



# TEST REPORT

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## 1. Client

- Name ..... : Sena Technologies Co., Ltd.
- Address..... : 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea

## 2. Use of Report..... : FCC Approval

## 3. Sample Description

- Product Name : Wireless Communication Systems
- Model Name : WiFiCom Squad

## 4. Date of Receipt..... : 2025-09-03

## 5. Date of Test ..... : 2025-10-27 ~ 2025-11-18

## 6. Test Method ..... : FCC Part 15 Subpart C 15.247

## 7. Test Results ..... : Refer to the test results

- ※ The results shown in this test report are the results of testing the samples provided.
- ※ This test report is prepared according to the requirements of ISO / IEC 17025.

|             |                                                                                                                |                                                                                                                   |
|-------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Affirmation | Tested by                                                                                                      | Technical Manager                                                                                                 |
|             | Joon-Young, Jeon <br>(Sign) | Jong-Myoung, Shin <br>(Sign) |

Dec 09, 2025

EMC Labs Co., Ltd.



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## APPENDIX

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# Version

| TEST REPORT NO.   | DATE         | DESCRIPTION   |
|-------------------|--------------|---------------|
| KR0140-RF2512-004 | Dec 09, 2025 | Initial Issue |
|                   |              |               |
|                   |              |               |



## 1. Applicant & Manufacturer & Test Laboratory Information

### 1.1 Applicant Information

|                   |                                                    |
|-------------------|----------------------------------------------------|
| Applicant         | Sena Technologies Co., Ltd.                        |
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### 1.2. Manufacturer Information

|                      |                                                    |
|----------------------|----------------------------------------------------|
| Manufacturer         | Sena Technologies Co., Ltd.                        |
| Manufacturer Address | 19, Heolleung-ro 569-gil, Gangnam-gu, Seoul, Korea |

### 1.3 Test Laboratory Information

|                          |                                                                            |
|--------------------------|----------------------------------------------------------------------------|
| Laboratory               | EMC Labs Co., Ltd.                                                         |
| Laboratory Address       | 100, Jangjateo-ro, Hobeop-myeon, Icheon-si, Gyeonggi-do, Republic of Korea |
| Contact Person           | Jong-Myoung, Shin                                                          |
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| Fax No.                  | +82-505-116-8895                                                           |
| FCC Designation No.      | KR0140                                                                     |
| FCC Registration No.     | 580000                                                                     |
| IC Site Registration No. | 28751                                                                      |



## 2. Equipment under Test(EUT) Information

### 2.1 General Information

|               |                                |
|---------------|--------------------------------|
| Product Name  | Wireless Communication Systems |
| Model Name    | WiFiCom Squad                  |
| FCC ID        | S7A-SP185                      |
| Rated Voltage | DC 3.7 V                       |

### 2.2 Additional Information

|                     |                                              |
|---------------------|----------------------------------------------|
| Operating Frequency | 2 402 MHz ~ 2 480 MHz                        |
| Number of channel   | 79                                           |
| Modulation Type     | BDR Mode(GFSK), EDR Mode(Pi/4 DQPSK, 8DPSK)  |
| Antenna Type & Gain | PCB Pattern Antenna(with Max gain: 0.90 dBi) |
| Firmware Version    | 1.0                                          |
| Hardware Version    | 1.0                                          |
| Test software       | AIROC Bluetooth Test and Debug Tool 1.4      |

### 2.3 Test Frequency

| Test mode  | Test Frequency (MHz) |                  |                |
|------------|----------------------|------------------|----------------|
|            | Low Frequency        | Middle Frequency | High Frequency |
| GFSK       | 2 402                | 2 441            | 2 480          |
| Pi/4 DQPSK | 2 402                | 2 441            | 2 480          |
| 8DPSK      | 2 402                | 2 441            | 2 480          |

### 2.4 Worst-Case

|     |               |
|-----|---------------|
| BDR | GFSK (DH5)    |
| EDR | 8DPSK (3-DH5) |

Note: The power measurement has been conducted to determine the worst-case mode from all possible Combinations between available modulations, data rates.

### 2.5 Mode of operation during the test

- The EUT continuous transmission mode during the test with set at Low Channel, Middle Channel, and High Channel. To get a maximum radiated emission levels from the EUT, the EUT was moved throughout the XY, YZ, XZ planes.

### 2.6 Modifications of EUT

- None



### 3. Test Summary

| Applied                             | FCC Rule                        | IC Rule                                  | Test Items                     | Test Condition       | Result              |
|-------------------------------------|---------------------------------|------------------------------------------|--------------------------------|----------------------|---------------------|
| <input checked="" type="checkbox"/> | 15.203                          | –                                        | Antenna Requirement            | Conducted            | C                   |
| <input type="checkbox"/>            | 15.247(a)                       | –                                        | 20 dB Bandwidth                |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | –                               | RSS GEN (6.7)                            | Occupied Bandwidth (99%)       |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | 15.247(a)                       | RSS-247 (5.1)                            | Number of Hopping Frequencies  |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | 15.247(a)                       | RSS-247 (5.1)                            | Time of Occupancy (Dwell Time) |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | 15.247(a)                       | RSS-247 (5.1)                            | Carrier Frequencies Separation |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | 15.247(b)                       | RSS-247 (5.4)                            | Peak Output Power              |                      | NT <sup>Note2</sup> |
| <input type="checkbox"/>            | 15.247(d)                       | RSS-247 (5.5)                            | Conducted Spurious Emission    |                      | NT <sup>Note2</sup> |
| <input checked="" type="checkbox"/> | 15.247(d)<br>15.205 &<br>15.209 | RSS-247 (5.5)<br>RSS-GEN<br>(8.9 & 8.10) | Radiated Spurious Emission     | Radiated             | C                   |
| <input checked="" type="checkbox"/> | 15.207                          | RSS-GEN (8.8)                            | Conducted Emissions            | AC Line<br>Conducted | C                   |

