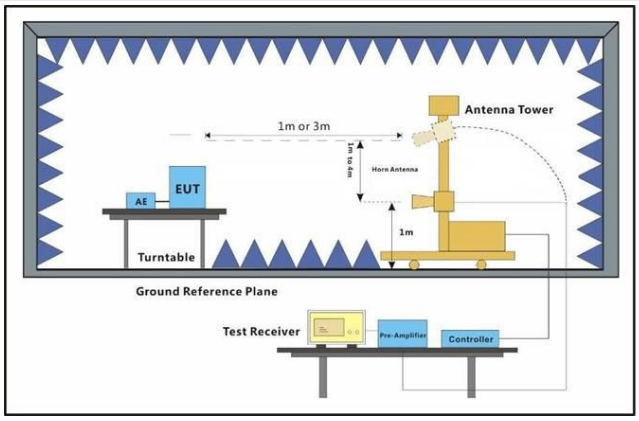



Figure 3. Above 1 GHz

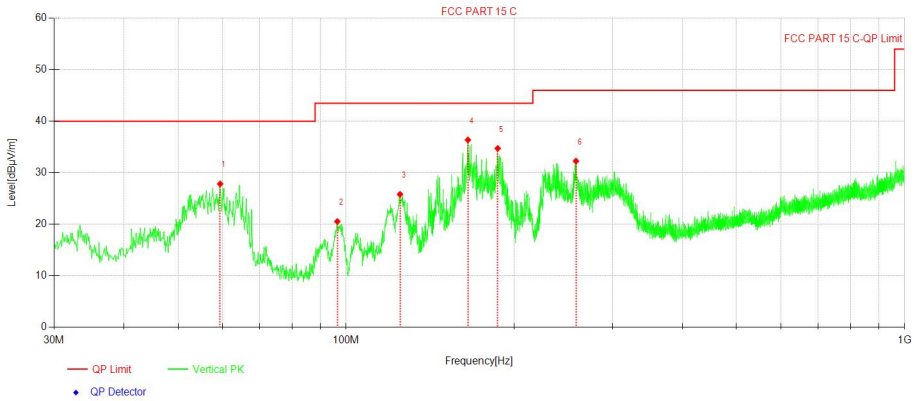
| | |
|---|---|
| Test Procedure: | h. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>i. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation<br>j. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>k. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>l. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>m. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>n. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>o. Test the EUT in the lowest channel, the middle channel ,the Highest channel.<br>p. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.<br>q. Repeat above procedures until all frequencies measured was complete. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates.Transmitting mode. |

| | |
|---|---|
| Final Test Mode: | Pretest the EUT at Transmitting mode.<br>Through Pre-scan, find the worst case. |
| Instruments Used: | Refer to section 2.9 for details |
| Test Results: | Pass |

**Test data**

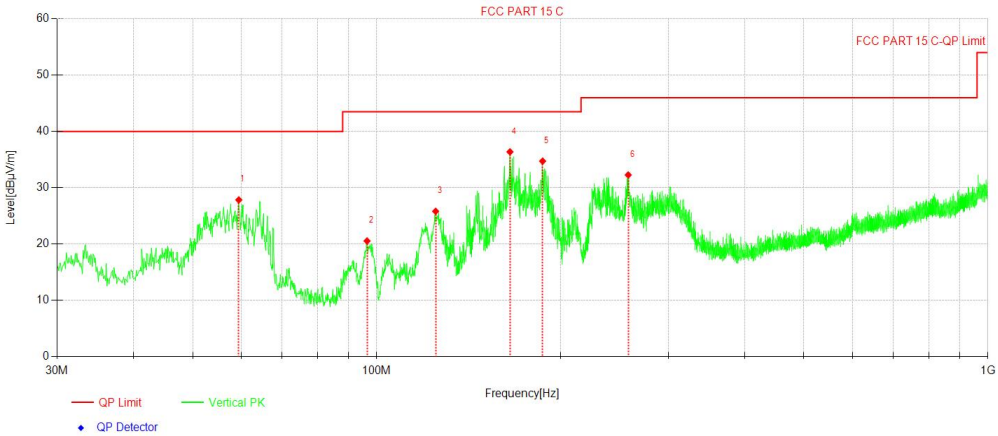
**For 30-1000MHz TX**

Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 60.46 | 27.10 | -8.81 | 18.29 | 40.00 | 21.71 | 100 | 201 | QP |
| 2 | 146.70 | 42.11 | -8.06 | 34.05 | 43.50 | 9.45 | 200 | 11 | QP |
| 3 | 168.23 | 43.29 | -8.17 | 35.12 | 43.50 | 8.38 | 200 | 6 | QP |
| 4 | 225.37 | 49.62 | -10.94 | 38.68 | 46.00 | 7.32 | 200 | 52 | QP |
| 5 | 255.25 | 50.32 | -8.80 | 41.52 | 46.00 | 4.48 | 100 | 219 | QP |
| 6 | 303.95 | 49.86 | -6.86 | 43.00 | 46.00 | 3.00 | 100 | 163 | QP |

Horizontal:

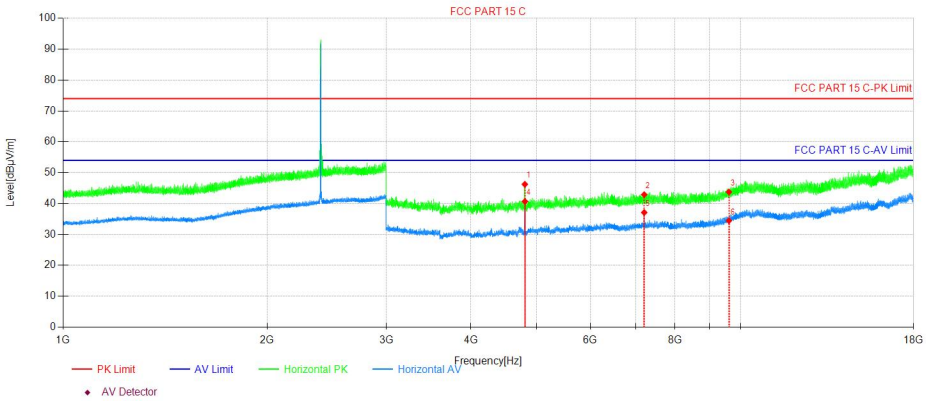



| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 59.49 | 36.54 | -8.71 | 27.83 | 40.00 | 12.17 | 100 | 65 | QP |
| 2 | 96.45 | 33.67 | -13.14 | 20.53 | 43.50 | 22.97 | 100 | 168 | QP |
| 3 | 124.87 | 35.69 | -9.88 | 25.81 | 43.50 | 17.69 | 100 | 341 | QP |
| 4 | 165.23 | 44.36 | -7.99 | 36.37 | 43.50 | 7.13 | 100 | 360 | QP |
| 5 | 186.86 | 44.91 | -10.19 | 34.72 | 43.50 | 8.78 | 100 | 360 | QP |
| 6 | 257.97 | 40.96 | -8.69 | 32.27 | 46.00 | 13.73 | 200 | 98 | QP |

**For above 1GHz TX**

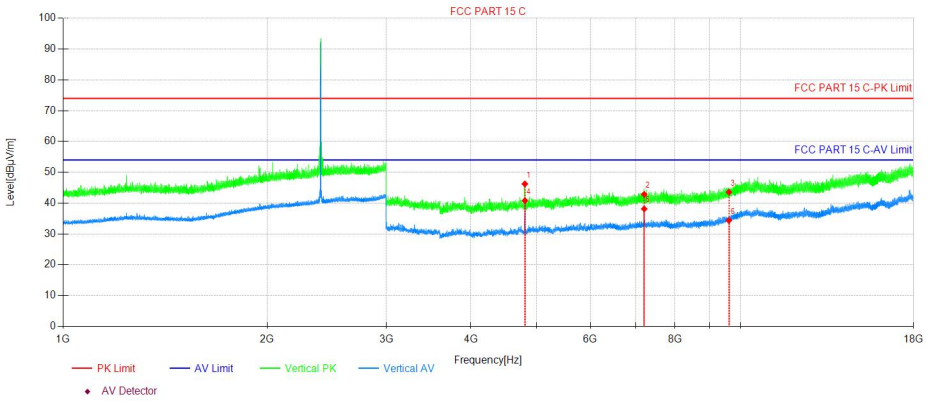
**2402MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4803.09 | 50.87 | -4.61 | 46.26 | 74.00 | 27.74 | 150 | 0 | Peak |
| 2 | 7206.21 | 44.68 | -1.76 | 42.92 | 74.00 | 31.08 | 150 | 177 | Peak |
| 3 | 9608.58 | 42.90 | 0.88 | 43.78 | 74.00 | 30.22 | 150 | 126 | Peak |
| 4 | 4804.59 | 45.31 | -4.61 | 40.70 | 54.00 | 13.30 | 150 | 16 | AV |
| 5 | 7206.21 | 38.89 | -1.76 | 37.13 | 54.00 | 16.87 | 150 | 177 | AV |
| 6 | 9608.58 | 33.60 | 0.88 | 34.48 | 54.00 | 19.52 | 150 | 16 | AV |