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The test is not performed because it was tested on the Certified RF Module. (Model No.: Type1LV / FCC ID: VPYLBEE59B1LV / IC: 772C-LBEE59B1LV)

The test report No. is 1901WSU002-U4.

Refer to the test report for the detailed results.

The sample was tested according to the following specification: ANSI C63.10:2013.

Compliance was determined by specification limits of the applicable standard according to customer requirements.



## 4. Used equipment on test

|                                     | Description                                      | Manufacturer      | Model Name            | Serial Name     | Next Cal.  |
|-------------------------------------|--------------------------------------------------|-------------------|-----------------------|-----------------|------------|
| <input type="checkbox"/>            | TEMP & HUMID CHAMBER                             | JFM               | JFMA-001              | 20200929-01     | 2026.11.05 |
| <input type="checkbox"/>            | CONTROLLER                                       | AMWON TECHNOLOGY  | TEMI2500              | S7800VK191 0707 | 2026.11.05 |
| <input type="checkbox"/>            | PSA SERIES SPECTRUM ANALYZER                     | AGILENT           | E4440A                | MY45304057      | 2026.11.05 |
| <input type="checkbox"/>            | MXG ANALOG SIGNAL GENERATOR                      | AGILENT           | N5183A                | MY50141890      | 2026.11.05 |
| <input type="checkbox"/>            | SYSTEM DC POWER SUPPLY                           | AGILENT           | 6674A                 | MY53000118      | 2026.11.05 |
| <input type="checkbox"/>            | VECTOR SIGNAL GENERATOR                          | ROHDE & SCHWARZ   | SMBV100A              | 257524          | 2026.11.05 |
| <input type="checkbox"/>            | DIRECTIONAL COUPLER                              | AGILENT           | 773D                  | 2839A01855      | 2026.11.05 |
| <input type="checkbox"/>            | ATTENUATOR                                       | AGILENT           | 8493C                 | 73193           | 2026.11.06 |
| <input type="checkbox"/>            | TERMINATION                                      | HEWLETT PACKARD   | 909D                  | 07492           | 2026.11.06 |
| <input type="checkbox"/>            | POWER DIVIDER                                    | HEWLETT PACKARD   | 11636A                | 06916           | 2026.11.05 |
| <input type="checkbox"/>            | SLIDE-AC                                         | DAEKWANG TECH     | SV-1023               | NONE            | 2026.11.05 |
| <input type="checkbox"/>            | DIGITAL MULTIMETER                               | HUMANTECHSTORE    | 15B+                  | 50561541WS      | 2026.11.05 |
| <input checked="" type="checkbox"/> | ATTENUATOR                                       | ACE RF COMM       | ATT SMA 20W 20dB 8GHz | A-0820.SM20.2   | 2026.04.04 |
| <input type="checkbox"/>            | DC POWER SUPPLY                                  | AGILENT           | E3634A                | MY40012120      | 2026.02.13 |
| <input type="checkbox"/>            | USB Peak Power Sensor                            | Anritsu           | MA24408A              | 12321           | 2026.11.05 |
| <input type="checkbox"/>            | High Pass Filter                                 | WT Microwave INC. | WT-A3314-HS           | WT22111804-1    | 2026.11.05 |
| <input checked="" type="checkbox"/> | High Pass Filter                                 | WT Microwave INC. | WT-A1935-HS           | WT22111804-2    | 2026.11.05 |
| <input type="checkbox"/>            | SPECTRUM ANALYZER                                | ROHDE & SCHWARZ   | FSU26                 | 200444          | 2026.02.13 |
| <input type="checkbox"/>            | ATTENUATOR                                       | Mini-Circuits     | BW-K3-2W44+           | 2318-1          | 2026.02.13 |
| <input type="checkbox"/>            | ATTENUATOR                                       | Mini-Circuits     | BW-K3-2W44+           | 2318-2          | 2026.05.08 |
| <input type="checkbox"/>            | Balanced Temperature and Humidity Control System | ESPEC CORP.       | SH-241                | 92004650        | 2026.05.07 |
| <input checked="" type="checkbox"/> | ACTIVE LOOP ANTENNA                              | TESEQ             | HLA 6121              | 55685           | 2026.12.20 |
| <input checked="" type="checkbox"/> | Biconilog ANT                                    | Schwarzbeck       | VULB 9160             | 3260            | 2026.04.01 |
| <input type="checkbox"/>            | Biconilog ANT                                    | Schwarzbeck       | VULB9168              | 902             | 2026.08.28 |
| <input checked="" type="checkbox"/> | Horn ANT                                         | Schwarzbeck       | BBHA9120D             | 974             | 2026.12.01 |
| <input type="checkbox"/>            | Horn ANT                                         | Schwarzbeck       | BBHA9120D             | 1497            | 2026.01.03 |
| <input checked="" type="checkbox"/> | Amplifier                                        | TESTEK            | TK-PA18H              | 200104-L        | 2026.05.23 |
| <input checked="" type="checkbox"/> | Horn ANT                                         | Schwarzbeck       | BBHA9170              | 01188           | 2026.03.20 |
| <input type="checkbox"/>            | Horn ANT                                         | Schwarzbeck       | BBHA9170              | 01189           | 2026.03.20 |
| <input checked="" type="checkbox"/> | AMPLIFIER                                        | TESTEK            | TK-PA1840H            | 220105-L        | 2026.03.17 |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER                                | ROHDE & SCHWARZ   | ESW44                 | 101952          | 2026.03.17 |
| <input checked="" type="checkbox"/> | Test Receiver                                    | ROHDE & SCHWARZ   | ESR7                  | 101616          | 2026.06.25 |
| <input checked="" type="checkbox"/> | TWO LINE V-NETWORK                               | ROHDE & SCHWARZ   | ENV216                | 102596          | 2026.04.14 |
| <input checked="" type="checkbox"/> | PULSE LIMITER                                    | lignex1           | EPL-30                | NONE            | 2026.01.04 |