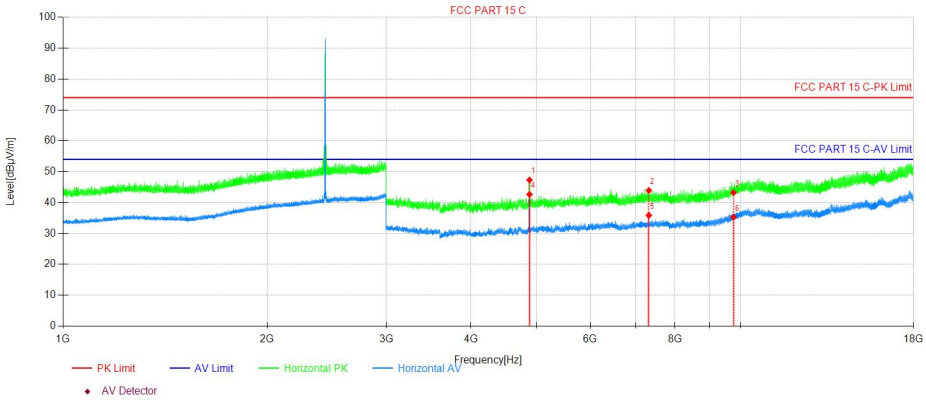
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4803.09 | 50.84 | -4.61 | 46.23 | 74.00 | 27.77 | 150 | 165 | Peak |
| 2 | 7206.21 | 44.61 | -1.76 | 42.85 | 74.00 | 31.15 | 150 | 15 | Peak |
| 3 | 9608.58 | 42.68 | 0.88 | 43.56 | 74.00 | 30.44 | 150 | 0 | Peak |
| 4 | 4804.59 | 45.41 | -4.61 | 40.80 | 54.00 | 13.20 | 150 | 177 | AV |
| 5 | 7206.21 | 39.89 | -1.76 | 38.13 | 54.00 | 15.87 | 150 | 153 | AV |
| 6 | 9608.58 | 33.50 | 0.88 | 34.38 | 54.00 | 19.62 | 150 | 55 | AV |

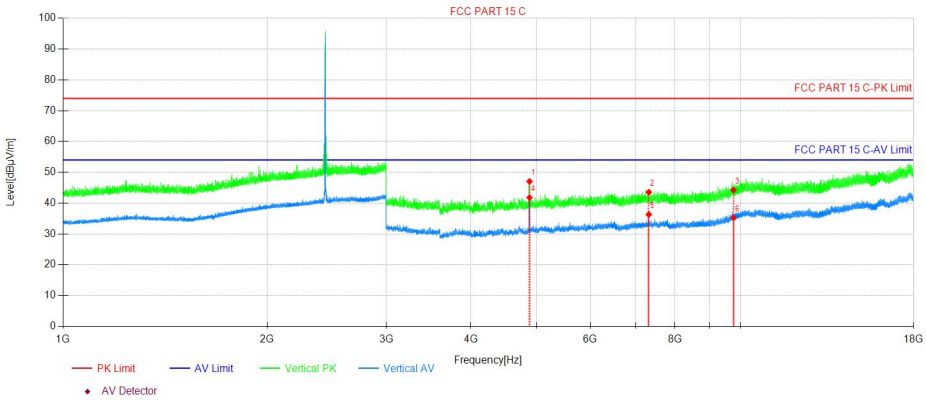
**2440MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4879.59 | 52.03 | -4.70 | 47.33 | 74.00 | 26.67 | 150 | 18 | Peak |
| 2 | 7320.21 | 45.43 | -1.49 | 43.94 | 74.00 | 30.06 | 150 | 177 | Peak |
| 3 | 9760.08 | 41.61 | 1.62 | 43.23 | 74.00 | 30.77 | 150 | 140 | Peak |
| 4 | 4880.34 | 47.35 | -4.71 | 42.64 | 54.00 | 11.36 | 150 | 18 | AV |
| 5 | 7320.21 | 37.36 | -1.49 | 35.87 | 54.00 | 18.13 | 150 | 177 | AV |
| 6 | 9760.08 | 33.69 | 1.62 | 35.31 | 54.00 | 18.69 | 150 | 99 | AV |