## 5. Antenna Requirement

According to §15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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.

According to §15.247(b)(4) e conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 5.1 Result

#### Complies

(The transmitter has a PCB Pattern Antenna. The directional peak gain of the antenna is 0.90 dBi.)



## 6. TX Radiated Spurious Emission

### 6.1 Test Setup

Refer to the APPENDIX I.

### 6.2 Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

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

| Frequency (MHz) | Limit (uV/m)  | Measurement Distance (meter) |
|-----------------|---------------|------------------------------|
| 0.009 ~ 0.490   | 2400/F (kHz)  | 300                          |
| 0.490 ~ 1705    | 24000/F (kHz) | 30                           |
| 1705 ~ 30.0     | 30            | 30                           |
| 30 ~ 88         | 100 **        | 3                            |
| 88 ~ 216        | 150 **        | 3                            |
| 216 ~ 960       | 200 **        | 3                            |
| Above 960       | 500           | 3                            |

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 – 72 MHz, 76 – 88 MHz, 174 – 216 MHz or 470 – 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.



According to § 15.205(a) and (b), only spurious emissions are permitted in any of  
The frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz           |
|---------------------|-----------------------|-----------------|---------------|
| 0.009 ~ 0.110       | 16.42 ~ 16.423        | 399.90 ~ 410    | 4.5 ~ 5.15    |
| 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.            | 1435 ~ 1626.5   | 9.0 ~ 9.2     |
| 4.20725 ~ 4.20775   | 25.73 ~ 74.6          | 1645.5 ~ 1646.5 | 9.3 ~ 9.5     |
| 4.17725 ~ 4.17775   | 74.8 ~ 75.2           | 1660 ~ 1710     | 10.6 ~ 12.7   |
| 6.215 ~ 6.218       | 108 ~ 121.94          | 1718.8 ~ 1722.2 | 13.25 ~ 13.4  |
| 6.26775 ~ 6.26825   | 149.9 ~ 150.05        | 2200 ~ 2300     | 14.47 ~ 14.5  |
| 6.31175 ~ 6.31225   | 156.52475 ~ 156.52525 | 2310 ~ 2390     | 15.35 ~ 16.2  |
| 8.291 ~ 8.294       | 156.7 ~ 156.9         | 2483.5 ~ 2500   | 17.7 ~ 21.4   |
| 8.362 ~ 8.366       | 162.0125 ~ 167.17     | 2690 ~ 2900     | 22.01 ~ 23.12 |
| 8.37625 ~ 8.38675   | 3345.8 ~ 3358         | 3260 ~ 3267     | 23.6 ~ 24.0   |
| 8.41425 ~ 8.41475   | 3600 ~ 4400           | 3332 ~ 3339     | 31.2 ~ 31.8   |
| 12.51975 ~ 12.52025 | 3345.8 ~ 3358         | 240 ~ 285       | 36.43 ~ 36.5  |
| 12.57675 ~ 12.57725 | 3600 ~ 4400           | 322 ~ 335.4     | Above 38.6    |
| 13.36 ~ 13.41       |                       |                 |               |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.



### 6.3 Test Procedure for Radiated Spurious Emission

1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3.75 meter away from the interference-receiving antenna.
3. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.
4. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
5. For each suspected emission, the EUT was arranged to its worst case and then The antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.  
(The EUT was pre-tested with three axes (X, Y, Z) and the final test was performed at the worst case.)
6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 10 dB 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 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.



### Measurement Instrument Setting

1. Frequency Range: Below 1 GHz  
RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak
2. Frequency Range: Above 1 GHz  
Peak Measurement  
RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto,  
Trace mode = Max Hold until the trace stabilizes  
  
Average Measurement  
RBW = 1MHz, VBW  $\geq 1/T$ , Detector = Peak, Sweep Time = Auto,  
Trace Mode = Max Hold until the trace stabilizes

## 6.4 Test Result

### 9 kHz ~ 25 GHz Data (Modulation: GFSK)

#### ● Low frequency

| Frequency<br><br>(MHz) | Reading   |       | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |      | Result    |      | Margin |      |
|------------------------|-----------|-------|------|-------------|--------------|-----------|------|-----------|------|--------|------|
|                        | (dBuV/m)  |       |      |             |              | (dBuV/m)  |      | (dB)      |      |        |      |
|                        | AV / Peak |       |      |             |              | AV / Peak |      | AV / Peak |      |        |      |
| 2 385.56               | N/A       | 28.58 | V    | 11.20       | -24.79       | 54.0      | 74.0 | 15.0      | 39.8 | 39.0   | 34.2 |
|                        |           |       |      |             |              |           |      |           |      |        |      |
|                        |           |       |      |             |              |           |      |           |      |        |      |
|                        |           |       |      |             |              |           |      |           |      |        |      |
|                        |           |       |      |             |              |           |      |           |      |        |      |

#### ● Middle frequency

| Frequency | Reading   |  | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |  | Result    |  | Margin    |  |
|-----------|-----------|--|------|-------------|--------------|-----------|--|-----------|--|-----------|--|
|           | (dBuV/m)  |  |      |             |              | (dBuV/m)  |  | (dBuV/m)  |  | (dB)      |  |
| (MHz)     | AV / Peak |  |      |             |              | AV / Peak |  | AV / Peak |  | AV / Peak |  |
|           |           |  |      |             |              |           |  |           |  |           |  |
|           |           |  |      |             |              |           |  |           |  |           |  |
|           |           |  |      |             |              |           |  |           |  |           |  |
|           |           |  |      |             |              |           |  |           |  |           |  |
|           |           |  |      |             |              |           |  |           |  |           |  |

#### ● High frequency

| Frequency | Reading   |       | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |      | Result    |      | Margin    |      |
|-----------|-----------|-------|------|-------------|--------------|-----------|------|-----------|------|-----------|------|
|           | (dBuV/m)  |       |      |             |              | (dBuV/m)  |      | (dBuV/m)  |      | (dB)      |      |
|           | AV / Peak |       |      |             |              | AV / Peak |      | AV / Peak |      | AV / Peak |      |
| 2 484.89  | N/A       | 31.36 | V    | 10.94       | -24.79       | 54.0      | 74.0 | 17.5      | 42.3 | 36.5      | 31.7 |
|           |           |       |      |             |              |           |      |           |      |           |      |
|           |           |       |      |             |              |           |      |           |      |           |      |
|           |           |       |      |             |              |           |      |           |      |           |      |
|           |           |       |      |             |              |           |      |           |      |           |      |

Note 1: The radiated emissions were investigated 9 kHz to 25 GHz. And no other spurious and harmonic emissions were found above listed frequencies.

Note 2: DCCF(Duty Cycle Correction Factor)

- Time to cycle through all channels =  $\Delta t = T \text{ [ms]} \times 20$  minimum hopping channels, where  $T = \text{pulse width} = 2.880 \text{ ms}$   
 -  $100 \text{ ms} / \Delta t \text{ [ms]} = H \rightarrow$  Round up to next highest integer, to account for worst case,  $H' = 100 / (2.880 \times 20) = 1.74$   
 $\approx 2$

- The Worst Case Dwell Time =  $T \text{ [ms]} \times H' = 2.880 \text{ ms} \times 2 = 5.76 \text{ ms}$

-  $\text{DCCF} = 20 \times \log(\text{The Worst Case Dwell Time} / 100 \text{ ms}) \text{ dB} = 20 \times \log(5.76 / 100) = -24.79 \text{ dB}$

Note 3: Sample Calculation.

Margin = Limit - Result / Peak Result = Peak Reading + TF / Average Result = Peak Reading + TF + DCCF

TF = Ant factor + Cable Loss + Filter Loss - Amp Gain + Distance Factor

Distance Factor =  $20\log(\text{applied distance}/\text{required distance}) = 20\log(3.75\text{m}/3\text{m}) = 1.94$

## 9 kHz ~ 25 GHz Data (Modulation: 8DPSK)

### ● Low frequency

| Frequency<br>(MHz) | Reading   |       | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |      | Result    |      | Margin    |      |
|--------------------|-----------|-------|------|-------------|--------------|-----------|------|-----------|------|-----------|------|
|                    | (dBuV/m)  |       |      |             |              | (dBuV/m)  |      | (dBuV/m)  |      | (dB)      |      |
|                    | AV / Peak |       |      |             |              | AV / Peak |      | AV / Peak |      | AV / Peak |      |
| 2 382.05           | N/A       | 28.53 | V    | 11.20       | −24.79       | 54.0      | 74.0 | 14.9      | 39.7 | 39.1      | 34.3 |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |

### ● Middle frequency

| Frequency<br>(MHz) | Reading   |  | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |  | Result    |  | Margin |  |
|--------------------|-----------|--|------|-------------|--------------|-----------|--|-----------|--|--------|--|
|                    | (dBuV/m)  |  |      |             |              | (dBuV/m)  |  | (dB)      |  |        |  |
|                    | AV / Peak |  |      |             |              | AV / Peak |  | AV / Peak |  |        |  |
|                    |           |  |      |             |              |           |  |           |  |        |  |
|                    |           |  |      |             |              |           |  |           |  |        |  |
|                    |           |  |      |             |              |           |  |           |  |        |  |
|                    |           |  |      |             |              |           |  |           |  |        |  |
|                    |           |  |      |             |              |           |  |           |  |        |  |