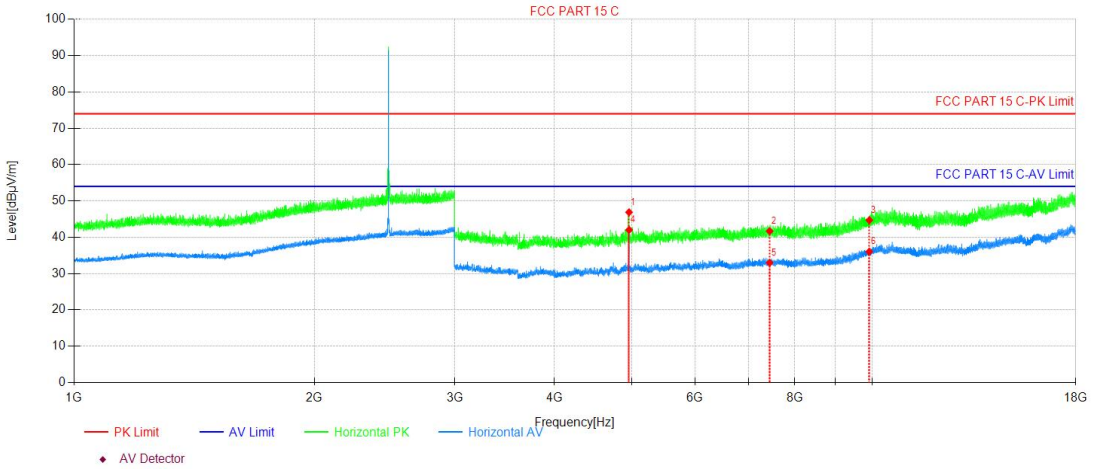
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4879.59 | 51.74 | -4.70 | 47.04 | 74.00 | 26.96 | 150 | 98 | Peak |
| 2 | 7320.21 | 45.03 | -1.49 | 43.54 | 74.00 | 30.46 | 150 | 15 | Peak |
| 3 | 9760.08 | 42.62 | 1.62 | 44.24 | 74.00 | 29.76 | 150 | 111 | Peak |
| 4 | 4880.34 | 46.50 | -4.71 | 41.79 | 54.00 | 12.21 | 150 | 83 | AV |
| 5 | 7320.21 | 37.80 | -1.49 | 36.31 | 54.00 | 17.69 | 150 | 164 | AV |
| 6 | 9760.08 | 33.61 | 1.62 | 35.23 | 54.00 | 18.77 | 150 | 98 | AV |

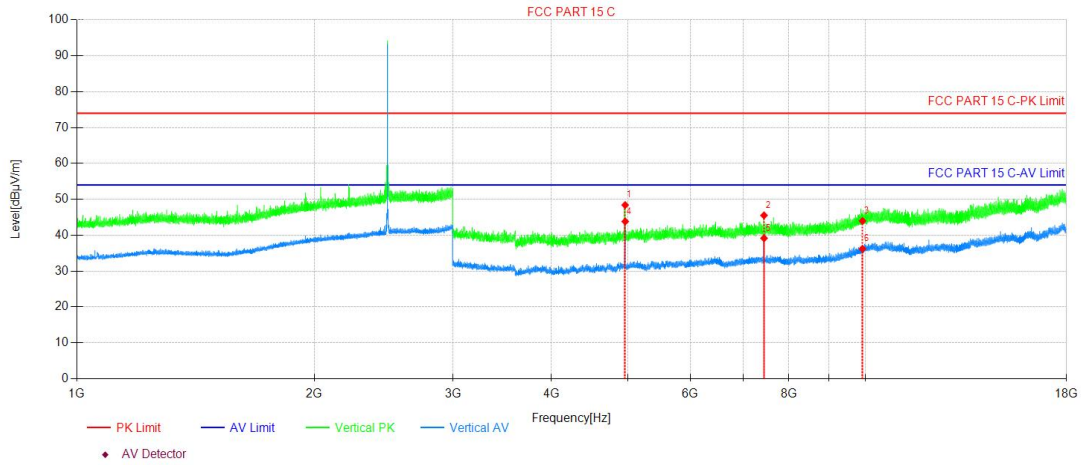
**2480MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] |
|---|---|---|---|---|---|---|---|---|
| 1 | 4959.84 | 51.74 | -4.86 | 46.88 | 74.00 | 27.12 | 150 | 177 |
| 2 | 7440.22 | 43.03 | -1.34 | 41.69 | 74.00 | 32.31 | 150 | 177 |
| 3 | 9920.59 | 42.44 | 2.27 | 44.71 | 74.00 | 29.29 | 150 | 85 |
| 4 | 4960.59 | 46.87 | -4.86 | 42.01 | 54.00 | 11.99 | 150 | 0 |
| 5 | 7440.22 | 34.31 | -1.34 | 32.97 | 54.00 | 21.03 | 150 | 177 |
| 6 | 9920.59 | 33.78 | 2.27 | 36.05 | 54.00 | 17.95 | 150 | 139 |