### ● High frequency

| Frequency<br>(MHz) | Reading   |       | Pol. | T.F<br>(dB) | DCCF<br>(dB) | Limits    |      | Result    |      | Margin    |      |
|--------------------|-----------|-------|------|-------------|--------------|-----------|------|-----------|------|-----------|------|
|                    | (dBuV/m)  |       |      |             |              | (dBuV/m)  |      | (dBuV/m)  |      | (dB)      |      |
|                    | AV / Peak |       |      |             |              | AV / Peak |      | AV / Peak |      | AV / Peak |      |
| 2 483.51           | N/A       | 37.39 | V    | 10.94       | −24.79       | 54.0      | 74.0 | 23.5      | 48.3 | 30.5      | 25.7 |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |
|                    |           |       |      |             |              |           |      |           |      |           |      |

Note 1: The radiated emissions were investigated 9 kHz to 25 GHz.

Note 2: DCCF(Duty Cycle Correction Factor)

- Time to cycle through all channels =  $\Delta t = T \text{ [ms]} \times 20$  minimum hopping channels, where  $T$  = pulse width = 2.880 ms  
-  $100 \text{ ms} / \Delta t \text{ [ms]} = H \rightarrow$  Round up to next highest integer, to account for worst case,  $H' = 100 / (2.880 \times 20) = 1.74$

$\approx 2$

- The Worst Case Dwell Time =  $T \text{ [ms]} \times H' = 2.880 \text{ ms} \times 2 = 5.76 \text{ ms}$

-  $DCCF = 20 \times \log(\text{The Worst Case Dwell Time} / 100 \text{ ms}) \text{ dB} = 20 \times \log(5.76 / 100) = -24.79 \text{ dB}$

Note 3: Sample Calculation.

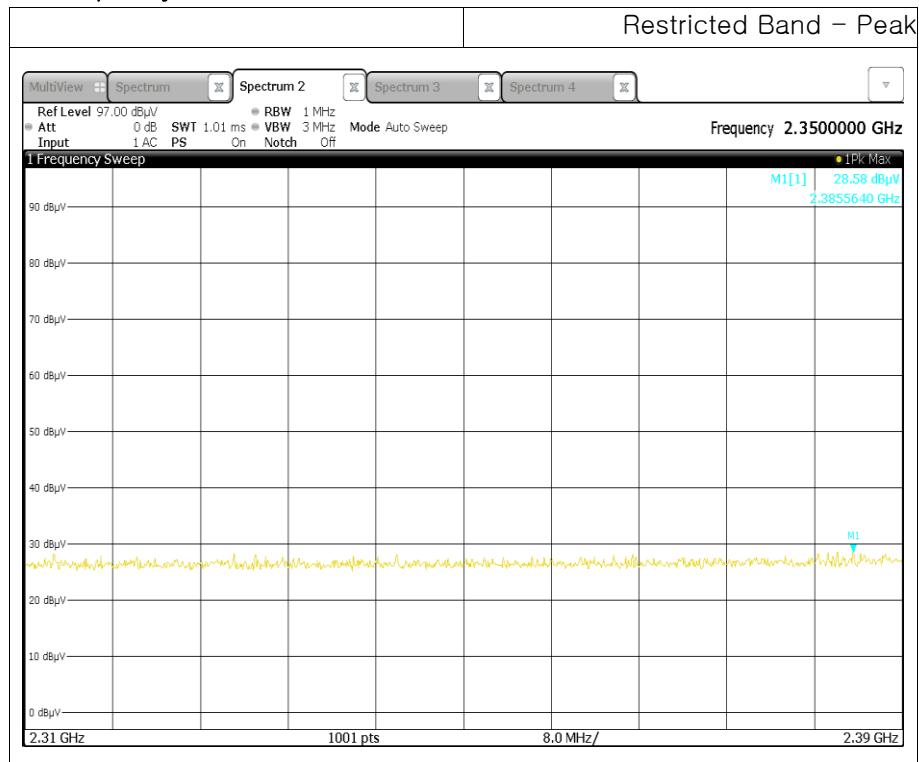
Margin = Limit - Result / Peak Result = Peak Reading + TF / Average Result = Peak Reading + TF + DCCF

TF = Ant factor + Cable Loss + Filter Loss - Amp Gain + Distance Factor

Distance Factor =  $20\log(\text{applied distance}/\text{required distance}) = 20\log(3.75\text{m}/3\text{m}) = 1.94$

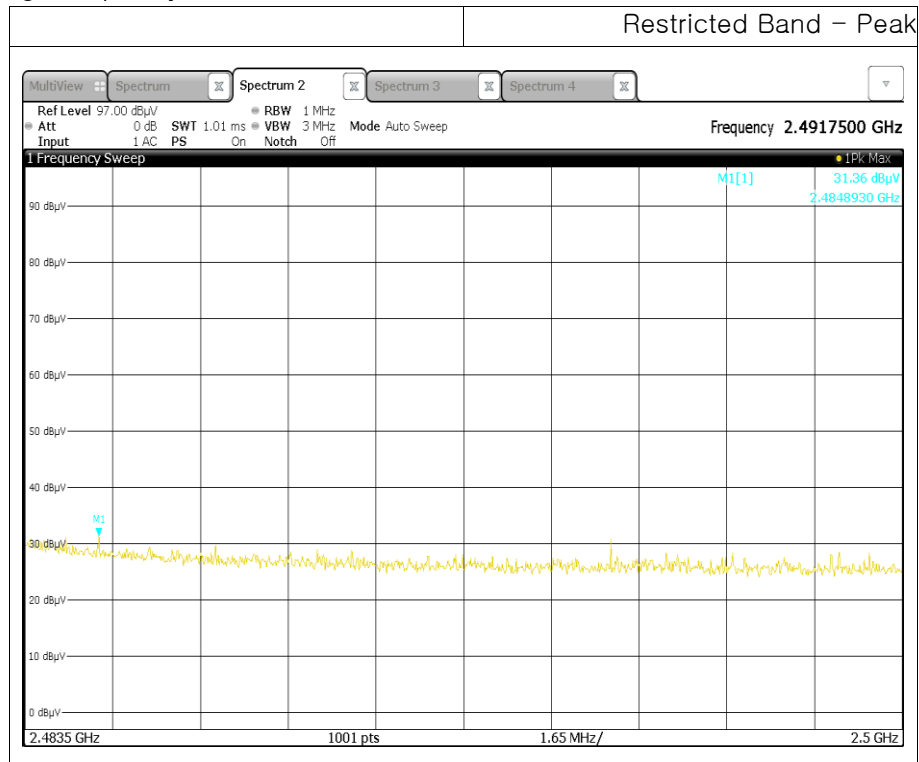
## 6.5 Test Plot for Radiated Spurious Emission