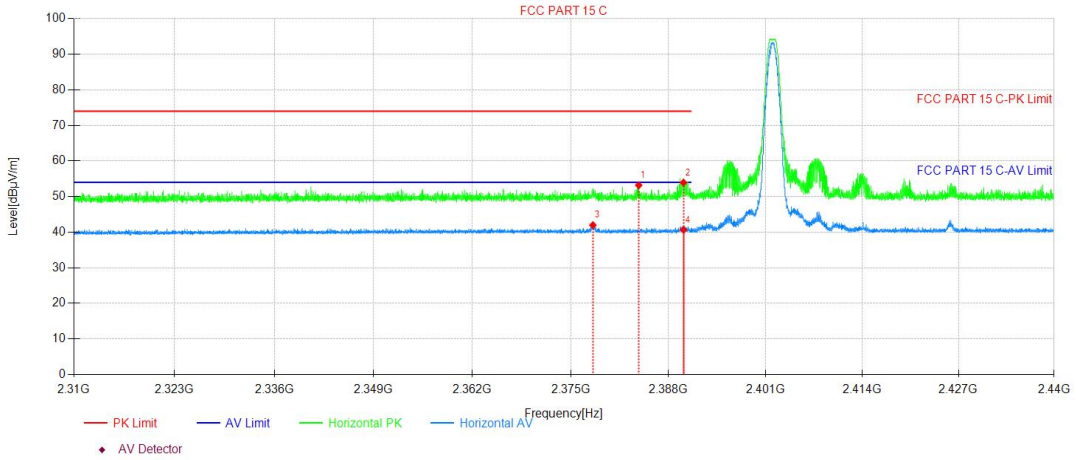
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] |
|---|---|---|---|---|---|---|---|---|
| 1 | 4959.84 | 53.26 | -4.86 | 48.40 | 74.00 | 25.60 | 150 | 79 |
| 2 | 7440.22 | 46.87 | -1.34 | 45.53 | 74.00 | 28.47 | 150 | 122 |
| 3 | 9920.59 | 41.70 | 2.27 | 43.97 | 74.00 | 30.03 | 150 | 135 |
| 4 | 4960.59 | 48.69 | -4.86 | 43.83 | 54.00 | 10.17 | 150 | 79 |
| 5 | 7440.22 | 40.50 | -1.34 | 39.16 | 54.00 | 14.84 | 150 | 122 |
| 6 | 9920.59 | 33.94 | 2.27 | 36.21 | 54.00 | 17.79 | 150 | 177 |

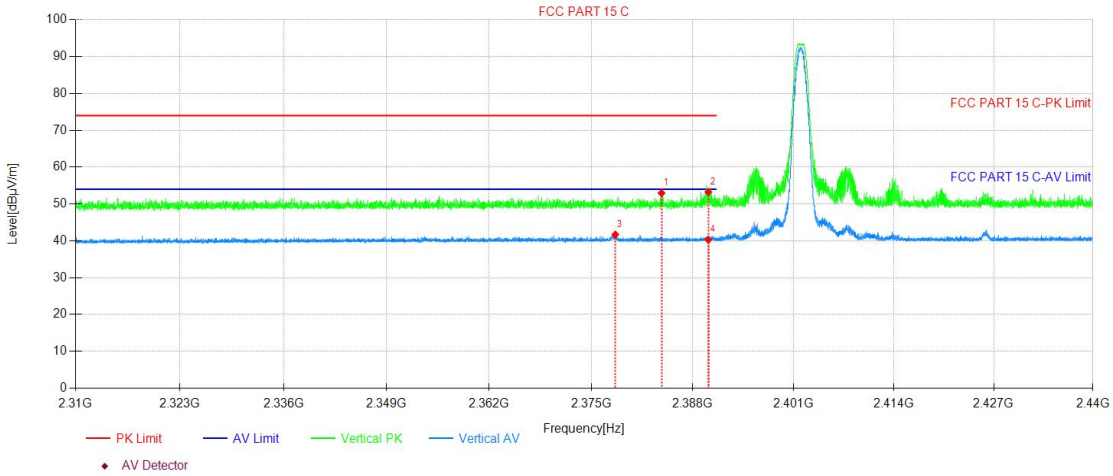
**2402MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2384.04 | 54.00 | -0.82 | 53.18 | 74.00 | 20.82 | 150 | 231 | Peak |
| 2 | 2390.01 | 54.72 | -0.80 | 53.92 | 74.00 | 20.08 | 150 | 218 | Peak |
| 3 | 2377.94 | 42.82 | -0.84 | 41.98 | 54.00 | 12.02 | 150 | 186 | AV |
| 4 | 2390.01 | 41.47 | -0.80 | 40.67 | 54.00 | 13.33 | 150 | 218 | AV |

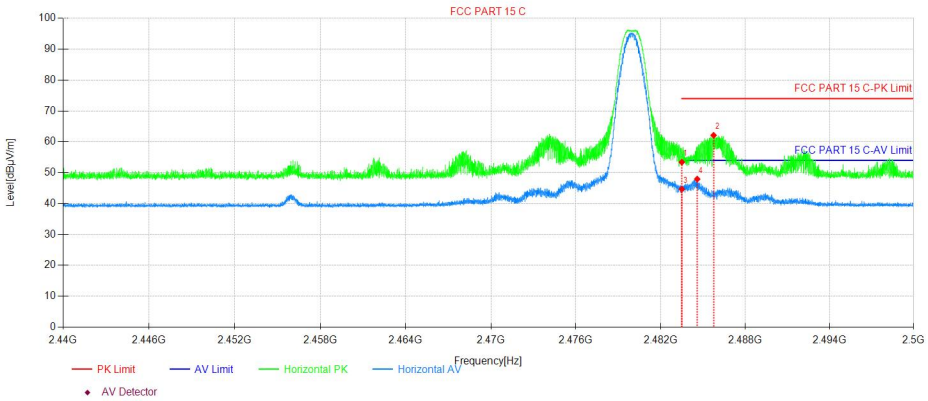
Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2384.00 | 53.78 | -0.82 | 52.96 | 74.00 | 21.04 | 150 | 172 | Peak |
| 2 | 2390.01 | 54.05 | -0.80 | 53.25 | 74.00 | 20.75 | 150 | 172 | Peak |
| 3 | 2378.08 | 42.53 | -0.84 | 41.69 | 54.00 | 12.31 | 150 | 172 | AV |
| 4 | 2390.01 | 41.09 | -0.80 | 40.29 | 54.00 | 13.71 | 150 | 54 | AV |

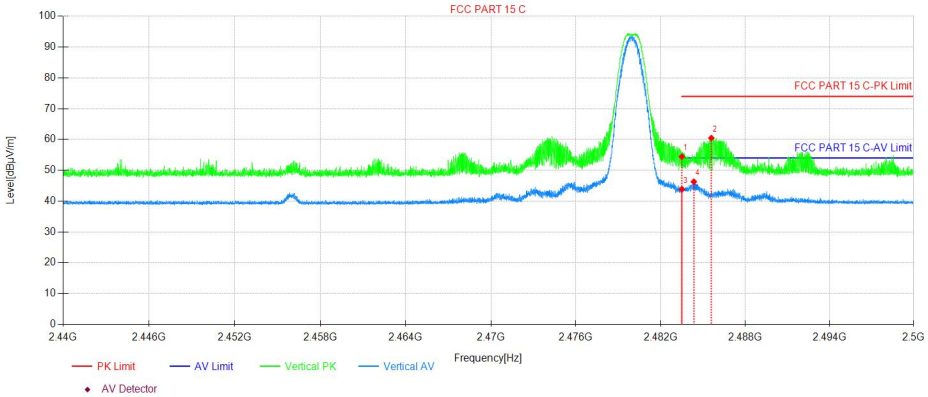
**2480MHz**

Horizontal:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.50 | 53.71 | -0.29 | 53.42 | 74.00 | 20.58 | 150 | 187 | Peak |
| 2 | 2485.76 | 62.38 | -0.27 | 62.11 | 74.00 | 11.89 | 150 | 220 | Peak |
| 3 | 2483.50 | 44.98 | -0.29 | 44.69 | 54.00 | 9.31 | 150 | 209 | AV |
| 4 | 2484.59 | 48.23 | -0.28 | 47.95 | 54.00 | 6.05 | 150 | 220 | AV |

Vertical:




| NO. | Freq. [MHz] | Reading Level [dBμV] | Correct Factor [dB/m] | Result Level [dBμV/m] | AV Limit [dBμV/m] | Margin [dB] | Height [cm] | Angle [°] | Detector |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.51 | 54.73 | -0.29 | 54.44 | 74.00 | 19.56 | 150 | 156 | Peak |
| 2 | 2485.59 | 60.72 | -0.27 | 60.45 | 74.00 | 13.55 | 150 | 156 | Peak |
| 3 | 2483.51 | 44.11 | -0.29 | 43.82 | 54.00 | 10.18 | 150 | 168 | AV |
| 4 | 2484.35 | 46.57 | -0.28 | 46.29 | 54.00 | 7.71 | 150 | 168 | AV |