- GFSK \_ Low frequency

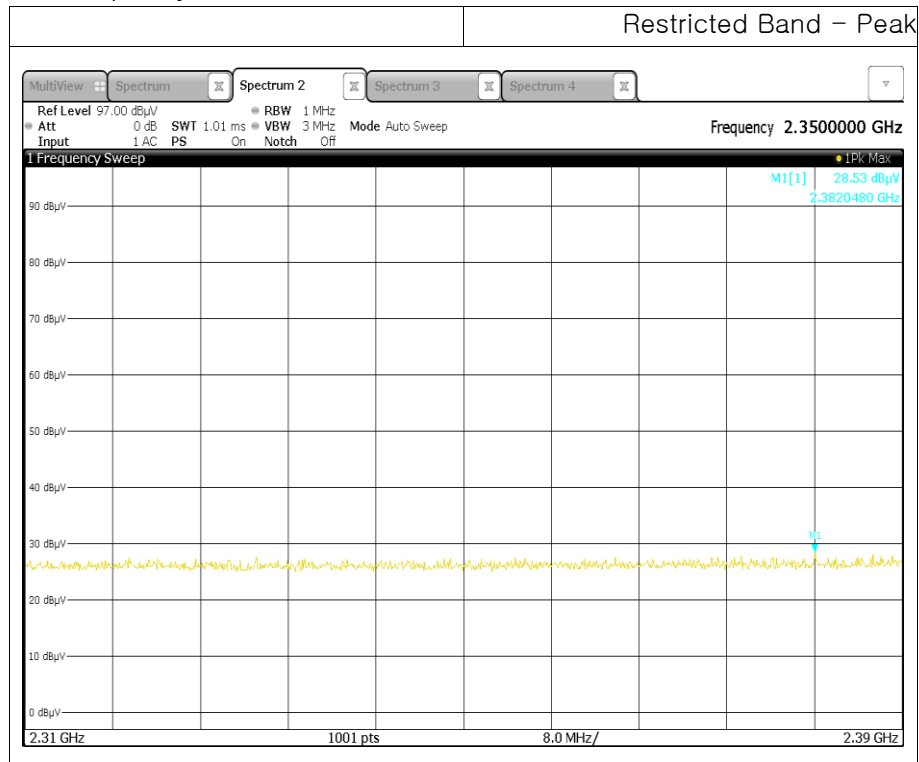




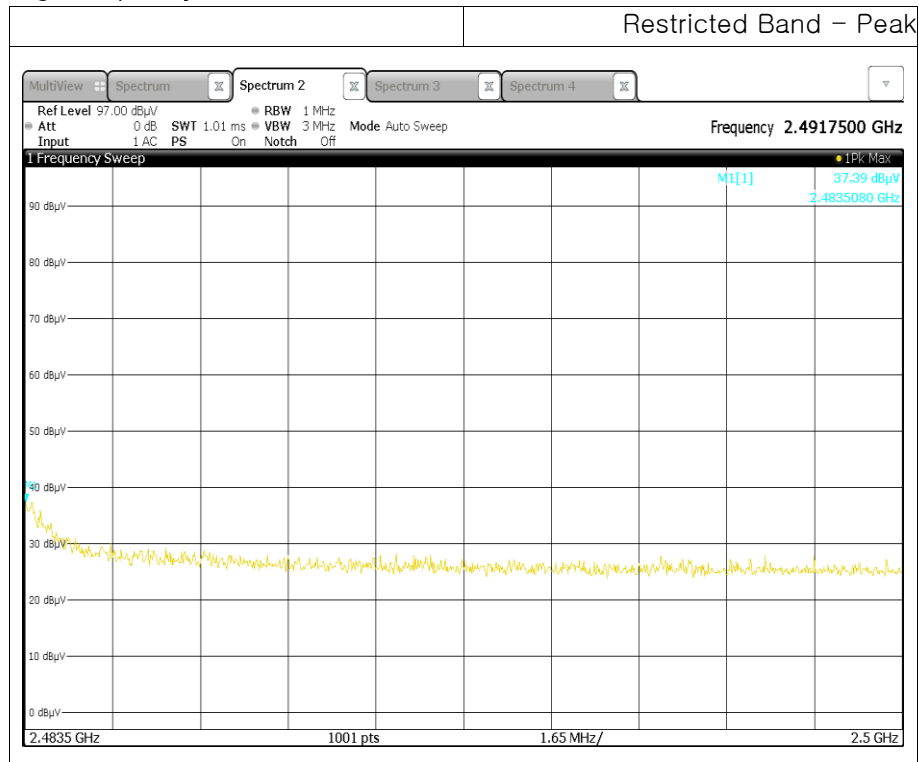
- GFSK \_ High frequency



## ● 8DPSK \_ Low frequency



## ● 8DPSK \_ High frequency



□

## 7. Conducted Emission

### 7.1 Test Setup

See test photographs for the actual connections between EUT and support equipment.

### 7.2 Limit

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

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

| Frequency Range (MHz) | Conducted 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

### 7.3 Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10.

1. The test procedure is performed in a 6.5 m  $\times$  3.5 m  $\times$  3.5 m (L  $\times$  W  $\times$  H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W)  $\times$  1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

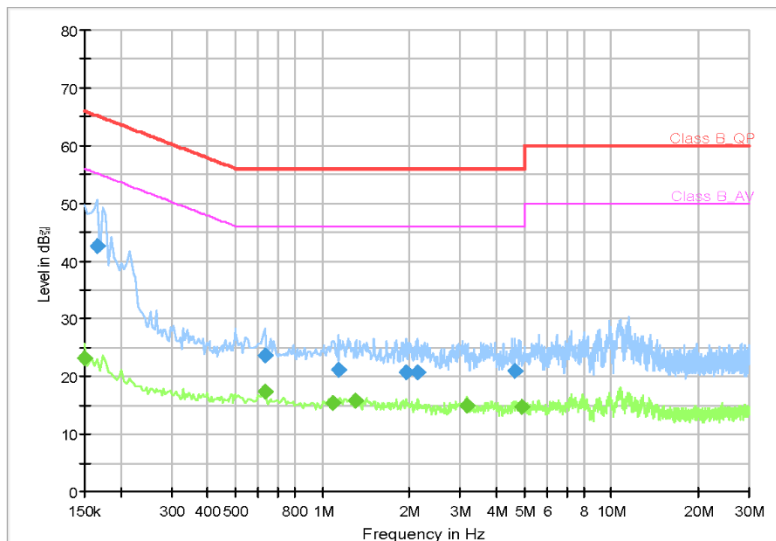


## 7.4 Test Result

- AC Line Conducted Emission (Graph)

WiFiCom Squad\_Charging Mode\_L1

### Conducted Emission

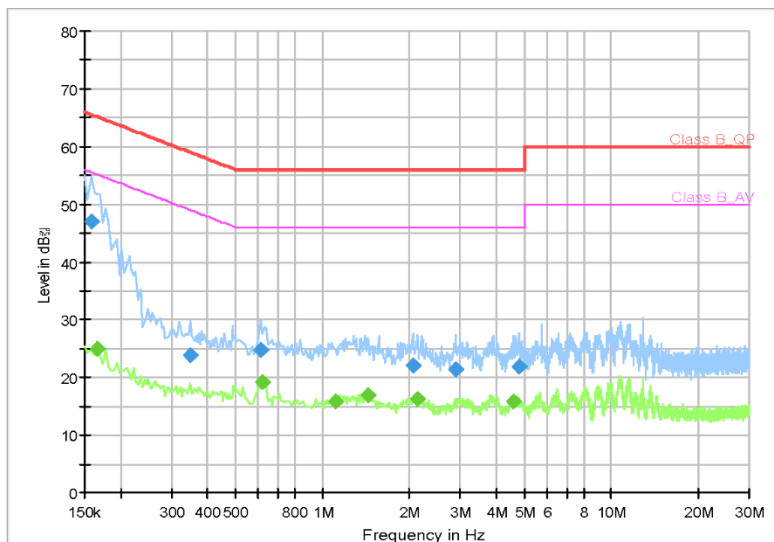


### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|------|------------|
| 0.150           | ---              | 23.19           | 56.00        | 32.81       | 9               | L1   | 19.4       |
| 0.166           | 42.59            | ---             | 65.16        | 22.57       | 9               | L1   | 19.7       |
| 0.630           | ---              | 17.30           | 46.00        | 28.70       | 9               | L1   | 19.7       |
| 0.630           | 23.59            | ---             | 56.00        | 32.41       | 9               | L1   | 19.7       |
| 1.090           | ---              | 15.44           | 46.00        | 30.56       | 9               | L1   | 19.7       |
| 1.130           | 21.26            | ---             | 56.00        | 34.74       | 9               | L1   | 19.7       |
| 1.300           | ---              | 15.76           | 46.00        | 30.24       | 9               | L1   | 19.7       |
| 1.950           | 20.78            | ---             | 56.00        | 35.22       | 9               | L1   | 19.6       |
| 2.140           | 20.72            | ---             | 56.00        | 35.28       | 9               | L1   | 19.6       |
| 3.180           | ---              | 14.86           | 46.00        | 31.14       | 9               | L1   | 19.6       |
| 4.630           | 20.85            | ---             | 56.00        | 35.15       | 9               | L1   | 19.7       |
| 4.910           | ---              | 14.74           | 46.00        | 31.26       | 9               | L1   | 19.7       |

WiFiCom Squad\_Charging Mode\_N

## Conducted Emission



### Final Result

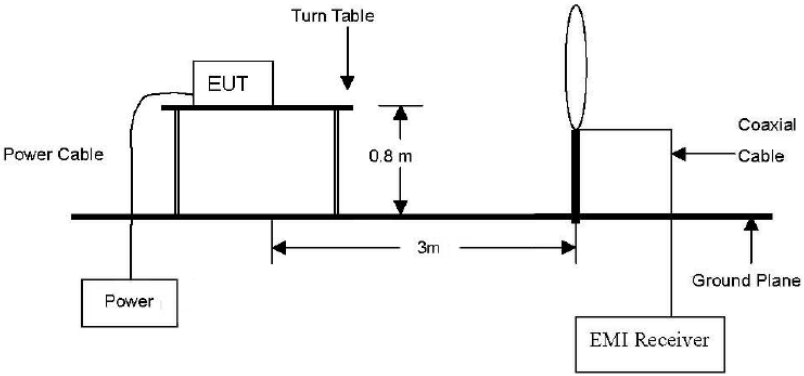
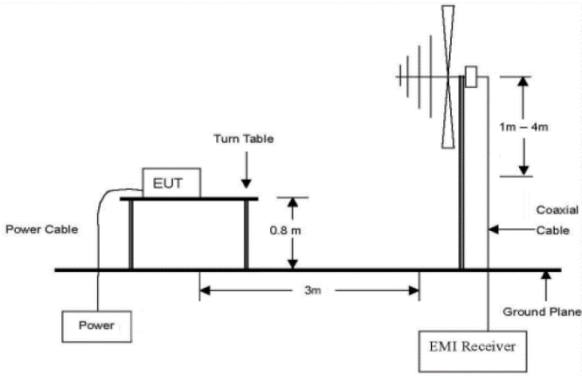
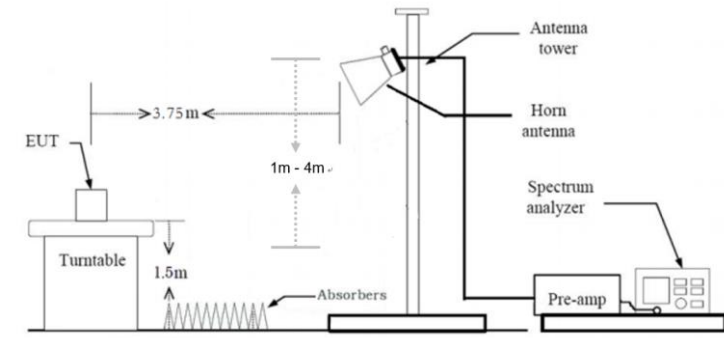
| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|------|------------|
| 0.158           | 47.05            | ---             | 65.57        | 18.52       | 9               | N    | 19.5       |
| 0.166           | ---              | 24.87           | 55.16        | 30.29       | 9               | N    | 19.7       |
| 0.350           | 23.92            | ---             | 58.96        | 35.04       | 9               | N    | 19.5       |
| 0.610           | 24.71            | ---             | 56.00        | 31.29       | 9               | N    | 19.7       |
| 0.620           | ---              | 19.09           | 46.00        | 26.91       | 9               | N    | 19.7       |
| 1.110           | ---              | 15.89           | 46.00        | 30.11       | 9               | N    | 19.7       |
| 1.440           | ---              | 16.94           | 46.00        | 29.06       | 9               | N    | 19.6       |
| 2.060           | 22.06            | ---             | 56.00        | 33.94       | 9               | N    | 19.6       |
| 2.140           | ---              | 16.30           | 46.00        | 29.70       | 9               | N    | 19.6       |
| 2.890           | 21.39            | ---             | 56.00        | 34.61       | 9               | N    | 19.6       |
| 4.580           | ---              | 15.87           | 46.00        | 30.13       | 9               | N    | 19.7       |
| 4.780           | 21.89            | ---             | 56.00        | 34.11       | 9               | N    | 19.7       |

## APPENDIX I

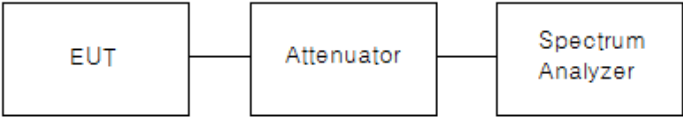
### TEST SETUP



## ● Radiated Measurement

|              |                                                                                      |
|--------------|--------------------------------------------------------------------------------------|
| below 30 MHz |    |
| below 1 GHz  |   |
| above 1 GHz  |  |

## ● Conducted Measurement

|           |                                                                                      |
|-----------|--------------------------------------------------------------------------------------|
| Conducted |  |
|-----------|--------------------------------------------------------------------------------------|

## APPENDIX II

### UNCERTAINTY



| Measurement Item            | Expanded Uncertainty<br>$U = kU_c (k=2)$ |
|-----------------------------|------------------------------------------|
| Radiated Spurious Emissions | 5.82 dB                                  |
| Conducted Emissions         | 2.00 dB                                  |