Note:

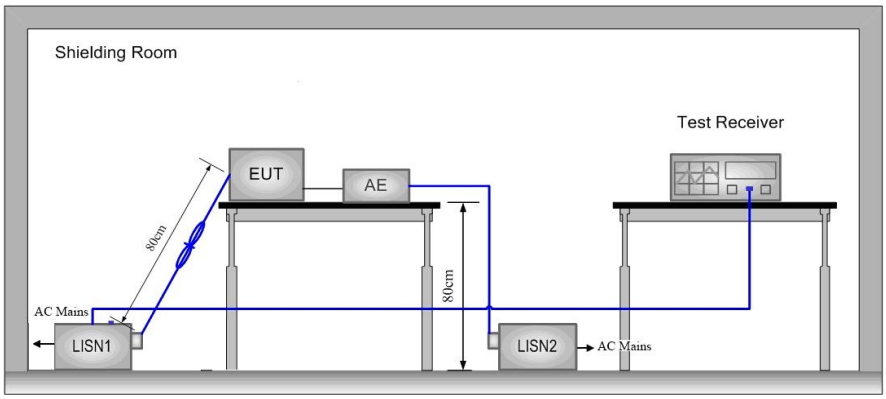
1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

   Measurement Level= Reading Level + Correct Factor(including LISN Factor ,Cable Factor etc. )

2. Average Level=Peak Level + 20log(Duty cycle)

3. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

## 3.5 AC Power Line Conducted Emissions

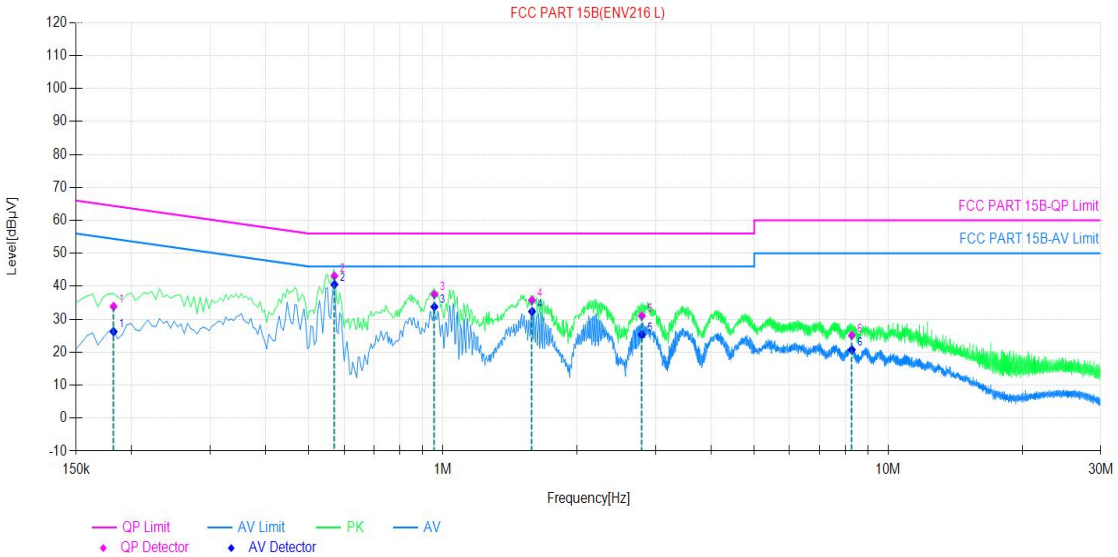
| | | | |
|---|---|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.207 | | |
| Test Method: | ANSI C63.10: 2020 | | |
| Test Frequency Range: | 150kHz to 30MHz | | |
| Limit: | Frequency range (MHz) | Limit (dBuV) | |
| | | Quasi-peak | Average |
| | 0.15-0.5 | 66 to 56* | 56 to 46* |
| | 0.5-5 | 56 | 46 |
| | 5-30 | 60 | 50 |
| | * Decreases with the logarithm of the frequency. | | |
| Test Procedure: | 1) The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 2013 on conducted measurement. | | |
| Test Setup: |  | | |

| | |
|---|---|
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.<br>Charge + Transmitting mode. |
| Final Test Mode: | Through Pre-scan, find the 6.5Mbps of rate of 802.11n(HT20) at lowest channel is the worst case.<br>Charge + Transmitting mode.<br>Only the worst case is recorded in the report. |
| Instruments Used: | Refer to section 2.9 for details |
| Test Results: | PASS |

Measurement Data

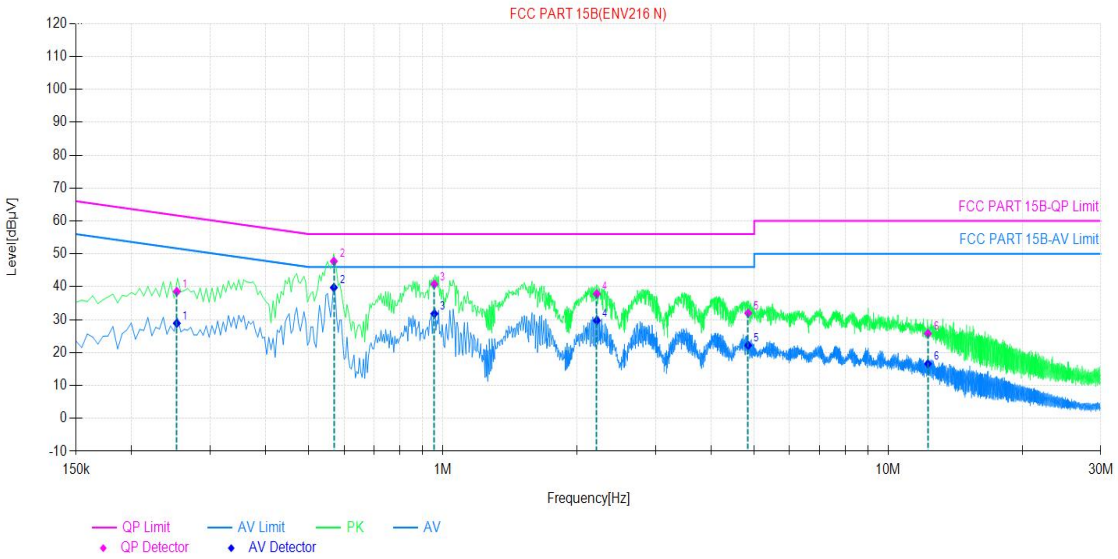
An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:




| NO. | Freq. [MHz] | Correct Factor [dB] | QP Reading Level | QP Result Level | QP Limit [dBµV] | QP Margin [dB] | AV Reading Level | AV Result Level | AV Limit [dBµV] | AV Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.18 | 9.92 | 23.95 | 33.87 | 64.38 | 30.51 | 16.29 | 26.21 | 54.38 | 28.17 |
| 2 | 0.57 | 9.84 | 33.28 | 43.12 | 56.00 | 12.88 | 30.69 | 40.53 | 46.00 | 5.47 |
| 3 | 0.95 | 9.73 | 27.79 | 37.52 | 56.00 | 18.48 | 24.03 | 33.76 | 46.00 | 12.24 |
| 4 | 1.58 | 9.73 | 26.01 | 35.74 | 56.00 | 20.26 | 22.62 | 32.35 | 46.00 | 13.65 |
| 5 | 2.79 | 9.74 | 21.27 | 31.01 | 56.00 | 24.99 | 15.58 | 25.32 | 46.00 | 20.68 |
| 6 | 8.28 | 9.87 | 15.22 | 25.09 | 60.00 | 34.91 | 10.89 | 20.76 | 50.00 | 29.24 |

Neutral Line:




| NO. | Freq. [MHz] | Correct Factor [dB] | QP Reading Level | QP Result Level | QP Limit [dBμV] | QP Margin [dB] | AV Reading Level | AV Result Level | AV Limit [dBμV] | AV Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.2526 | 9.87 | 28.67 | 38.54 | 61.67 | 23.13 | 19.03 | 28.90 | 51.67 | 22.77 |
| 2 | 0.5690 | 9.76 | 37.99 | 47.75 | 56.00 | 8.25 | 30 | 39.76 | 46.00 | 6.24 |
| 3 | 0.9566 | 9.71 | 31.07 | 40.78 | 56.00 | 15.22 | 22.11 | 31.82 | 46.00 | 14.18 |
| 4 | 2.2154 | 9.80 | 28.01 | 37.81 | 56.00 | 18.19 | 19.92 | 29.72 | 46.00 | 16.28 |
| 5 | 4.8468 | 9.97 | 21.99 | 31.96 | 56.00 | 24.04 | 12.21 | 22.18 | 46.00 | 23.82 |
| 6 | 12.2794 | 9.86 | 15.92 | 25.78 | 60.00 | 34.22 | 6.73 | 16.59 | 50.00 | 33.41 |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including LISN Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including LISN Factor, Cable Factor etc. )

---END REPORT---